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# Ethiopia

## Well-Being and Poverty in Ethiopia

### The Role of Agriculture and Agency

July 18, 2005

Poverty Reduction and Economic Management 2 (AFTP2)  
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*GOVERNMENT FISCAL YEAR: July 8-July 7*

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*Currency Unit = Birr (ETB)*

*US\$1.00 = ETB 8.67 (July 18, 2005)*

*Weights and Measures*

*Metric System*

## **ABBREVIATIONS AND ACRONYMS**

ADLI	Agricultural Development-Led Industrialization
BMI	Body Mass Index
CB	Capacity Building
CEM	Country Economic Memorandum
CPI	Consumer Price Index
CPIA	Country Policy and Institutional Assessment
CSA	Central Statistical Authority
CSR	Country Status Report
DAG	Development Assistance Group
DAP	Diammoniumphosphate
DBS	Donor Budget Support
DHS	Demographic and Health Survey
EA	Enumeration Area
EDRI	Economic Development and Research Institute
EMIS	Education Management Information System
EMTPS	Extension Management Training Plots
EPRDF	Ethiopian People's Revolutionary Democratic Front
ERHS	Ethiopian Rural Household Surveys
ESW	Economic and Sector Work
ETB	Ethiopian Birr
EUHS	Ethiopian Urban Household Surveys
FAO	Food and Agriculture Organization
FDRE	Federal Democratic Republic of Ethiopia
GDP	Gross Domestic Product
GoE	Government of Ethiopia
HAZ-scores	Height for Age Z-scores
HICES	Household, Income, Consumption and Expenditure Survey
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immuno Deficiency Syndrome
ICP	International Comparison Project
ICRGE	International Country Risk Guide Economic indicators
IFPRI	International Food Policy Research Institute
kg/ha	Kilogram/hectare
LBW	Low-birth-weight
LG	Local Government
MDGs	Millennium Development Goals
MEDaC	Ministry of Economic Development and Cooperation

M&E	Monitoring and Evaluation
MoE	Ministry of Education
MoFED	Ministry of Finance and Economic Development
MoH	Ministry of Health
MP	Member of Parliament
MTNSP	Medium Term National Statistical Program
NGOs	Non-Governmental Organizations
ODA	Official Development Assistance
P <sub>0</sub> , P <sub>1</sub> , P <sub>2</sub>	Poverty headcount, poverty gap, poverty gap squared
PADETES	Participatory Demonstration and Training Extension System
PAN	Poverty Action Network
PER	Public Expenditure Review
PPA	Participatory Poverty Assessment
PPD MoH	Program and Planning Department, Ministry of Health
PPP	Purchasing Power Parity
PRSC	Poverty Reduction Support Credit
PSCAP	Public Service Delivery Capacity Building Program
PTR	Pupil/Teacher Ratio
SDPRP	Sustainable Development and Poverty Reduction Program
SDPRS	Sustainable Development and Poverty Reduction Strategy
SG 2000	Sasakawa-Global 2000
SNNPR	Southern Nations Nationalities and People Regional State
SSA	Sub-Saharan Africa
TFR	Total Fertility Rate
UNOCHA	UN Office for the Coordination of Human Affairs
VCT	Voluntary Counseling and Testing
WB	World Bank
WDI	World Development Indicators
WMS	Welfare Monitoring Survey
WMU	Welfare Monitoring Unit

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## EXECUTIVE SUMMARY

1. **Study objective.** A decade and a half of relative peace and political stability, broad economic reforms, and far-reaching political decentralization have brought Ethiopia back from one of its lowest levels of income per capita to one of its highest levels over the past forty years. At the same time, GDP per capita today is still only slightly above the levels reached in the early 1970s, underscoring the deep-rooted and complex nature of poverty in Ethiopia. The positive developments at the macro level obviously beg the questions of how well the Ethiopian people themselves fared during this period and what can be done to improve their lives further. These are the two overarching questions this study attempts to address, with a larger emphasis on the analysis of the relative importance of the different determinants of people's well-being and its policy implications in light of the upcoming revision of Ethiopia's Sustainable Development and Poverty Reduction Strategy (SDPRP). In particular, the study seeks to identify areas of intervention to improve people's well-being which currently appear promising at the margin and to provide the micro behavioral foundations for developing sector specific policies. For a comprehensive treatment of the challenges and opportunities related to the different sectors, the study refers to the World Bank Country Status Reports on Health, Education and Rural Development. The particular role of population growth in poverty reduction and the importance of effective population interventions are addressed in a separate piece of Economic Sector Work.

2. **Methodological approach.** To examine how Ethiopians fared over the past decade and a half, the report takes both a utilitarian and capabilities approach, and explores progress on monetary and non-monetary indicators of well-being, i.e. measures of income or consumption, human capabilities and empowerment. It looks in particular at people's current poverty status, their vulnerability, i.e. their prospect of being poor in the future, and the evolution of inequality in Ethiopian society. The findings reported here are grounded in careful economic and micro-econometric analysis of mostly nationally representative, but also purposively sampled household data, along with secondary data, much of which has been made available for the first time by the government. In doing so, the report seeks to complement the Poverty Profile of Ethiopia published by the Ministry of Finance and Economic Development, Government of Ethiopia (GoE) in 2002 and also hopes to illustrate how the extremely rich information base in Ethiopia can be further used to address important and pressing policy questions.

3. **Information base.** The study has particularly drawn on the 1995 and 1999 Household, Income, Consumption and Expenditure Survey (HICES), the accompanying Welfare Monitoring Survey (WMS), the 1994-2000 Agricultural Sample Surveys, the 2000 Demographic and Health Survey and the 1999 National Labor Force Survey. The GoE is currently undertaking another round of the HICES and WMS surveys and has launched a national participatory poverty assessment in the fall of 2004. Unfortunately, the insights from both surveys were not available in time for inclusion in this report, but will provide the basis for follow up analysis. The insights from the available nationally representative surveys are complemented with information from secondary sources and the findings from analyzing a panel of 1,500 rural households spanning 1994-1999 in 15 purposively selected villages and a panel of 1,500 urban households in the major urban centers covering the same time period.

Both surveys have been conducted by Addis Ababa University and its collaborating institutions. The study further builds upon and cross references several other economic studies conducted by World Bank teams such as the World Bank Country Economic Memorandum and the World Bank Country Status Reports mentioned above.

4. **Striking statistics.** While it is neither our intent, nor indeed possible, to capture the complex reality of people's livelihoods in a series of statistics, the following broad findings, each of which need further qualification, are worth highlighting before discussing the overall insights and recommendations of the report. They epitomize key features of people's environment and their daily struggle to survive:

- Risk permeates life in Ethiopia, and shocks can have long lasting damaging effects. *"Households that reported to have suffered substantially more during the 1984/85 famine continued to experience two to three percent less annual growth per capita between 1989 and 1997 compared to those that suffered substantially less."*
- Remoteness defines daily life in rural Ethiopia. *"Only 13 percent of the rural population has a radio, three times less than the Sub Saharan African average, and 87 percent of the rural population are not exposed to mass media (radio, TV, newspaper) at least once a week. Households are on average 10 kilometers away from a dry weather road and, more importantly, 18 kilometers from public transport services. Eighty-five percent of the rural population has been continuously residing in the same district (woreda) as they were born, i.e. without ever having lived elsewhere. Clearly, physical and informational isolation combine to exclude the Ethiopian population from exposure to new ideas and influences."*
- Soil nutrient depletion continues at a fast rate. *"Preliminary estimates suggest that the annual phosphorus and nitrogen loss nationwide due to dung removal is roughly equivalent to the total amount of commercial fertilizer annually applied."*
- A significant number of poor Ethiopian households are net cereal buyers. *One in five rural Ethiopian households lives on less than 0.08 ha per person<sup>1</sup>, which yields on average only slightly more than half the daily cereal caloric needs per person, given current cereal production technologies used in Ethiopia. A land poor class living on hunger plots is rapidly emerging, with evidence of engagement in multiple off-farm activities as a coping strategy."*
- Gender inequalities are pronounced. *"Rural girls are 12 percent less likely than boys to be enrolled in school. In other words, one million people are denied schooling merely on the basis of their gender. Domestic violence is a deeply rooted, culturally accepted practice, with 85 percent of Ethiopian women believing that a husband is justified in beating his wife for at least one of the following reasons: burning food, arguing with him, going out without telling him, neglecting the children, or refusing sexual relations."*
- High returns to education especially for women and access to information provide hope. *"An additional grade of primary schooling for male and female adults would increase consumption by 1.4 and 1.7 percent respectively. This corresponds to one year of economic growth at its average pace since 1991. The recent increase in investment in primary schooling for boys and girls by the government thus holds hope for people's future well-being. There also appear important returns to access to information*

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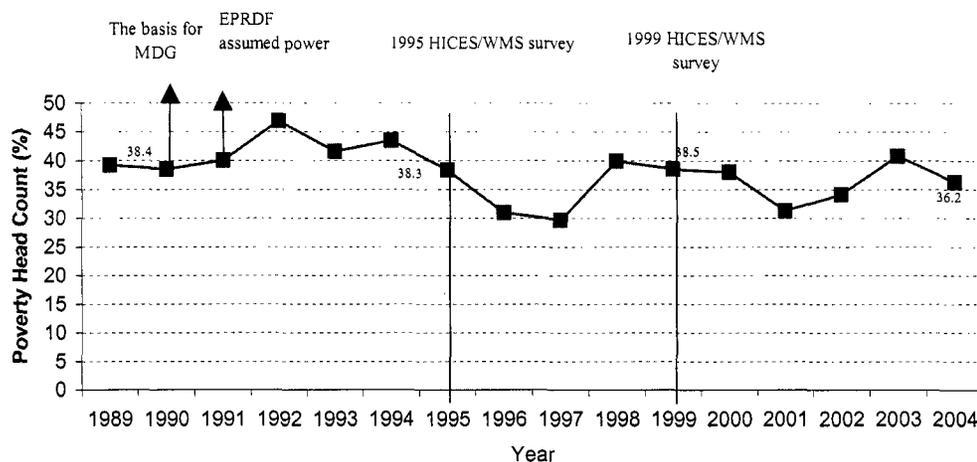
<sup>1</sup> This average excludes SNNPR where many farmers grow and consume enset as well as coffee, and average land size per household is even lower.

with rural households with a radio estimated to be 17.5 percent better off than those without. Moreover, an increase in the proportion of households in a community owning a radio by ten percentage points is estimated to increase households' consumption in these communities by 3.9 percent. This points to the existence of important externalities of access to information.”

### *How well have the Ethiopian people fared?*

5. The micro and macro evidence paint a picture of limited to no decline in consumption poverty incidence since 1992 (see Figure i-a). There is a growing consensus that poverty incidence in urban areas is increasing, while rural poverty incidence may have decreased slightly, by one or two percentage points. Overall, consumption inequality in Ethiopia remains low (Gini=0.29), though inequality in urban areas is on the rise. The reasons behind these broad trends are largely found in the disappointing performance of the agricultural sector, which barely kept up with rural population growth. Whatever poverty reduction occurred in rural areas probably resulted from improved access to services and infrastructure. The government estimated rural poverty incidence in 1999 at 45 percent.

Figure i-a: Evolution of poverty incidence between 1989 and 2004<sup>2,3</sup>



Source: Own calculations

6. This still leaves the question why poverty in urban areas increased despite substantial growth in the service sector. Overall economic growth was indeed largely fuelled by growth

<sup>2</sup> This evolution is obtained by applying the historical sectoral growth rates from the national accounts to the 1995 household consumption levels from the 1995 HICES survey when the poverty headcount was estimated at 38.3 percent. To do so, each household has been classified across the agricultural, industrial or service sector based on the main employment sector of the household head. The poverty levels in 1999 obtained using this methodology are similar to those found in the 1999 HICES survey, which provides confidence in the methodology.

<sup>3</sup> The poverty headcount levels reported in this figure are based on revised poverty calculations. While the reported levels are slightly different from the official numbers, the reported trends across both the 1995 and 1999 survey are similar irrespective of the methodology used.

in the service sector (estimated at seven percent annually) during this period, though its benefits for the urban population were also substantially eroded by urban population growth (estimated at 4.7 percent) following rural-urban migration. Moreover, growth in the service sector was mainly driven by government expansion, with an increase in military expenditures between 1995 and 1999 to finance the border war with Eritrea. While this was followed by a shift out of defense into poverty sectors since 2000, it was probably too early to already feel the positive effects of these more recent investments in the poverty sectors (e.g. doubling of expenditures on education). Also, some of these investments had a deliberate rural bias, consistent with the potential small decline in rural poverty in the absence of agricultural per capita growth. Finally, the observed increase in urban inequality suggests that the benefits from growth in the service sector were unevenly distributed during this period. Urban poverty incidence was officially estimated at 37 percent in 1999.

**7. The slow pace of poverty reduction does not mean that everyone everywhere endured the same fate.** Indeed, the averages hide a substantial amount of churning. Many people move in and out of poverty, often in tandem with annual rainfall patterns. This underscores the immediate impact of rainfall on households' current consumption. Moreover, there are clear signs that the negative effect of severe rainfall shocks often persists over time. For example, households who reported to have suffered substantially more during the 1984/5 famine experienced on average 16 percentage points lower growth in the 1990s, and 10 percent lower than average rainfall in a single year was found to reduce consumption growth rates by one percent four to five years later. Harvest failure proves to be especially harmful for child growth and female enrolment, thereby permanently damaging the earning prospects of the next generation.

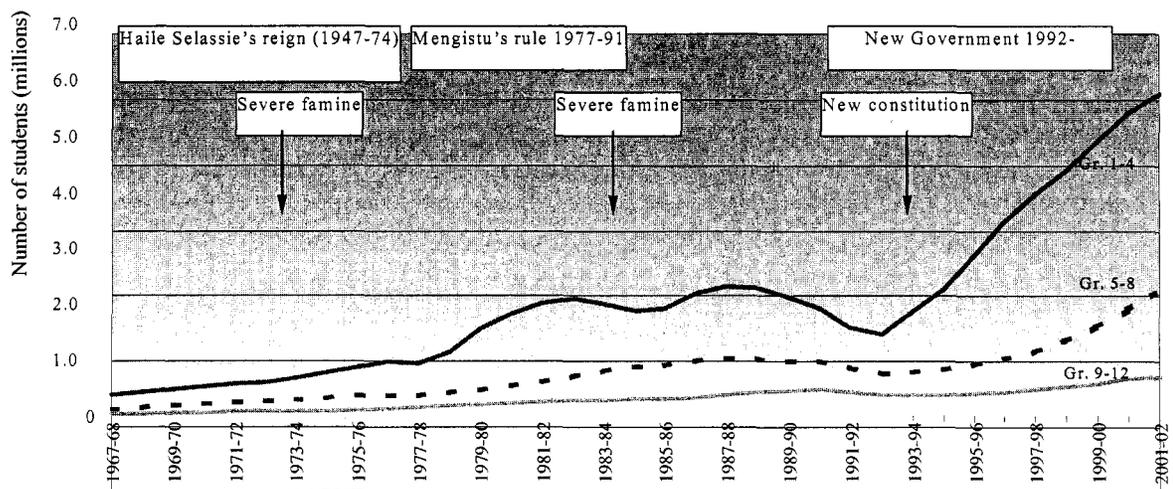
**8. In addition to droughts, HIV/AIDS, and also malaria, continue to present substantial risks to the Ethiopian population.** The prevalence of HIV/AIDS is estimated at 4.4 percent of all adults infected (2.6 percent in rural and 12.6 percent in urban areas) in 2003. The latest estimates further suggest that the rate at which the HIV/AIDS epidemic is progressing, declined over the past years, especially in urban areas, which is in line with observed changes in behavior. Nonetheless, with about 1.5 million people currently infected and an estimated 539,000 AIDS orphans, HIV/AIDS continues to threaten future development and poverty reduction in Ethiopia. While largely neglected, malaria is also a major contributor to the disease burden in Ethiopia, third only to acute respiratory illness and perinatal disease. HIV/AIDS and malaria account for 6.2 and 4.5 percent of child deaths respectively.

**9. Poverty is more prevalent among the uneducated and among agriculturalists.** Poor Ethiopians tend to live in large households and households with high dependency ratios. Households with older heads also tend to be poorer. Urban female headed households appear worse off, though the evidence regarding female headed households in rural areas is somewhat ambiguous. Perhaps the most startling finding is the very strong correlation between educational achievements and poverty, with the marginal returns to education positive and high, both for male and even more so for female adults. Poverty incidence among cash crop producers (especially chat growers) is estimated to be substantially lower than average. However, households growing coffee appeared to be equally poor as the rest of the nation during the 1995 - 1999 period. This is surprising, especially given the coffee price

peaks in 1997 and 1998. More generally, the well-being and livelihoods of coffee growing households is poorly understood and deserves further investigation given the numerical importance of this group (about 30 percent of the rural population grows some coffee) and in light of the recent collapse in international coffee prices.

10. **Human capabilities have substantially improved, albeit from extremely low levels and with a lag in impact on income poverty.** Starting from a low base, Ethiopia's enrolment expansion at all levels of education has been impressive, with the number of students in the first level of primary school (grades 1-4) almost tripling since 1994 (see Figure i-b). National primary gross enrollment in grades 1-4 was estimated at 83 percent in 2000-2001, up from 30 percent in 1994-1995. Yet substantial gender and regional differences remain. Despite some progress, at around 55-60 percent, pre-school child stunting remains among the highest in Sub-Saharan Africa, imposing a substantial drag on the development of the next generation and future economic growth. Under-five child mortality dropped from 216 per 1,000-live births to about 169 between 1984 and 1999-2000. The population share with access to safe water increased from 21 percent to 27 percent between 1995 and 1999. Yet about one-third of households continue to rely on open rivers and lakes as their main source of drinking water. Finally, it should be noted that the difference in progress between people's human assets and their well-being in monetary terms is likely related to the time discrepancy, i.e. the observed progress in human capabilities is not only quite recent, it mainly concerns Ethiopia's children (primary enrollment rates, child mortality, child malnutrition). To strengthen people's human capabilities more rapidly, the government is also promoting adult training and it has recently substantially expanded the number of agricultural and health extension agents. Similarly, adult education (e.g. through adult literacy programs) deserves more attention.

Figure i-b: Enrollments in grades 1-12, Ethiopia, 1967-2002



Source: World Bank, 2004c

11. **Women (but also pastoralists) (40 million people in total) appear particularly disempowered --“The husband’s beating stick is like butter.”**<sup>4</sup> The widespread acceptance of violence against women by women themselves epitomizes the deeply rooted existence of pronounced gender inequalities. Results from a nationally representative household survey conducted in 1999 by the Central Statistical Authority of Ethiopia indicate that 85 percent of women believe that a husband is justified in beating his wife for at least one of the following reasons: burning the food, arguing, going out without telling, neglecting the children, and refusing sexual relations. Moreover, these attitudes seem to be associated with development outcomes: the under-five mortality rate for children of women who do not accept any of the given reasons as justification for abuse is 154 out of 1,000 live births, while for those accepting at least one reason the rate is over 192. The same survey reveals that 60 percent of all women support female circumcision. Women consistently have lower educational attainment than men, with over 75 percent of women having received no education at all (compared to 50 percent of men). With only 6 percent of all rural women exposed to mass media (radio/TV/newspaper) at least once a week (compared to 20 percent of rural men), they are virtually excluded from any outside information and thus other perspectives on life. They have little representation in decision making positions. Nonetheless, as illustrated in Picture 11.1, p. 217, sporadic civic reaction to violence against women is emerging. While there is less quantitative evidence on pastoralists’ disadvantaged position, it is recognized.

12. **More broadly, the full effects of government reform and action to empower citizens have yet to be fully felt by citizens and sub-regional governments.** The GoE has committed itself through the Constitution and the SDPRP to the empowerment of citizens through decentralization. In addition, specific laws, policies and initiatives have been launched to address the position of women and pastoralists. However, transitional processes have moved slowly, meaning that the potential effects of the GoE’s efforts are not yet fully realized. Partly as a result of this, the strength of informal, traditional practices persists at the community level, where resistance to change represents a tremendous impediment to opening opportunities, particularly for traditionally disempowered people such as women and pastoralists. Moreover, the shift from an historically deep-rooted political culture favoring a strong role for the federal level government to devolving real power to local government and people is difficult to bring about. As a result, opportunities for meaningful participation of Ethiopian citizens in governance and political life to shape their lives are currently few. This is further exacerbated by the few resources Ethiopian citizens can claim access to, and their immobility and isolation from the outside world, limiting the extent to which they are able to take action to improve their own lives.

### ***Households start from an extremely low endowment base***

13. **Ethiopia’s private endowment base is extremely low and has largely remained so over the past decade.** While the educational status of Ethiopia’s population has been steadily improving over the past decade, educational attainment remains limited. Male adults completed on average only 1.8 grades; female adults only 0.88 grades. Disease and malnutrition further erode labor productivity. Land pressure has increased tremendously over the past decades, with average landholdings declining from 0.5 ha per person in the 1960s to

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<sup>4</sup> Saying in Amharic.

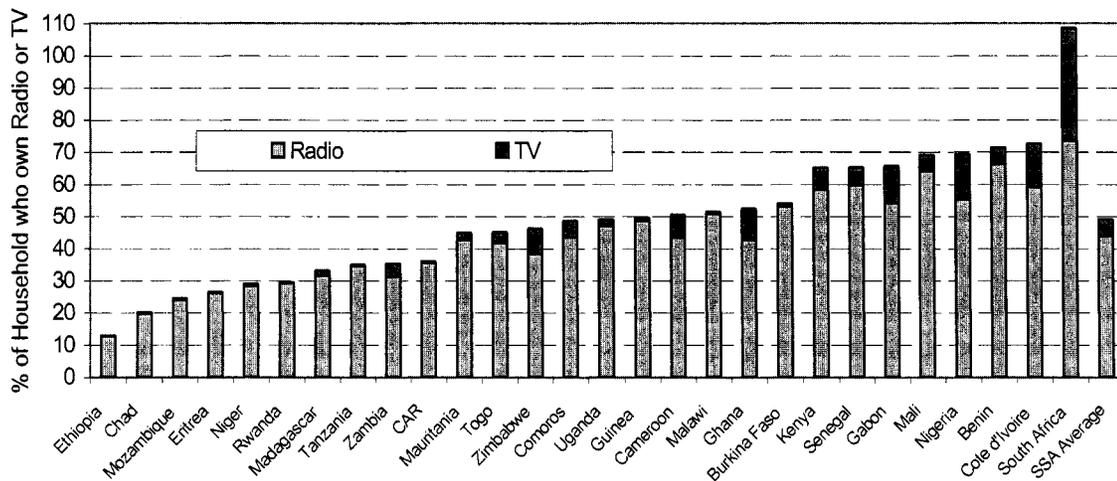
0.11 ha per person in 1999. While about 40 percent of the population have at least one ox, only 30 percent have two, the number necessary for an ox-span to plough the fields.

14. **A land poor class living on “hunger” plots has emerged.** Since the land reform under the Derg regime, Ethiopian agriculture is essentially characterized by smallholder farming. Nonetheless, land inequality is high (Gini=0.47). This does not follow from the existence of a small class of large landowners, but is rather the result of the continuous fragmentation of landholdings and the emergence of a rapidly growing group of people living on “hunger plots”. For example, given current technology, about one fifth of all rural households (excluding SNNPR) do not manage to produce half of their annual cereal caloric needs from their plots, despite being mainly dependent on agriculture.

15. **Soil nutrient depletion and environmental degradation appear to be substantial.** The most important source of cooking fuel is firewood, used by almost 75 percent of households. About one in six households uses mainly dung cakes as a source of cooking fuel, resulting in a continuous depletion of the soil at alarming rates. Preliminary estimates suggest that the annual phosphorus and nitrogen loss nationwide due to dung removal is about equivalent to the total amount of commercial fertilizer annually applied. While the extent to which the nutrient content of dung translates into actual alimentionation of the soil with phosphorus and nitrogen depends critically on the handling of the dung and the cultivation methods, these results are sufficiently large to warrant a much closer investigation of the effect of dung collection on agricultural productivity and poverty. In addition to soil nutrient depletion, soil run-off also poses an important environmental threat, with experiments in Tigray indicating that soil loss could be substantially decreased through stone bunds (on average by 68 percent).

16. **Remoteness epitomizes daily life in rural Ethiopia.** Rural households are on *average* 10 kilometers away from a dry weather road and 18 kilometers from any public transport, rendering people immobile. Indeed, 85 per cent of the rural population live in the same area (woreda) as they were born, without ever having moved. Only 13 percent of the rural population has a radio, the lowest incidence in Sub-Saharan Africa (see Figure i-c), exemplifying the sheer disconnect of Ethiopian’s population from the rest of the world, not only in terms of market access, but also in terms of access to information.

**Figure i-c: Incidence of radio and TV ownership among rural households in selected Sub-Saharan African countries, 1995-2001**



Note: Incidence of radio ownership is added to incidence of TV ownership. As a result, total incidence can reach up to 200 % maximum.

Source: Own calculations from 1995-2001 DHS surveys

17. **Risk and drought shocks have severe and long lasting effects on poverty.** *Ceteris paribus*, households in areas characterized by larger rainfall fluctuations were found to be poorer. The effects of crop damage due to droughts, pests, insects, frosts, or other causes on consumption were substantial. For example, it was estimated that 2.7 percent of consumption per adult equivalent was lost in 1999 due to crop damage, a year characterized by average rainfall. This corresponds to about 1.5 years of GDP growth per capita at its historic rate. Moreover, not only are households unable to protect their consumption from continuously recurring shocks, but the effect of these shocks are often long lasting. Micro-econometric evidence shows that households that suffered substantially during the 1984-1985 drought, which resulted in a nationwide famine, continued to experience two to three percentage points less annual per capita growth during the 1990s than those who weren't hit as hard. Although there is little evidence that short-term illness affects incomes and consumption, serious illness episodes tend to reduce consumption substantially.

18. **Fluctuations in consumption due to shocks also have important gender dimensions**, with men typically experiencing less severe fluctuations in their welfare than women. Furthermore, the experience of an income shock leads parents to disinvest in their children's schooling, especially their daughters'. Households with half of their plot area damaged were found to be 2.6 percentage points less likely to send their daughter of school-going age to school.

*Livelihoods are agriculture based, but labor productivity in agriculture is low*

19. **Rural households continue to rely heavily on low input, low output, subsistence oriented, rainfed agriculture and agriculture related activities.** Agriculture is responsible for 85 percent of employment, 45 percent of national income, and more than 90 percent of exports. Of the total area under temporary crops in the 1990s, cereals accounted for 88.7 percent. Commercial fertilizer is applied to approximately 40 percent of total farmland under cereals over the past years, and is heavily concentrated on a few cereals (wheat, teff, and maize). Improved seeds are only applied on about five percent of the total cultivated cereal area and pesticides on about seven percent. Less than one percent of the total cultivated area in Ethiopia is irrigated, despite massive fluctuations in rainfall. The limited (and only slowly expanding) use of inputs and modern technology is consistent with the low average yields in cereal production hovering around 1.1-1.2 tons/ha (about one-fifth of the yields observed in Asia since the Green Revolution), as well as the low marginal productivity of labor observed in the data. Ethiopia still finds itself at the very beginning of its structural transformation.

20. **Evidence suggests significant numbers of net cereal buying poor households in rural Ethiopia, an important finding in discussing the food price dilemma.** Micro evidence suggests that in 1996, 53 percent of all rural households were net cereal buyers. Moreover, the bulk of the marketed surplus is produced by a minority of producers. This is consistent with the evidence from other poor SSA countries. Poorer households are more likely to engage in multiple activities as a coping strategy. Especially livestock products, but also business activities (collection of water and fuel wood, artisanal activities, grain trading,) and off-farm wage work (especially food and cash for work) provide sources of cash income to buy food. In addition to the urban (poor) population, these rural households will gain from a (gradual) decline in cereal prices. This is in contrast to the smaller set of poor rural households which are net cereal sellers.

21. **Substantial potential remains for increasing productivity in staple crop production through agricultural intensification, especially in food secure areas.** Based on a review of the available evidence, rough estimates suggest that doubling cereal yields in the more food secure areas and increasing cereal yields by 50 percent in the food insecure areas lie well within the realm of the possible. Much could be gained from better cultivation techniques, broader and joint adoption of both fertilizer and improved seeds, and increasing market access (better access to roads and rural towns) in the more food secure areas, while wider adoption of fertilizer-improved seed packages will have to be especially complemented with the promotion of soil conservation and better water and risk management techniques as well as improved market access in the food insecure areas. Consistently, the government has recently complemented its longer standing extension program, geared at promoting modern input use, with soil conservation programs and rapid expansion of water harvesting. It is also experimenting with broad bed ploughing of vertisols permitting two crops per year and thus potentially a substantial increase in yields.

22. **Nonetheless, to realize the unrealized potential in staple crop production, it will be important to further our understanding of the major factors constraining wider adoption and diffusion of land saving technologies.** The role of political and land tenure security in the adoption of irrigation and environmentally sustainable cultivation practices

respectively, as well as the role of having effective risk management strategies in adopting modern inputs deserve further investigation. Anecdotal and empirical evidence suggests that the demand by poorer households for fertilizer-improved seed packages is limited because of the downside risks involved. Similarly, input delivery systems may have to be made more efficient and demand driven for these strategies to be more effective.

**23. In addition, the low marginal value of labor in terms of additional agricultural income from cereal production, given current landholding size, and the higher marginal value of expanding landholdings, holding labor input constant, suggest the need for complementary policy routes to expand households' income.** As noted, one option is raising marginal productivity of labor and land through agricultural intensification in cereal production. Second, the land frontier could be pushed further and new areas could be exploited, i.e. agricultural extensification. Third, labor productivity could be increased through diversification into non-cereal (tradable) agricultural production. Fourth, land pressure could be reduced and labor productivity enhanced through diversification and migration out of agriculture into highly remunerative non-agricultural activities. The optimal combination will obviously differ across space depending on the region's comparative advantage in terms of agro-ecological potential, and market access as determined by population density and access to infrastructure. Further work to help identify and quantify these optimal combinations across products and space is called for.

#### *A balanced road out of poverty - the role of agriculture and agency*

24. Given the findings noted above, a balanced approach to reduce poverty presents itself. Macroeconomic projections suggest that reaching the MDG of halving poverty incidence by 2015 from its 1990 level will not be possible without buoyant agricultural growth. Simulations indicate that a decade of 4.1 percent agricultural growth would reduce the current poverty head count by about one third. While such growth in agriculture will be necessary to sustain the required growth in the non-agricultural sectors and facilitate the structural transformation with labor shifting out of agriculture into industry and services over time, it will not be sufficient. Enhancement of individual agency and empowerment, both in the economic and social space, and increased foreign aid will be equally necessary to achieve growth with poverty reduction.

#### *Agriculture and rural development*

**25. The contribution of increased agricultural productivity to economic growth and poverty reduction works through consumption and production linkages.** In particular, a productivity increase in non-tradable activities such as cereal production leads to lower prices, effectively increasing consumers' real incomes. There will be important direct gains through decreased food prices for all net cereal buyers, which in most years make up the majority of the Ethiopian population. However, the greatest benefits are to be expected from the consumption linkages, whereby increased demand for locally produced goods and services following the decline of food prices in response to a productivity increase, generates off-farm employment and subsequently increases the demand for food as well. To generate sizeable multiplier effects, the income elasticity for locally produced non-food non-tradables must be large local, supply elastic, and labor intensive. The productivity gain must concern a non-

tradable with a high average budget share such as cereals, which constitute 30 to 40 percent of total expenditures among the poor in Ethiopia. Yet, net cereal sellers could lose if demand is inelastic.

26. **Production linkages can occur when increased productivity or higher prices in the production of tradables positively affect the incomes of producers.** The direct poverty reducing effect may be substantial if assets are equally distributed and access to complementary inputs (e.g. fertilizer, improved seeds) is universal. To maximize the poverty reducing effect, promoted technologies should be scale-neutral and labor intensive. Multiplier effects through backward linkages (increased demand for inputs) are usually limited, since inputs are generally capital intensive and imported. Nonetheless, important externalities may exist through increased local availability of inputs for other (non-cash crop) agricultural activities.

27. **Agricultural extensification has so far been the key force behind growth in agriculture, though its potential to further boost agricultural growth is limited.** Not only has the ongoing expansion of the land frontier not been sufficient for growth in agriculture to keep up with population growth, let alone to sustain growth of 4.1 per cent, the scope for further agricultural extensification is rapidly decreasing, especially in light of continued population growth of 2.5 to three percent per year. Some potential for area expansion remains, in the lowlands, when they become more accessible through malaria and tse-tse fly eradication, and better public services, which are potentially costly. This approach is consistent with the philosophy behind the ongoing resettlement program, though sustainable population movements could be equally achieved through well-functioning labor markets, an area which is still poorly documented and understood in the Ethiopian context.<sup>5</sup>

**Table i a: Cereal yield and input use in food deficit, food balanced and food surplus areas, 2001/02<sup>1)</sup>**

	Food deficit	Food balance	Food surplus
Cereal yield (ton/ha)	1.08	1.19	1.44
Cereal yield using fertilizer only	1.24	1.25	1.44
Cereal yield using fertilizer & improved seed	1.65	2.20	2.63
Absolute difference between using fertilizer & improved seed compared to average cereal yield (ton/ha)	0.57	1.01	1.19
% difference between using fertilizer & improved seed compared to average cereal yield (ton/ha)	53	85	84
Fertilizer use rate in cereals (% area)	29.12	26.40	56.13
Fertilizer combined with seed rate (% area)	3.08	3.15	4.88

<sup>1)</sup> Calculated from Agricultural Census, 2001/02 (Federal Democratic Republic of Ethiopia, Central Statistical Authority).

Source: Diao et al., 2004

<sup>5</sup> This is being addressed in the ongoing Labor Market Study undertaken by the World Bank in collaboration with the GOE.

28. **Agricultural intensification in cereal production through the promotion of increased modern input use will continue to play an important role in raising incomes and reducing poverty.** Given the large share of cereal consumption in (poor) people's budget, and the existence of a substantial group of (poor) net cereal buyers (rural and urban), it will be important to sustain the focus on increasing cereal productivity to prevent cereal prices from rising rapidly which would hurt the poor (as well as many non-poor). Evidence suggests that there is still significant scope for improvement, in particular through increased use of combined modern input packages (fertilizer and improved seeds), and especially in the food secure areas (see Table ia). However, agricultural intensification in cereal production through increased modern input use alone will clearly not suffice and the constraints to further technology adoption (risk management, input delivery systems, market development) must be better understood.

29. **Increasing cereal production in the face of price inelastic cereal demand may lead to large cereal price declines.** When increased production is due to reversible productivity increases (e.g. through the use of fertilizer and improved seeds), large (and undesirable) cereal price fluctuations may follow. Or, when productivity increases are due to irreversible investments (e.g. infrastructure facilitating better water and soil management), it may put cereal producers on a price treadmill whereby producers see the gains from their investments being eroded by lower cereal prices, which will force them to either withdraw from agriculture or engage in another round of productivity increases.

30. **However, these risks must be put in the right context and can also be managed.** First, for the 2000-2002 experience, it is generally agreed that the observed collapse in (especially) maize prices was compounded by food aid mismanagement, with food aid being imported while it could have been locally procured to help support local cereal prices. Clearly there is a role for more effective and non-distortive management of food aid in preventing undesirable cereal price movements: this is currently being pursued under the productive safety nets program. Second, in contrast to maize, the demand for other cereals such as teff and wheat is more sensitive to prices (as is their supply). The observed price collapse in 2000-2002 was indeed the largest for maize. Third, it is important to recognize that for those (rural) poorer households who are net cereal buyers as well as the urban population, declining cereal prices increase their real incomes.

31. **To avoid large price fluctuations and/or a price treadmill in cereals, better food aid management and complementary actions especially in market development and agricultural diversification are needed.** A simultaneous increase in the production and productivity of non-staple tradables (livestock, traditional and non-traditional agricultural export crops), in addition to increased cereal production, can foster production linkages, help generate off-farm employment, and generate demand for food which will prevent food prices from collapsing. A more balanced agricultural growth pattern will also facilitate migration out of the food insecure areas and maximize the linkage effects and thus poverty reduction. To do so, focused interventions in staple and non-staple agriculture such as agricultural research and extension will need to be complemented with market development, i.e. proper incentives for farmers and traders, a facilitating institutional environment, and infrastructure to improve market connectivity.

32. **In addition to diversification across agricultural products, agricultural growth strategies will also need to be spatially diversified.** While there is still some scope for intensification of food/cereal production in the northern dry lands of Ethiopia, this should be complemented with promoting livestock production and tree planting. This underscores the desirability of the broader extension packages currently pursued by the government. Moreover, to successfully intensify food production, promotion of the use of fertilizer and improved seed packages (e.g. for sorghum) will need to be complemented with the adoption of soil conservation structures (e.g. stone terraces) and sustainable land management practices as well as better water and risk management. The current food for work programs when complemented with sufficient technical assistance could be usefully mobilized to help build this infrastructure.

33. In the high potential cereal producing areas of the central and northwestern highlands, a continued focus on intensive cereal production through increased use of input packages is warranted given the existing scope for substantial yield increases. This strategy could be usefully complemented with the development of dairy production in areas closer to urban markets. Continued focus on intensification of food production through improved seeds and fertilizer use, and concerted efforts to increase productivity of coffee production and marketing efficiency hold promise to foster agricultural growth and reduce poverty in the humid high potential perennial zones in the southern and western highlands. In addition to further intensification of cereal crop production, development of the dairy industry in peri-urban areas, tree planting, and the promotion of non-traditional agricultural exports, including floriculture and horticulture products, also hold promise in Central Ethiopia around Addis Ababa, initially without much additional public investment.

34. **Many public investments benefit both agricultural and non-agricultural growth.** While an agricultural led growth strategy does require continued investments in agricultural research and extension and other agriculture specific investments which are not necessarily costly (e.g. soil conservation through stone terracing), many of the necessary investments to foster agricultural growth (both in staple and non-staple crop production) actually lie outside agriculture, such as investments in infrastructure, risk management, education, health, and access to information. As usually both agricultural as well as non-agricultural activity stand to benefit from these investments, the debate about agriculture versus non-agriculture is often ill conceived from this perspective.

35. **Promoting market connectivity through improved access to roads in addition to access to information will be key to stimulate and distribute the benefits from increased agricultural and non-agricultural production.** The micro-evidence shows that access to markets as proxied by distance to urban centers and roads contributes greatly to increased agricultural production and diversification of agriculture into non-food production. For example, in regions which are overall better connected, the estimated elasticity of cereal output to market accessibility (defined as the population size of the nearest town or big market divided by the road distance to this town or market) usually exceeds 1.2. However, the estimated elasticities are much lower for the remote northern regions covered in the same study, which may suggest the existence of infrastructure threshold effects below which the returns to connectivity are limited. Roads bring direct short term employment, generate access to markets and services, facilitate migration and exchange of information and ideas,

and bring long term off-farm employment opportunities. Continued emphasis by the government on expanding especially the rural road network as envisaged in the current road development plans appears warranted. The potential existence of threshold effects should be explored further and subjected to empirical scrutiny.

**36. Policies to strengthen households' asset bases should be supplemented with promoting a broad range of ex-ante and ex-post risk management strategies, also in the food secure areas.** Ex ante options include better water management. The micro evidence on the large immediate and persistent effect of shocks on people's welfare underscores the large benefits of containing any crisis and the critical importance to support those affected by a crisis well beyond the initial crisis period. Moreover, both in food secure and food insecure areas, risks and the absence of efficient tools to cope with shocks ex post may prevent many poorer people from adopting more productive, but higher risk, production technologies such as fertilizer and more remunerative crop portfolios.

**37. A combination of small scale irrigation, weather based insurance and productive safety nets hold promise to help farmers better manage their risks.** Strengthening farmers' capacity to effectively manage their risks could be done either by helping them to better mitigate the effects of shocks (e.g. irrigation, pest and plant disease management) or by increasing their capacity to cope with shocks ex post (e.g. better targeting of food aid in response to shocks, development of weather index based insurance schemes, strengthening of the existing informal insurance schemes, or through contingent transfer programs such as food/cash for work or for education). The cost effectiveness and implementation constraints of each of these interventions needs to be investigated further. The following three interventions deserve particular attention:

- **Supplemental irrigation.** There are compelling reasons for Ethiopia to focus on irrigation in general, and small scale irrigation in particular, for poverty reduction. First, unreliable rainfall is the leading cause of harvest failure and hunger. Second, the availability of new irrigation technologies (low cost drip systems) make small scale irrigation possible, and open up new opportunities for water conservation. Finally, the country already has successful experience with such a strategy: over 66,000 Ethiopians are reported to enjoy higher crop yields due to small scale irrigation through the Ethiopian Social Reconstruction Development Fund. The government has recognized Ethiopia's irrigation potential and has identified water harvesting and small scale irrigation as a key instrument for reducing vulnerability and poverty in the SDPRP. A recent evaluation of the experience in Tigray suggests that household incomes could be substantially increased through investment in rainwater harvesting ponds provided that they are close to the homestead, that they are properly constructed, that households grow high value crops (such as vegetables), and that households receive adequate extension support. Given that poorly planned irrigation programs also introduce their own risks (e.g. increased malaria incidence), the current water harvesting program should be closely monitored and their impact further evaluated. The internal constraints to wider adoption of irrigation techniques should also be better understood, as recent developments in the multi-country dialogue on the development of the Nile Basin open up important opportunities.

- **Weather based insurance:** Irrigation will not be possible for many farmers and rainfed agriculture will continue to be at the core of their livelihoods for years to come. An innovative low-cost risk management tool, which is much less prone to the usual moral hazard issues, is to insure farmers against drought risk through formal contracts with private insurance companies or public institutions. Such contracts insure the contracting party against a specific and objectively verifiable rainfall outcome, e.g. drought, and may be entered into by farmers directly, by credit institutions, or by governments. Such schemes are already available to poor farmers in India, Mexico, and South Africa. There are many ways to deliver this insurance. The contract could stipulate a cash payment to participants upon the realization of the event, or it could (partially) forgive loan repayment on an input (e.g. fertilizer) if the rains fail and thus foster technology adoption. Weather based insurance schemes are currently piloted in Ethiopia.
- **Productive safety nets:** Existing safety nets have saved lives but have been largely unproductive and often not well targeted. Yet they can continue to serve their vital insurance function while being made more productive through a mix of programs aimed at building productive physical and human assets. In particular, guaranteed multi-annual transfers to households in return for participation in public works and targeted health and education programs can: (1) encourage risk-taking behavior among small-holder farmers by insuring against downside risk of consumption loss; (2) build public infrastructure and maintain community assets, which provide complementary inputs to private inputs and improve the productivity of individuals; and (3) promote market development by increasing demand in places that are otherwise too poor.

38. **Remaining institutional and resource obstacles to the generation of off-farm employment and private sector growth must be removed.** While agricultural intensification will generate demand for locally produced goods and services, and thus create local employment, institutional constraints in factor markets must be further addressed to facilitate an appropriate off-farm supply response and maximize the linkage effects. Private sector growth in off-farm activities will also be necessary to sustain robust growth in the non-agricultural sector which has so far been largely fueled by government expansion. While the government has recently introduced new policies in favor of the private sector and has been very active in improving its dialogue with the sector, significant obstacles remain. The World Bank Country Economic Memorandum and the upcoming Investment Climate Assessment present a detailed review of both progress in and continuing constraints to private sector development and off-farm employment generation. A particularly critical issue, which has also been raised during participatory poverty assessments, relates to the availability and cost of urban land to set up a business, both in urban areas and rural towns. While the reform of urban land is now in full swing, progress has been slow and substantial residual uncertainties for private investors persist.

### *Agency*

39. **To further people's well-being it will also be critical to continue to unlock their potential and strengthen their agency and opportunity structure,** as indicated in the SDPRP. Strengthening people's agency will require large improvements in their human

capabilities (being well educated, healthy, and well-nourished) as well as in their access to informational resources, over and above the need to substantially increase their incomes and material and financial resources. In the face of continued poor performance on voice and accountability and government performance indicators, the GoE has recently indicated a strong commitment to professionalize its governance apparatus and empower its citizens through political, fiscal and administrative decentralization. However, these necessary changes to improve people's opportunity structure are relatively recent and, as in other countries, processes of change of such magnitude are slow. Great strides have already been made in terms of decentralizing to certain woredas and in urban areas, but government representatives and citizens report that progress toward making the state apparatus more responsive and accountable is limited as of yet. With formal institutions of government in a state of transition, there is evidence that many citizens rely on their own informal forms of organization and norms of behavior to manage everyday life rather than those of government. It will be important to minimize the risk that these informal practices exclude marginalized individuals and groups, thereby reducing their capacity to make effective choices about their own development.

40. **The critical importance of education and especially female education for people's well being cannot be sufficiently underscored, and warrants a continued focus on public investment in education, even though the benefits may only be fully felt over time.** One of the most robust and most striking empirical findings of this report is the huge effect of education and particularly female education on consumption poverty as well as on human development outcomes and people's ability to shape their own lives. The empirical simulations suggest that bringing all female adults up to at least a 4<sup>th</sup> grade education could reduce poverty incidence by 12 percent. Education will be necessary to help households adopt new technologies and thus enhance their agricultural productivity. It will facilitate migration out of agriculture and marginal areas into off-farm employment and rural towns, thereby reducing land pressure among the remaining population.

41. **Female adult education is one of the most critical determinants of all human development outcomes.** Giving the average mother in rural areas four years of education would increase children's survival by 5.1 percent, and bringing at least one female adult in the household to 6<sup>th</sup> grade would reduce child stunting by up to 12 percent. Male adult education also has substantial positive effects on consumption and child malnutrition, though these are generally slightly smaller than the effects of female adult education. Moreover, educational attainments of parents and the community at large are critical determinants of the education of the next generation. For each additional year of educational attainment by the household head, the probability that a child is enrolled in school increases on average by 1.1 percentage points in rural areas and by 1.6 percentage points when it concerns a girl's enrollment.

42. **The empirical analysis suggests a series of promising interventions to enhance primary school enrollments and completion.** Merely enhancing households' income through overall economic growth will not suffice to reach the education MDG (universal primary completion by 2015) and specific actions will be required:

- specific policy interventions to increase *rural* enrollment and completion rates should focus on: (1) increasing accessibility to schooling, especially by locating new schools in

unserved and underserved areas; (2) improving sanitation facilities and the availability of water in schools; (3) using innovative pedagogical methods such as multi-grade teaching to promote school quality; and (4) strengthening the set of risk management tools available to farmers, which would especially help in raising girls' educational attainment;

- actions to increase *urban* enrollments should focus more on improving the quality of schooling by: (1) reducing student-teacher ratios, particularly in the early grades, where dropping is concentrated; (2) increasing the deployment of female teachers; and (3) improving sanitation facilities and the availability of water in schools;

While attainment of the education MDGs presents a daunting challenge, the foregoing interventions would accelerate Ethiopia's progress, bringing the intermediate objective of 100 percent gross enrollment in Grades 1-4 within reach in the near future<sup>6</sup>.

43. **The potential of adult literacy programs deserves further attention.** Given the critical role of adult education for both economic development and human development outcomes, the potential for adult literacy programs which were common during the Derg regime, should be explored further. This could timely complement the government's ongoing efforts to foster primary school enrollment rates. The large externality effects on primary school enrollment of the average educational attainment in the community, and of female adult literacy in particular, further suggest that adult literacy programs would help increase enrollment rates as well. Finally, a more detailed ethnographic investigation of why households are less likely to invest in girls' education is called for.

44. **In addition to formal maternal education, specific health and nutritional knowledge also play a critical role in reducing child malnutrition and child mortality.** The empirical evidence on the determinants of child stunting suggests that child growth monitoring and maternal nutritional education programs could play an important complementary role to other development actions such as promotion of food security, income growth, and more general parental education, which are already underway. The role of other direct nutrition interventions such as micronutrient supplements, promotion of exclusive breast-feeding, and appropriate complementary feeding should be equally considered. Moreover, while it will take a considerable amount of time before these other development actions substantially affect pre-school child growth faltering, child growth monitoring and nutritional education programs as well as complementary feeding and micronutrient supplementation could take effect immediately, as illustrated by the successful ongoing Vitamin A supplementation program. It is anticipated that the new Health Extension Program will take on some of these challenges. The most promising (non-health) interventions to reach the MDG of reducing child mortality by two thirds by 2015 from the 1990 level are enhancing maternal education and increasing access to safe drinking water. Given that 24 percent of under-five child deaths are attributed to diarrhea, maternal health knowledge and behavioral change will be equally critical.

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<sup>6</sup> An in depth analysis of the education sector in Ethiopia is provided in the 2005 World Bank Education Country Status Report.

45. **Given the critical importance of early childhood malnutrition for future economic growth, reducing child malnutrition should be of great concern to the Ministry of Finance and Development.** This will require increased awareness about the long term detrimental effects of early childhood malnutrition on future economic growth. At the institutional and policy level, a comprehensive and coherent multi-sectoral nutrition policy will need to be developed, and the institutional responsibilities of the various ministries, and mechanisms for coordination of their actions in the field of nutrition will need to be clearly delineated.

46. **More broadly, a better understanding of the existence of synergies between, and the appropriate sequencing of, interventions is needed to inform a multi-sectoral approach toward improving human capabilities.** The empirical analysis shows that irrespective of the particular human development outcome (malnutrition, mortality, or education), important opportunities for improving these outcomes are to be found outside the particular sectoral realm. The institutional implications of these findings must be further investigated. For example, in the case of child stunting there are indications that income and community nutritional knowledge act as substitutes, suggesting that there may be substantial gains from imparting nutritional knowledge, a relatively easy to implement and low cost intervention, even if people remain very poor. Yet, further investigation of the potential substitution between income and nutritional knowledge is necessary. There may also be thresholds below which these determinants begin to act as complements. Identifying the relationships between different determinants, and the potential thresholds below or above which they act either as complements or as substitutes will be critical in designing effective multi-sectoral interventions to reach the MDGs.

47. **There is tremendous scope to enhance people's capability to aspire and expand their choice horizons, as well as to reduce monetary poverty by increasing their access to information for example through wide dissemination of radios and mass civic education programs.** Information is a powerful transformer, and community radio programs are a commanding medium to transmit sound information for example about better farming techniques, hygiene and nutritional practices, market and weather conditions, etc., especially when the majority of the population is illiterate and physically isolated, as in Ethiopia. It is estimated that providing the poorest quintile of the population with a radio would increase average consumption by five percent, reduce poverty incidence by 11 percent, and reduce the poverty gap by about 40 percent.

48. **Radio programs are major dialogue initiators, often empowering individuals and fostering societal change.** This is consistent with the important empirically observed externality effects of radio ownership within communities on poverty, and is exemplified by the deeply disturbing story of Woineshet, a 13-year old rape victim in southern Ethiopia whose father's decision to bring her case to court was prompted by his exposure while working in Addis Ababa to radio announcements and bus ads urging the prosecution of rape cases (see Box 2.3, p. 40). Moreover, the marginal beneficial effects of radio ownership are real, empirically robust, and high compared to the marginal costs, making investment in increasing access to information through community radio programs a cost effective and timely intervention to better connect rural Ethiopia with the rest of the world, facilitate civic engagement and reduce their poverty. To do so will not only require increasing people's

access to radios but also providing an enabling legal framework fostering open debate and supporting citizens' rights to information, including plurality of radio licensing.

49. **In addition to enhancing people's agency (i.e. their human capabilities, their access to (and production of) information, their financial and material assets), people's opportunity structure should also be strengthened to foster empowerment of citizens in general and women (and pastoralists) in particular.** To improve the position of women in Ethiopian society actions are recommended in the legal, social and economic spheres:

- Following the recent increase in the legal age at marriage to 16 years old, further support is required to hone and deepen government strategies supporting equal legal protection of women. This includes: (1) better aligning the penal codes and application of existing laws to make them consonant with the word and spirit of Article 25 of the constitution and the National Policy on Women; (2) providing training on gender sensitization to judges, lawyers and other members of the legal profession; (3) establishing a watchdog to track changes in the law and its application; and (4) supporting legal advocacy groups and providing legal aid, women's advisory centers and shelters for abused women.
- The entrenched social norms and practices that discriminate against women should be addressed. The billboard actions against gender based violence undertaken by the Gurage Women and Teacher's Association are encouraging signs of civic engagement in this context (see examples of billboards in Picture 11.1, p. 217). Other entry points include: (1) ensuring that gender issues are appropriately addressed in all development interventions and government programs; (2) organizing training events for women parliamentarians and other champions of women's issues on communication skills, computer literacy, gender budgeting, planning, monitoring and evaluation for women MPs; and (3) continuing the focus on girls' education and promoting the inclusion of gender sensitivity programs in education curricula.
- Women's participation in the formal economy should be increased by providing: (1) incentives to businesses to hire women; (2) business management training and follow-up support to women; and (3) expanded credit availability to female entrepreneurs.

50. **To further facilitate the ongoing transition from traditional norms to national legal frameworks,** actions should focus on continued support to existing programs of decentralization and support to the development of independent civil society. Particularly crucial to foster empowerment through these programs would be: (1) a continuous emphasis on capacity building at the woreda and kebele level to ensure effective use of block grants for poverty reducing purposes; (2) the enhancement of the interface between kebele and woreda councils, and between citizens and both of these organizational entities; (3) the increased involvement of citizens in the formulation of kebele plans, budgeting and monitoring; and (4) establishing functional mechanisms of accountability, including annual performance appraisals.

51. **Despite encouraging signs of a decelerating increase in the spread of HIV/AIDS, the current focus on reversing the spread of HIV/AIDS must be sustained,** if Ethiopia's aspirations for economic growth and poverty alleviation are to be met. Ethiopia's HIV/AIDS

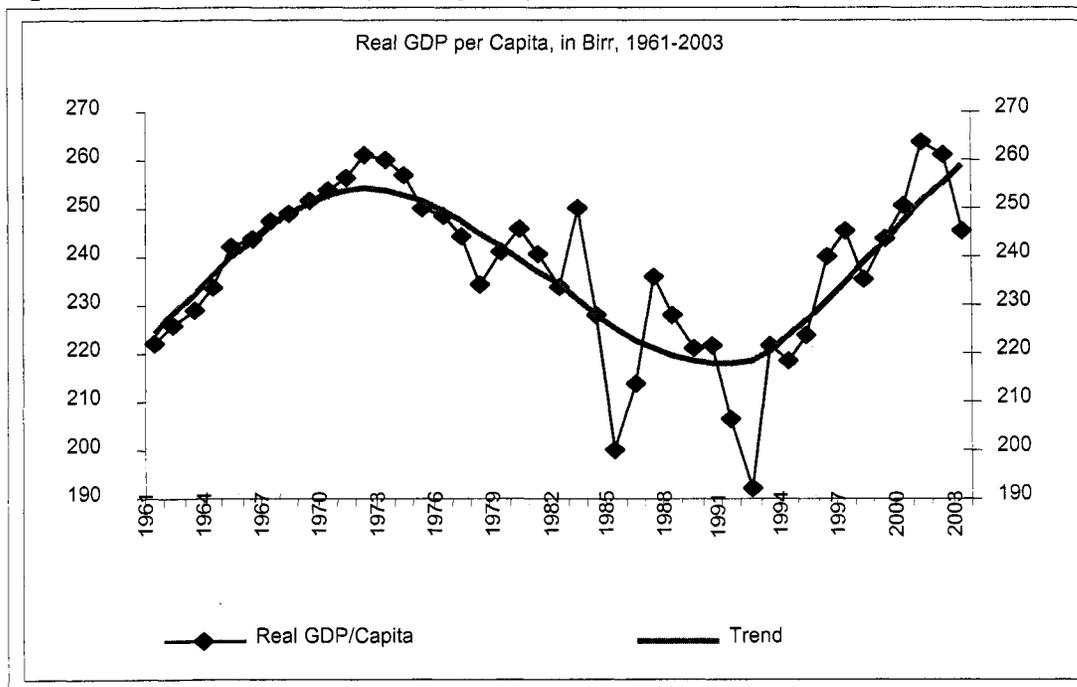
epidemic is generalized, having spread far beyond the original high-risk subpopulations. Continued progression of the epidemic will simply undermine any current and future development efforts. In particular, successful implementation of the innovative multi-sectoral HIV/AIDS program, which is now in full swing, will require unrelenting support from the highest political levels. An accurate database will also need to be urgently established.

**52. In sum, a balanced approach to poverty reduction focused on agriculture and agency holds promise.** A geographically differentiated focus on increasing labor productivity in cereal and non-cereal *agriculture*, including concerted efforts to strengthen people's ability to manage risks, will be needed. In addition, to maximize the linkage effects and reduce poverty substantially, connectivity to urban growth centers will equally need to be improved and the investment climate ameliorated to foster off-farm employment generation and facilitate the structural transformation. Actions to strengthen people's ability to make effective choices, both in the economic and social space, will further be key. This will help unlock people's innate potential and will require enhancing their *agency* (i.e. asset base) and fostering a conducive opportunity structure (i.e. institutional environment). To do so, a strong emphasis on female education and increased access to information will be needed. Empowering people in the economic space will also be necessary to effectively absorb the current and future resource flows, and issues of pacing of aid and the government's administrative absorption capacity will increasingly have to be at the center of our attention as aid flows further increase. Finally, any prospect for poverty reduction in Ethiopia is pre-conditioned on adequate containment of HIV/AIDS.

## INTRODUCTION

1. **The last decade and a half have ushered in a period of optimism in Ethiopia, preconditioned by several important internal social developments.** The first of these was the end of the civil war in 1991. Except for the two years (1998-2000) of the border war with Eritrea, which was costly both in lives and in financial resources, the fifteen year period since 1990 has been a period of relative peace in the recent history of the country. This has allowed the government to channel its resources to more productive activities. Second, broad economic reforms were introduced by the new government in the first half of the 1990s, which included shifting the economy from central planning to market mechanisms, keeping inflation under control, and improving the management of public expenditures. Third, the new government also fundamentally changed its governance structure. Its program of political decentralization, which is still ongoing, introduced a process of empowerment of sub-national governments and diluted one of the sources of past conflicts—concentration of power at the centre.

Figure 0.1: Real gross domestic product per capita, Ethiopia, 1961 to 2003



Source: World Bank, 2004c

2. **As a result, the 1990s and the early 2000s are sometimes viewed as a period of broad recovery.** One of the first signs of this recovery has been the overall output response of the economy. Between 1991 and 2004, GDP per capita has risen from its lowest level to one of the highest in the past 40 years (see Figure above). To be sure, even at its peak in 2001, GDP per capita was only at a level last reached in 1972. Moreover, stark volatility of growth has remained, and agricultural growth has continued to lag far behind the other sectors (industry and services) despite the prominence and attention it received under the reformist government. The good news is that per capita GDP has risen by about 1.7 percent per year

since the Ethiopian People's Revolutionary Democratic Front (EPRDF) assumed power.<sup>7</sup> About 1.1 percentage points of this growth can be attributed to the policy changes and public investments of the reformist government, which boosted total factor productivity, while the rest is partly the peace dividend (or catch up growth).<sup>8</sup>

**3. These positive developments at the policy, institutional and macro-level beg two major questions: (1) How well did the Ethiopian people fare during this period of economic recovery? and (2) What can be done to improve their lives further?** This study seeks to shed light on these two broad, overarching and complex questions which continue to underpin the policy dialogue in Ethiopia. The arguments and policy implications presented in this report follow from confronting insights and hypotheses put forward during elaborate consultations with the government and development partners with both development theory and rigorous empirical analysis of Ethiopia's rich information base.

**4. The report is comprehensive in scope,** though some topics such as the role of agriculture, risk and empowerment in poverty reduction are dealt with in more depth given their prominence in the ongoing policy debates in Ethiopia. The study will draw upon and cross reference several other economic sector works which have been undertaken in parallel with this study by other World Bank Teams, such as the World Bank Country Economic Memorandum and the World Bank Country Status Reports on Education and Health. As the report seeks to complement and extend the Poverty Profile of Ethiopia published by the Ministry of Finance and Economic Development (MoFED), Government of Ethiopia (GoE) in 2002, it addresses people's well-being in a broader sense and includes issues related to empowerment and vulnerability. It further places a larger emphasis on analyzing the determinants of people's well-being and its policy implications in light of the upcoming revision Ethiopia's Sustainable Development and Poverty Reduction Strategy (SDPRP).

**5. To examine how Ethiopians fared over the past decade and a half, the report explores both monetary and non-monetary dimensions of well-being.** This can also be referred to as a utilitarian and a capability approach.<sup>9</sup> In particular, the report explores progress on measures of income or consumption to capture the monetary, or utilitarian, perspective, and focuses on such issues as nourishment, health, literacy, and the extent to which people in Ethiopian society are empowered to capture the non-monetary, or capability, approach. The report further distinguishes three different, though related, dimensions of well-being, i.e. poverty, vulnerability and equality. In particular, the report examines whether people have enough of what is considered valuable compared to some external benchmark, i.e. it assesses their poverty status. It further explores the extent to which people can be sure today that they will have enough of what is considered valuable in the future, i.e. it studies how vulnerable they are. Finally, it investigates how people fare relative to their neighbors, i.e. how equally or unequally assets and well-being are distributed. Following this picture of the evolution of monetary and non-monetary well-being, the report proceeds with an analysis of their determinants.

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<sup>7</sup> Average growth rates between 1992 and 2004; an estimate and a projection were used for 2003 and 2004 respectively.

<sup>8</sup> Easterly, 2002.

<sup>9</sup> Sen, 1985.

6. **To address these different perspectives and dimensions of people's well being as well as their determinants, the report draws on a rich information base** collected during the 1990s by the GoE and Addis Ababa University in collaboration with other international institutions and universities. In addition to the national accounts at the macro level, the GoE conducted a series of nationally representative household surveys. The 1995 and 1999 Household, Income, Consumption and Expenditure Survey (HICES) and the accompanying Welfare Monitoring Survey (WMS) provide the key information base used in this study to examine consumption poverty and its determinants as well as the evolution of non-monetary indicators. However, it will be shown that caution is warranted in drawing too strong conclusions regarding the evolution of poverty based on only two observations in time, given the rain dependence of the Ethiopian economy. Other important sources of information include the 2000 Demographic and Health Survey and the 1999 National Labor Force Survey. The GoE has recently also launched another round of the HICES and WMS surveys and is conducting a national participatory poverty assessment. The information derived from these surveys will unfortunately not be available in time for inclusion into this report.

7. The insights from these nationally representative surveys are complemented with information from the Ethiopian Rural Household Surveys (ERHS), a panel of 1,500 rural households in 15 villages conducted by Addis Ababa University along with Oxford University and the International Food Policy Research Institute (IFPRI), its collaborating institutions. The villages were purposively selected to capture the agro-ecological diversity of Ethiopia. Households were interviewed 5 times between 1994 and 1999 and a new round has just been completed, though its results are not yet available. In parallel, another group at Addis Ababa University in collaboration with Göteborg University conducted the Ethiopian Urban Household Surveys (EUHS), tracking a sample of 1,500 urban households from the seven major urban centers of Ethiopia during 1995-1999, with a new round being completed in 2004. The findings from both these data sets provide important additional insights into the evolution of rural and urban poverty and its determinants in Ethiopia. These survey data are further augmented with secondary information on agro-ecological and demographic conditions (rainfall, population density, and soil erosion) as well as insights obtained from qualitative and participatory case studies providing key contextual information in the dynamics of social interaction, empowerment and the evolution of poverty.

8. The report begins by exploring the evolution of well-being in Ethiopia in Part I. It will zoom in on the evolution of monetary well-being in its different dimensions (poverty, inequality and vulnerability) (Chapter 1) followed by a discussion of the levels and evolution of people's capabilities, i.e. their educational attainments, health and empowerment status (Chapter 2). Part I concludes with a summary of the emerging profile of people's well being in Ethiopia and a discussion of continuing knowledge gaps and data needs (Chapter 3). An overview and assessment of the current poverty monitoring and evaluation system is included in Appendix 1. Part II explores the determinants of monetary well-being. Taking a livelihoods approach, it sketches the endowment base of Ethiopia's people and the risk factors they face, and using econometric analysis it subsequently analyzes how the returns to these endowments and risk factors differ across endowments, time and space (Chapter 4). Given that Agricultural Development-Led Industrialization (ADLI) forms the corner-stone of the government's current poverty reduction strategy, and given that the large majority of the poor

live in rural areas and that almost the entire rural population is primarily employed in agriculture, Chapter 5 subsequently sketches the performance of the agricultural sector and empirically analyzes the relative importance of the different determinants of agricultural income. Chapter 6 discusses the continuing strategic importance of raising the performance of the agricultural sector (both food and non-food) as well as the need for scaling up foreign aid to reach the Millennium Development Goal (MDG) related to poverty in Ethiopia. It also presents micro-econometric simulations to shed light on the optimal sectoral composition of public investment (education, infrastructure, health, agriculture) to reach the poverty MDG. Part III explores the determinants of non-monetary well-being, in particular the relative importance of different factors in reducing child malnutrition and child mortality and the respective role of demand and supply side factors in increasing male and female primary enrollment rates (Chapters 8-10). Chapter 11 concludes by identifying key policy implications to enhance nutritional, health and educational outcomes, and explores alternative ways to enhance people's agency and empowerment.

## **Part I: How Well has the Ethiopian Population Fared?**

This report takes a multi-dimensional approach and addresses the broad overarching question of how the Ethiopian population has fared over the past decade and a half both from a utilitarian/monetary and a capability/non-monetary perspective. Chapter 1 begins by examining the evolution of well-being, using monetary indicators such as income and consumption--the most common approach. We build on the 2002 poverty profile of Ethiopia prepared by MoFED, and report new results on levels and changes in consumption poverty and inequality for the years 1995/96 and 1999/2000 along socio-economic, spatial and temporal dimensions. We also briefly review how vulnerable people are to becoming poor in the future.

Chapter 2 addresses the same overarching question from a capability/non-monetary perspective and reports on the evolution of human capabilities (education, health, nutrition), followed by a discussion of people's ability to make effective choices, i.e. their level of empowerment. In contrast to the discussion of the monetary indicators and people's human capabilities, which heavily draws on quantitative statistics, the evidence base for gauging people's status of empowerment is more qualitative in nature. Chapter 3 summarizes the main findings and concludes by identifying continuing knowledge gaps in our understanding of people's well-being in Ethiopia and the corresponding data needs. An overview and assessment of the current poverty monitoring and evaluation system is provided in Appendix 1.

### **CHAPTER 1. MONETARY DIMENSIONS OF WELL BEING--A UTILITARIAN PERSPECTIVE**

1.1 The chapter first sketches the evolution of monetary poverty and inequality since 1992 as suggested by both the macro and micro data, and interprets the emerging picture within the evolution of the broader economic and social context during that period. This is followed by a brief characterization of poverty in Ethiopia. The chapter concludes by discussing people's prospects for becoming poor in the future, i.e. their vulnerability.

#### **1.1 The Evolution of Poverty and Inequality in Ethiopia Since 1992**

1.2 **Tracing trends in household consumption and poverty over time is harder in practice than is suggested by theory.** While the difficulties surrounding the measurement of household consumption and consumption poverty are well known,<sup>10</sup> these difficulties are compounded when one tries to compare household consumption over time. First, this task requires full comparability of the sample and questionnaire design, which is often not the case, especially when repeated cross sections are used. Second, the longer intervals between surveys allow sufficient time for households to adjust their preferences rendering comparisons across time more challenging. Third, there is the thorny issue of which deflators to use in

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<sup>10</sup> Issues include: the valuation of certain goods and services such as housing, durables and the market value of own-grown foods for which markets (and thus prices) are often incomplete or even totally missing; the need for geographical price deflators to make expenditures comparable across space; and measurement error related to recall periods (Deaton and Grosh, 2002; Sahn and Stifel, 2003).

order to make expenditures between periods (and areas) comparable. Few countries have reliable and regularly updated consumer price indexes that account for spatial differences in prices.

**1.3 This poverty assessment encounters all of these problems.** The questionnaire design for non-food expenditures changed somewhat between the national HICES survey rounds, which are four years apart. Further, in the period between rounds important changes have taken place in the weather, the external environment (e.g. a border war), and prices (e.g. a collapse of coffee prices), all of which may have led people to adapt their consumption bundles. Finally, and most importantly, we find that there are several deflators, which steer the conclusions in widely divergent directions. All these problems are further exacerbated when comparing consumption and poverty levels across countries (see Box 1.1).

**1.4 To address these challenges, we draw on different data sources and triangulate the evidence emerging from each of these sources.** We begin by linking the sectoral components of overall GDP growth with household consumption from surveys, based on the household head's sector of employment, to explore how poverty evolved over a longer time period. While limited in its own way, this methodology enables one to track poverty over time and allows a more fine-grained tracking of poverty than is possible using the aggregate growth rate. Second, we compare consumption and poverty across the two HICES surveys conducted in 1995 and 1999. The HICES surveys allow presentation of a nationally representative picture based on micro-data, and therein lies their major strength. Yet, as will be further illustrated, it is difficult to draw firm conclusions about longer term trends based on two data points when the economy experiences large annual fluctuations in its overall value. Thus, and third, we complement the evidence from the national surveys with those from purposively sampled rural and urban panel data which are also more consistent in survey and questionnaire design over time, as well as with qualitative case studies and other contextual evidence. Finally, given that large improvements and deteriorations in welfare should eventually be reflected in asset holdings, we also examine the evolution of key assets over time. Taken together, the evidence suggests that consumption poverty during the 1990s has largely stagnated, with indications that urban poverty and inequality have increased while rural poverty may have slightly declined.

**Box 1.1: How poor is Ethiopia really? Different measures, different results?**

How poor is Ethiopia when compared to other countries? Alternative monetary measures and methodologies often seem to yield different answers. We explore this paradox and compare living standards in Ethiopia to those in other countries using monetary measures of average income and monetary measures of poverty, which are sensitive to the lower end of the distribution, and find that the results are broadly internally consistent. Using both sets of statistics Ethiopia emerges as an equal, but equally poor society.

Some of the differences emerging from comparing different measures arise from the technical solution adopted to express monetary variables in a common scale. Conversion of the monetary variables in the same currency (usually US dollars) using market exchange rates offers an intuitive answer. Market exchange rates reflect, however, a host of factors which might not be relevant for the comparison of welfare across countries, such as speculative movements and government interventions on the exchange rate. These factors can alter the exchange rate, without really affecting how people's purchasing power varies from country to country. Purchasing Power Parity (PPP) adjusted exchange rates form a useful alternative. PPPs are exchange rates that take into account the cost and affordability of a basket of common items in different countries, usually expressed in the form of US dollars. The first two columns in table 1 below illustrate how the use of different conversion methodologies may lead to seemingly widely different conclusions when evaluating people's welfare in a country.

Table B1.1.1: Average monetary resources in Ethiopia in US dollars

	GDP/capita (2003 US\$)	GDP/capita (2003 PPP US\$)	Private consumption/Capita (national accounts, 1999)*	Consumption/Capita (1999 Survey)
Level	97	716	80	126
Ranking out of 154 countries	153	148	-	-

Average exchange rate for 1999 was 7.942

Source: World Bank, 2004g, and FDRE, 2001 (1999 HICES), own calculations

The large increase in income per capita shown by adopting PPPs rather than market exchange rates is not a peculiarity of Ethiopia. When in country A prices are lower than in country B, values expressed in PPP terms will be higher. In general, there is a broad association between price levels and income of a country, so that in poorer countries PPP values tend to be higher than in dollar terms. Price differences often follow from differences in wages, which tend to be much higher in richer countries. Yet despite the large increase in GDP per capita which may suggest that Ethiopia is not so poor after all, its relative position as one of the poorest countries in the world remains largely unchanged when moving to PPP exchange rates. Rankings are indeed much less affected than levels by the use of a dollar or a PPP indicator—the rank correlation between ordering countries either on the basis of GDP in PPP or GDP in US dollars is 0.97.

In the last columns of Table 1, we consider only those resources which are available for private consumption, and contrast the data of the national accounts with those of the HICES household survey to gauge internal consistency. While consumption per capita according to the national account is almost 40 percent less than what is observed in the household surveys, at 126 US dollars per capita the bottom line that Ethiopia is among the poorest countries in the world remains. Discrepancies between national accounts and household surveys in estimating private consumption are very common. In the former, private consumption is obtained as a residual, while household surveys use self-reported consumption to measure consumption directly. Factors driving the discrepancies include problems with respondents' recall and effective sample coverage in the case of household surveys, difficulties in accounting properly for informal and subsistence activities in the national accounts, differences in the definition of "private sector" between household survey and national accounts, and different treatment of income in kind, imputed rents and financial services (Ravallion, 2003).

Turning to distributionally-sensitive measures of welfare, we compare Ethiopia's 1 and 2 dollar a day poverty incidence numbers with those of other countries, and explore how these poverty numbers compare with the poverty incidence derived from locally estimated poverty lines, again to gauge internal consistency. International comparability in this case is ensured using comparable household surveys and by adopting an internationally comparable poverty line (i.e. a poverty line whose level can be considered meaningful across different countries) expressed in PPP dollars. The choice of an internationally comparable poverty line has received much attention. 1 dollar a day (or more exactly US\$ 1.08 a day) in 1993 PPPs has been identified as a good approximation to the national poverty lines, given consumption levels adopted by low income countries. It is, however, a conservative estimate, and an alternative poverty line, set to be twice as much as the first one (US\$ 2 a day), has been adopted as well to provide a less stringent standard. To obtain comparable poverty estimates based on these international poverty lines, the international line is translated into local currency in 1993 (by using the PPP for 1993) and the local consumer price index is then used to take into account the difference in local prices between 1993 and the present. The results for Ethiopia are in Table 2.

Table B1.1.2: Poverty incidence in Ethiopia

	1 US\$/day ppp	Ranking across 96 countries	2 US\$/day ppp	Ranking across 96 countries	National poverty line 1999
Poverty headcount (%)	26.3	73	80.7	84	44.2

Source: World Bank, 2004g, based on HICES, 1999

The table above shows that estimates of poverty based on the international poverty lines differ from estimates based on the national poverty line. This is not surprising as in Ethiopia the national poverty line adopted by the government is equivalent to 1.50 dollars in 1993 PPP (even though this corresponds to only 0.31 actual 1999 US\$) (Kakwani, 2004). This implies that the estimated incidence of poverty based on the national poverty line will lie between the incidence obtained with the 1 and 2 dollar a day lines and the poverty numbers thus appear internally consistent. Its exact position depends on the distribution of consumption. These considerations further underline the importance of using different poverty lines as well as the need to take into account the spread of the distribution. For example, Senegal, despite having a GDP per capita almost 6 times higher than Ethiopia in 2003, had exactly the same incidence of US\$ 1 a day (in PPP terms) poverty, 26.3 percent according to the latest available estimates, though only 68 percent of the population were found to be below US\$ 2 a day as opposed to 81 percent in Ethiopia. This results from higher overall inequality in Senegal, with the Gini coefficient being 0.41 in Senegal compared to 0.29 in Ethiopia. Indeed, wealth is rather equally distributed in Ethiopia compared to other countries in the world with only 16 countries out of 126 with a lower Gini coefficient than Ethiopia. This is also reflected in the different ranking Ethiopia takes depending on the US\$ 1 and 2 a day poverty lines. While it ranks 73<sup>rd</sup> out of 96 countries when using the US\$ 1 a day poverty line, it ranks 84<sup>th</sup> when using the US\$ 2 a day poverty line. Together the different monetary indicators suggest that Ethiopia is equal, but equally poor. Ethiopia's ranking in the Human Development Index (170 out of 177 countries) and the Human Poverty Index (92 out of 95 countries), which also include non-monetary indicators of poverty, confirm this picture.

Sources: World Bank 2004g; International Comparison Project ([www.worldbank.org/data/icp](http://www.worldbank.org/data/icp)); Ravallion, 2003; Kakwani, 2004

### 1.1.1. Macro evidence

1.5 To explore poverty trends over the past 15 years, the historical information on sectoral GDP growth rates from the national accounts is linked with information on the sector of employment of the household and household consumption from the 1995 HICES. More specifically, it is assumed that GDP and private consumption grow at similar rates. The population's employment share in each sector is derived from the 1995 HICES based on the sectoral employment of the household head or other male adults in cases where the household head was inactive. In addition, within-sector growth is assumed to be distribution neutral.

1.6 The evolution of headcount poverty for Ethiopia from 1989 through 2004 obtained by applying this macro-micro simulation method to the 1995 HICES is presented in Figure 1.1. The fact that the 1999 head count poverty rate generated through this simulation is similar to the one obtained by direct calculation from the 1999 HICES data (see Section 1.1.2, Table 1.2 using the lower poverty line) provides confidence in the empirical validity of our methodology.<sup>11</sup> When examining the evolution of head count poverty portrayed in Figure 1.1, there are three important observations to note.

**Box 1.2: Basic assumptions underpinning the growth-poverty scenarios**

A number of steps and assumptions underpin the growth-poverty scenarios presented in this report. First, the poverty reducing effect of the different growth scenarios is obtained by applying observed (sectoral) GDP growth and population rates to the income distribution observed in the 1995 HICES. Household income was approximated by total expenditure per adult equivalent with imputed rent, excluding energy expenditures given the intricacies involved in imputing expenditures related to firewood and dung collection, a common fuel source in the rural areas. In using GDP growth rates to predict the evolution of household consumption, we assume that private consumption and GDP grow at similar rates. While the large amounts of food aid Ethiopia receives could arguably affect the levels of private consumption as well as smooth out its fluctuations over time, this should not affect longer term average growth rates, unless food aid reception grows at a substantially different pace than GDP. Closer inspection of the national accounts indicates that nominal private consumption and GDP have historically followed similar growth paths.<sup>12</sup> This is corroborated by rural household surveys where consumption is found to closely track the movements in agricultural income.<sup>13</sup> Finally, for 2003, we only considered a decline in agricultural GDP of 7 percent in our simulations, corresponding to the reported decline in private consumption, as opposed to the reported 12 percent decline in agricultural GDP. This way we account for the massive influx of food aid in 2003, in response to the huge slump in agricultural income in 2003 following the widespread drought and the substantial drop in commercial fertilizer use compared to 2002. The exceptional influx of food aid has partly offset the drop in agricultural income and has helped the country steer clear of a disastrous famine. Second, we use the lower full national poverty line discussed in Table 1.2. Third, the overall population in 1995 in Ethiopia is estimated at 54 million. By operating the actual population and sectoral growth rates on the 1995 income distribution, we estimate that 24.3 million people or 36.2 percent of the Ethiopian population were poor in 2004. Fourth, the population's employment share in each sector is derived from the 1995 HICES based on the sectoral employment of the household head. In cases where the household head was inactive, we looked at the employment sector of the other male adults in the household. In 1995, 85 percent of the Ethiopian population was employed in agriculture, one percent in industry and 14 percent in the service sector. According to the 1999 HICES, 84 percent of the household heads were employed in agriculture, six percent in industry and 10 percent in the service sector. Clearly, Ethiopia is still overwhelmingly an agricultural society.

1.7 **The first important observation is that poverty declined only marginally between 1990 and 2004.** Despite 1.7 percent per capita overall growth (Table 1.1), the simulation method suggests that poverty incidence declined only marginally between 1990 (the starting point for the poverty MDG) and 2004 (from 38.4 to 36.2 percent). To shed further light on this surprising and seemingly contradictory result, Table 1.1 also presents a brief review of the sectoral growth rates (both in overall and per capita terms) from 1992 to 2004. Overall and sectoral growth rates during 1995-1999, the period spanned by the HICES surveys, are also included and reviewed for reference when we discuss the micro evidence below. To

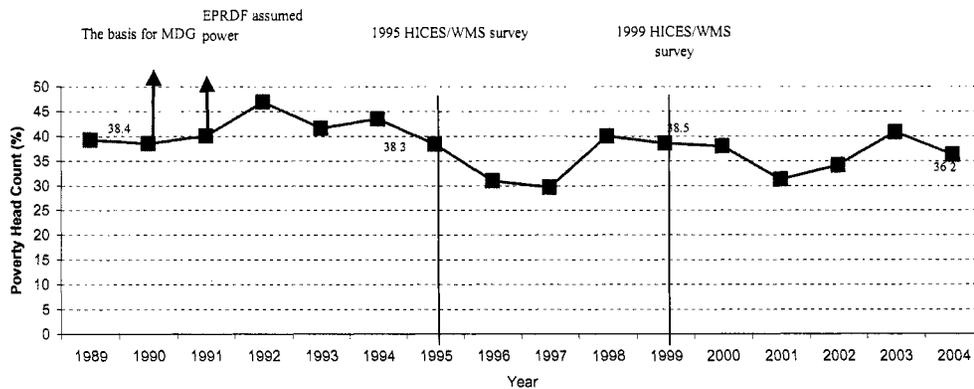
<sup>11</sup> For a more elaborate discussion of the assumptions and the validity of this simulation method, see Box 1.2.

<sup>12</sup> Xiao Ye and Alan Gelb (2004) also indicate that real private consumption and GDP growth have started to diverge since 1995. They attribute this to a divergent evolution of the CPI index and the GDP deflator. They further indicate that reported CPI evolution since 1995 is highly unlikely compared to other existing evidence of the evolution of food and non-food market prices in Ethiopia.

<sup>13</sup> Dercon, 2004.

obtain sectoral per capita growth rates, we divide agricultural GDP growth by rural population growth and industrial and service GDP growth by urban population growth. About 96 percent of the rural population was employed in agriculture.

**Figure 1.1: Evolution of poverty incidence between 1989 and 2004**



Source: Own calculations

**1.8 Economic growth per capita since 1992 has been completely driven by growth in the service sector, with virtually no (or even slightly negative) annual growth per capita in the agricultural sector** (Table 1.1 and Figure 1.2). Given that 85 percent of the population lives in rural areas and that virtually everybody in rural areas derives their livelihood directly from agriculture or agriculture related activities, it should not come as a surprise that poverty stagnated or declined only marginally over the past 15 years. Based on these findings, we hypothesize and confirm below using micro-data that there has been no or only limited poverty reduction in rural areas. Nonetheless, this still leaves the question why service sector growth has not translated into more (urban) poverty reduction.

**Table 1.1: Per capita GDP growth in key economic sectors, 1992-2004**

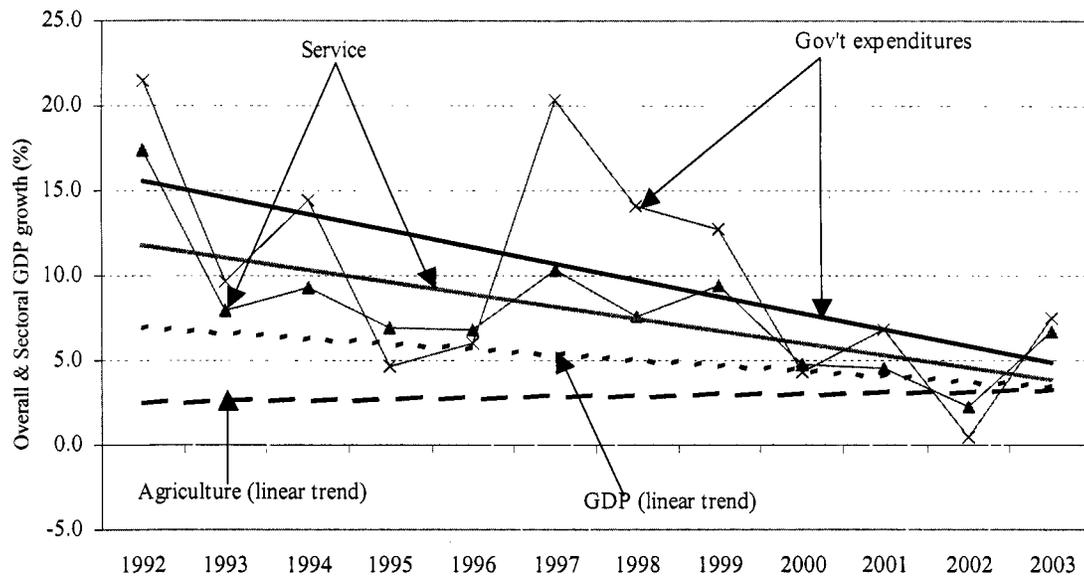
Sectors	1992-2004	1995-1999
Overall GDP per capita growth (annual %)	1.73	2.53
Real annual agricultural growth (%)	2.04	2.35
Real annual industrial growth (%)	5.13	4.07
Real annual services growth (%)	6.80	7.83
Real annual growth (%) in public administration, education, health and defense	10.2	11.3
Real annual agricultural growth per capita (%)	-0.25	0.05
Real annual industrial growth per capita (%)	0.45	-0.66
Real annual services growth per capita (%)	2.11	3.11

Source: World Bank, 2002b; an estimate and a projection were used for 2003 and 2004 respectively

**1.9 Analysis of service sector growth indicates that this was largely determined by rapid government expansion** (Table 1.1 and Figure 1.2). As a result, the government's share of GDP increased from about 12 percent in 1992 to around 20 percent in 2004. Service sector expansion was especially rapid during the 1995-1999 period, which can be largely attributed to the military build-up for the border war with Eritrea. In 1998 and 1999, the

government sector (as derived from the national accounts)<sup>14</sup> expanded by 25 and 16 percent respectively compared to about 4.8 and 6.6 percent in 1995 and 1996. Nominal military expenditures (as per reported government outlays) rose fivefold and eightfold between 1996 and 1998 and 1999. Economic growth fueled by military expansion is however unlikely to have reduced poverty. We will explore this further with the micro data which cover the 1995-1999 period.

**Figure 1.2: Evolution of overall, sectoral and government GDP growth rates, 1992-2004**



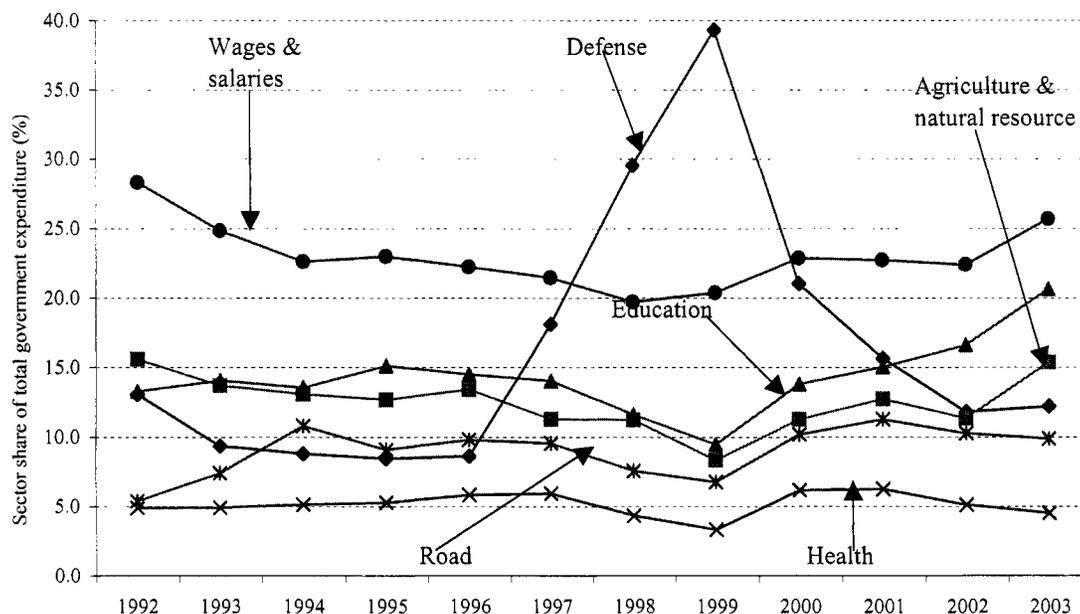
Source: Own calculations

1.10 **The composition of government expenditures has shifted substantially from defense to poverty related sectors since 2000** (agriculture, road construction, education and health) with spending increasing most rapidly in the education sector (Table 1.2, Section 1.1.3, Figure 1.3). This increase in public investment in poverty related sectors holds promise for future poverty reduction. While this is consistent with the predicted decline in poverty since 1999 in Figure 1.1 above, it may take some time before the effects of this enhanced public investment will be fully felt in terms of poverty reduction. This holds especially for the expansion of the education sector, but also to some extent for the rehabilitation and expansion of the road network.<sup>15</sup>

<sup>14</sup> Expenditures mentioned here exclude expenditures on education and health.

<sup>15</sup> For a more detailed analysis of the evolution of the composition of the Ethiopian economy, government expenditures, and domestic demand, see World Bank, 2004c.

**Figure 1.3: Evolution of sectoral shares in total government expenditures, 1992-2004**



Source: Own calculations

**1.11 Harvest failure in 2003 likely undermined positive effects of poverty-focused public investment.** However, the anticipated poverty reducing effects of the increase in poverty-focused public expenditures have likely been substantially undermined by the massive harvest failure in 2003, which threatened about 14 million people with famine and most likely pushed many people back into poverty, as suggested by the sharp increase in poverty incidence in 2003. Analysis of the upcoming 2004 HICES (not included in this report) will help get a more accurate estimate of the net effect on poverty of these opposing forces (enhanced poverty focused public investment versus droughts). These events also illustrate the broader point that while analysis of the national accounts coupled with household survey data is very informative in generating hypotheses about the broad trends in poverty incidence and its underlying causes, micro data are needed to get a more detailed and accurate picture of the evolution across locations and livelihoods. Micro data on consumption will also be better able to capture income from the informal economy. We will thus use the available micro-data to further gauge the empirical validity of the emerging picture of limited decline in poverty incidence over the past 15 years, as well as to shed light on the evolution of poverty among the rural and urban population and different livelihoods in light of the observed trends in government spending and the performance of the different sectors of the economy. Before doing so, we make two more observations regarding the evolution of poverty incidence in Ethiopia.

**1.12 The second observation regarding the evolution of poverty incidence in Ethiopia is that poverty incidence is highly volatile.** As can be seen, for example, from Figure 1.1 above, poverty incidence declined sharply between 1994 and 1997, but bounced back strongly

between 1997 and 1999. While food aid, which is not taken into account in these figures, would presumably smooth the fluctuations a little bit, it is safe to say that high volatility of poverty incidence characterizes the evolution of poverty throughout the 1990s. Delays in procurement and distribution often prevent food aid from acting as an effective insurance mechanism. The volatility in poverty incidence follows from the high dependence of the Ethiopian economy on rain-fed agriculture and the inability of the Ethiopian population to insure themselves adequately against these shocks (see further Chapter 4). The bi-variate correlations between contemporary and lagged average annual rainfall and poverty are estimated at  $-0.37$  and  $-0.30$  respectively.<sup>16</sup>

**1.13 Third, and closely related to the second observation, the conclusion regarding the direction and rate of poverty reduction differs significantly depending on which two years are compared.** For example, a comparison between 1992 and 1997 shows a high rate of poverty reduction, while a comparison of 1995 and 1999 suggests stagnation. Similarly, when comparing 1994 with 1997 it could be concluded that poverty has substantially declined, while a 1994-2000 comparison suggests a much smaller decline. This calls for caution in the interpretation of poverty trends derived from a small number of data points over time, and the development of better methodologies for monitoring poverty between survey rounds. It also underscores the need to take a longer term perspective when analyzing trends of poverty in Ethiopia.

#### **1.1.2. Micro evidence**

1.14 In this section, we examine if the broad picture of limited decline in poverty incidence during the past 15 years emerging from the macro data is confirmed in the micro data. The micro data allow us to obtain more accurate and more disaggregated poverty numbers by location and livelihoods, though care must be taken in interpreting trends emerging from these data given that they are collected much less frequently, and in light of high volatility in the Ethiopian economy. We begin with evidence from the two nationally representative household consumption surveys, followed by evidence from purposively sampled surveys.

#### ***Evidence from the HICES surveys***

1.15 Table 1.2 reports three sets of poverty ratios. The first (estimates from MoFED) reproduces the results from the Government's own estimates of the three most common measures of poverty—the head count ( $P_0$ ), the poverty gap ( $P_1$ ) and the poverty gap squared ( $P_2$ ), a measure of the severity of poverty. The next four columns report estimates of poverty which assume a common basket across time for all households and are based on a lower and an upper poverty line. This way, we test the robustness of the results to the choice of the poverty line. The last four columns report the same measures but allow for variation in consumption baskets across reporting levels and across time for the same reporting level. Put differently, the findings in the last columns allow for the possibility that households or individuals living in different locales consume different baskets of goods and services at different prices. The differences between our methods and those of the government are

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<sup>16</sup> A correlation coefficient of one indicates that both variables move perfectly in parallel, while a correlation coefficient of zero indicates that both variables change independent from each other

discussed in more detail in Box 1.2. The construction of the poverty line is discussed in Box 1.3.

**Table 1.2: Evolution of poverty between 1995 and 1999**

		Estimates by MoFED (No substitution)		Poverty estimates using one poverty line				Poverty estimates using local poverty lines			
		(3)	(4)	Lower Poverty Lines		Upper poverty lines		Lower poverty lines		Upper poverty lines	
(1)	(2)	1995	1999	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Poverty	1995	1999	1995	1999	1995	1999	1995	1999	1995	1999
Rural	P0	0.47	0.45	0.40	0.38	0.59	0.58	0.37	0.29	0.54	0.39
	P1	0.13	0.12	0.10	0.10	0.19	0.18	0.10	0.07	0.16	0.10
	P2	0.05	0.05	0.04	0.04	0.08	0.08	0.04	0.02	0.06	0.04
Urban	P0	0.33	0.37	0.31	0.37	0.46	0.53	0.32	0.46	0.47	0.70
	P1	0.1	0.1	0.09	0.10	0.15	0.17	0.09	0.14	0.16	0.29
	P2	0.04	0.04	0.04	0.04	0.07	0.08	0.04	0.06	0.07	0.15
National	P0	0.46	0.44	0.38	0.38	0.57	0.57	0.36	0.32	0.53	0.43
	P1	0.13	0.12	0.10	0.10	0.18	0.18	0.10	0.08	0.16	0.13
	P2	0.05	0.05	0.04	0.04	0.08	0.08	0.04	0.03	0.06	0.05

Source: Ministry of Finance and Economic Development, 2002, and own calculations from HICES data

**Box 1.3: Methodologies used to measure the extent of poverty**

The poverty numbers obtained by the government and this report differ in three ways: 1) the underlying expenditure variables; 2) the poverty lines; and 3) the deflators used.<sup>17</sup> First, our approach uses expenditures with imputed rents as opposed to rents estimated during the interview by the enumerators, and excludes energy variables whose measures were left to the discretion of the enumerators and therefore subject to a lot of noise.

Second, while the Government report uses one poverty line, based on a national average consumption bundle, we report results using a lower and an upper poverty line. While in essence similar to the government's approach, we convert each households' consumption figures into Addis Ababa prices and calculate their poverty status by relating these converted consumption figures to the 1995 Addis Ababa urban poverty line. We also explore how the use of region- and time-specific poverty lines as opposed to one national poverty line may affect the poverty estimates (last four columns in Table 1.2). These are obtained through direct comparison of the expenditures in each reporting level/region to the reporting level specific lower and upper poverty line, which has been separately calculated for each survey year. In doing so, we account for differences in preferences across regions (corrected for income differences) as well as potential substitution by households in response to changes in relative prices over time

Third, we use different deflators than the government. Following standard practice, we first present results which do not allow for substitution in consumption over time in response to relative price changes (column 4-8, Table 1.2). No deflators are needed for our second set of results which are based on location and time specific poverty lines. For geographic price deflators, we adjust expenditures by the ratio of food poverty lines in each reporting level relative to the Addis Ababa urban food poverty line (for details on the calculation of the food poverty line, see Box 1.4). Specifically, we scale both 1995 and 1999 expenditures by the same spatial deflators (ratio of each reporting level of food poverty in 1995 to Addis Ababa food poverty in 1995), and then adjust the temporal price difference using the Addis Ababa food consumer price index calculated by the Central Statistical Authority (CSA) of Ethiopia. So only location specific food poverty lines are used to calculate geographic price deflators. In contrast, the government report uses food and non-food prices to compute geographic deflators and uses national average food and non-food baskets. Although it is technically correct to include the price of food and non-food in the index, we find that using food CPI rather than the General CPI makes little difference

<sup>17</sup> This report uses the same adult equivalent scales as in MOFED, 2002.

because during the period under consideration (1995-1999), there is very little difference between these two measures (see Appendix 3, Table A.1.1). However, by using location specific food poverty lines as deflators, we also control for differences in the dietary patterns across regions. This could be important as some regions largely derive their calories from cereals while others are more enset dependent.

**1.16 Following standard methods to measure poverty, there appears to have been little reduction in poverty between 1995 and 1999.** The estimated poverty rates reported in the middle four columns of Table 1.2 are consistent with those reported by the government. If the lower poverty line is taken as the poverty line, then roughly 38 percent of Ethiopians could not meet their basic needs in 1995. By 1999, the same proportion would have been considered poor. The government's estimates put the national poverty head count at 46 percent in 1995 and slightly less, 44 percent, in 1999. The severity of poverty and its depth as measured by P1 and P2, also held steady throughout. At the upper poverty line, about 57 percent of Ethiopians would have been counted as poor in both 1995 and 1999. In sum, there was hardly any change in poverty rates at the national level.

**1.17 Further decomposition suggests a slight decline in rural poverty.** Using the lower poverty line, about 40 percent of the rural population was estimated to be poor in 1995, but poverty incidence declined to 38 percent by 1999. Similarly, a small reduction in poverty, from 59 percent in 1995 to 58 percent in 1999, is observed when upper poverty lines are used. These results are again consistent with the pattern in rural poverty reported by the government.

**1.18 But urban poverty increased.** Among urban residents, poverty incidence was estimated at 31 percent in 1995 and rose to 37 percent in 1999. When using the upper poverty line even larger increases in poverty rates are observed, from 46 percent in 1995 to 53 percent in 1999. The substantial increase in urban poverty seems largely driven by a substantial increase in poverty in Addis Ababa. Those counted as poor in Addis Ababa rose from 50 percent to 57 percent, and this increase accounts for 71 percent of the increase in urban poverty. The government numbers suggest an increase in urban poverty incidence of 4 percentage points.

**1.19 Allowing for poverty lines to vary by locale, the observed tendencies are intensified.** When we allow households to substitute their food consumption bundles in response to price changes, rural poverty substantially declines and urban poverty starkly increases, resulting in an overall decline of the poverty head count by 4 to 10 percentage points depending upon the poverty line used. While the findings from the conventional approach are clearly more consistent with those obtained from the macro-evidence, it would be useful to explore this further with the upcoming 2004 HICES. We refer to Appleton (2003) for a more detailed discussion of the different normative assumptions underpinning the use of one national vis-à-vis location- and time-specific poverty lines.

#### **Box 1.4: Methodological considerations in obtaining poverty lines**

*The cost of basic needs approach:* The most common method for obtaining poverty lines starts from the assumption that every individual has basic caloric needs to survive and perform daily activities (to work, to think, etc.). On the basis of this assumption, the first goal becomes identifying a minimum bundle of goods that will satisfy this basic need. Since there are numerous possible bundles, the simplest strategy is to pick the consumption bundle of a group of individuals, typically ranked in the lower part of the consumption distribution (say in the 30<sup>th</sup> or 40<sup>th</sup> percentile), and treat this as containing the minimum bundle of goods that would be required to meet the basic needs of individuals. Once the basket is identified, the next step is to cost it by calculating the minimum expenditure that would buy the minimum calories needed. Specifically, the idea is to estimate the price of a calorie (dividing expenditures by calories) and multiply this by the required calories per day (in this case, we used 2,200 calories per day per adult). Computing what it costs to buy such a bundle establishes the food poverty line.

However, the poor also have non-food basic needs. They need minimum standards of clothing, shoes, etc. in order to participate in social activities, and to maintain their dignity. So after establishing the basic food expenditures needed, the next step is to obtain basic non-food spending. This is done by calculating the average non-food spending of the individuals identified as poor. Adding the food poverty line and the non-food basic needs spending establishes the full poverty line.

The standard practice is to calculate one food poverty line and one full poverty line, each at the national level. The most recent analysis of poverty conditions in Ethiopia by the Government of Ethiopia (MoFED, 2002) does this, as does the last poverty report by the World Bank (1999). In both of these studies, a consumption level of 1,075 Birr in 1995 prices is established as the poverty line.

*Multiple poverty lines and substitution effects:* Like the analyses mentioned above, this report uses the cost of basic needs approach. However, there are some differences between the preceding studies and what is done here. First, rather than compute one national food and one national full poverty line, we compute multiple food and full poverty lines, one for each of the 32 groups of zones that the Ethiopia Central Statistical Authority uses for sampling of households. We do this for 1995 and again for 1999, so that altogether there are 64 food and full poverty lines. There are several reasons for this choice. One is that defining a common national basket is neither accurate nor desirable because individuals living in different parts of Ethiopia may have different preferences and tastes. Another is that a common and nationally defined basket of goods does not allow easy introduction of new goods and household substitution of goods that are confined to a single or a few geographic spaces. In defining multiple baskets and letting the contents of these baskets change, we allow for differences in preferences, and substitution effects in response to relative price changes over time. A major objection to such an approach derives from the fact that preferences may differ by income level. Consequently, if government spending across space is sensitive to poverty incidence, it may in effect remunerate “expensive” tastes.

To control for differences in dietary patterns, and allowing for substitutions in response to relative price changes while still controlling for income effects, we follow a practical way suggested by Ravallion (2003).<sup>18</sup> In particular, to obtain the food poverty lines, we first choose a group of individuals who are around the 45<sup>th</sup> percentile of the national consumption distribution. We choose the 45<sup>th</sup> percentile because the Government’s report estimated that about 45 percent of people are poor. Specifically, we take individuals within a 20 percent band around this percentile, or those within the 35<sup>th</sup> to 55<sup>th</sup> percentiles. From this group of individuals, we obtain the prices they paid and the quantities they purchased, as reported in the survey data. We then group individuals in the 35<sup>th</sup> – 55<sup>th</sup> percentiles into geographic reporting levels, and use a reporting level-specific basket of food to calculate location-specific food poverty lines.

To obtain full poverty lines, we use non-parametric methods discussed in Ravallion (2003). Rather than one full poverty line, we calculate both a lower and an upper bound to check that the poverty rates and the evolution of poverty are robust to the choice of the poverty line. To obtain the lower poverty line we first calculate the mean per adult equivalent non-food expenditures for individuals in a reporting level whose per

<sup>18</sup> See Appleton (2003) for an alternative way of obtaining income adjusted regional poverty lines as well as a discussion of the normative assumptions underlying the use of one versus multiple poverty lines.

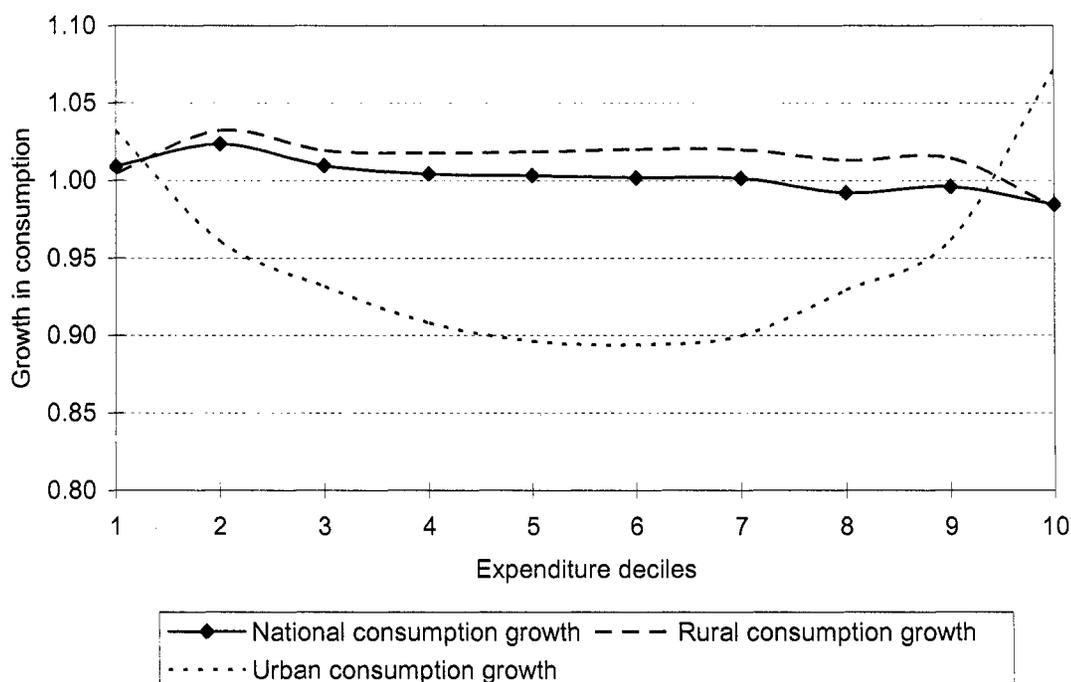
adult equivalent *total* expenditures lie within a small interval (say plus or minus 10 percent) of the per adult equivalent food poverty line for that reporting level. The mean of the non-food expenditures is obtained by taking the mean of the means obtained through stepwise expansion of the interval around the food poverty line (e.g. first one percent around the food poverty line, then two percent, etc.) This mean per adult equivalent non-food component, when added to the food poverty line, establishes the lower full poverty line.

For the upper poverty line, we follow a similar procedure but use the average per adult equivalent non-food expenditures for individuals whose *food* expenditures lie within a small interval of the per adult equivalent food poverty line for each reporting level (for more details see Appendix 3, Table A.1.2). Note that the individuals included in the sample to calculate the food poverty line are not necessarily the same as those used to calculate the full poverty lines. In the first case, the individuals are drawn from the group defined as the poor—in this case, those in the 35<sup>th</sup> – 55<sup>th</sup> percentile of the consumption distribution. But when calculating the full poverty lines, individuals are drawn from all those in the survey from that reporting level.

Once the reporting level-specific poverty lines are calculated, one can report poverty rates and the associated severity and depth of poverty measures by comparing reported consumption per adult equivalent and the reporting level-specific poverty lines, properly weighted. In this report we present the results using this approach (Poverty rates using local poverty lines, cols 9-12, Table 1.2). However, we also report results from the more common approach (Poverty rates using one poverty line, cols. 4-8, Table 1.2).

**1.20 To examine the evolution of inequality over time, we present the evolution of growth in consumption across the different expenditure deciles** in Figure 1.4 (see Appendix 3, Table A.1.3 for details). The deciles provide a picture, albeit discrete, of the growth pattern across the entire distribution of consumption. The 1999 consumption averages have been expressed in 1995 prices. Rural consumption is slightly above one across all deciles except for the top decile suggesting a slight improvement in rural living standards across the rural population. In urban areas on the other hand, we observe a decline in living standards across all deciles, except for the poorest decile which becomes slightly better off, and the richest decile whose living standards increase by about seven percent, suggesting an increase in inequality. The national pattern reflects the rural pattern with the lowest seven deciles slightly better off and the richest three deciles slightly worse.

Figure 1.4: Consumption growth ratios between 1995 and 1999 per consumption decile



Source: Own calculations from HICES data

1.21 The suggested picture of an increase in urban inequality and slight decline in rural and national inequality is mirrored by the estimated Gini coefficients (Table 1.3).<sup>19</sup> The Gini coefficients paint Ethiopia as an equal, but equally poor society consistent with people's self image that holds that "everybody is equally poor."<sup>20</sup> It should be noted, however, that inequality in urban areas is larger than in rural areas and increasing, possibly fuelled by the influx of unemployed migrants and the emergence of a small upper class.

Table 1.3: Evolution of Inequality in Ethiopia

Gini coefficient	1995	1999
Rural	0.284	0.272
Urban	0.350	0.365
National	0.300	0.287

Source: Own calculations from HICES data

#### *Evidence from purposively sampled urban and rural panel data*

1.22 Evidence from the EUHS (urban panel data) suggests a slight increase in urban poverty between 1995 and 2000 and a starker increase in inequality (Table 1.4). The panel survey of 1,500 urban households from seven major cities and towns in Ethiopia has been conducted by the Department of Economics, Addis Ababa University, jointly with

<sup>19</sup> Intuitively, the Gini index (commonly referred to as "Gini coefficient") of a population represents the expected income difference between two randomly selected individuals or households.

<sup>20</sup> Rahmato and Kidanu, 1999.

Göteborg University. The survey started in 1994, and the same households were revisited in subsequent surveys (1995, 1997, 1999, and most recently in 2004). The cities and towns included are Addis Ababa, Awassa, Bahir Dar, Dessie, Dire Dawa, Jima and Mekele. The results regarding the evolution of poverty and inequality from the urban panel data are broadly consistent with those of the national surveys based on the more standard calculation methods. Poverty increased slightly in urban areas between 1995 and 2000, with signs of a continuing increase in inequality over time (Gini increased from 43 in 1995 to 48 in 2000).

**Table 1.4: EUHS panel data evidence on the evolution of welfare in urban Ethiopia, 1994-2000**

Year	Share of food exp in total exp	Real per capita consumption per month (Birr)	Headcount poverty (P <sub>0</sub> ) (%)	Gini
1994	0.85	103	39	44
1995	0.71	109	37	43
1997	0.62	125	34	47
2000*	0.67*	116*	38*	48*

\*preliminary results

Source: *Shimeles, 2004*

1.23 The ERHS is a panel of 1,500 rural household surveys undertaken in 15 villages by Addis Ababa University, jointly with the Centre for the Study of African Economies at Oxford University and IFPRI. The villages have been purposively sampled from a north-south axis of the country in an attempt to include the diversity of the agro-ecological zones, farming systems, and socio-economic characteristics. The villages were first surveyed in 1994 (two rounds), revisited in 1995, 1997, 1999, and again in 2004 (data not yet available).

1.24 **Evidence from ERHS suggests a drop in rural poverty of six percentage points** (Table 1.5). While the decline in rural poverty noted by this survey is consistent with the decline found in the national surveys using standard methods, at six percent it is substantially larger. Yet Table 1.5 also shows that real monthly consumption, measured in 1994 prices, increased by 27 percent between 1994 to 1997 and by 11 percent between 1994 and 1999, which translates to about 2.1 percent per year. This is significantly more than the aggregate per capita agricultural growth and the reported private consumption growth calculated from the nationally representative household surveys used for this report.

**Table 1.5: ERHS panel data evidence on the evolution of welfare in rural Ethiopia, 1994-1999**

Year	Real per adult equivalent consumption per month (Birr)	Head count poverty (P <sub>0</sub> ) (%) <sup>2)</sup>	
		Method 1	Method 2
1994/5	90	53	30
1997 <sup>1)</sup>	115	43	23
1999	100	47	25

<sup>1)</sup> In 1997, three villages were surveyed in a different season not appropriate for comparison with the other data. The latest suitable observation for 1995 is used. However, alternative assumptions do not affect these findings. Only households with complete information for all three periods have been included. In total, 1,377 households (from a possible sample of 1,477) have been retained. This implies an overall attrition rate of less than seven percent, which is low for this type of survey.

<sup>2)</sup> The poverty numbers based on method 1 have been obtained by using similar methodologies as in the urban panel to facilitate comparison. The poverty figures based on method 2 are comparable with those reported in Table 1.11.

Source: *Dercon, 2004*

1.25 Given the care with which the ERHS data have been collected and compiled, and given the consistency in the survey and questionnaire design over time, it is unlikely that these differences result from measurement error. Further comparison of their asset base shows that farmers in the ERHS cultivated on average 1.6 to 1.35 ha in 1994 and 1999 respectively,<sup>21</sup> compared to the national average of 0.99 and 0.95 ha per holder. Also, the reported rainfall in 1994 and 1997 exceeds the national average by about 100 to 130 mm respectively.<sup>22</sup> Better overall rainfall conditions combined with more landholdings might have resulted in larger consumption growth. Yet the position of the ERHS households within the national distribution needs to be investigated further. Inclusion of some of the same questions as in the WMS in the 2004 ERHS will allow ERHS researchers to do so.

1.26 **Other evidence from the Northeastern highlands (Amhara Region) suggests a slide towards destitution.** The study surveyed 2,160 households between November 2001 and April 2002, and examined the evolution of their well-being through retrospective questions.<sup>23</sup> Based on respondents' self assessments of the evolution of their well-being over time, the study finds that the percentage of respondents who considered themselves destitute had increased from 5.5 percent in 1992 to 16.4 percent in 2000, falling back to 14.6 percent in 2002, following two good rainfall years in most of the surveyed communities. At the same time, the percentage of households considering themselves to be "doing well" dropped from 32 percent in the early 1990s to just three percent at the beginning of 2000. Most notably, the group of vulnerable increased from 17 percent 10 years ago to 55 percent in 2002, indicating that 2.5 million people out of 4 million are at serious risk of becoming destitute in the near future. These trends, based on self-assessments were largely confirmed by the community level perceptions of trends in well-being and matched evidence from the more quantitative data collected in the study.

### *Evolution of assets*

1.27 **There is no sign of asset accumulation in rural areas,** which might have signaled a population experiencing rapid or measurably significant poverty reduction. These assets can take the form of consumer durables (radios, TVs, etc.) as well as cattle and livestock in general. In rural Ethiopia in particular, it would seem reasonable to expect significant livestock accumulation because of their consumptive and hedging value. However, there is no evidence of growth in livestock holdings during the period spanned by the HICES surveys (Table 1.6). As a matter of fact, the number of holders with livestock slightly declined (see Chapter 4, Table 4.4). A look at the changes in the distribution of ownership of assets such as TVs or radios does not show a significant improvement either, though the percentage of holders with a radio (a small consumer durable) increased.

1.28 **Some improvements in the possession of consumer durables were observed in the urban areas.** Especially radio, but also TV ownership increased. We also observed some increase in the ownership of bicycles and cars. As ownership of the larger consumer durables

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<sup>21</sup> Van den Broeck, 2004; Gabriel and Demeke, 2003.

<sup>22</sup> Average rainfall in the ERHS villages reported at 1,102 and 1,181 mm in 1994 and 1997 respectively, compared to 1,001 and 1,051 mm nationwide.

<sup>23</sup> Sharp, Devereux, and Amare, 2003.

(car, TV, bicycle) is still concentrated among a small minority and associated with larger consumption levels (see Chapter 4, Table 4.9), this evolution is consistent with the observed increase in urban inequality.

**Table 1.6: Ownership of livestock and consumer durables in Ethiopia between 1995 and 1999.<sup>1)</sup>**

Average	Rural			Urban		
	1996	1998	2000	1996	1998	2000
<i>Livestock holdings per holder<sup>1)</sup></i>						
# cattle for agricultural purposes/oxen	1.15	-	1.08	-	-	-
cattle for other purposes	2.85	-	2.88	-	-	-
sheep and goat	2.85	-	2.36	-	-	-
horses, mules, asses, camels	0.55	-	0.58	-	-	-
<i>Consumer durables</i>						
Radio	7.7	8.3	11.2	47.8	56.5	60.0
TV	0.1	0.0	0.0	6.8	8.8	13.7
Bicycle	0.5	0.4	0.4	2.1	2.2	4.0
Car (for private or commercial use)	-	0.0	0.2	-	3.0	3.2

<sup>1)</sup> Figures do not include pastoralist households not cultivating ; figures for livestock actually refer to 1995 and 1999.

Source: CSA, 2001, and own calculations from 1995 and 1999 Agricultural Sample Surveys, CSA

### 1.1.3 Emerging picture of poverty and inequality since 1992

**1.29 The macro and micro evidence paint a picture of limited to no decline in overall poverty incidence in Ethiopia since 1992.** Urban poverty seems to be edging upwards while rural poverty remained largely constant with signs of a potentially limited decline (one to two percentage point). While overall inequality in Ethiopia remains low and does not appear to be increasing, inequality within urban areas is on the rise. Moreover, the overall economy in general, and the Ethiopian population in particular, remain highly vulnerable to rainfall shocks. We provide a more detailed account of the latter dimension of people's well-being based on micro data in Section 1.3. Several factors have contributed to this distressing picture of limited to no poverty decline in Ethiopia.

**1.30 First, while overall growth per capita has been positive, agricultural growth per capita during the period has been either negative or zero, consistent with the limited poverty decline observed in rural areas.** With 85 percent of the population living in rural areas and virtually everyone in rural areas earning their livelihoods in agriculture or agriculture related activities, absence of a larger reduction in national poverty, and rural poverty in particular, does not come as a surprise. Overall economic growth has been largely driven by growth in the service sector.

**1.31 Second, the rather strong average annual growth in the service sector (6.8 percent during 1992-2004 and 7.8 percent during 1995-1999) begs the question of why hasn't urban poverty declined further.** Rapid urban population growth due to rural-urban migration significantly eroded the benefits from overall growth in the service sector. Average urban population growth over the past decade and a half is estimated at about 4.7 percent. As a result, service sector (or urban income) growth in per capita terms is substantially less (2.1 and 3.1 percent during 1992-2004 and 1995-1999 respectively). According to the 2000

Demographic Health Survey (DHS) total fertility rate (TFR) of Addis Ababa (which accounts for about 30 percent of Ethiopia's urban population) is currently estimated at 1.9 children per woman and is therefore slightly below replacement level, whilst the TFR for urban Ethiopia as a whole is only 3.3.<sup>24</sup> This suggests that rural to urban migration must be important to explain urban population growth of 4.7 percent.<sup>25</sup> Furthermore, labor force participation rates in urban areas are observed to be low and declining, suggesting discouraged workers and a growing number of urban residents joining the masses of the poor.<sup>26</sup>

**1.32 Third, not only was economic growth in urban areas substantially eroded by urban population growth, the quality and spatial allocation of growth in the service sector over the past decade was not always conducive to urban poverty reduction.** Growth in the service sector has largely been driven by Government spending – a boost in defense expenditures during the second half of the 1990s and a rapid expansion of spending in poverty related sectors (especially education) since 2000 (see Table 1.7). While growth in defense spending is not conducive to rapid poverty reduction in general, it is also unlikely to lead to rapid urban poverty reduction, which helps explain why despite 3.1 percent per capita growth in the service sector between 1995 and 1999, urban poverty did not decrease.

**1.33 Fourth, the more recent increase in Government spending on poverty sectors had a deliberate rural bias and will affect income poverty with a lag** (Table 1.7). In particular, the Government's focus has been on increasing the reach of agricultural extension, and access

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<sup>24</sup> For comparison, the national TFR is 5.9 and national population growth is estimated at 2.5 to 3.0 percent depending on the source.

<sup>25</sup> Nonetheless, the internal consistency of the available statistics regarding rural and urban population growth and fertility will need to be further investigated. According to the 1999 Labor Force Survey (CSA, 2000), a person is considered a non-migrant if s/he has been continuously residing in the same town or if s/he has been continuously residing in the rural part of the same woreda where he was born. Migrants are further divided in long term and recent migrants. Recent migrants are migrants who migrated during the last five years prior to the survey date. While 19.6 percent of the population (i.e. 10.7 million people) was considered a migrant in 1999, only 4.3 percent of the total population was estimated to be a recent migrant (or 2.3 million people). Closer investigation of the recent migration patterns show that most recent migration has happened within rural areas (38 percent). It was further found that about 24 percent of all recent migrants (about 0.5 million people) moved from rural to urban areas, while 16 percent moved back from urban to rural areas. This implies that net urban in-migration from rural areas is only eight percent (24 - 16 percent), or only 176,000 people (=2.2 million\*0.08) between 1994 and 1999. In 1999, the urban population has been estimated at 7.35 million (and the country's total population at 54.4 million). Given an urban population growth rate of 4.7 percent, this would imply that urban population expanded by 1.5 million people and that only 12 percent (176,000/1.5 million) of this expansion was due to net rural in-migration. This seems at odds with the estimated total fertility rate of 3.3 which has been survey based, unless the urbanization rate is actually much lower. It is also possible that urban to rural migration has been overestimated. According to the 1994 population census it was only seven as opposed to 16 percent. In sum, these discrepancies underscore the need for an urgent update of the population census and more in-depth investigation of migration patterns in Ethiopia.

<sup>26</sup> Urban migrants tend to be male, between 20 and 49 years old and mostly work in services and commerce if they are low-skilled, or remain unemployed during the first years of their arrival in urban centers if they are better educated (Admassi, Guta and Ayalew, 2003). As evidence of queuing for better public jobs, workers with diplomas have unemployment rates comparable to those with general education, and unemployment duration tend to be long—a mean of 4 years. Nearly 75 percent of the urban employed hold low skill jobs. In 2002, urban unemployment was estimated to be around 25 percent (Commander, 2004). A more detailed profile of urban labor markets and the position of migrants will be provided in the upcoming Labor Market ESW prepared by a World Bank Team.

to primary education and health, in rural areas. By contrast, urban areas (also known as municipalities) were expected to provide these services from their own revenues, except for rare cases like the city of Addis Ababa, where investments were insufficient to keep up with the growing population. Therefore, it can be argued that in the absence of agricultural growth per capita, any observed poverty reduction in rural areas probably resulted from better access to services and infrastructure, and the slight increase in female adult education. (see Chapter 4, Table 4.2). The increase in urban poverty, together with the observed deterioration in access to public services (health, public transport, drinking water) in urban areas (Chapter 4, Table 4.2), is consistent with the rural bias in public investment. The latter finding is also consistent with increasing pressure on public services observed in urban areas due to rural-urban in-migration. Moreover, it must be emphasized that some investments will take time before the effects are felt in terms of poverty reduction—especially investments related to education, but also investments related to road construction. In sum, the more recent increase in public spending on poverty sectors was unlikely to have heavily affected urban poverty because many of the additional investments were geared towards rural areas and several of these investments take time to pay off in terms of income poverty reduction. Nonetheless, the increased spending on poverty sectors holds hope for the future (both for rural and urban poverty reduction) as indicated by the micro-simulations in Chapter 6 about the expected poverty reduction from these investments.

**Table 1.7: Index of real government expenditure and share in percent of GDP**

	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05
	Actual	pre act	pre act	pre act	Con. Budget	Prov Budget
<b>Index of Expenditure</b>						
Total Government Expenditure	100.0	93.5	103.5	112.8	116.2	124.5
Defence	100.0	48.9	38.6	32.6	40.0	38.2
Debt servicing	100.0	89.9	83.6	95.6	105.5	112.5
Poverty sectors including Food Security	100.0	135.3	159.5	170.6	229.2	257.3
Poverty sectors Excluding Food Security	100.0	135.3	159.5	170.5	210.2	221.2
Agriculture & natural resource	100.0	123.2	151.3	141.4	155.8	187.3
Roads	100.0	137.4	166.8	183.1	248.2	195.1
Education	100.0	133.0	152.6	193.4	219.6	263.0
Health	100.0	168.1	184.5	152.2	242.9	239.1
Relief related aid/food aid	100.0	91.2	93.8	254.0	73.6	72.4
Other sectors	100.0	126.1	165.2	157.2	154.0	181.5
<b>In percent of GDP</b>						
Total Government Expenditure	32.6	29.8	34.0	35.9	32.0	31.9
Defence	12.8	6.1	5.0	4.1	4.3	3.8
Debt servicing	2.3	2.0	1.9	2.1	2.0	2.0
Poverty sectors including Food Security	9.1	12.0	14.5	14.8	17.5	18.3
Poverty sectors Excluding Food Security	9.1	12.0	14.5	14.8	16.0	15.7
Agriculture & natural (water) resource	2.7	3.3	4.1	3.9	3.6	4.0
Roads	2.2	3.0	3.6	3.5	4.6	3.3
Education	3.1	4.0	4.7	5.7	5.7	6.4
Health	1.1	1.8	2.0	1.8	2.2	2.0
Food security	0.0	0.0	0.0	0.0	1.4	2.6
Relief related aid/food aid	2.0	1.8	1.9	5.1	1.3	1.2
Other sectors	6.4	7.9	10.6	9.8	8.3	9.1

Source: World Bank, 2004d

1.34 **Fifth, the benefits from economic growth which reached the urban centers were likely concentrated among a limited number of citizens.** Indeed, only a small fraction of the population in urban areas may have benefited from growth in urban areas, which has been largely driven by growth in the Government sector, as only 20 percent of all urban employees above the age of 10 years work in the public sector.<sup>27</sup> And this is under the extreme and unlikely assumption that growth was uniformly distributed among public employees. This observation is consistent with the reported rise in urban inequality.

## 1.2 The Face of Hunger and Deprivation

1.35 The overall picture of limited decline in poverty masks a wide variety of different experiences. In this section we disaggregate the poverty numbers further, and briefly review some key defining characteristics of the poorer sections of the population. We look in particular at how poverty incidence differs across educational attainment of the household, its livelihood system and its location.

### 1.2.1 Education and poverty

1.36 **Despite an overall lack of movement in poverty reduction, there is a surprising diversity among the Ethiopian population, with the less educated having a particularly high likelihood of being poor.** Table 1.8 presents the poverty rates among different socio-economic groups in 1999 using the lower poverty lines.<sup>28</sup> Clearly, the more educated a household head, the less likely his household is in poverty. While education is generally observed to be important in developing countries, the probabilities of being poor among households with educated versus uneducated households are quite stark. We will return to this in Chapter 4.

**Table 1.8: Incidence of poverty by education in 1999**

Socio-economic characteristics	Poverty Ratio
Incomplete Primary education	0.32
Completed Secondary	0.21
Completed postsecondary	0.09

*Source: Own calculations from 1999 HICES.*

### 1.2.2 Livelihoods and poverty

1.37 **Poverty incidence among households employed in non-agriculture is substantially lower.** Poverty incidence also differs widely across people's livelihoods. As indicated in Table 1.9 households employed in the non-agricultural sector tend to be less poor than those in agriculture. The policy implications of this finding will be discussed at length in Chapter 6.

<sup>27</sup> CSA, 2003.

<sup>28</sup> Using the 1995 data or the upper poverty lines yields the same insights.

**Table 1.9: Consumption and poverty incidence by sector of employment of household head in 1995 and 1999**

Sector of employment of household head	1995			1999		
	Population share (%)	Consumption per adult equivalent	Poverty incidence (%)	Population share (%)	Consumption per adult equivalent	Poverty incidence (%)
Agriculture	85	1592	40	84	1600	38
Industry	1	1980	32	6	1707	43
Services	14	2201	28	10	2113	35

*Source: Own calculations from 1995 and 1999 HICES.*

**1.38 Within agricultural households, cash crop producers are better off.** Even in rural areas families undertake a variety of activities. Some grow grains, some keep livestock and other grow crops for export or cash. Table 1.10 illustrates the incidence of poverty among these various livelihood strategies, in particular the agriculturalists. Overall, cash crop producers have lower rates of poverty than food crop producers. Further decomposition shows that among the cash crop producers, chat producers were the least poor, though their poverty rates increased substantially between the two periods. Poverty among tea producers however declined. The poverty rates among the coffee producers were even slightly higher than among the rest of the population (Table 1.10).

**Table 1.10: Ethiopia, incidence of poverty by livelihood<sup>29</sup>**

Type of livelihood	1995	1999
Mainly agriculture	0.41	0.38
Mainly cash crop producers	0.29	0.26
Coffee producers	0.42	0.40
Chat producers	0.19	0.33
Tea producers	0.41	0.24

*Source: Own calculations from 1995 and 1999 HICES*

**1.39** While not representative of coffee/chat growing households at large—for example, the sample excludes any sites from Keffa and only one site from Hararghe, both places of high value coffee production—the five year ERHS panel offers a snapshot of the fortunes of people engaged in such livelihoods. Two-thirds of the households in the ERHS sample grow neither coffee nor chat. About 21 percent grew coffee (of which 80 percent are from three villages: one in Sidamo, one in Kembata and one in Hadiya), seven percent grew chat (mostly in a village in Hararghe) and six percent grew coffee and chat (mostly in Gurage). The results show that coffee growers in this sample are relatively poorer than non-coffee growers, whether they have coffee alone or with chat, consistent with the nationally representative household surveys. Similarly, chat growers appear better off than other farmers.<sup>30</sup> Table 1.11 also shows that non-coffee/chat growers have managed to increase mean consumption levels and reduce poverty between 1994 and 1997, but that after this the decline in poverty stagnated. However, for many of the chat and coffee farmers any gains between 1994 and 1997 appear to have been wiped out.

<sup>29</sup> Uses lower poverty line. Using upper poverty line gives same results.

<sup>30</sup> See Dercon, 2004 for details.

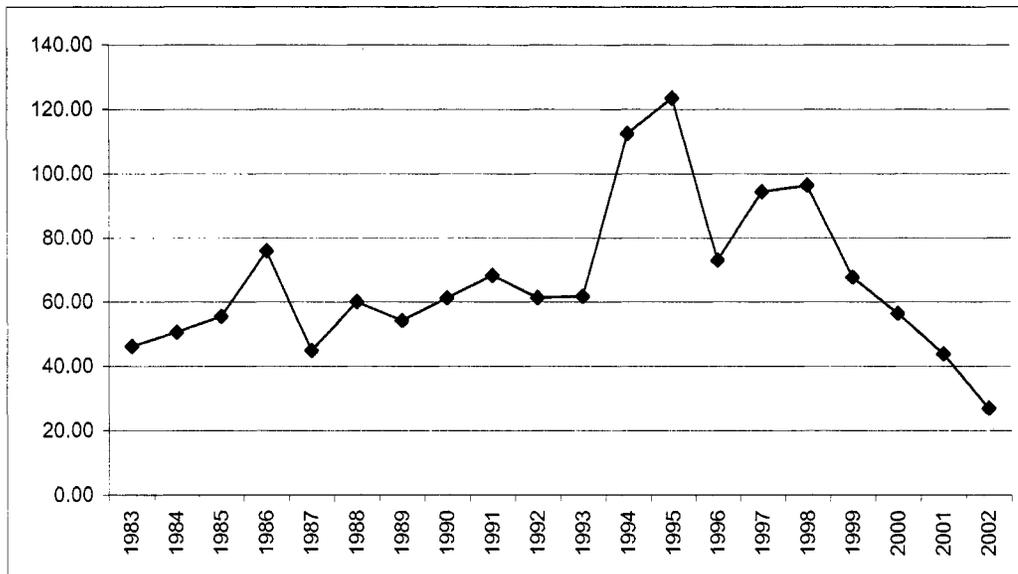
**Table 1.11: Evolution of poverty among coffee and chat growers, 1995-1999**

	Real consumption per adult equivalent per month (Birr)			Poverty incidence (%)		
	1994-5	1997	1999	1994-5	1997	1999
Neither coffee or chat (66%)	97	123	110	27	20	18
Coffee only (21%)	70	89	67	44	35	44
Chat only (7%)	104	136	115	12	10	20
Chat and coffee (6%)	65	84	80	40	35	38
Group Total	90	115	100	30	23	25

Source: *Ethiopian Rural Household Survey*

1.40 While coffee prices did indeed decline substantially between 1995 and 1999, they were also at an historical peak in 1995, while prices in 1999 were around their historical average. This may explain why we did not observe an increase in poverty among coffee growers in the national survey. Nonetheless, the high poverty incidence among coffee producers in Ethiopia is somewhat puzzling. Could it be related to the size of their landholdings? While coffee production may be a more productive activity than cereal production, landholdings among coffee growers are on average only 66 percent as large as those among non-coffee producers, and more than 30 percent have less than 0.07 ha per person. The reasons behind the large poverty incidence among coffee growers deserves further investigation, especially in light of the collapse in coffee prices over the past few years. The price paid to producers of coffee dropped from about 70 US ct. per pound in 1999 to an historical low of about 30 US ct. per pound in 2002 (Figure 1.5). About 25 to 30 percent of rural households grow coffee, although some of them only for home consumption.

**Figure 1.5: Producer price of Arabica coffee (US ct. per lb)**



Source: *International Coffee Organization*

### 1.2.3 The geography of poverty

1.41 **Geographically, poverty is widespread.** The majority of the poor live in the four large regions (Tigray, Amhara, Oromiya and SNNP) and Addis Ababa. Together, these regions account for 85 percent of the population of the country. As Table 1.12 shows, the highest rates of poverty among the major regions are found in Tigray and SNNP. These regions are characterized by lower than average arable land per capita, underscoring the role of land scarcity in determining poverty. But poverty rates are also high in the city of Dire Dawa, and in the peripheral, sparsely populated regions of Benishangul-Gumuz and Gambela. By 1999, only Amhara had experienced a substantial decline in poverty. Information about average expenditures and food expenditure shares by region is reported in Table A.1.4.

**Table 1.12: Poverty incidence in Ethiopia by administrative region 1995-1999**

Region	Lower poverty rates		Upper poverty rates	
	1995	1999	1995	1999
Tigray	0.45	0.49	0.66	0.69
Afar	0.20	0.43	0.26	0.63
Amhara	0.45	0.36	0.65	0.55
Oromiya	0.28	0.32	0.46	0.52
Somali	0.08	0.15	0.18	0.33
Benishangul-Gumuz	0.49	0.54	0.72	0.71
SNNP	0.49	0.48	0.67	0.65
Gambela	0.35	0.66	0.48	0.79
Harari	0.25	0.29	0.43	0.47
Addis Ababa	0.34	0.41	0.50	0.57
Dire Dawa	0.47	0.49	0.65	0.68

*Source: Own calculations from 1995 and 1999 HICES.*

### 1.2.4 Pastoralists

1.42 **Pastoralists tend to be poorer and more vulnerable.** There is little statistical information on pastoralists, but it is commonly held that pastoralists tend to be poorer and more food insecure than their highland, humid and sub humid, counterparts, to be less literate, to enjoy less access to public infrastructure and services and to depend disproportionately on food aid.<sup>31</sup> Despite the lack of representative statistical information, the main characteristics of their livelihoods are well documented in a variety of qualitative studies. Pastoralists face a myriad of risks, with drought and losses of herd being pervasive concerns. Lack of access to economic infrastructure compounds the challenges pastoralists face when dealing with the consequences of these shocks: markets for livestock are little developed so that markets are fragmented and prices are very variable in space and time. The weakness of livestock markets also implies that pastoralists lack a rapid way of replenishing their stocks after a crisis. Violence linked to land access issues and as a stock replenishment strategy is quite common.

<sup>31</sup> Smith, Barrett and Box, 2001, p. 3.

1.43 **Pastoralists are increasingly entrapped in poverty...** Pressures from population growth, the increasing share of land which becomes inaccessible due to either the establishment of private property rights or agriculture, and more generally institutional limits to herd mobility, are further putting pressures on land. They lead to increased livestock density, land deterioration, and thus increased risks. These factors can combine to entrap poor pastoral households: impoverished households whose herd size becomes too small to support their livelihoods following a shock, move closer to towns.

1.44 **... and are moving to towns.** Towns offer food aid distribution centers, easier access to services and potentially more income earnings opportunities, though these seem to be more easily available to those who have savings that can be used as starting capital. The concentration of livestock in peri-urban areas increases the likelihood that the land will not be able to support the animal stock, resulting therefore in further impoverishment. Impoverished pastoralist household end up being increasingly dependent on external assistance, generally provided by food aid. Informal insurance systems no longer seem to offer appropriate help.<sup>32</sup>

### 1.3 Risk, Vulnerability and Poverty

1.45 **Vulnerability to poverty is high.** While there is some consensus on how to measure poverty and inequality, the academic community has only recently started to develop direct and comprehensive measures of household vulnerability. The merits and weaknesses of these different methodologies are still debated and empirical applications are scarce.<sup>33</sup> One view considers vulnerability as the probability of becoming poor in the future (irrespective of one's welfare now). An empirical application of this methodology to cohorts of the Ethiopia 1995 and 1999 HICES shows that 61 percent of the Ethiopian population have a larger than 50 percent chance of falling below the poverty line in the future. This means that, holding current endowments constant, about two out of three Ethiopians will be poor at least five out of the coming 10 years.<sup>34</sup>

1.46 **Average poverty numbers hide a substantial amount of moving in and out of poverty.** In the absence of direct empirical estimates, household vulnerability is often also gauged by the extent of movement in and out of poverty over time. The substantial amount of churning reported in the HICES cohort study is also found in the ERHS (Table 1.13). Although a substantial number (22 percent) moved out of poverty between 1994 and 1999, 16 percent fell into poverty in this period.<sup>35</sup>

**Table 1.13: Poverty dynamics in ERHS between 1994 and 1999**

Cell%	Non-Poor 1999	Poor 1999	Total
Non-Poor 1994	53	16	70
Poor 1994	22	9	30
Total	75	25	100

Source: Dercon, 2004

<sup>32</sup> Lentz and Barrett, 2004.

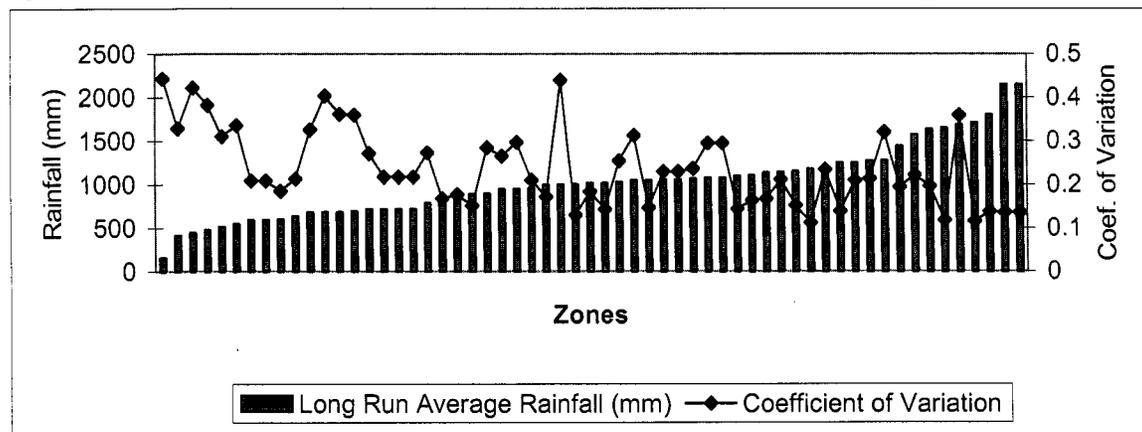
<sup>33</sup> See Christiaensen and Subbarao (2005) for a review of the different methodologies.

<sup>34</sup> World Bank, 2004e.

<sup>35</sup> It is unlikely that these movements are largely driven by measurement error. See Dercon and Krishnan (2000a) for a discussion.

**1.47 Ethiopians face multiple risks.** To further gauge people’s vulnerability, we also explore their risk environment and the extent to which people can cope with it. Risks arise from many sources—natural (droughts, floods), economic (prices), institutional (land tenure insecurity), and political (civil conflict and war). Most importantly, Ethiopian producers have to deal with highly volatile rainfall and frequent droughts. As an example, between 1978 and 1998 alone, there were 15 droughts (and famines) that have led to the displacement, injury or death of more than one million people.<sup>36</sup> Moreover, the burden of low average rainfall is often exacerbated by high volatility in the rainfall patterns as illustrated in Figure 1.6.<sup>37</sup>

**Figure 1.6: Long run average rainfall and rainfall variation across woredas in Ethiopia**



Source: Own calculations

**1.48 Drought shocks often lead to severe harvest failure and have long-lasting effects.** Careful analysis of the evolution of poverty between 1989 and 1995 among households in six villages in Ethiopia indicated that while poverty overall declined by 29 percent, it would have declined by about 39 percent in the absence of rainfall shocks. Indeed, about 78 percent of the households in the ERHS reported harvest failure, most often caused by rainfall failure, as the most common type of hardship.<sup>38</sup> Other ways in which drought risks are experienced include loss of livestock (including oxen), and as food and water insecurity. Empirical evidence further suggests that in addition to the immediate negative impacts of shocks on consumption, the detrimental effects can be long lasting. Again, among the households in the ERHS data, it has been shown that 10 percent lower rainfall 4-5 years earlier led to a reduction in current growth rates of one percent. Even more strikingly, the impact of the 1984/85 drought was found to affect consumption growth throughout the 1990s. Households at the 75<sup>th</sup> percentile of consumption loss during the 1984/5 famine experienced on average 16 percentage points less growth during the 1990s than those at the 25<sup>th</sup> percentile.<sup>39</sup> Clearly, not only are households’ livelihoods exposed to drought shocks, they are often unable to cope with it ex post, rendering them very vulnerable. We will present further evidence on the pervasive negative effects of shocks on well-being in the remainder of the report (Chapters 4, 8 and 9).

<sup>36</sup> World Bank, 2000.

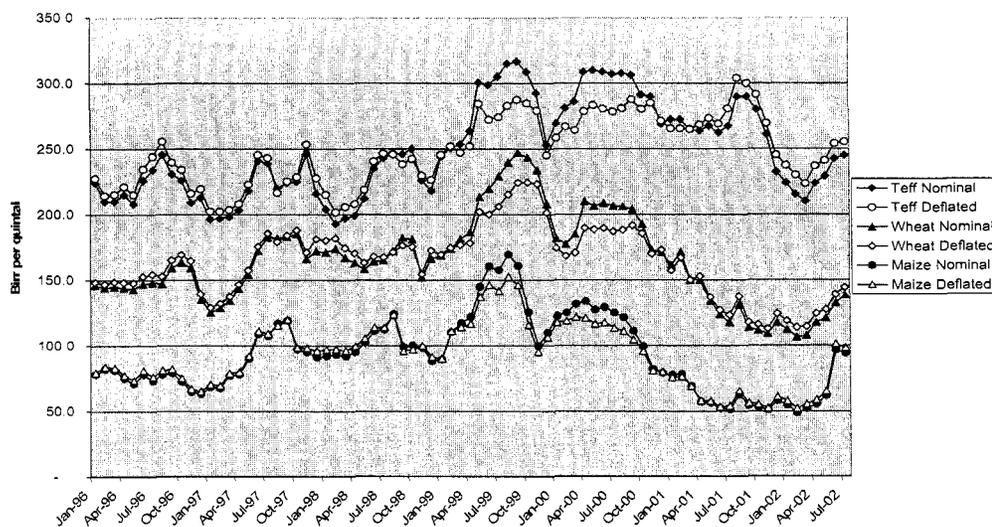
<sup>37</sup> The observed correlation between average rainfall and the coefficient of variation is  $-0.49$ .

<sup>38</sup> Dercon, 2002.

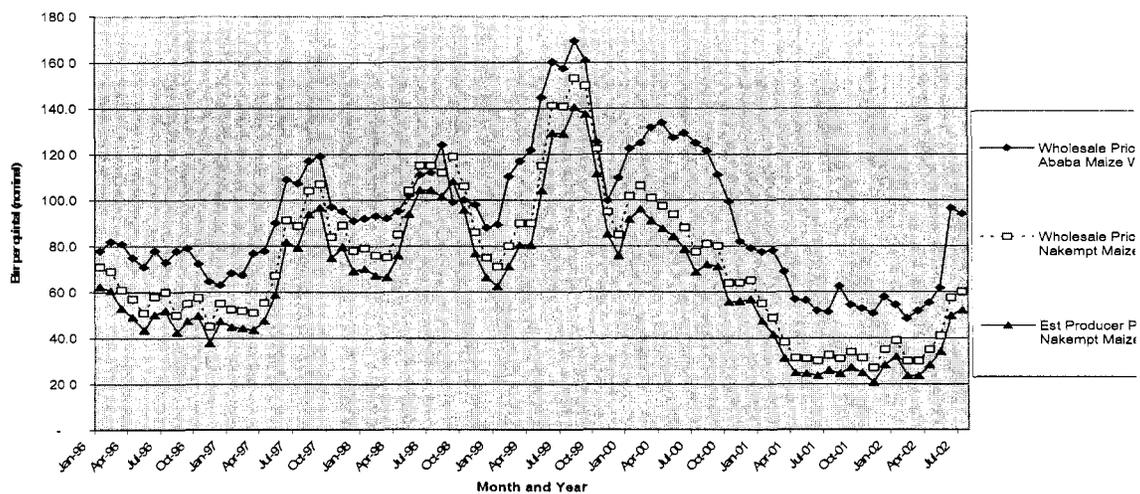
<sup>39</sup> Dercon, 2004.

1.49 **Intra-annual price volatility can be high.** Figure 1.7 shows nominal and deflated cereal prices at the Addis Ababa wholesale market. The main observation is that cereal prices, which constitute the main staple of the population and particularly of the poor, display wide intra-annual variations. For instance, in just a few months, July 1998 to October 1999, practically all three major cereal prices first increased by over 60 percent (July 1998-July 1999) and then declined by about the same amount. Maize prices are even more volatile (Figure 1.8). Such large swings in prices, especially cereal prices, create large uncertainties in the market, induce risk-aversion and therefore loss of production and poverty reduction.

**Figure 1.7: Nominal and deflated cereal prices – Addis Ababa wholesale**

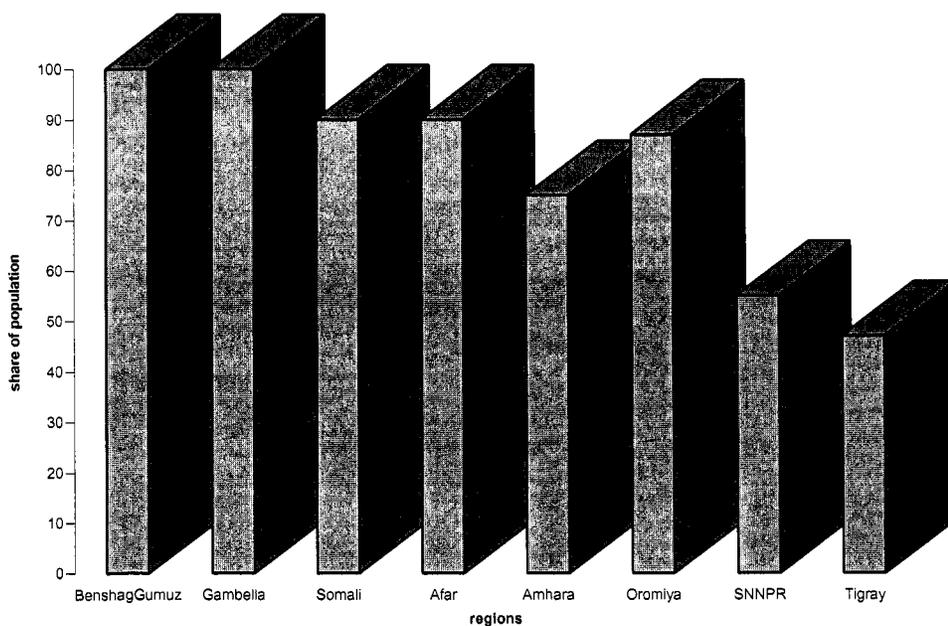


**Figure 1.8: Maize price structure – Addis Ababa and Nakempt**



**1.50 Malaria presents another pervasive risk.** About 75 percent of the 60 million Ethiopians in 2000 were estimated to live in malaria infected woredas (World Bank, Roll Back Malaria, 2003). Figure 1.9 displays the distribution of malaria risk across regions in Ethiopia. All the populations in Benishangul/Gumuz and in Gambela regions are considered to be at risk since all live in malarious woredas. This is followed by Somali and Afar, both of which have very high proportions (90 percent) of their populations at risk of malaria (see also Appendix 2, Figures A.1.1-A.1.2). Malaria is third only to acute respiratory illness and perinatal disease in terms of its contribution to the disease burden in the country. Over 10 percent of the total discounted years of life lost due to premature death is from malaria.<sup>40</sup> We return to the estimated effect of malaria and illness shocks more broadly on consumption and poverty in Chapter 4.

**Figure 1.9: Share of population at risk of malaria in Ethiopia**



**1.51 Ethiopia is home to one and a half million people living with AIDS.**<sup>41</sup> The HIV/AIDS infection rate has risen from a low base in the mid-1980s to 4.4 percent in 2003 with recent signs that the increase may be leveling off, especially in urban areas. The HIV/AIDS incidence among adults was estimated at 12.6 percent in urban areas in 2003 compared to 13.4 percent in 1995. It is estimated at 2.6 percent in rural areas in 2003 compared to 0.8 percent in 1995. There are an estimated 539,000 AIDS orphans. These orphans are a particularly vulnerable group. Only 41 percent of maternal AIDS orphans living in foster families find feeding conditions with their foster families satisfactory, which is significantly lower than the percentage of orphans not infected with HIV/AIDS. The percent

<sup>40</sup> See Tables 1 and 11, in Geresu, 1996.

<sup>41</sup> FDRE, 2004.

of AIDS orphans engaged in income-generating activities increased from nine percent to 23 percent after the mother's death.<sup>42</sup>

**1.52 The geographical and demographic characteristics of the epidemic bode ill for its impact on the economy and poverty.** Urban rates of infection are twice those in rural areas, with 15.6 percent prevalence in Addis Ababa. Based on data collected by the Ministry of Health, about 91 percent of infections occur among adults between 15 and 49 years old, the most economically productive segment of the population. With (relatively) well-educated urban adults hit hardest by the disease, compounded by the probable negative effects on orphans' education, the impact on the country's stock of human capital threatens to be severe. As it stands, AIDS imposes, and will continue to impose, a burden on the limited capacity of Ethiopia's health system, as well as on the surviving families to care for the sick and the orphaned. While awareness about the disease has increased and some change in behavior has been observed over the past couple of years, HIV/AIDS continues to pose a significant threat to the government's development efforts and continued and concerted actions as well as strong leadership will be needed to prevent the HIV/AIDS epidemic from turning into a disaster.

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<sup>42</sup> Bhargava, 2005.

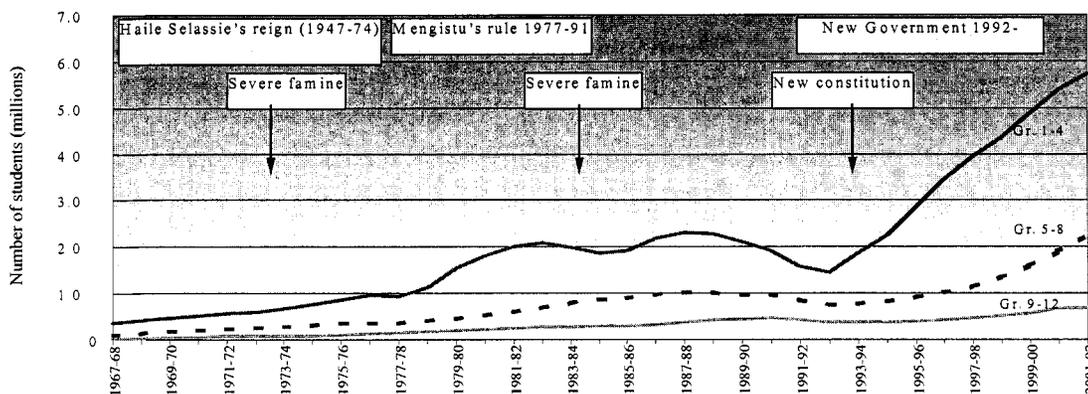
## CHAPTER 2. NON-MONETARY DIMENSIONS OF WELL-BEING—A CAPABILITY PERSPECTIVE

2.1 In this chapter we look at poverty from a capability perspective, and examine how people have fared along dimensions which could be considered intrinsically (as opposed to instrumentally) valuable. In particular, we gauge overall progress in people’s educational attainments, their nutritional and health status, i.e. their human capabilities (Section 2.1), and explore how able people are in making effective choices to shape their lives, i.e. their level of empowerment (Section 2.2). In contrast to lackluster advancement in terms of monetary measures of well being and poverty, Ethiopia has made significantly more progress in improving human capabilities, with rapid improvements in education and a slower but positive evolution in health and nutrition. Yet the full effect of recent government reform and actions to empower citizens as a means of poverty reduction have yet to be fully felt by citizens, and the empowerment level of Ethiopian citizens, especially of women and pastoralists, remains low.

### 2.1 The Evolution of Human Capabilities

2.2 **Starting from a low base, Ethiopia’s enrolment expansion at all levels of education since 1994 has been impressive.** Primary enrolment (grades 1-4) has gone up from less than two million children in 1991 to about six million in 2001-02, almost tripling the number of students in the first level of primary school. In the same period, enrolment in the second level of primary (grades 5-8) rose from under one million to over 2.5 million (see Figure 2.1). As a result, gross enrolment in grades 1-8 has increased from 24 percent in 1994 to 62 percent in 2001-02. Similarly, while secondary and higher education start from even lower bases than primary education, their rate of expansion has also been phenomenal: secondary education rose by 40 percent between 1994 and 2001-02 while university enrolment more than doubled.

**Figure 2.1: Enrollments in grades 1-12, Ethiopia, 1967-2002**



Source: World Bank, 2004a

**2.3 Substantial gender and regional differences in education remain.** Clearly, Ethiopia has accomplished much in educational attainment in the last decade. This is, by far, the country's most impressive and far-reaching achievement in non-monetary measures of well-being. Key remaining areas for improvement include the large gender gap in enrolment, which while having narrowed, remains substantial. The ratio of girls' over boys' gross primary school enrollment is now about 0.8, though only still 0.67 for secondary education (grades 9-12) and merely 0.21 for higher education. Note furthermore that the relatively favorable position of girls today is the culmination of progress over more than 30 years with girls in 1967/8 accounting for just 30 percent of the pupils in grades 1-4 to reach 42 percent in 2001/2. The evidence indicates that the main source of differences in enrolment between boys and girls is at entry, since once in, the attrition (drop-out) rates between boys and girls are the same.<sup>43</sup> The large regional differences in educational attainment must also be bridged. Afar and Somali, the two pastoralist regions, both have enrolments not exceeding 15 percent.

**2.4 Unlike education, progress in most of Ethiopia's health outcomes has been slower.** For instance, life expectancy has shown no improvement between 1996 and 2000 (Table 2.1). Instead, it actually declined from 44 years to 42. Levels of maternal mortality are estimated at 871 deaths per 100,000 live births, potentially a huge improvement since 1995<sup>44</sup> but still among the highest in Africa. This contributes directly to the observed low life expectancy. While the urban groups have better access to health care, the problem of few professional birth-attendants persists everywhere in the country. Nearly three-quarters of pregnant women receive no antenatal care.

**2.5 Under-five mortality dropped from 216 per 1,000 live-births to about 169 per 1,000 live-births** between 1984 and 1999/2000. Effectively, this means that Ethiopia has been successful at reducing the probability of a child dying before his/her fifth birthday from 21.6 percent in 1984 to 16.6 percent in 2000. While this is a significant achievement, a child mortality rate of 166 deaths per 1,000 live births is still unacceptably high. There is very little difference in outcomes between the very poor (24 percent child mortality) and the very rich (around 22 percent child mortality). Too many children are dying needlessly.

**Table 2.1: Selected health indicators for Ethiopia, 1984-1999/2000**

Health indicators	Census		Survey	
	1984	1994	1995/96	1999/00
Overall life expectancy (years)	42 <sup>a)</sup>	45 <sup>c)</sup>	44	42
Total fertility rate (births per woman over reproductive lifespan)	7	6.4 <sup>b)</sup>	6	5.9
Maternal deaths per 100,000 live births			1800 <sup>d)</sup>	871
Child mortality rate (deaths per 1,000 live-births)	216			169

a) refers to 1982.

b) refers to 1990.

c) refers to 1992.

d) the range of uncertainty for this estimate is particularly wide, from 790 to 3,200, and the reduction by 2000 should be interpreted in this context.

Source: *CSA and ORC Macro, 2001; World Bank, 2003a; World Bank 2004b*

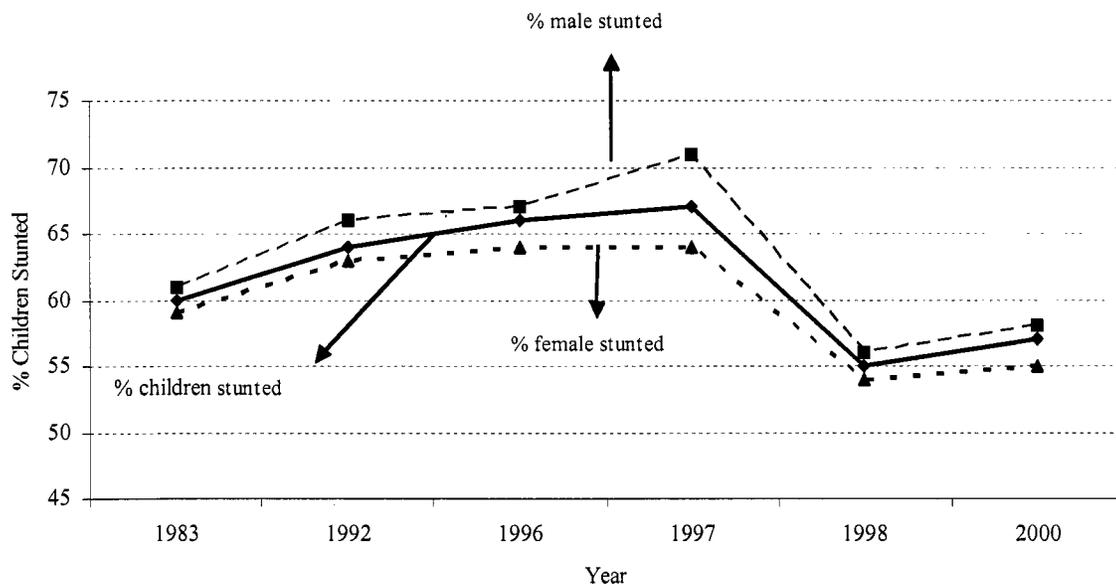
<sup>43</sup> World Bank, 2004a.

<sup>44</sup> Data quality leads us to question the actual size of this improvement

2.6 **Accessibility to health care services has improved, but remains poor.** Only about 50 percent of the population live less than seven kilometers away from the nearest health care centre, which is a big problem considering that roads are not available everywhere and few are useable in all weather conditions, and that many of the poor do not own transport animals or vehicles to get to these facilities. This is particularly pronounced in pastoralist areas. According to a World Health Organization report, only about five percent of the Afar population had access to proper health care, with 2 hospitals in the entire region.<sup>45</sup>

2.7 **Some progress has been made in reducing child malnutrition.** The positive news for Ethiopia is that the prevalence of child stunting, measured as an abnormally low height-for-age score, an indicator of cumulative (long term) poor nutritional status, has dropped below 60 percent from levels as high as 67 percent in 1997 (Figure 2.2). Consistent with other evidence from Sub Saharan Africa, prevalence of stunting is lower among boys than among girls<sup>46</sup>. Furthermore, the average rural child has a much higher chance of being malnourished over the long run than the average urban child. However, measures of child wasting as captured by low weight for height scores, a measure of short run malnutrition, did not improve (see Figure 2.3).

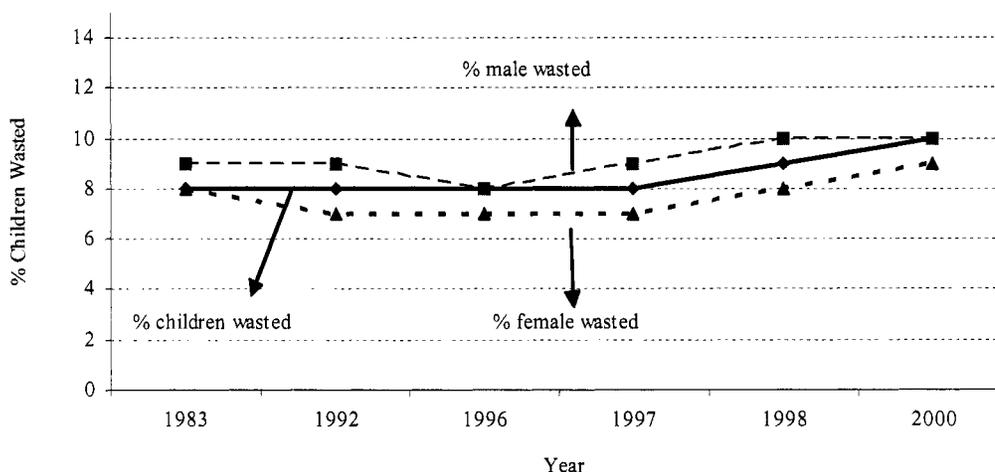
Figure 2.2: Evolution of child stunting in Ethiopia 1983-00



<sup>45</sup> Cited in UNOCHA, 2002.

<sup>46</sup> Svedberg, 1990.

Figure 2.3: Evolution of child wasting in Ethiopia 1983-00



**2.8 Child malnutrition remains among the highest in Sub-Saharan Africa, locking another generation into a nutrition-poverty trap.** In 2000, the Ethiopian rates for pre-school child stunting were still 18 percentage points above the average of 39 percent in Sub-Saharan Africa. Severe malnutrition, especially for children between six and 36 months old, lowers cognitive development and the ability to learn, which in turn decreases the long term accumulation of human capital and lifetime earnings. Clearly, any strategy for reducing poverty must include measures to reduce child malnutrition as a core element. Ethiopia-specific evidence suggests that imparting maternal nutritional knowledge can be an effective and timely complementary strategy to reduce malnutrition in addition to raising incomes and increasing female formal education.<sup>47</sup>

**2.9 Progress has been made in providing access to safe drinking water, though little improvement has been observed concerning sanitary conditions.** The population share with access to safe water (tap or protected well) increased from 21 percent to 27 percent between 1995 and 1999 (Table 2.2). Nonetheless, about one third of the households continue to rely on open rivers and lakes as sources of water. Sanitation conditions are worse. In 1995, about 84 percent of the population disposed of waste by throwing it away (Table 2.2). Some of that waste was used as fertilizer, a dangerous practice in terms of spreading disease. The situation has changed little since 1995.

<sup>47</sup> Christiaensen and Alderman, 2004.

**Table 2.2: Sources of drinking water and use of waste disposal facilities, 1995-1999**

% Population Using Facility/Method in:	1995	1999
<b>Water</b>		
Public or private tap	14.87	15.88
Protected well	5.74	11.03
Unprotected well	19.06	38.58
Unsafe River or Lake	46.39	33.85
<b>Sanitation</b>		
Disposal vehicles / containers	2.71	2.57
Dug-outs	3.63	3
Throw away	84.27	47.76
Use as Fertilizer	-	42.12
Burn	-	3.35
Other	9.35	1.1

Source: FDRE, 1997 (1995/96 WMS), and FDRE, 2001 (1999/2000 WMS)

**2.10 It may be noted that these observed improvements, especially in education but also in health outcomes, seem at odds with the earlier reported limited decline in monetary poverty.** In Chapter 4, we do indeed find substantial economic returns for example to education. Yet, most of the reported improvements in human capabilities are rather recent and concern children (primary enrollment rates, child mortality, and child malnutrition). Thus, it will take some time before the benefits are felt in terms of poverty reduction. In Chapter 6, we will simulate the poverty gains to be expected from these improvements in human capabilities.

## **2.2 The Status of Empowerment in Ethiopia**

**2.11 Good governance and empowerment are among the eight major thrusts of the GoE's Sustainable Development and Poverty Reduction Program (SDPRP),<sup>48</sup>** reflecting the comprehensive and multi-dimensional view the government takes of people's well being—or lack thereof. In this view, evaluating people's well-being cannot be reduced to only reviewing their material welfare (as reflected by their income), or their human capabilities, but also includes exploring their status of empowerment. To address this issue, this section draws largely on qualitative information, in line with the nature of the topic, but to the extent possible it will also use statistically representative quantitative data to strengthen the insights obtained from analyzing the qualitative information base. Because data collection systems have traditionally been geared toward collecting information on monetary indicators of well-being and indicators of human capabilities, the data base to analyze empowerment, though growing, is unfortunately not as rich and systematic as that available to assess improvements in monetary indicators of well being and human capabilities. Nonetheless, important insights and hypotheses regarding the empowerment status of particular groups and

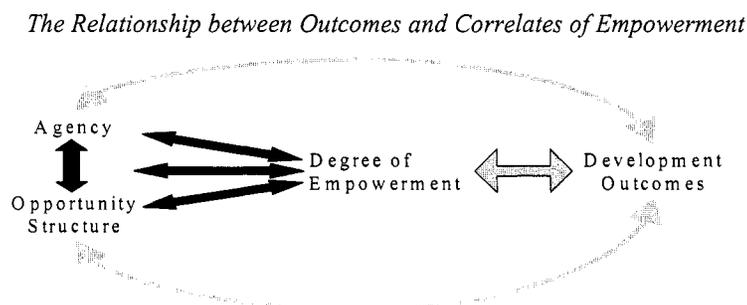
<sup>48</sup> "The broad thrust of the SDPRP [includes]: Improvements in governance to move forward in the transformation of society, improve empowerment of the poor and set frameworks/provide enabling environment for private sector growth and development (p 40)... To eradicate poverty, correct policies and good governance equipped with efficiency and effectiveness are needed. ...A democratic system, which is based on the realization of people's participation in the development process, and which ensures good governance, is a vital instrument for combating poverty and backwardness (section 6.3)" (FDRE, 2002).

people more generally can already be derived from the available body of information and knowledge. Moreover, this situation is not unlike the one encountered less than a decade ago when studying well-being from a monetary perspective. The fact that a rich and comprehensive information base to track monetary indicators of well-being has been established in less than a decade<sup>49</sup> actually holds promise that more systematic information on people's empowerment situation will rapidly become available.

**2.12 Empowerment is the process of enhancing an individual's or group's capacity to make choices and transform those choices into desired actions and outcomes.** The status of a person's empowerment is the outcome of the interaction between the person's ability to make meaningful choices (i.e. his *agency*), and the context within which the person operates (i.e. his *opportunity structure*) (see Box 2.1 for a more detailed discussion). A person's agency is largely indicated by his *asset endowments*, including material, financial, human, informational, organizational, and psychological assets. A person's opportunity structure is shaped by the presence and operation of *formal and informal institutions*, or rules of the game, i.e. the laws, regulatory frameworks, and norms governing people's behavior.

**Box 2.1: Understanding empowerment**

If a person or group is empowered they possess the capacity to make *effective* choice. This capacity is primarily influenced by two sets of inter-related factors: agency and opportunity structure. Agency is defined as an actor's ability to make meaningful choices – that is, the actor is able to envisage and purposively choose options– and is indicated in large part by their *asset endowment*. Opportunity structure is defined as those aspects of the context within which actors operate that determine their ability to transform agency into effective action. This is shaped by the presence and operation of *formal and informal institutions*, or rules of the game, including the laws, regulatory frameworks, and norms governing people's behavior.



To illustrate the empowerment process by an example, consider an individual whose human assets are improved through completion of secondary education, while at the same time new opportunities for citizen participation in budget allocations are opened up by the institutionalization of local level budget planning processes. Using the new skills, confidence, and knowledge gained through formal education, and taking advantage of the opportunities opened up in the planning process, that individual is empowered to effectively participate in local-level decision-making. This corresponds to one "Degree of Empowerment" noted in the figure above<sup>50</sup>

Source: Alsop, Heinsohn and Somma 2004

<sup>49</sup> The Welfare Monitoring System was established in 1996 and the first comprehensive household consumption survey was carried out in 1995/6.

<sup>50</sup> These different degrees of empowerment include the existence of choice, the use of choice, and the effectiveness of choice. For further discussion of these different forms, see Alsop and Heinsohn, 2004.

2.13 **Assessing a person’s empowerment status thus requires information on his agency and his opportunity structure as well as an assessment of the complex interaction between the two** (see Box 2.2 for examples of observable indicators on these two dimensions).<sup>51</sup> An overall review of people’s material, financial and human assets has been given in the previous sections and more detailed accounts will be presented in Part II of the report. In this section we will only briefly summarize this information, or refer to it where necessary, and focus on people’s informational assets.<sup>52</sup> When discussing the opportunity structure, we will especially explore how the persistence of traditional social practices and norms may limit people’s capability to use (1) their (limited) asset base, and (2) the formal opportunities opened up in the legal and governance structure of the GoE to make choices and transform these into desired actions and outcomes.

**Box 2.2: Intermediate indicators of empowerment: agency and opportunity structure in practice**

<u>Agency</u>	
<i>Indicator/Domain</i>	<i>Examples</i>
Material Resources	Land ownership, tool ownership, housing type
Financial Resources	Employment, income, indebtedness, access to credit, food expenditures, type of occupation
Human Resources	Literacy, numeric skills, education, health status
Informational Resources	Media access, such as radio, television, newspaper, passable road access, locally functioning post office
Organizational Resources	Existence and quality of local organizations, local organization membership
Psychological Resources	Happiness, self-perceived exclusion, sociability, capacity to envision change
<u>Opportunity Structure</u>	
<i>Indicator/Domain</i>	<i>Examples</i>
Legal/Justice	Protections in civil code, press freedom, protection from political and social oppression, and from domestic violence, statutory rights
Political	Government accountability, elections, freedom of political parties, participation of excluded groups in political processes, availability of information on government decisions, citizen participation in decision-making, influence of local elites
Service Delivery	Availability of hospitals, education facilities, water points, other basic services, enrollment rates, responsiveness/performance of service provision agencies, citizen influence on/participation in service delivery schemes
Household	Allocative decision-making within households, division of labor in households, domestic violence
Community	Existence of neighborhood associations, cultural and religious traditions and norms, influence of different groups on community decisions, social interaction, social capital, violence in the community, informal patterns of exclusion

2.14 Given that especially women, but also pastoralists, are considered to be particularly disempowered, we begin by discussing their agency and subsequently review the GoE’s reforms and the continuing effect of informal institutions on first, women, and second, pastoralists and other social groups. This is followed by a broader analysis of the government’s major vehicle for poverty reduction through citizen empowerment—decentralization. The review finds striking evidence that gender inequalities are extremely pronounced and that women are repressed by traditional gender roles and behavior.

<sup>51</sup> Indicators and measures for empowerment are currently being developed through a five-country study on Measuring Empowerment. For additional information on that initiative, see [www.worldbank.org/empowerment](http://www.worldbank.org/empowerment).

<sup>52</sup> Systematic information on people’s organizational and psychological assets is currently not available.

Pastoralists also emerge as a disadvantaged group. The analysis furthermore suggests both that traditional institutions remain more important to citizens than the formal organizations that are attempting to bring governance and resource control closer to citizens, and that these efforts are also currently inhibited by informal practices and norms.

### 2.2.1 The disadvantaged position of women

2.15 **Gender inequalities are very pronounced** and the available data present a grim picture of women's capability to make choices and transform them into desired actions. This is most vividly illustrated by the recent experience of a 13-year old rape victim in her elusive quest for justice (Box 2.3). The real significance of this horrifying, though potentially singular, event becomes especially apparent when augmented with nationally representative evidence on women's attitudes towards domestic violence collected by the Central Statistical Authority of Ethiopia under the aegis of the Ministry of Health.<sup>53</sup>

#### Box 2.3: Ethiopian rape victim pits law against culture

"She rushed through the tangled brush of onion farms and up the footpaths of her village. Her shirt was bloody, her clothes were torn and her thighs were bruised a deep shade of purple, recalled the villagers who were drawn by her screams.

Woineshet (...) was running from her rapist. She was abducted one night in March 2001 by four men who hacked down the front door of her home in the village of (...) with a machete. Police and witnesses said she was forced into a nearby shack by the men's leader and raped for two days. She was 13 years old. When the police finally arrived, Woineshet [ran]. The police, who say they have never seen a child covered in so much blood, arrested the suspect.

Woineshet's father, (...), 49, who was working and living in Addis Ababa, the capital, went home, looked at his daughter and made [an] unusual decision. For months, he had heard radio announcements and seen bus ads sponsored by the Ethiopian Women Lawyers Association urging the prosecution of rape cases(...) he vowed: This case will go to court. But what happened next made him distrust not just justice, but his own common sense. The accused, Aberew Jemma Negussie, was released on bail [and..] abducted Woineshet again, this time hiding her in his brother's house and raping her for 15 days. She escaped again (...)

(...)Woineshet's example highlights an important moment of change here, as lawyers, police and family members struggle to overcome social taboos and establish a new pattern for investigating and prosecuting rape in Ethiopia. Last year, Woineshet's abductor was taken to court a second time, convicted of rape and kidnapping and sentenced to 10 years in jail. But a judge released him after he had served just one month. Woineshet and her father, backed by the Ethiopian Women Lawyers Association and Equality Now, an international women's rights group, are appealing the case to Ethiopia's highest court. (...)

Woineshet's father recalled that he felt caught between the draw of the modern world in the capital and the traditions of the village. He said he was offered bribes of cows and cash by local elders to keep quiet. He also endured pressure from some members of his family, who thought that Woineshet should marry her abductor. Ethiopian law absolves abductors of their crime if they marry their victims. Other family members said they also wanted Woineshet to get married because she was no longer a virgin and therefore, they believed, would never find a husband. But her father resisted. "I thought, 'Here I am, very much happy in Addis, and women here are working and smart. They aren't suffering all the time,'" he said. "I have only one daughter. And I had that dream for my daughter. That is how I got my courage. I wanted to see her happy like them."

'Maybe They Were Just in Love' "We have a problem here," said Bekissa, the court's president, ... "The trouble is, this type of crime happens secretly. You can't gain evidence about her virginity so easily." Bekissa called in Judge Biyo Ukie, who had helped make the decision to allow the accused assailant out on bail. "I don't

<sup>53</sup> CSA and ORC Macro, 2001.

think she was abducted or raped," said Ukie, ..... "The health report did not specify that she was a fresh virgin. No one wants to rape anyone who is not a virgin. Maybe they were just in love. This case has no evidence." Even Woineshet's state-appointed lawyer, Srat Tolch, expressed doubt about the rape charge. "I think Woineshet was like, 'Please rape me.' Maybe he couldn't afford the dowry and they wanted to be together without a formal marriage," he said, shrugging his shoulders. "Culturally, no one rapes a non-virgin. So unless we can prove for sure she was a virgin until the time of the rape, there is reasonable doubt and the man should just be left alone."

A trial was held, and the accused was sentenced to 10 years in jail last November. But in December, during a new court session, Ukie, then the judge on the bench, (...) suggested her choices were to marry Negussie or try to send him back to jail... Woineshet refused to marry. Her father refused. The police refused. Even members of the community attending the trial stood up and refused. "I had already made it through the worst nightmares," Woineshet said. "I couldn't have been hurt any more than I already was. He raped me. His family beat me. They forced me to be married. I wanted to speak out. I had known pain for so long. All I knew was that I didn't want to be married to my abductor."

One month later, for reasons no one is certain of, Ukie let Negussie out of jail. Ukie said that there were not enough witnesses and that Woineshet was most likely in love with Negussie and ready for marriage. "This family is only out for revenge," Ukie said in an interview. "Maybe they don't want her to marry him. So they accuse him of rape." Later, when he was asked about a health report showing severe abuse during the second abduction, Ukie said: "Look, a marriage contract had been signed, and I think we should find it. If she wanted to marry him, then if there was a rape that makes it legally okay." Then he sighed and said, "Some of our new laws and ideas on these matters do not fit with the culture anymore." (...)

Source: Wax, 2004

2.16 **“The Husband’s Beating Stick is Like Butter”<sup>54</sup>—it was found that 85 percent of women “believe that a husband is justified in beating his wife for at least one of the following reasons,”** burning food (65 percent agree), arguing with him (61 percent), going out without telling him (56 percent), neglecting the children (65 percent), or refusing sexual relations (51 percent) (see Table 2.3). Further exploration indicates that opinions don’t change much with age (82 percent of the 15-19 year olds surveyed still agree with this statement compared to 90 percent of 45 to 49 year olds), that social acceptance of domestic violence is also widely spread in urban areas (69 percent of urban women agreed) and that acceptance only significantly declines with secondary and post secondary education. Nonetheless, even among the more highly educated still 57 percent support the practice. There are no apparent differences in attitude across the regions, with the exception of Harari, Addis Ababa, and Dire Dawa. Yet even in these urbanized centers, the practice carried the support of the majority of women.

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<sup>54</sup> This is an example of the many sayings in the Ethiopian languages referring to domestic violence in particular and the disadvantaged position of women more generally.

**Table 2.3: Women's opinions on wife beating, Ethiopia 2000**

Percentage of women who agree with specific reasons justifying a husband hitting or beating his wife and percentage who agree with at least one of the reasons, by background characteristics, Ethiopia 2000

Background Characteristics	Reasons justifying a husband hitting or beating his wife						Number
	Burns the food	Argues with him	Goes out without telling him	Neglects the children	Refuses sexual relations	Agrees with at least one specified reason	
<b>Age</b>							
15-19	62.6	59.1	52.9	62.8	43.5	82.1	3,710
20-24	64.1	61.4	56.4	64.3	49.5	84.5	2,860
25-29	63.0	61.5	55.4	63.7	52.1	83.9	2,585
30-34	66.7	63.5	57.9	65.2	54.2	85.3	1,841
35-39	64.3	60.9	57.1	67.6	53.5	85.2	1,716
40-44	64.7	60.9	57.6	64.3	56.2	85.6	1,392
45-49	70.2	65.3	61.5	66.9	58.9	89.6	1,264
<b>Location</b>							
Urban	41.0	39.6	38.2	51.6	29.0	69.0	2,791
Rural	69.7	66.1	60.2	67.4	55.7	87.9	12,576
<b>Region</b>							
Tigray	57.7	56.5	55.9	68.1	41.0	85.7	969
Afar	72.6	71.1	70.6	75.0	70.5	85.7	178
Amhara	66.6	67.9	59.4	65.1	51.6	88.4	3,820
Oromiya	64.7	62.2	55.5	61.5	54.0	84.1	5,937
Somali	48.8	61.5	63.9	65.2	52.0	80.6	175
Benishangul-Gumuz	70.4	61.4	59.0	68.7	51.1	85.0	160
SNNP	73.2	62.3	60.1	73.4	55.2	87.6	3,285
Gambela	57.1	54.4	52.7	56.5	36.1	83.4	40
Harari	28.7	25.8	17.7	28.6	19.9	49.8	41
Dais Ababa	23.3	20.8	22.9	40.0	11.8	54.4	684
Dire Dawa	42.2	46.7	44.0	55.3	37.8	66.9	79
<b>Education</b>							
No education	69.5	65.6	60.4	67.0	56.2	88.1	11,551
Primary	61.6	59.6	53.0	65.8	44.8	83.0	2,425
Secondary and higher	27.4	28.3	27.0	41.8	17.1	56.9	1,391
<b>Employment</b>							
Not employed	63.7	59.5	54.8	62.5	49.6	84.0	5,630
Employed for cash	60.1	56.9	52.6	63.9	47.1	81.4	3,852
Employed not for cash	68.0	65.9	59.9	66.8	54.5	87.0	2,885
<b>All women</b>	<b>64.5</b>	<b>61.3</b>	<b>56.2</b>	<b>64.5</b>	<b>50.9</b>	<b>84.5</b>	<b>15,367</b>

Source: CSA and ORC Macro, 2001

**2.17 Clearly, domestic violence is a deeply rooted cultural practice, symptomatic of women's overall empowerment position, with potentially detrimental effects on other development outcomes.** Other forms of violence toward women also carry their broad support. For example 60 percent of all women stated that they supported female circumcision, while 80 percent of them had been circumcised (see Appendix 3, Table A.2.1). Moreover, the acceptance of domestic violence, and women's disempowerment more generally, not only has a striking impact on the well-being of the women themselves, it also appears highly correlated with other development outcomes such as their children's chances of survival. The under-five mortality rate for children of women who do not accept any of the given reasons as justification for abuse is 154 out of 1,000 live births, while for those accepting at least one reason the rate is over 192, i.e. almost 40 children per 1,000 live births more.<sup>55</sup> While commonly associated factors such as education and urbanization most likely partly drive these results, the difference is nonetheless striking. In conclusion, as will be shown below, these practices and their wide acceptance by the women themselves are symptomatic of their overall empowerment position. We now turn to a more systematic exploration of the underlying forces, i.e. women's agency and their opportunity structure.

**2.18 Women have extremely low educational achievements and virtually no access to external information.** As indicated earlier, women consistently have lower levels of education than men, with over 75 percent having no education at all (compared to 50 percent of men, see Appendix 2, Figure A.2.1).<sup>56</sup> Moreover, despite encouraging improvements, the gender gap in primary school enrolment remains significant.<sup>57</sup> Exposure to mass media (radio, TV or newspaper) is extremely low across Ethiopia, and it is even more pronounced among women. While 73 percent of men have no access to mass media, this is the fate of 86 percent of all women. Less than 11 percent of all women listen at least once a week to the radio, compared to 24 percent of the men.<sup>58</sup>

**2.19 Women have a significantly lower employment rate than men, and have little representation in decision making positions.** Nearly 43 percent of women are unemployed, and over 36 percent of them are chronically unemployed (see Appendix 2, Figure A.2.3). When employed or receiving cash earnings, about three quarters of women decide themselves on how earnings are used. While there are large differences between the regions in who decides on the spending of women's earnings (35 percent of the women themselves in Benishangul-Gumuz versus 82 percent in SNNPR), there are no significant differences between urban and rural or educated and uneducated women. Despite such authority over spending decisions in the household, professionally women have little representation in decision-making positions. For example, although 40 percent of government employees are women, 71 percent of them are concentrated in the lower levels.<sup>59</sup>

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<sup>55</sup> CSA and ORC Macro, 2001.

<sup>56</sup> Bridging the Gap, 2003.

<sup>57</sup> World Bank, 2002.

<sup>58</sup> CSA and ORC Macro, 2001.

<sup>59</sup> World Bank, 2004 (draft).

2.20 **The GoE recognizes the disadvantaged position of women, and has implemented a number of policies, laws, and initiatives to promote women's empowerment**, including removal of discriminatory laws from the Constitution. With the announcement of the National Policy on Women in 1993 and promulgation of the new Constitution in 1995, the FDRE highlighted its commitment to the equal development of women. Article 25 of the Constitution clearly guarantees equality and makes any discrimination on the grounds of race, color and sex illegal.

2.21 **However, these policies and laws are often weakly enforced, and in many cases provide contradictory or incomplete coverage in their protection for women.** For example, while violations such as female genital mutilation, wife battering, domestic violence, and sexual harassment are outlawed in the Constitution, the penal code contains no provisions for adjudicating them, and existing laws are often applied by judges in a manner that does not take account of women's rights.<sup>60</sup>

2.22 **Most rural people in Ethiopia continue to apply customary laws to their economic and social relationships**, and the example of Woineshet is not an isolated incident.<sup>61</sup> Although these customary laws are not legitimized in the Constitution, and Article 9.1 of the Constitution states that "any law, customary practice, or a decision of an organ of state or a public official which contravenes this Constitution shall be of no effect," especially within the rural context customary practices have greater influence on gender relations than the formal system.<sup>62</sup> Ellen Alem, a legal aid service coordinator with the Ethiopian Women Lawyers Association, said it is almost impossible to bring a rape case to court in rural areas when the victim's virginity is questioned. She is lobbying the government to specify in the law that non-virgins can also be victims of rape and that their cases should be taken seriously.<sup>63</sup>

2.23 **While the legal integration of customary conflict resolution mechanisms with the civil courts was meant to enable citizens to retain their ethnic and religious identities, in practice this has reinforced damaging attitudes and customs toward women.** Article 34(7) of the Constitution reserves the option to adjudicate disputes related to personal matters in accordance with religious or customary laws, rather than under the civil code, if the parties to the disputes agree. In practice, personal disputes, particularly between men and women, are frequently directed to traditional adjudication mechanisms by the choice of men, without the consent of women. In Muslim areas, if a husband goes to the *Sharia* court first to institute divorce proceedings, then the wife often does not have recourse to the civil court.<sup>64</sup> Focus group discussions among Orthodox Christians in Addis Ketama also note that if there is a conflict between husband and wife, the case is first handled by a traditional court. They note that even if one goes directly to formal courts, the case would be passed to traditional courts.<sup>65</sup>

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<sup>60</sup> World Bank, 2004 (draft).

<sup>61</sup> Similar accounts are regularly appearing in the local newspapers.

<sup>62</sup> World Bank 2004, (draft).

<sup>63</sup> See Wax, 2004.

<sup>64</sup> World Bank, 2004 (draft).

<sup>65</sup> Legovini, 2004.

2.24 Testimony from a 32 year old, well educated, head of the kebele women’s association shows how damaging this situation can be for women: “My husband does not give me enough money for the house expense. ... He gets drunk every night and disturbs our peace. One day I had had enough and told him to leave the house, which I own. Surprisingly, the community leaders said I should leave the house. ... At the end, I had no choice but to continue living with him”.<sup>66</sup> This was a repeated theme (even in many cases from men): traditional courts are the first recourse, and they generally favor men. (See Box 2.4 for a discussion of gender inequalities in asset distribution in divorce.)

**Box 2.4: Asset distribution at divorce**

Recent studies of asset disposition during divorce show that half of surveyed monogamous household members expect a household’s land and house to go to the husband upon divorce, while 40 percent expect it to be divided equally. If there is a fault-based divorce (such as resulting from adultery, drunkenness, spouse beating, etc.), the distributional situation changes dramatically. The study found that if the husband is at fault, the wife is slightly more likely to be granted land and livestock than if it is a no-fault divorce. If the wife is at fault, however, no notable percentage of those surveyed believed she would receive land at divorce, and just 34 percent believed she would even receive the livestock that she brought into the marriage.

2.25 **One of the many consequences of the dominance of traditional beliefs and practices is continued prevalence of wife beating.** As discussed above, the widespread acceptance of violence towards women clearly indicates that it is a deeply rooted cultural practice. As one man noted: “Women are obedient to their husbands because they have trained themselves to be obedient, so most of the time there is no problem.... Sometimes men can beat their wives in the community, but it is taken as an expression of love, so the women didn’t take it as a big problem.” Another man put this more bluntly, noting that if a woman does wrong she should be beaten. “Only a pot does not like whisking,” he said.<sup>67</sup> (See Box 2.5 for additional examples of violence against women.)

**Box 2.5: Violence and abduction in marriage**

One of the more extreme forms of violence is by its very nature one that clearly goes against the wishes of women. This is *telefa*, the practice of abducting a woman if she shows unwillingness to be part of a proposed marriage. In some cases *telefa* involves beatings and rape. One study of rural households found that 10 percent of all marriages were described as “kidnappings,” and 2/3 of these (or six percent of all marriages) involved women being forced into marriage despite her wishes (the other 1/3 were more likely a couple marrying despite their families’ disapproval).<sup>68</sup> According to Ethiopian law, rape and abduction are not punishable if the victim “freely” contracts a valid marriage with the abductor.

One study respondent described how the parents of his bride-to-be refused to allow her to marry on the marriage day, arguing that some agreed gifts had not been made. The respondent’s relatives kidnapped a teenaged girl on their way back from the bride’s village because they did not want food prepared for the wedding to go to waste. The girl broke her arm fighting her abductors, but was still married that day.

Source: *Fafchamps and Quisumbing, 2002*

<sup>66</sup> Legovini, 2004.

<sup>67</sup> Legovini, 2004.

<sup>68</sup> Fafchamps and Quisumbing, 2002.

**2.26 In sum, women’s narrow asset base, not in the least their limited access to information and education, and the strength of traditional norms and behavioral systems reinforce each other in limiting women’s ability to make effective choices.** A continued focus on closing the gender gap in education, increasing access to information and enhancing women’s awareness of their rights via mass media is needed to improve women’s empowerment positioning. In addition, bolstering the GoE’s capacity to enforce the laws that are in place to protect women, and to close existing loopholes, gaps, and contradictions in the justice system that allow it to be manipulated to the disadvantage of women will be necessary steps to start addressing the pronounced gender inequalities in Ethiopia.

### **2.2.2 The role of informal institutions among pastoralists and other social groups**

**2.27 There appear marked limits to pastoralists’ individual agency.** According to a 2001 World Health Organization report, only about five percent of the mainly pastoralist Afar population had access to proper health care, with two hospitals in the entire region.<sup>69</sup> The Afar and largely pastoralist Somali regions rank behind only Amhara in proportion of population with no access to mass media, and have the lowest levels of savings and per capita daily calorie intake among all regions. Somali has the lowest proportion of population currently employed, and the highest proportion of chronically unemployed, as well as the lowest net primary school enrollment rate. Of more concern is that the situation appears to be deteriorating. For example, both regions have seen significant increases in the proportion of income going toward food purchases.

**2.28 Recent policy developments, ministerial restructuring, and statements have indicated that the GoE fully recognizes the extent of pastoralists’ exclusion from development opportunities.** The SDPRP notes that in pastoralist areas “there is poor understanding of the holistic nature of the problems. Interventions were following a piecemeal development approach and development failed to be sustainable”.<sup>70</sup> The government has recently made structural changes in the bodies responsible for pastoralist policy. This includes the appointment of a Minister of Rural Development, whose ministry has been established to address the governance and administrative needs of “emerging regions” which comprise the pastoral areas of Afar and Somali Regions. In addition, a Pastoral Unit has been established within the Ministry of Federal Affairs.

**2.29 The GoE’s rethinking of its approach to development and governance in pastoralist areas also acknowledges pastoralists’ reliance on, and in some cases the resurgence of, traditional patterns of organization and behavior.** As with women, there are indications that this persistence of informal institutions can stifle citizens’ capacity to make effective choices in support of their own development. In an environment where traditional organizational patterns demonstrate both positive and negative consequences from an empowerment perspective, both the government and citizens have shown remarkable adaptability.

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<sup>69</sup> Cited in UNOCHA, 2002.

<sup>70</sup> FDRE, 2002 (p. 70).

**2.30 There has been some interaction between traditional and state structures of representation in pastoralist areas.** In many instances this is made possible by different positions being held by the same pastoralist representative. For example, a number of federal level MPs are also high-ranking pastoral elders. In Borona, there are estimates that about 20 percent of the kebele council (about 100 people) are also elders, and this has had a positive impact on citizen perceptions of kebele councils, where the councilors are considered “one of the people.”

**2.31 In some areas, specific mechanisms/structures have been established to allow traditional “representatives” to engage with formal political systems, yet these have had mixed results and sometimes serve to reinforce traditional patterns of exclusion.** In Somali Region there is a Constitutional provision for an Assembly of Elders and Ethnic Leaders. This has not yet been formally established but is nevertheless currently operating and is intended to bring traditional conflict management mechanisms into government. In addition, the government has appointed a number of elders, known as “amakari” to advise them at regional, zonal and woreda levels on matters relating to customary and community issues. There exist conflicting views regarding the extent to which this structure is in fact an effective means of mediating interests, stemming primarily from the fact that the amakari were under the pay of the government and had therefore become divorced from the communities they represented. According to Lister (2003), “there is also widespread agreement that the amakari exercise considerable control over the voting habits of the communities from which they come.” More importantly, while traditional pastoralist systems emphasize equal participation by all resident households, their decisions are based on the consensus reached by adult males, with women and outcast groups (such as disfavored clans/subclans) excluded from these processes.<sup>71</sup>

**2.32 Other social groups have similar experiences, with both positive and negative consequences.** For example, where Gurage traditions of collective action persist, these areas have seen empowering impacts at the community level (see Box 2.6). However, there are also cases where the continued emphasis on traditional practices appear to result in arrangements that are problematic for individuals to freely express their agency, and hence stifle development. For example, in a recent study of the political and historical traditions of the Sidama people, Aadland (2002) notes a widespread skepticism with which the Sidama view the state and its administrative system, and a resulting negative impact this is having on development and social relations (see Box 2.7).

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<sup>71</sup> Lister, 2003; Polhemus and Yohannes, 2003. Cited in World Bank, 2004 (draft).

### Box 2.6: Gurage traditional law

Zewdie and Pausewang (2002) note that while government courts enjoyed legal backing, customary courts such as the *Sabat Bet Gurage* exercised moral and ritual sanction. Although the existence of a centralized court and police system has somewhat diminished the power and applicability of traditional systems of arbitration like the *Sabat Bet Gurage*, it is indeed a measure of the vitality of those traditional institutions, that, far from disappearing completely, they continue to operate extensively.

This continued reliance on traditional organizational practices is often quite a positive mechanism for community-level development. Gurage customary law has helped to foster and sustain the Gurage's sense of identity, and has played a significant role in mobilizing Gurage populations to develop their region. Remarkable progress made in road construction, for example, would have been inconceivable without the network put in place by those customary institutions, not to mention the importance that traditional Gurage society attaches to transport networks. There have also been attempts, spear-headed by both urban and rural Gurage populations, to make such institutions adaptable to contemporary reality by trying to tackle a range of issues from rural development to substance abuse and AIDS.

Source: World Bank, 2004 (draft)

**2.33 The GoE is therefore faced with the dual problem of improving the effectiveness of policies to enhance equity and inclusion, and balancing a respect for traditional cultures.** The current approach, which blends a mixture of increased autonomy within the ethnic regions with continued exercise of federal authority over broad policy directions, appears to result in somewhat contradictory outcomes. On the one hand, ethnic tensions are to some degree diminishing within the country; on the other hand, citizens in ethnic regions are experiencing a pull toward traditional ways of organizing daily life, with mixed results in terms of empowerment. The GoE therefore faces a difficult decision regarding whether it is time to retract central control in ways that professionalize government and the state-society interface and give rise to new forms of organization at the local level. Pursuing this will require a system where citizens trust and work with the government instead of using their traditional, sometimes unequal, institutions. This requires a demonstrated capacity by government to effectively represent, be accountable and respond to citizens.

### Box 2.7: The effect of traditional Sidama institutions

With the coming to power of the new government and the reestablishment of control from above, the Sidama's previous experience of subjugation and domination appears to have been revived, and this has in turn revitalized old customs, traditions, and institutions without analysis of their current relevance or democratic potential. Two traditional cultural administrative structures are noteworthy components of this revival that have significant impacts on power relations within Sidama communities. First, the Sidama are split into those who do and don't possess *anga*, or "noble heritage." Those who are not of 'noble heritage' are potentially victims of social discrimination, since in historical times they were not given land, and were forced to make a living from professional work as tanners or potters, weavers or blacksmiths. Further, the stratification layers in the Sidama hierarchical structure consist of four strata: high-ranking lineages, low-ranking lineages, caste-groups and slaves.

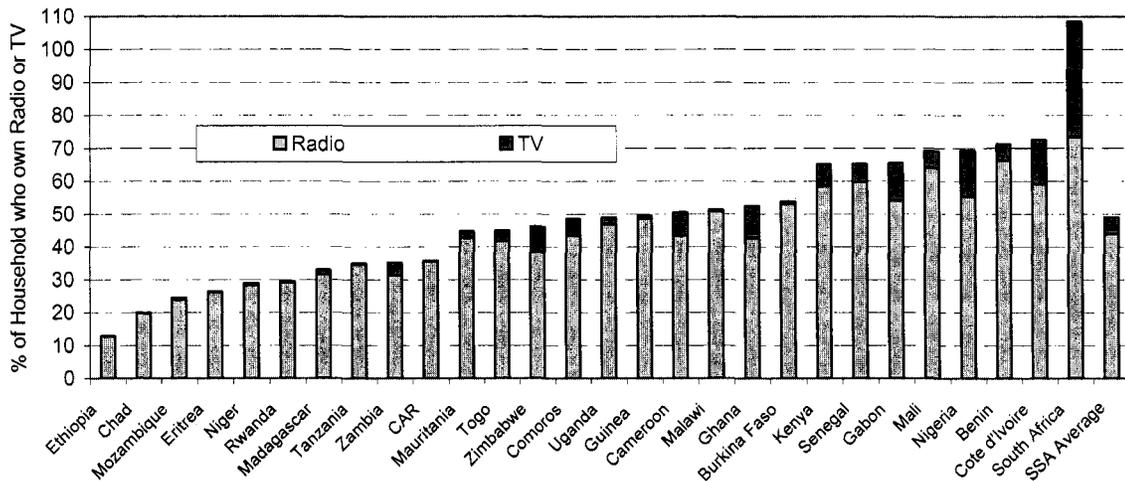
Along with this wave of reaffirming traditional Sidama organizational structures and norms, a strong trend of resistance against innovation is emerging. Recent research shows that such indigenous structures become "nostalgic and rather mythological, out of touch with the reality of present day challenges, as a result of being neglected". Thus, an uncritical attempt at the revival of such institutions is likely to exclude large segments of the Sidama population and render equality and general participation difficult.

Source: World Bank, 2004 (draft)

### 2.2.3 State-society relations—the role of information and traditional institutions

2.34 **People’s lack of material, financial and human assets is compounded by their sheer disconnect from the rest of the world**, suggesting that they are likely to be substantially limited in their capability to make choices and transform these into action to improve their own lives, irrespective of their opportunity structure. The emerging picture from the cursory review of the people’s asset base in the previous sections, indicating that people have little material, financial and human resources will be documented in much more detail and confirmed in Part II of the study when we explore the determinants of monetary well-being. Compounding the limited agency resulting from this poor material resource base is the sheer disconnect of the large majority of Ethiopian citizens from the rest of the country and the world. In particular, people’s immobility, their limited access to roads and transport services, and above all, their lack of access to information combine to completely isolate Ethiopian people in their traditional habitats, *de facto* limiting their capability to aspire and expand their choice set.

**Figure 2.4: Incidence of radio and TV ownership among rural households in selected Sub-Saharan African countries, 1995-2001**



Note: Incidence of radio ownership is added to incidence of TV ownership. As a result, total incidence can reach up to 200 % maximum.

Source: Own calculations from 1995-2001 DHS surveys

2.35 **There is virtually no migration or exposure to information in the country.** According to the 1999 Labor Force Survey,<sup>72</sup> 85 percent of the rural population has been continuously residing in the same area (woreda) as they were born, without ever having lived elsewhere. Only 2.6 percent of the total rural populations were recent migrants, i.e. people

<sup>72</sup> CSA, 2000.

who have moved into the area over the past five years.<sup>73</sup> Given that 85 percent of the total population lives in rural areas, exposure to new ideas or outside influences is clearly very limited. Moreover, while access to mass media could make a difference in such circumstances, according to the 2000 Demographic and Health Survey (DHS) only 13 percent of the rural households owns a radio (and virtually nobody owns a TV), and 87 percent of the population is not exposed to any form of mass media (radio, newspaper, TV) on a regular basis.<sup>74</sup> These figures are striking even within the Sub Saharan context, where Ethiopia ranks lowest in terms of radio ownership among all countries (Figure 2.4). Sheer remoteness and isolation epitomizes life in rural areas, rendering it extremely difficult to reach the rural population, limiting cross-fertilization, and perpetuating ongoing knowledge patterns, traditional practices and customs.

**2.36 Turning to people's opportunity structure, the continuing focus of the central government on ensuring stability has been effective in managing the period of transition** from the Derg regime, the conflict with Eritrea, and ethnic reconciliation within the country. The country is seen as increasingly stable, with one index of law and order showing improvement from 33 out of 100 in 1990 (where 100 represents high performance), to 83 out of 100 by 2002.<sup>75</sup>

**2.37 However, the country ranks in the bottom 25 percent globally in indicators of voice and accountability,** and its position deteriorated from a 30.9 percentile rank in 1996, to a 14.6 percentile rank in 2002. Government performance suffers in this environment, where Ethiopia ranks in the bottom 25 percent globally, and has fallen over the years from a 34.6 percentile rank in 1996 to a 16 percentile rank in 2002 (Figures 2.5 and 2.6). Press freedom in the country is limited (an index score of 0, the lowest possible score), and bureaucratic performance is recorded as highly ineffective, with an index score of 25 where 100 is considered low risk.<sup>76</sup>

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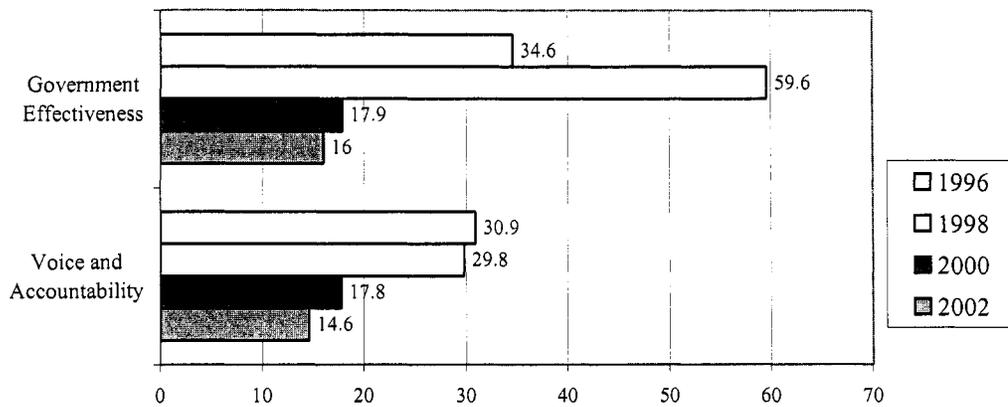
<sup>73</sup> People moving in and out of the area were considered migrants if they spent less than 6 continuous months in the area where they were surveyed prior to the survey, or if they intend to leave the area again within the next 6 months.

<sup>74</sup> There are currently three government owned radio stations.

<sup>75</sup> World Bank, 2004f.

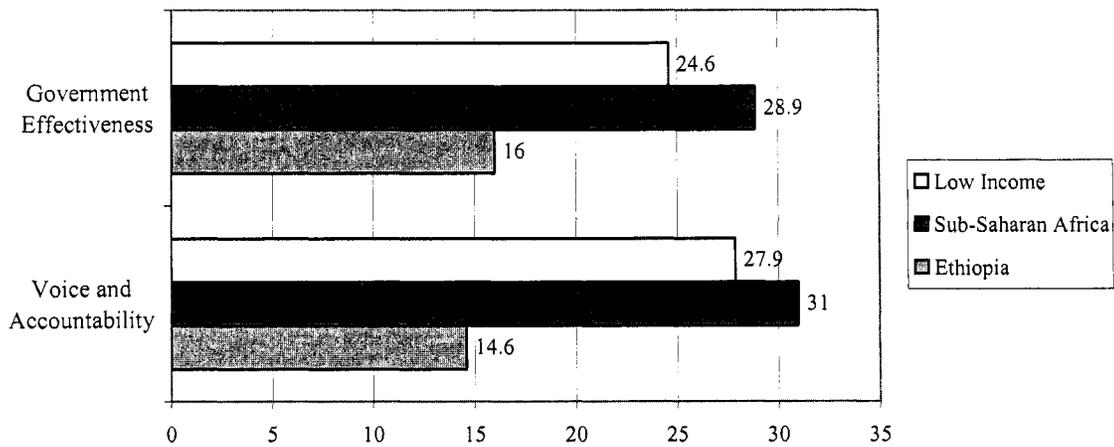
<sup>76</sup> World Bank, 2004f.

**Figure 2.5: Governance indicators in Ethiopia**



Source: Kaufmann, Kraay and Mastruzzi 2003

**Figure 2.6: Governance in Ethiopia compared with similar categories (2002)**



Source: Kaufmann, Kraay and Mastruzzi 2003

**2.38 Through the SDPRP and other initiatives, the GoE has recently shown a strong commitment to professionalizing its governance apparatus and empowering citizens through political, fiscal and administrative decentralization.<sup>77</sup>** However, these changes are relatively recent and, as in other countries, processes of change of such magnitude are slow. Great strides have already been made in terms of decentralizing to certain woredas and in urban areas, but even here government representatives and citizens report that progress toward making the state apparatus more responsive and accountable is limited as of yet. With

<sup>77</sup> The recently initiated Public Sector Capacity Building Program marks the seriousness of GoEs efforts to decentralize and professionalize services, as does its commitment to the Civil Society Capacity Building Project, currently under preparation.

formal institutions of government in a state of transition, as the following discussion shows, there is evidence that many citizens rely on their own informal forms of organization and norms of behavior to manage everyday life rather than those of government. In addition to not achieving the SDPRP's objectives in terms of empowering its citizens, one danger in this is that informal practices at times exclude marginalized individuals and groups, thereby reducing their capacity to make effective choices about their own development. As local government is the main point of interface between the state and its citizens, we first explore the current state of empowerment of local governments and then the relationship between local governments and citizens.<sup>78</sup>

### ***Empowerment of local governments***

2.39 As the GoE operationalizes its strategy for decentralization, it faces three critical issues in empowering sub-national levels of government.

2.40 **First, there remain important capacity constraints within political and bureaucratic bodies at all levels** (see Table 2.4) (Appendix 3, Table A.2.2 provides a description of Ethiopia's administrative structure and responsibilities). Local governments find it difficult to recruit staff equipped with the skills required for management of the processes of decentralized, democratic governance. The educational qualifications of local government staff have improved from a situation in the mid-90's where the mode was 6th or 7th grade to one where most staff now have at least a diploma.<sup>79</sup> However, the qualifications achieved rarely relate to the substance of government, which means staff have a steep—and often unaided—learning curve.

**Table 2.4: Capacity constraints for decentralization in Ethiopia**

Community Level	Capacity to: understand roles and responsibilities; be informed on development; identify development needs; demand accountability; participate in development programs; pay rates etc.; engage with support agents.
Woreda Level	Capacity to: establish systems and structures to: manage finances, prepare and implement budgets; plan implement and monitor development programs; promote civic participation; ensure service delivery; manage capital and human resources; promote economic development and sustainable land use.
Regional Level	Capacity to: support and regulate decentralization and local govt. i.e. to: provide clear legislation, policy and technical guidelines; establish and manage woreda financing systems; provide training; facilitate organizational development; co-ordinate external support initiatives; facilitate information sharing; establish monitoring systems.
Federal Level	Capacity to: establish policy; set minimum service standards; outline CB designs; outline staffing structures; mobilize external resources; co-ordinate, monitor and evaluate PSCAP and LG performance; ensure training facilities.

*Source: Development in Practice, Ltd., 2003*

<sup>78</sup> An objective of the SDPRP is to "Establish institutional arrangements to ensure empowerment, democratization and efficient administration at woreda and kebele levels."

<sup>79</sup> Vaughn and Tronvoll, 2003. There remains room for caution, however, as these capacity improvements have come largely thanks to government-initiated programs, thus raising the possibility of enhancing upward loyalty rather than downward accountability.

2.41 **A second constraint is the inadequacy of budgets.** While the switch to woreda block grants has the potential to enable more locally responsive planning and budgeting (see Box 2.8), substantial challenges in implementation remain. Even with the intention of supporting local level discretionary expenditures, the paucity of funds available via block grants results in most funds being allocated to recurrent, rather than capital, expenditures. For example, salary obligations consume between 85 and 90 percent of the overall budget. At the kebele level, the fact that kebeles receive little of the capital funding requested through the planning exercise creates few incentives for councilors to engage with citizens. A recent assessment of local governments noted that “kebele councils need to control a budget, which will deliver tangible demand-led projects, so [that] the council is seen to be responding to local needs”.<sup>80</sup>

**Box 2.8: Recent reform in fiscal resource transfers**

In July 2002, the GoE began a pilot reform of the resource transfer system in an effort to ensure less discretion in total transfers to woredas. Under the previous system, transfers from the federal level to the regions were made on a formula weighing population (55 percent), a composite development index (20 percent), an index of revenue effort (15 percent) and a poverty index (10 percent). Regions distributed these to zones sometimes mimicking the federal formula (e.g., Amhara, SNNP), and sometimes using alternative formulas. Transfers from zones to woredas, however, were always discretionary, although there was evidence that food-insecure woredas did receive transfers greater than their share of zonal population, while the reverse was true in food-secure woredas.

Under the revised system, currently being piloted in Oromiya, Tigray, SNNP, and Amhara and intended to spread nationally in coming years, transfers are now made directly from the Regions to the woredas, and based essentially on the same formula as from the Federal level to the Regions.

*Source: World Bank Country Office in Ethiopia, 2002; World Bank, 2003a*

2.42 **Finally, the transition from a centrally managed system to a mode of devolved fiscal responsibility requires changes in expectations and behavior.** The previous system of transfers through zones was critiqued for capture of funds at the regional and zonal levels and imposing limits on the ability of woreda officials to adjust spending on the basis of local realities.<sup>81</sup> Now, block grants to woredas allow for a more transparent and egalitarian system of resource transfer, but it is apparent that some regional officials continue to limit “the discretion of individual woredas in expenditure assignments through providing budget guidelines on the functional and economic split of expenses”.<sup>82</sup> In addition, federal guidelines with respect to wage levels and firing staff limit woreda councils’ capacity to re-allocate financial resources.<sup>83</sup> To some extent, capacity problems at both the woreda and kebele levels explain a continued reliance on higher levels of government. In 2002 most woreda staff did not think that zonal interventions eroded their authority, but rather that their own administration lacked the skills necessary to formulate budgets.

2.43 Historically, woreda and kebele officials looked upward in terms of loyalty, concern, and accountability, rather than downward toward their constituencies. For example, while

<sup>80</sup> INTRAC, 2004a.

<sup>81</sup> See, for example, Girishankar, Alemayehu and Ahmad, 2001.

<sup>82</sup> World Bank, 2003a; World Bank, 2003b.

<sup>83</sup> World Bank, 2003b.

they regularly transmitted financial reports to the zone, these were not disseminated to kebeles, and there was no evidence of kebele-level gatherings to discuss the woreda budget.<sup>84</sup> As the 2004 studies quoted in this section indicate, this behavior has changed in a small number of locations, but it will take time, experience, capacity building of both government representatives and citizens, and the development of appropriate incentive systems before the traditional tendency for upward rather than downward accountability is fully addressed.

### ***Local government and citizens***

**2.44 In practice, citizen voice and influence are partial in Ethiopia.** Citizens are largely disengaged from local governance and decision-making processes. The Woreda Studies vividly illustrate the disconnect between what communities identified as priority needs and what is ultimately communicated to woredas, noting that “communities had very low expectation of gaining from the official planning process”.<sup>85</sup> While it is unrealistic to expect that citizen “wish lists” will always be translated into official programs and policies, the remarkably low expectations of citizens are evidence that more is needed from local level officials to meet citizen demands, to manage expectations where they cannot be met, and to explore synergies between local and national level priorities.

#### **Box 2.9: Citizen’s relationships with kebele and woreda governments**

The predominant reasons for organizations/ institutions of civil society to associate with kebele and woreda administrations/ offices were:

- Kebele cabinets commonly communicate information and make requests for community assistance (e.g. labour), particularly through agricultural work groups and *iddir*.
- Organizations/ institutions at kebele level use kebele cabinets in the enforcement of disciplinary actions, when penalties by group leaders have proved ineffective.
- Woreda sector offices have regulation and financial control responsibilities with respect to cooperatives and credit groups.
- Technical support and service delivery.

These relationships are characterized by:

- Extensive overlap in membership: members of kebele cabinets are also members of *iddir* and other centrally important organizations/ institutions in people’s lives.
- A wariness on the part of members/ associates of organizations/ institutions of civil society about the possible nature of government support (when perceived as ‘interference’ rather than, for example, technical and financial management support).
- A submissive respect for hierarchal authority, which considers challenging public figures to be inappropriate.

As Box 2.9 shows, citizens interact with government in very limited ways. As yet processes of decentralization have not given many the capacity to influence resource allocation or management, and there is little evidence of government—either elected representatives or line ministry staff—ever being held accountable by citizens.<sup>86</sup>

<sup>84</sup> World Bank Country Office in Ethiopia, 2002.

<sup>85</sup> World Bank Country Office in Ethiopia, 2002, p. 30.

<sup>86</sup> INTRAC, 2004a; Vaughn and Tronvill, 2003.

**2.45 Citizens rely on their own informal organizations, rather than counting on formal government bodies to deliver basic needs.** Research in 1999 indicated that citizens rely more on informal local institutions than on formal governmental entities or NGOs. This was particularly true in rural areas, although urban residents in many cases also ranked formal institutions low in terms of their importance in everyday life (see Appendix 3, Tables A.2.3 and A.2.4). Where kebeles were mentioned as important, this was largely “because (i) [they link] the community residents with the government, and (ii) that is where community residents go to receive ID cards or any other kind of official document”.<sup>87</sup> A 2004 study in nine woredas across six Regions found that households associate with between one and 24 organizations at the local level.<sup>88</sup> Membership-based community organizations were found to be particularly important in people’s lives. The most commonly joined groups included iddir (ranging from 100 percent of kebele households to just under 50 percent), and agricultural mutual assistance groups (ranging from almost 100 percent of kebele households to just over 38 percent). Also prominent, but less so, were rotating savings and credit groups (iqqub), social religious groups, business/trade groups, women’s organizations and clan, sub-clan and age groups (particularly in pastoralist areas).<sup>89</sup> Government organizations were rarely mentioned.

**2.46 Kebele councils, as well as representatives from other levels of government, recognize this, and often use community organizations as a communication and access point to the community.** Citizens are however concerned about the influence of local governments, and some people are reluctant to join iddir because of concerns that they might be used as political instruments. In one kebele, while the iddir was perceived to currently be free from government interference, “the possibility of this was felt to always be present, especially if they were to obtain significant funds for development – from an NGO, for example.... Projects initiated by government or NGOs are unlikely to be ‘owned’ by the people – government and NGOs simply tell you what they are going to do and go about it in their own way”.<sup>90</sup>

**2.47 Citizens appear to continue to have a general distrust of government that limits the extent to which they rely on formal institutions.** As two studies completed in the last few months indicate, “there is still a strong residual suspicion of the state”.<sup>91</sup> A survey on corruption conducted in 2001 by the Ethics Subprogram of Ethiopia’s Civil Service Reform Program found that citizens rank corruption second in priority in a list of 18 socio-economic problems. Forty nine percent of a sample of over 2,500 people reported observing a corrupt act by a public official in the past two years. Thirty-five percent of 477 households involved in lawsuits said there had been an indication of bribery during the proceedings. Finally, households reported spending an average of 4.5 percent of household income on unofficial payments to public officials.<sup>92</sup>

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<sup>87</sup> Rahmato and Kidanu, 1999.

<sup>88</sup> INTRAC, 2004a. The median was nine.

<sup>89</sup> INTRAC, 2004a.

<sup>90</sup> INTRAC, 2004a.

<sup>91</sup> INTRAC, 2004b, referencing INTRAC, 2004a.

<sup>92</sup> Cited in Polhemus and Yohannes, 2002.

**2.48 Citizen reliance on their own resources and local informal organizations has limits.** Researchers in Ethiopia have identified numerous strengths associated with these organizations, but with these also come significant weaknesses (Table 2.5). In particular, exclusion along the traditional fault lines of society and the limited power of local organizations to influence government indicate that this dependency may not only be exacerbating existing problems but that it also does little to enhance citizens capability to interact with government.

**Table 2.5: Strengths and weaknesses of informal organizations**

Strengths	Weaknesses
Spontaneous formation	Short-lived; liable to dissolve
Voluntary membership	Exclusive membership
Voluntary contributions	Social compulsion
Self-reliance and autonomy	Weak and isolated
Membership control	Leadership control
Mutual benefit of members	Benefits limited group
Sharing of risks, costs, benefits	Disadvantages poorest
Group cohesion	Excludes others
Trusted and respected	Limited to the group
Social security and insurance	Assistance limited
Informal and flexible	Hidden and invisible
Accountable leadership	Weak control of leaders
Democratic structure	Represent hierarchies
Efficient pooling of resources	Wasteful consumption
Promote democratic behavior	Influence and role limited
Role in resource management	Limited influence and authority
Role in resolving conflicts	Lack of enforcement mechanisms
Local counterbalance to state authority	Limited scope to act; no higher groupings
Promotes participatory development	Limited to small isolated group
Promotes sustainability of projects	Weak ability to manage projects

Source: Pankhurst, 2003

**2.49 Lack of citizen participation in local governance and resource management is reducing returns to government spending.** Where local authorities have engaged with citizens and collaborated in local development initiatives results have been remarkable.<sup>93</sup> Evidence suggests that citizens are eager to participate, but only where they know it will make a difference. For example, the Woreda Studies note that “The increased enthusiasm displayed in relation to the planning of activities outside the formal woreda plan suggests that apparent problems in engaging participation relate more to a lack of motivation than to capacity constraints.” When communities do participate, their contributions often turn out to be major sources of development finance for infrastructure construction and maintenance. In Butajira 1.4 million Birr (approximately US\$ 165,000) was contributed in cash by local people to the construction of a new hospital building. Additional contributions of labor and materials reduced the initial cost estimate from 13 million Birr to seven million Birr. The local government provided some technical advice and has now assumed complete responsibility for hospital management, staffing and financing.<sup>94</sup> In the Amhara Region, the value of community contributions appeared to exceed official capital transfers to the woredas there.

<sup>93</sup> INTRAC, 2004b.

<sup>94</sup> Report of field visit to Butajira World Bank project preparation team June 2004.

Awabel Woreda, for example, received a subsidy of ETB 0.74 million in 1998/99, while communities contributed labor and materials valued at ETB 0.82 million for agro-forestry, soil and water conservation, roads, water schemes, and housing.<sup>95</sup>

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<sup>95</sup> World Bank Country Office in Ethiopia, 2002.



## CHAPTER 3. PEOPLE'S WELL-BEING –CONCLUDING REMARKS

3.1 Despite a decade and a half of relative peace and stability, broad economic reforms, and far-reaching political decentralization, progress in the well-being of Ethiopia's people has remained below expectations. To examine how Ethiopians fared over the past decade and a half we took both a utilitarian and capability approach and explored progress on monetary and non-monetary indicators of well-being. We looked in particular at people's poverty status, their expectations with respect to poverty in the future, i.e. their vulnerability, and the evolution of inequality in Ethiopian society. Here, we summarize what we have learned and identify areas for further analysis and data collection to enhance our diagnostic of people's well-being in Ethiopia. Follow up actions in terms of strategies, policies and investments to improve people's well-being will be discussed in the concluding chapters of Parts II and III following an analysis of the determinants of monetary and non-monetary indicators of people's well being respectively.

3.2 **First, the micro and macro evidence paints a picture of limited to no decline in consumption poverty incidence since 1992.** While there is a growing consensus that poverty incidence in urban areas is deteriorating, rural poverty incidence remained largely constant with signs of a one to two percentage point decline. Overall, consumption inequality in Ethiopia remains low, though inequality in urban areas is on the rise. The reasons behind these broad trends are largely found in the disappointing performance of the agricultural sector which barely kept up with rural population growth. Whatever poverty reduction occurred in rural areas probably resulted from improved access to services and infrastructure. In urban areas, growth in the service sector (estimated at about seven percent per year), which fuelled overall economic growth, was substantially eroded by urban population growth (estimated at 4.7 percent) following rural-urban migration. Moreover, growth in the service sector was mainly driven by government expansion, with a strong increase in military expenditures between 1995 and 1999 financing the border war with Eritrea, followed by a shift out of defense into poverty sectors since 2000. While not much (urban) poverty reduction is to be expected from the increase in expenditures on defense, it was probably too early to already feel the positive effects of the more recent investments in the poverty sectors (e.g. doubling of expenditures on education). Also, some of these investments had a deliberate rural bias, which is consistent with the small decline in rural poverty in the absence of agricultural per capita growth. Finally, only a small percentage of the urban population appears to have benefited from the growth in the service sector during this period, as exemplified by the observed increase in urban inequality.

3.3 **Poverty is more severe among the uneducated, agriculturalists and coffee growers.** While education is generally observed to be an important way out of poverty in developing countries, the probability of being poor is far higher for households with uneducated heads. In support of this finding based on bi-variate analysis, people in participatory surveys often mention education as the most important way out of poverty for their children. This will be further investigated in a multi-variate setting in Chapter 4. Households employed in the service or industry sector appear better off than those in agriculture. The implications of this observation will be addressed at length in Chapter 5 and 6. Poverty incidence among cash crop growers was estimated to be substantially lower than

poverty among agriculturalists. Households growing coffee appeared to be equally poor during the 1995-99 period as the rest of the nation. This is surprising, especially given the coffee price peaks in 1997 and 1998 and the general observation that coffee growers (and cash crop growers more generally) tend to be richer. This observation deserves further investigation given that about 30 percent of the rural population grows coffee and in light of the recent collapse in international coffee prices.

**3.4 Risks permeate daily life in Ethiopia, and drought shocks severely affect current and future consumption.** The slow pace of poverty reduction does not mean that everyone everywhere endured the same fate. Indeed, the averages hide a substantial amount of churning. Many people move in and out of poverty, often in tandem with annual rainfall patterns. This underscores the immediate impact of rainfall on households' current consumption. Moreover, there are clear signs that the negative effect of severe rainfall shocks often persists over time. For example, households who reported to have suffered substantially more during the 1984/5 famine experienced on average 16 percentage points lower growth in the 1990s, and 10 percent lower rainfall was found to reduce consumption growth rates by one percent four to five years later. Harvest failure proves to be especially harmful for child growth and female enrolment, thereby permanently damaging the earning prospects of the next generation. This underscores the need for appropriate risk management programs.

**3.5 In addition to droughts, HIV/AIDS, and also malaria, continue to present substantial risks to the Ethiopian population.** The prevalence of HIV/AIDS is estimated at 4.4 percent of all adults infected (2.6 percent in rural and 12.6 percent in urban areas) in 2003. The latest estimates further suggest that the rate at which the HIV/AIDS epidemic is progressing, has been declining over the past years, especially in urban areas, which is in line with observed changes in behavior. Nonetheless, with about 1.5 million people currently infected and an estimated 539,000 AIDS orphans, HIV/AIDS continues to threaten future development and poverty reduction in Ethiopia. While largely neglected, malaria is also a major contributor to the disease burden in Ethiopia. High malaria endemicity further presents an important obstacle to unlocking the agricultural potential of the lowlands.

**3.6 Second, in contrast to lackluster progress in terms of monetary measures of well-being, human assets have improved.** Starting from a low base, Ethiopia's enrolment expansion at all levels of education has been impressive, with the number of students in the first level of primary school (grades 1-4) almost tripling since 1994. Yet substantial gender and regional differences remain. While progress was also recorded in terms of the prevalence of pre-school stunting, malnutrition rates remain unacceptably high, imposing a substantial drag on the development of the next generation and the future productivity of the economy. Further progress in the health sector will continue to be slow if advances in water and sanitation are not rapidly made. Finally, note that while seemingly inconsistent, the difference in progress between people's human assets and their well-being in monetary terms follows from the time discrepancy, i.e. the observed progress in human capabilities is not only quite recent, it mainly concerns Ethiopia's children (primary enrollment rates, child mortality, child malnutrition) and its effects on monetary poverty will only be felt in the future.

**3.7 Third, women and pastoralists (40 million people in total) appear particularly disempowered—"The husband's beating stick is like butter."** The widespread acceptance of violence against women by women themselves epitomizes the deeply rooted existence of

pronounced gender inequalities. Results from a nationally representative household survey conducted in by the Central Statistical Authority of Ethiopia indicates that 85 percent of women believe that a husband is justified in beating his wife for at least one of the following reasons: burning the food, arguing, going out without telling, neglecting the children, and refusing sexual relations. The same survey reveals that 60 percent of all women support female circumcision.

**3.8 More broadly, the full effects of government reform and action to empower citizens have yet to be fully felt by citizens and sub-regional governments.** The GoE has committed itself, through the Constitution and the SDPRP amongst other initiatives, to the empowerment of citizens through decentralization. In addition, specific laws, policies and initiatives have been launched to address the position of women and pastoralists. However, transitional processes have moved slowly, meaning that the potential effectiveness of the GoE's efforts is not yet fully realized. Partly as a result of this, the strength of informal, traditional practices persist at the community level, where resistance to change represents a tremendous impediment to opening opportunities particularly for traditionally disempowered people such as women and pastoralists. The shift from an historically deep-rooted political culture favoring a strong role for the federal government to devolving real power to local government and people is difficult to bring about. As a result, opportunities for meaningful participation of Ethiopian citizens in governance and political life to shape their lives are currently few. This is further exacerbated by the few resources Ethiopian citizens can claim access to, raising serious concerns regarding the extent to which they are able to take action to improve their own lives.

**3.9 Immobility and isolation further limit people's capability to aspire and expand their choice set.** Not only do Ethiopian citizens command few (material and human) resources, their sheer disconnect from the rest of the world, helps perpetuate traditional practices and customs and substantially limits their opportunities to broaden their horizons. Eighty-five percent of the rural population has been continuously residing in the same area (woreda) as they were born, i.e. without ever having lived elsewhere. Only 2.6 percent of the total rural population were recent migrants, i.e. people who have moved into the area over the past 5 years. Further compounding their physical isolation is their limited access to mass media, with only 13 percent of the rural households owning a radio (virtually nobody has a TV), the lowest among 29 Sub Saharan African countries. Given that 85 percent of the total population lives in rural areas, exposure to new ideas or outside influences is clearly very limited among the Ethiopian population.

**3.10 Key areas for further analysis and data collection to improve the evaluation of people's well-being include:**

- **New methodologies to track poverty in a timely fashion.** In light of the increasing focus on results and the Millennium Development Goals, it will be critical to monitor progress towards achieving these goals on a regular basis. Poverty numbers in Ethiopia prove highly sensitive to rainfall patterns and fluctuate significantly over time. Mere comparison of a couple of points over time is likely to strongly bias conclusions about poverty trends. It will thus be necessary to develop methodologies which are on the one hand sufficiently accurate to properly capture poverty incidence across the nation and the

major geographical areas, and on the other hand not too data intensive or technically demanding so as to ensure timely generation of the results. Consumption prediction techniques developed under the poverty mapping projects combined with a systematized compilation of regularly collected administrative and other secondary data as well as the welfare monitoring and/or Core Welfare Indicator Questionnaire surveys hold promise.

- **A targeted, but comparable, household survey on coffee growers.** Given the share of households growing coffee, its importance for the economy as a whole both in terms of export earnings and as a source of growth through back and forward linkages<sup>96</sup>, and the recent collapse in coffee prices, it is imperative that we better understand the dynamics surrounding the high poverty rate among coffee growers. More broadly, existing household surveys could be enhanced if they would allow for a better identification of food and cash crop producers (preferably by type of cash crop).
- **Systematic data collection and analysis of pastoralists' livelihoods.** The dearth on systematic and comparable information on pastoralists renders it difficult to assess how disadvantaged pastoralists are compared to the rest of the population.
- **In addition, poverty monitoring systems need to broaden their range of indicators to include empowerment indicators.** Empowerment is one of the eight major thrusts of the government's poverty reduction strategy, yet there is an almost complete lack of direct indicators of empowerment. In addition, existing data on intermediary indicators of empowerment, i.e. assets and institutions, would benefit from analysis that sheds light on empowerment and its association with poverty reduction. One simple improvement in data could include disaggregation of the population by social, ethnic or economic attributes.
- **The need for better documentation, dissemination and integration of existing data bases.** While there is a wealth of information available in Ethiopia both nationally representative as well as purposively sampled, the data is often fragmented across different agencies and organizations and not systematically documented. Efforts to better document, disseminate and integrate these different data systems would be enormously useful to further refine the knowledge base of Ethiopia's status of poverty and well-being and its evolution over time.

3.11 Steps have already been taken to address some of these data and knowledge gaps as discussed in Appendix 1, which describes Ethiopia's Action Plan to Strengthen SDPRS Monitoring and Evaluation.

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<sup>96</sup> World Bank, 2004c.

## Part II: Determinants of Monetary Well-Being and Poverty

Having described the evolution of well being in Ethiopia over the past fifteen years in Part I, the following chapters now seek to better understand the forces determining people's monetary well being. They further explore the potential and effectiveness of different strategies to reduce people's vulnerability and lift them out of (consumption) poverty. In doing so, the report addresses a specific request by the GoE related to this study, i.e. to strengthen the current empirical knowledge base, drawing on the Ethiopian experience, to help inform the ongoing revisions of the current strategic framework for poverty reduction (SDPRP). Part II will also gauge the potential of reaching the poverty MDG by considering different strategic scenarios.

The conceptual framework used to address these questions is derived from the standard economic household model.<sup>97</sup> According to this framework, reducing people's consumption poverty and vulnerability will require a combination of (1) increasing their endowments, (2) enhancing the productivity or returns to their endowments, and (3) reducing the volatility of those returns, or increasing people's ability to cope with it, and (4) increasing the security of the endowments themselves. The HICES surveys and the agricultural sample surveys, augmented with secondary data, are used to explore how households in Ethiopia fare along these different dimensions.

We begin by empirically describing the endowment base of the Ethiopian population and the risk factors it faces, across time and space, followed by an analysis of the returns to these endowments (Chapter 4). The importance of geography for poverty reduction and the relation between risk management and poverty reduction in Ethiopia are also explored in detail. Given the importance of agriculture for most people's livelihoods, Chapter 5 explores the performance of the agricultural sector in Ethiopia. In particular, the determinants of agricultural productivity are examined and the potential for increasing agricultural incomes in different geographical areas is explored. Using the empirical insights on the potential to increase agricultural income and the relative importance of the different determinants of monetary well-being more broadly from Chapters 4 and 5, Chapter 6 discusses the role of agriculture, intersectoral linkages, and aid for further poverty reduction in a broader macro perspective, taking into account the structural nature of poverty. It also uses micro simulations to explore the effectiveness of different interventions (e.g. education, infrastructure, access to information, soil degradation) in reaching the poverty MDG.

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<sup>97</sup> In this approach, people are considered to be endowed with a wide array of assets including physical capital (the amount and quality of belongings such as land, trees, tools, machinery, etc.), human capital (the amount and quality of labor), financial capital (savings), and social capital. They live in environments with distinct agro-ecological (e.g. weather and soil characteristics) and socio-economic (e.g. infrastructure availability and population density) features and risk factors, which affect both the returns to and the security of their endowments. Within these environments, and subject to these risks, people allocate their endowments across different activities which constitute their livelihoods (Ellis, 2000a), in order to maximize their income. The resulting income thus depends on the portfolio and the size of an individual's endowments, as well as the security of and returns to those endowments. Returns to people's endowments usually fluctuate due to natural (e.g. rainfall, diseases), economic (e.g. prices) or political (e.g. civil unrest, policies) factors. Yet, there is typically not a one-to-one mapping from income to consumption as people try to smooth their consumption over time either through depletion (and accumulation) of savings or by engaging in formal or informal insurance schemes (e.g. iddir, iqub).

## CHAPTER 4. ENDOWMENTS, RETURNS AND RISKS

4.1 This chapter begins with a detailed review of the level of people's private and public endowment bases, their distribution across space, and their evolution over time as well as the different risks people face. It subsequently estimates the returns to these private and public endowments, i.e. the relative importance of each of these factors in determining people's welfare, and explores how this differs across time and space. Particular attention will be paid to the effects of shocks, and relatedly households' ability to cope with them, on people's welfare.

### 4.1 People's Endowments and their Distribution in Ethiopia

4.2 **Endowment levels seem equally distributed at strikingly low levels.** To characterize people's resource base in Ethiopia, Table 4.1 and Table 4.2 present key statistics on the levels and distribution of people's assets across time and space in Ethiopia. From looking across the tables it is most striking that while assets appear to be equally distributed, people in Ethiopia have to earn their living from a very poor asset base, with households in urban areas only slightly better endowed than those in rural areas. Little progress has been seen in the private endowment base across the survey years 1995 and 1999, with the exception of some improvements in access to public services and infrastructure. As was regularly expressed in the "Ethiopia Consultations with the Poor" report of 1999, inequality is not considered an issue, as virtually everybody is extremely poor.<sup>98</sup> However, this commonly heard statement deserves to be nuanced further, as will be illustrated below.

4.3 **Looking across years, household size dropped from 6.01 to 5.90 persons per household,** accompanied by an increase in the dependency ratio in rural areas (from 1.43 to 1.49) and a decline in urban areas (1.17 to 1.12). Further inspection shows that the number of children aged 5 years or less increased substantially in rural areas, while it dropped in urban areas, reflecting a decline in fertility<sup>99</sup> and possibly the effects of HIV/AIDS. HIV/AIDS is much more prevalent in urban areas and highest in absolute terms for both males and females in the 20-29 year old group<sup>100</sup>. The number of household members in the 16-25 year age group declined by 0.06 in both rural and urban areas, boding ill for the future labor supply. The number of household members between 6 and 15 years old also declined substantially. There was only a marginal change in the number of household members older than 25. Average age of the household head remained around 45 years. Almost one-fifth of households were headed by a woman, and female headship of the household is about twice as common in urban areas than in rural areas (33 percent of all households versus 17 percent).

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<sup>98</sup> Rahmato and Kidanu, 1999.

<sup>99</sup> CSA and ORC Macro, 2001.

<sup>100</sup> World Bank, 2004b.

**Table 4.1: Endowment base and risk factors of Ethiopian households in 1995 and 1999.<sup>1), 2)</sup>**

	1995			1999		
	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
<b>Private endowments</b>						
<b>Human capital/demographics</b>						
Size of household	6.01	4.00	7.00	5.90	4.00	7.00
Dependency ratio	1.39	0.67	2.00	1.44	0.75	2.00
Ratio of females in house	0.50	0.38	0.60	0.51	0.40	0.63
Female head of house	0.18	0.00	0.00	0.19	0.00	0.00
Age of household head	44.9	35.0	55.00	44.5	34.0	53.0
# of household members ≤ 5 yrs old	1.10	0.00	2.00	1.19	0.00	2.00
# of household members bw 6-15 yrs old	2.02	1.00	3.00	1.94	1.00	3.00
# of household members bw 16-25 yrs old	1.06	0.00	2.00	0.99	0.00	2.00
# of household members bw 26-35 yrs old	0.63	0.00	1.00	0.61	0.00	1.00
# of household members bw 36-45 yrs old	0.54	0.00	1.00	0.53	0.00	1.00
# of household members greater than 45 yrs old	0.65	0.00	1.00	0.63	0.00	1.00
Grade obtained by adult males	1.80	0.00	2.33	1.80	0.00	3.00
Grade obtained by adult females	0.82	0.00	0.00	0.88	0.00	0.00
No of adults completed post secondary	0.01	0.00	0.00	0.03	0.00	0.00
<b>Physical capital</b>						
Land ownership (ha)	1.03	0.34	1.31	0.97	0.31	1.24
Own farm animal	0.54	0.00	1.00	0.80	1.00	1.00
Own transport animal	0.24	0.00	0.00	0.34	0.00	1.00
Own plough	0.62	0.00	1.00	0.63	0.00	1.00
Own bicycle	0.01	0.00	0.00	0.01	0.00	0.00
Own TV/Radio	0.16	0.00	0.00	0.21	0.00	0.00
No toilet in household	0.86	1.00	1.00	0.82	1.00	1.00
<b>Livelihoods</b>						
Obtain some income from coffee (1=yes)	0.29	0.00	1.00	0.25	0.00	1.00
Obtain some income from chat (1=yes)	0.09	0.00	0.00	0.09	0.00	0.00
Share of income from agriculture	0.74	0.64	0.98	0.65	0.52	0.89
Share of income from wages	0.08	0.00	0.00	0.07	0.00	0.00
Share of income from self employment	0.13	0.00	0.09	0.08	0.00	0.04
Share of income from other sources	0.05	0.01	0.06	0.19	0.08	0.24
Number of livelihood strategies engaged in	1.19	1.00	1.00	1.42	1.00	2.00
<b>Public endowments</b>						
Electricity as source of household energy	0.10	0.00	0.00	0.10	0.00	0.00
Distance to food market (km)	6.41	2.00	9.00	5.35	2.00	7.00
Distance to water (km)	2.42	0.00	1.00	0.77	0.00	1.00
Distance to health facility (km)	8.84	3.00	12.00	7.38	3.00	11.00
Distance to transport services (km)	17.18	2.00	20.00	16.23	2.00	19.00
Distance to dry weather road (km)				9.30	0.00	12.00

	1995			1999		
	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
<b>Risk factors/Shocks</b>						
Household head was sick in last 2 months (1=yes)	0.26	0.00	1.00	0.36	0.00	1.00
2 year lagged rain shock <sup>3)</sup>	0.06	-0.05	0.16	0.02	-0.09	0.17
1 year lagged rain shock <sup>3)</sup>	(0.00)	-0.14	0.13	0.10	0.00	0.20
Contemporary rain shock <sup>3)</sup>	(-0.03)	-0.14	0.07	(-0.03)	-0.17	0.12
Percentage cultivated land area damaged <sup>4)</sup>	0.16	0.06	0.24	0.17	0.08	0.24
Real expenditure per adult equivalent in Addis 1995 prices	1439	865	1702	1432	884	1685

<sup>1)</sup> Unless otherwise specified, all results in parentheses are not significant up to the 90 percent level. All 1995 and 1999 means are otherwise significantly different beyond the 99 percent level.

<sup>2)</sup> All household level variables are population weighted, while all community level variables are household weighted.

<sup>3)</sup> All rain related variables are *Woreda* level means. Shock is defined as percentage deviation from the long run mean.

<sup>4)</sup> Crop damage concerns only the rural population. Observations are averages at the community or enumeration area level.

**Table 4.2: Endowment base and risk factors of Ethiopian households across rural and urban areas in 1995 and 1999<sup>1),2)</sup>**

	Rural			1999			Urban			1999		
	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
<b>Private endowments</b>												
<b>Human capital/demographics</b>												
Size of household	5.98	4.00	7.00	5.90	4.00	7.00	6.17	4.00	8.00	5.93	4.00	8.00
Dependency ratio	1.43	0.67	2.00	1.49	0.75	2.00	1.17	0.50	1.50	1.12	0.50	1.50
Ratio of females in house	0.50	0.38	0.60	0.50	0.38	0.63	0.55	0.40	0.67	0.55	0.42	0.67
Female head of house	0.15	0.00	0.00	0.17	0.00	0.00	0.34	0.00	1.00	0.33	0.00	1.00
Age of household head	44.9	35.0	55.0	44.5	34.0	53.0	44.7	35.0	53.0	45.0	35.0	54.0
# of household members ≤ 5 yrs old	1.14	0.00	2.00	1.25	0.00	2.00	0.85	0.00	1.00	0.79	0.00	1.00
# of household members bw 6-15 yrs old	2.03	1.00	3.00	1.95	1.00	3.00	1.97	1.00	3.00	1.85	1.00	3.00
# of household members bw 16-25 yrs old	0.99	0.00	2.00	0.93	0.00	1.00	1.46	0.00	2.00	1.38	0.00	2.00
# of household members bw 26-35 yrs old	0.62	0.00	1.00	0.60	0.00	1.00	0.71	0.00	1.00	0.72	0.00	1.00
# of household members bw 36-45 yrs old	0.54	0.00	1.00	0.53	0.00	1.00	0.56	0.00	1.00	0.54	0.00	1.00
# of household members greater than 45 yrs old	0.66	0.00	1.00	0.63	0.00	1.00	0.62	0.00	1.00	0.63	0.00	1.00
Grade obtained by adult males	1.22	0.00	2.00	1.24	0.00	2.00	5.23	0.00	9.00	5.49	0.00	9.50
Grade obtained by adult females	0.34	0.00	0.00	0.40	0.00	0.00	3.65	0.00	6.20	4.05	0.00	7.00
No of adults completed post secondary	(0.00) <sup>101</sup>	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.20	0.00	0.00
<b>Physical capital</b>												
Own plough	0.71	0.00	1.00	0.71	0.00	1.00	0.10	0.00	0.00	0.10	0.00	0.00
Own farm animal	0.62	0.00	1.00	0.88	1.00	1.00	0.08	0.00	0.00	0.30	0.00	1.00
Own transport animal	0.28	0.00	1.00	0.38	0.00	1.00	0.05	0.00	0.00	0.07	0.00	0.00
Own bicycle	0.01	0.00	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.05	0.00	0.00
Own TV/Radio	0.09	0.00	0.00	0.14	0.00	0.00	0.58	0.00	1.00	0.67	0.00	1.00
No toilet in household	0.95	1.00	1.00	0.91	1.00	1.00	0.35	0.00	1.00	0.25	0.00	1.00
<b>Livelihoods</b>												
Obtain some income from coffee (1=yes)	0.32	0.00	1.00	0.28	0.00	1.00	0.10	0.00	0.00	0.06	0.00	0.00
Obtain some income from chat (1=yes)	0.10	0.00	0.00	0.11	0.00	0.00	0.02	0.00	0.00	0.01	0.00	0.00
Share of income from agriculture	0.85	0.85	0.98	0.74	0.66	0.90	0.09	0.00	0.02	0.07	0.00	0.01
Share of income from wages	0.03	0.00	0.00	0.03	0.00	0.00	0.35	0.00	0.77	0.37	0.00	0.79
Share of income from self employment	0.07	0.00	0.02	0.05	0.00	0.02	0.46	0.00	0.91	0.34	0.00	0.71
Share of income from other sources	0.05	0.01	0.05	0.18	0.08	0.24	0.10	0.00	0.11	0.22	0.00	0.32

<sup>101</sup> Significant up to 95 percent.

	Rural			1995			1999			Urban			1995			1999		
	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
	Number of livelihood strategies engaged in	1.16	1.00	1.00	1.41	1.00	2.00	1.39	1.00	2.00	1.49	1.00	2.00	1.39	1.00	2.00	1.49	1.00
<b>Public endowments</b>																		
Electricity as source of household energy	0.01	0.00	0.00	0.01	0.00	0.00	0.65	0.00	1.00	0.71	0.00	1.00	0.65	0.00	1.00	0.71	0.00	1.00
Distance to food market (km)	7.38	3.00	10.00	5.97	2.00	9.00	0.74	0.00	1.00	1.27	0.00	1.00	0.74	0.00	1.00	1.27	0.00	2.00
Distance to water (km)	2.83	0.00	1.00	0.85	0.00	1.00	0.04	0.00	0.00	0.28	0.00	0.00	0.04	0.00	0.00	0.28	0.00	0.00
Distance to Health (km)	10.20	4.00	13.00	8.28	3.00	12.00	0.88	0.00	1.00	1.43	0.00	1.00	0.88	0.00	1.00	1.43	0.00	2.00
Distance to transport services (km)	19.79	5.00	24.00	18.21	5.00	23.00	1.89	0.00	0.00	3.16	0.00	0.00	1.89	0.00	0.00	3.16	0.00	1.00
Distance of dry weather road (km)	.	.	.	9.26	1.00	12.00	.	.	.	0.53	0.00	0.00	.	.	.	0.53	0.00	0.00
<b>Risk factors/shocks</b>																		
Household head was sick in last 2 months (1=yes)	0.26	0.00	1.00	0.37	0.00	1.00	0.22	0.00	0.00	0.30	0.00	0.00	0.22	0.00	0.00	0.30	0.00	1.00
2 year lagged rain shock <sup>3)</sup>	0.05	-0.05	0.16	0.04	-0.07	0.19	0.06	0.00	0.15	(-0.09)	-0.21	0.10	0.06	0.00	0.15	(-0.09)	-0.21	0.10
1 year lagged rain shock <sup>3)</sup>	(-0.01)	-0.14	0.12	0.10	0.00	0.19	0.04	0.00	0.30	0.07	-0.01	0.20	0.04	-0.15	0.30	0.07	-0.01	0.20
Contemporary rain shock <sup>3)</sup>	(-0.02)	-0.14	0.09	(-0.03)	-0.16	0.12	(-0.05)	-0.19	0.02	(-0.05)	-0.21	0.10	(-0.05)	-0.19	0.02	(-0.05)	-0.21	0.10
Percentage cultivated land area damaged <sup>4)</sup>	0.16	0.06	0.24	0.17	0.08	0.24	0.16	0.06	0.24	0.17	0.08	0.24	0.16	0.06	0.24	0.17	0.08	0.24
<b>Real expenditure per adult equivalent in Addis 1995 prices</b>	1348	841	1612	1352	874	1622	1966	1066	2429	1957	1007	2285	1966	1066	2429	1957	1007	2285

<sup>1)</sup> Unless otherwise specified, all results in parentheses are not significant up to the 90 percent level. All 1995 and 1999 means are otherwise significant beyond the 99 percent level.

<sup>2)</sup> All household level variables are population weighted, while all community level variables are household weighted.

<sup>3)</sup> All rain related variables are woreda level means. Shock is defined as percentage deviation from the long run mean.

<sup>4)</sup> Crop damage concerns only the rural population. Observations are averages at the community or enumeration area level.

**4.4 Education levels are extremely low across the country, but slightly improving over the four year period.** As indicated in Part I, educational achievement among Ethiopian adults is disastrously low. With an average completed grade of 1.8 among male and only 0.8 among female adults, Ethiopia is basically left with an uneducated work force. While the results are better in urban areas and improving across the country especially for females, there remains a long way to go. Even in urban areas the average completed grade for male adults was only 5.5 years in 1999. Encouraging trends are also observed in post secondary education. While still virtually nobody completed post-secondary education in rural areas, the number of adults who completed some form of post secondary education more than doubled in the urban settings (from 2.7 percent of all adults in 1995 to 6.1 percent in 1999).

**4.5 Regarding land size, one of the most important assets a rural household has, on average each holder has about one ha of land under temporary and permanent crops,** which translates to 0.21 ha per rural person.<sup>102</sup> This has declined from 0.5 ha per person in the 1960s.<sup>103</sup> At 0.11 ha the available land per person seems especially low in SNNPR and Gambela (Table 4.3). Landholdings per person are also lower in the food insecure zones in line with common perceptions of higher land scarcity in these areas.

**4.6 A land poor class is emerging.** Following the radical land reform/redistribution of 1975 under the Derg regime, Ethiopian agriculture has basically become a smallholder farm sector, with only a limited number of large scale commercial/state farms. Indeed less than one percent of land holders had more than 4.35 ha per holder, and the largest holding measured was only 85 ha. As land sales are forbidden,<sup>104</sup> equal access to land is commonly assumed to characterize Ethiopian agriculture. However, as illustrated in Table 4.3, land appears to be much more unequally distributed than commonly assumed, even though inequality does not arise from large land ownership. The Gini coefficient among those with land is estimated at about 0.45.<sup>105</sup> Further disaggregation of the data shows that 20 percent of the rural population has less than 0.06 ha per person, or 0.08 ha per person when SNNPR is excluded—holders in SNNPR have smaller plots and tend to grow mainly coffee and enset.<sup>106</sup> To fix ideas, 0.08 ha corresponds to a plot of 20 m by 40 m, which with current cereal production technologies would yield on average a daily equivalent of about 779 calories per

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<sup>102</sup> Figures obtained from the CSA Annual Agricultural Sample Surveys. The figure excludes landless households, though including landless households would not affect the results much, since about 98 percent of rural households reported to “own” land in the 1999 WMS. Strictly speaking land in Ethiopia belongs to the state and farmers only have user rights. Land tenure security and private land ownership are longstanding and hotly debated issues in Ethiopia. The effect of lack of private land ownership on agricultural productivity and environmental degradation will be extensively discussed in the ESW on Poverty and the Environment.

<sup>103</sup> Among a selected sample of Sub Saharan African countries, Jayne et al., 2003 calculate, based on FAO statistics, that the cultivated land/person ratio (=land cultivated under permanent and annual crops/population in agriculture) declined by 50 percent between the 1960s and the 1990s. For Ethiopia, they find the cultivated land/person ratio to decline from 0.508 to 0.252, which closely resembles our estimate for the late 1990s derived from household survey data.

<sup>104</sup> The state owns the land and farmers only hold usufruct rights. Land transfers through short term rent or contract are however possible, though relatively limited.

<sup>105</sup> This is very similar to the Gini coefficient of land size per holder among those with land, which is estimated at 0.462 in 1995 and 0.477 in 1999.

<sup>106</sup> Enset, or false banana, is a perennial tuber crop.

person, or slightly more than half the person's daily *cereal* caloric needs.<sup>107</sup> Further analysis suggests that households in the bottom quartile of land per person still derive a substantial part of their income from crop production.<sup>108</sup> A "landless" class is rapidly emerging in Ethiopia.

**Table 4.3: Land holdings per person and land inequality**

	Total Area Cultivated per Capita per Holder <sup>1)</sup>			
	Average		Gini coefficient <sup>2)</sup>	
	1995	1999	1995	1999
<b>Administrative region</b>				
Tigray	0.20	0.23	0.45	0.43
Amhara	0.26	0.26	0.42	0.46
Oromiya	0.24	0.23	0.43	0.45
Benishangul-Gumuz	0.27	0.34	0.40	0.49
SNNPR	0.11	0.11	0.43	0.47
Gambela	0.16	0.17	0.50	0.47
<b>Food security</b>				
food secure zones	0.21	0.22	0.47	0.47
Medium food secure zones	0.23	0.22	0.43	0.47
Food insecure zones	0.16	0.18	0.45	0.48
<b>Total</b>	<b>0.21</b>	<b>0.21</b>	<b>0.45</b>	<b>0.47</b>

<sup>1)</sup> Only land under temporary and permanent crops is considered. Permanent crops make up about 7 percent of the total land under temporary and permanent crops. Temporary and permanent crops make up about 85 percent of total cultivated land. The other 15 percent are used for grazing, fallow, wood land and others.

<sup>2)</sup> Gini is among those with land, yet 97 percent and 98 percent of the households in rural Ethiopia reported to own land in 1995 and 1999 respectively.

Source: Own calculations from 1995 and 1999 Agricultural Sample Surveys, CSA

**4.7 Several factors explain inequality in land access, including geography, life cycle effects, gender of household head, and household composition.** Analysis of variance suggests that inequality in land access cannot be attributed to large differences across provinces or zones. In particular, only three and eight percent of the variation in land access across the country could be explained by between-region or between-zonal differences respectively. There appear to be larger differences in land size across woredas which explain about 21 percent of the variation in land size. Other important factors include life cycle

<sup>107</sup> To see this, note that one kg of cereal flour yields between 3,500 and 3,800 calories depending on the cereal, with teff at the lower end of the range and maize and sorghum typically at the upper end. Given 15 to 20 percent loss during the milling or pounding process, we assumed that one kg of cereals yielded about 3,000 calories. Given average cereal yields of about 1.2 ton per ha, 0.08 ha per person would generate 779 calories per person per day [ $0.08(\text{ha/person}) \times 1,200(\text{kg/ha}) \times 3,000(\text{cal/kg}) / 365 = 779$ ]. From the 1999 HICES survey we know that the poorest half of the Ethiopian population obtains about two thirds of calories from cereals. Given a minimum daily requirement of 2,200 calories per adult, this implies that daily 1,466 calories per adult are needed from cereals, which corresponds to about 0.5 kg of (unmilled) cereals.

<sup>108</sup> Jayne et al. (2003) estimated that crop income share for households in the bottom quartile in land per capita was still 86 percent, with only 14 percent of income derived from non-farm income. Their estimates are based on a sub sample of the 1996 household budget survey for which they collected more information. Similarly, they observed crop income shares ranging from 57 percent in Zambia to 79 percent in Mozambique among households in the bottom quartile in land per capita. Only in Kenya were those with little land mainly engaged in other remunerative off-farm activities.

effects, gender of the household head, and the number of male and female adults. Households with heads that are 50 years of age have roughly 0.025 hectares more land per household member than those with heads 30 years of age. Female headed households have on average 0.07 hectares less land per household member than male headed households. This translates into one third less land per person when compared to the national average of 0.21 hectares per person. While households with more male and female adults tend to have more land per household, they also have less land per household member.<sup>109</sup> The average plot size, the amount of calories it can generate, the degree of land inequality and the correlates of land access are important stylized facts to gauge the merits of the Agricultural Development-Led Industrialization (ADLI) strategy. We return to the implications of these facts in Chapter 6, where we discuss the potential for ADLI in terms of poverty reduction in more depth.

**4.8 Average livestock ownership, another key household asset, has largely remained constant among rural (agricultural) households** across the two survey years (Table 4.4). Rural households engaged in temporary and permanent crop production have on average slightly more than one ox, almost three units of cattle, and two to three sheep and goats. Oxen are critically important in the ox-plough farming system which characterizes Ethiopian agriculture, and they must be used in pairs. However, only 29 percent of all households with oxen possess two or more oxen (not reported in the table). Moreover, the proportion with at least one ox has declined from 54 percent in 1995 to 42 percent in 1999. Similarly, the proportion of households possessing any large or small ruminants declined. Slightly more than one quarter of the population owns a transport animal. This corresponds to the 1995 figure reported in Table 4.4, which is derived from the WMS.<sup>110</sup> Regarding farm equipment, about 70 percent of rural households own their own plough (Table 4.2).

**Table 4.4: Livestock ownership in Ethiopia between 1995 and 1999.<sup>1)</sup>**

Number per holder	1995		1999	
	Average	Percentage of holders	Average	Percentage of holders
cattle for agricultural purposes, oxen	1.15	54.00	1.08	42.2
cattle for other purposes	2.85	66.10	2.88	59.5
sheep and goats	2.85	49.20	2.36	38.9
horses, mules, asses, camels	0.55	28.60	0.58	26.8

Note: Figures do not include pastoralist households that do not cultivate land.

Source: Own calculations from 1995 and 1999 Agricultural Sample Surveys, CSA

**4.9 Ownership of consumer durables such as bicycles and radios/TVs has increased, both in rural and urban areas** (Tables 4.1 and 4.2). Nonetheless, still only 14 percent of the population in rural Ethiopia has a radio (or TV), exemplifying the sheer isolation of the Ethiopian countryside, not only in terms of market access but especially in terms of information. Sanitation conditions improved in both urban and rural areas, though again from very low levels. The proportion of households using buckets or their surroundings as their toilet declined from 86 percent in 1995 to 82 percent in 1999. Once again the difference

<sup>109</sup> Jayne et al., 2003.

<sup>110</sup> Note that the difference in ownership of farm and transport animals reported in Tables 4.1 and 4.4 is related to definitional issues.

between urban and rural areas is stark, even though mere population density also encourages increased use of toilets.

**4.10 Households in rural areas derived on average about 85 percent of their income from agriculture in 1995, which dropped to about 75 percent in 1999.** These figures highlight once again the complete dependence of the Ethiopian countryside on agriculture. About 29 percent were coffee growers (which fell slightly to 25 percent in 1999) and about nine percent of households obtained some income from growing chat, a mild narcotic. About one third of households in urban areas were wage earners, while another 35 to 45 percent were self employed. The remainder earned their living from agriculture and other sources. The number of livelihood strategies<sup>111</sup> increased overall from 1.19 to 1.42 in rural and urban areas alike, most likely in response to deteriorating living conditions.

**4.11 Access to public endowments, including electricity and transportation networks, is extremely limited in rural areas, and distances to markets and public services are increasing for urban residents.** The number of households that used electricity increased by six percentage points in urban areas from 65 to 71 percent, but at one percent use of electricity remains virtually non-existent in rural areas. All distance measures indicate increased access to services in rural areas. This is critical as it reduces transaction costs and increases households' connectivity to the overall economy, through which they can reap the benefits from overall economic growth as well as the benefits that accrue from agglomeration and information externalities. Nonetheless, extreme remoteness continues to characterize the countryside, with food markets on average six kilometers away, a dry weather road almost 10 kilometers away, and public transport on average 18 kilometers away. The average distance to drinking water, however, dropped from 2.83 to 0.85 kilometers. In contrast, in urban areas distances to food markets, water sources, health centers and transportation services all increased by at least 60 percent between the survey years. As indicated before, this could be the consequence of increasing rural to urban migration, with the new settlements being built further and further way from the main hubs of activity. This is consistent with the observed increase in urban poverty.

**4.12 Rainfall and illness are critical risk factors.** Rainfall forms a critical, but highly variable, input for agricultural production and thus rural income generation. In the regression analysis in the following section, we capture rainfall shocks using the percentage deviation from the long run average in a given year for a woreda. For each survey year, we have information for rain shocks for that year (1995, 1999), which we call contemporary rain shocks, a one year lagged rain shock (1994, 1998), and a two year lagged rain shock (1993, 1997). However, no major nation-wide drought occurred during any of these years (Table 4.1 above), and shocks were mostly positive. Rainfall was especially plentiful in 1998, with 10 percent more than the long term average. Nonetheless, the nation-wide averages also mask quite large differences across the country, with some woredas experiencing serious shocks even in years with moderately good average rainfall, as illustrated by the 25th percentile rainfall shock of 14 to 17 percent in 1995 and 1999 respectively. We also use the percentage of cultivated land area damaged as reported by the farmers themselves, which captures both

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<sup>111</sup> A household is considered to engage in a particular livelihood strategy if it obtains more than 20 percent of its income in that activity.

idiosyncratic (insects/pests) as well as covariant (droughts and floods) shocks. The total area damaged is fairly steady at around 16 percent in both years. Finally, we consider health shocks proxied by self reported illness of the household head over the past two months. Self reported sickness incidence increased substantially between 1995 and 1999 from 26 to 36 percent.

**4.13 Woreda level measures of soil degradation<sup>112</sup>, agro-ecology, population density and malaria risk are used to characterize geography** in the regression analysis discussed in the following section. Rural population per arable land is on average 232, ranging from 90 to 281 and over two-fifths of the population are exposed to high malaria risk (Table 4.5). We include two measures of soil degradation. First, using information on the slope and characteristics of the soil, the Biomass project estimated average annual topsoil loss per woreda. The depth of the topsoil is an important measure of the moisture retention capacity of the soil. At less than 1.2 m of topsoil, moisture retention capacity rapidly declines. Average annual topsoil loss per year amounts to 14 tons, which corresponds to about 1.12 mm of topsoil per year. One quarter of woredas lose 1.6 mm of topsoil annually.

**4.14 Nutrient loss due to dung collection appears to be significant.** To further proxy nutrient loss, we include an estimate of the total phosphorus and nitrogen loss due to dung (and crop residue) collection from the fields expressed in DAP and Urea equivalent tons per woreda.<sup>113</sup> On average, 185 ton DAP equivalent and 624 ton Urea equivalent is removed from the fields per woreda due to dung (and crop residue) collection. In one quarter of the woredas the amount of DAP and Urea equivalent removed per year amounts to more than 300 and 1,000 tons respectively. Overall, the total nutrient loss due to dung collection in the country would result in a total DAP and Urea equivalent nutrient loss of 364,050 tons.<sup>114</sup> This is astronomical, especially when compared with the total amount of DAP and Urea annually applied to the fields by all farmers across the country, which in 2000 amounted to 341,000 tons. Yet, it must be emphasized that there is not at all a one-to-one mapping of the phosphorus and nitrogen content of dung (and crop residue) lost due to their removal from the fields and actual soil nutrient loss.<sup>115</sup> Nonetheless, the magnitudes are sufficiently large to suggest significant detrimental effects to agricultural productivity and thus income and poverty. Further investigation of this matter in the Ethiopian context is called for. With only slightly more than one quarter of all cultivated land fertilized with commercial fertilizer, fertilizer use in Ethiopia remains limited. The use of natural fertilizer appears even less (only 10 percent of total cultivated land).

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<sup>112</sup> Data have been collected by the Biomass project.

<sup>113</sup> DAP is diammoniumphosphate and urea is carbonyl diamide, which provide phosphorus and nitrogen respectively, the two key soil macro-nutrients.

<sup>114</sup>  $450 \text{ woredas} \times (184 \text{ ton DAP/woreda} + 624 \text{ Urea loss/woreda})$  yields 364,050 ton DAP and Urea equivalent nutrient loss.

<sup>115</sup> The extent to which dung (and crop residue) can enrich the nutrient base of soil critically depends on its composting, the timing of the application and the cultivation practice used to turn these materials in the soil. Roose and Barthès (2001) indicate that “the commonly used dry manure presents poor qualities, has lost most of its nitrogen and potassium, and carries pests, germs and weed seeds as faeces are not heated up sufficiently to kill these contaminants. Good quality manure is rare in Africa, but its positive influence on yields, its slow release of nutrients and positive effects on pH and other soil properties are well documented (FAO, 1975, Shaxson, 1999). However, 40-60 percent of the carbon and 30-50 percent of the nutrients from the grazed biomass do not return to the soil (Roose, 1996)”.

**Table 4.5: Parameters of soil degradation, agro-ecology, population density and malaria incidence in Ethiopia<sup>1)</sup>**

	Mean	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
<b>Soil degradation</b>			
DAP equiv. nutrient loss (tons/yr/woreda) due to dung and crop residue collection	185.07	6.36	305.01
Urea equiv. nutrient loss (tons/yr/woreda) due to dung and crop residue collection	624.06	13.14	1016.26
Average soil loss (tons/ha/yr)	14.36	7.39	19.90
% of cultivated land fertilized naturally in 1999	0.10	0.00	0.14
% of cultivated land fertilized by chemicals in 1999	0.27	0.00	0.50
<b>Agro-ecological characteristics</b>			
Mean Altitude (m)	1935.84	1664.00	2200.00
Long Run Average Rainfall (mm)	1085.69	804.33	1282.75
Long Run Coefficient of Variation of Rain	0.24	0.16	0.29
<b>Rural Population per arable area (people per km<sup>2</sup>)</b>	232.41	89.81	280.79
<b>Malaria risk (proportion)</b>			
High Malaria Risk (1=yes)	0.45	0.00	1.00
Medium Malaria Risk (1=yes)	0.11	0.00	0.00
Low Malaria Risk (1=yes)	0.44	0.00	1.00

<sup>1)</sup> All variables are at the woreda level.

**4.15 Overall, most households use firewood, though about 16 percent of the households use dung cakes, crop residues and saw dust as their primary source of cooking fuel.** Only five percent use charcoal, kerosene, gas and electricity and virtually all of these reside in urban areas. Looking across the regions, about twenty-five percent of all households in Amhara use dung cakes (and crop residues) which, combined with high population density, results in large annual DAP equivalent nutrient losses (Table 4.6). While the proportion of households using dung cakes and crop residues is even higher in Tigray, total DAP equivalent loss per woreda is not so high, as Tigray is much less densely populated. On the other hand, in SNNPR, where more than 90 percent of households rely on firewood as opposed to dung cakes, high levels of population density still result in above average rates of DAP nutrient loss per woreda. Use of dung cakes is also higher in the food insecure areas (Table 4.6), resulting in larger nutrient loss, further lowering labor productivity per capita in the face of less productive landholdings.<sup>116</sup>

<sup>116</sup> Pender et al. (2001) observe a robust association of decreased use of manure as fertilizer with population growth in Ethiopia, and attribute this finding to the increased demand for manure as fuel.

**Table 4.6: Biomass use for cooking fuel<sup>1)2)</sup>**

Proportion of households using	1995			1999		
	Firewood (collected and purchased)	Charcoal, Kerosene Gas, and Electricity	Dung cake, crop Residues, and Saw Dust	Firewood (collected and purchased)	Charcoal, Kerosene Gas, and Electricity	Dung cake, crop Residues, and Saw Dust
Tigray	55.65	2.25	34.13	63.86	1.78	31.11
Amhara	66.33	1.20	25.31	71.16	0.92	26.01
Oromiya	77.88	1.83	16.58	77.10	2.26	16.01
SNNPR	90.57	0.36	4.44	93.36	1.21	2.52
Rural	75.88	0.23	18.65	78.92	0.25	17.31
Urban	59.92	29.15	7.10	58.48	33.39	6.62
Food Secure zones	83.42	1.06	9.92	85.54	1.19	8.93
Between	68.91	1.52	24.24	72.40	2.23	22.43
Food Insecure zones	73.84	3.71	17.40	75.70	3.68	18.13
Total	73.50	4.54	16.93	76.13	4.77	15.85

<sup>1)</sup> The rows don't add up to 100, the difference being "other" sources than the ones the reported.

<sup>2)</sup> Zones have been divided in terciles based on a food security index which captures the average proportion of people estimated in need of food aid in 1994 and 1995.

**4.16 We explore the differences in endowments across administrative regions** in Tables 4.7 and 4.8. We focus on the four most populous regions for which we have sufficient data: Tigray, Amhara, Oromiya and SNNPR. While there is a large variation in mean expenditure across the regions, systematic variations in endowments are limited. Some of the more striking differences include the wide range among mean adult male education, with adult males in SNNPR having almost twice as many grades completed as their counterparts in Amhara (2.04 versus 1.08). Compared to the other regions, households in SNNPR have on average the lowest ownership of almost all assets (including land: see Table 4.7) but greater access to services. Across the regions, households derive about 70 percent of their income from agriculture. Coffee production is especially important in SNNPR (59 percent of all households obtain income from coffee), but also in Oromiya where about a quarter of all households are engaged in coffee production. Among the four regions, chat production is most prevalent in Oromiya. During our survey years, the crop damage rate was about twice as high in SNNPR compared to Tigray.

**Table 4.7: Endowment base and risk factors across four regions. 1)**

	TIGRAY			AMHARA			OROMIYA			SNNPR		
	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile
<b>Private endowments</b>												
<b>Human capital/demographics</b>												
Size of household	5.73	4.00	7.00	5.52	4.00	7.00	6.19	4.00	8.00	6.02	4.00	7.00
Dependency ratio	1.52	0.80	2.00	1.34	0.67	2.00	1.51	0.75	2.00	1.43	0.71	2.00
Ratio of females in house	0.52	0.40	0.67	0.51	0.38	0.63	0.50	0.38	0.60	0.50	0.40	0.63
Female head of house	0.27	0.00	1.00	0.16	0.00	0.00	0.18	0.00	0.00	0.17	0.00	0.00
Age of household head	47.62	38.00	57.00	45.15	35.00	55.00	44.57	34.00	54.00	43.48	33.00	51.00
Grade obtained by adult males	1.23	0.00	1.67	1.08	0.00	1.00	1.74	0.00	2.67	2.04	0.00	3.50
Grade obtained by adult females	0.88	0.00	0.00	0.56	0.00	0.00	0.69	0.00	0.00	0.69	0.00	0.00
No of adults completed post secondary	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
<b>Physical capital</b>												
Own plough	0.74	0.00	1.00	0.74	0.00	1.00	0.67	0.00	1.00	0.50	0.00	1.00
Own farm animal	0.70	0.00	1.00	0.76	1.00	1.00	0.72	0.00	1.00	0.65	0.00	1.00
Own transport animal	0.31	0.00	1.00	0.32	0.00	1.00	0.36	0.00	1.00	0.17	0.00	0.00
Own bicycle	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
Own TV/Radio	0.17	0.00	0.00	0.09	0.00	0.00	0.20	0.00	0.00	0.15	0.00	0.00
No toilet in household	0.91	1.00	1.00	0.93	1.00	1.00	0.86	1.00	1.00	0.82	1.00	1.00
<b>Livelihoods</b>												
Obtain some income from coffee (1=yes)	0.05	0.00	0.00	0.11	0.00	0.00	0.27	0.00	1.00	0.59	0.00	1.00
Obtain some income from chat (1=yes)	0.02	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.00	0.04	0.00	0.00
Share of income from agriculture	0.67	0.53	0.94	0.75	0.71	0.96	0.73	0.63	0.96	0.71	0.59	0.92
Share of income from wages	0.07	0.00	0.00	0.05	0.00	0.00	0.06	0.00	0.00	0.06	0.00	0.00
Share of income from self employment	0.08	0.00	0.00	0.09	0.00	0.01	0.10	0.00	0.05	0.10	0.00	0.11

	TIGRAY			AMHARA			OROMIYA			SNNPR		
	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile
Share of income from other sources	0.18	0.04	0.24	0.11	0.03	0.14	0.12	0.02	0.15	0.13	0.03	0.18
Number of livelihood strategies engaged in	1.38	1.00	2.00	1.25	1.00	1.00	1.29	1.00	2.00	1.39	1.00	2.00
<b>Public endowments</b>												
Electricity as source of household energy	0.11	0.00	0.00	0.05	0.00	0.00	0.08	0.00	0.00	0.05	0.00	0.00
Distance to food market (km)	9.04	3.00	12.00	7.05	3.00	9.00	5.93	2.00	9.00	3.91	1.00	6.00
Distance to water (km)	1.55	0.00	1.00	2.39	0.00	1.00	1.54	0.00	1.00	0.79	0.00	1.00
Distance to health facility (km)	8.97	3.00	12.00	8.51	3.00	12.00	8.54	3.00	12.00	7.84	3.00	12.00
Distance to transport services (km)	18.21	3.00	24.00	20.02	6.00	24.00	15.56	2.00	18.00	16.15	3.00	20.00
<b>Risk factors/shocks</b>												
Household head was sick in last 2 months (1=yes)	0.36	0.00	1.00	0.33	0.00	1.00	0.30	0.00	1.00	0.29	0.00	1.00
2 year lagged rain shock <sup>2)</sup>	-0.05	-0.19	0.06	0.04	-0.05	0.17	0.06	-0.05	0.17	0.05	-0.07	0.17
1 year lagged rain shock <sup>2)</sup>	0.16	0.07	0.22	0.09	0.04	0.25	0.01	-0.11	0.10	0.05	-0.04	0.16
Contemporary rain shock <sup>2)</sup>	0.05	-0.03	0.21	0.03	-0.09	0.13	-0.03	-0.15	0.07	-0.11	-0.17	-0.05
Percentage cultivated land area damaged <sup>3)</sup>	0.18	0.10	0.26	0.18	0.10	0.25	0.15	0.06	0.21	0.34	0.06	0.49
<b>Real expenditure per adult equivalent in Addis 1995 prices</b>	1181	740	1389	1981	956	2416	1396	874	1647	1550	984	1817

1) All household level variables are population weighted, while all community level variables are household weighted.

2) All rain-related variables are woreda level means. Shock is defined as percentage deviation from the long run mean.

3) Crop damage concerns only the rural population. Observations are averages at the community or enumeration area level.

**Table 4-8: Parameters of soil degradation, agro-ecology, population density and malaria incidence across four regions<sup>1)</sup>**

	TIGRAY			AMHARA			OROMIYA			SNNPR		
	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile	Mean	25 <sup>th</sup> Per-centile	75 <sup>th</sup> Per-centile
<b>Soil Degradation</b>												
DAP equiv. nutrient loss (tons/yr/woreda) due to dung and crop residue collection	98.63	70.35	121.02	325.20	247.89	400.51	127.36	0.00	254.39	131.40	3.89	235.36
Urea equiv. nutrient loss (tons/yr/woreda) due to dung and crop residue collection	341.11	259.44	402.95	1281.10	972.10	1630.51	370.57	0.00	747.38	285.04	7.78	482.28
Average soil loss (tons/ha/yr)	9.38	5.53	10.95	21.75	13.46	25.50	12.35	6.04	16.26	9.50	4.92	11.90
<b>Agro-ecological characteristics</b>												
Mean Altitude (m)	1911.95	1685.06	2126.70	2096.83	1855.58	2359.23	1927.70	1705.00	2167.00	1817.71	1549.00	2051.00
Long Run Average Rainfall (mm)	687.03	511.86	902.27	1040.79	836.35	1169.03	1120.69	745.93	1441.45	1235.41	1090.24	1453.03
Long Run Coefficient of Variation of Rain	0.28	0.21	0.35	0.26	0.17	0.33	0.23	0.16	0.28	0.20	0.15	0.23
<b>Rural Population per arable area (people per km<sup>2</sup>)</b>	140.95	78.60	190.09	193.78	137.90	247.10	267.85	116.31	318.66	380.12	119.30	594.76
<b>Malaria risk (proportion)</b>												
High Malaria Risk (1=yes)	0.54	0.00	1.00	0.37	0.00	1.00	0.43	0.00	1.00	0.57	0.00	1.00
Medium Malaria Risk (1=yes)	0.00	0.00	0.00	0.14	0.00	0.00	0.10	0.00	0.00	0.07	0.00	0.00
Low Malaria Risk (1=yes)	0.46	0.00	1.00	0.49	0.00	1.00	0.47	0.00	1.00	0.36	0.00	1.00

<sup>1)</sup> All variables are at the woreda level.

## 4.2 Returns to Endowments Across Time and Space

4.17 We now investigate the magnitude and precision of the returns to the various endowments discussed above, with the intention of shedding light on the relative importance of these endowments for consumption and poverty reduction. We further examine how the returns differ across time and space. The dependent variable used in all the estimated results presented is the natural logarithm of per adult equivalent expenditures. The reported coefficients thus represent a percentage change in expenditures given a marginal unit change in the independent variable of interest. All expenditures have been deflated across space and time and are expressed in Addis Ababa 1995 prices.

### 4.2.1 Returns across time

4.18 We first estimate the effect of private and public endowments on consumption. Table 4.9 presents the data, which are described in greater detail in this section. In the first column of Table 4.9, we present the results for our pooled sample, where we combine observations from both our 1995 and 1999 data. In the second and third column we decompose the pooled regression across years to get a sense of the change in returns across time. The fourth regression includes additional information on access to dry weather roads and enumeration area (EA) level measures on land availability and cultivation practices only available in 1999. We control for all other location-specific characteristics (e.g. differential prices, development interventions, government effectiveness, ethnicity, etc.) by including woreda dummies. In the next section we will further unbundle the effect of geography on consumption and poverty through explicit inclusion of measures of agro-ecological potential, population density, soil degradation and spatially correlated risk factors.

**Table 4.9: Estimated effects of household and public endowments on consumption.**<sup>1), 2), 3)</sup>

Logarithm of per adult equivalent consumption	Pooled 1995/99 <sup>2)</sup>		1995		1999		Extended 99 <sup>3)</sup>	
	Coef-ficient.	t-stat. <sup>4)</sup>	Coef-ficient.	t-stat.	Coef-ficient.	t-stat.	Coef-ficient.	t-stat
<b>Private endowments</b>								
<b>Human</b>								
<b>Capital/Demographics</b>								
Size of household	-0.0969	-61.34	-0.0938	-40.97	-0.1031	-50.16	-0.1001	-32
Dependency ratio	-0.0182	-5.87	-0.0122	-2.64	-0.0232	-5.92	-0.0209	-3.71
Ratio of Females in house	0.1673	12.37	0.1801	8.8	0.1497	8.94	0.1495	6.12
Female head of house	-0.0082	-1.12	-0.0253	-2.28	-0.0051	-0.56	0.0166	1.23
Age	-0.0078	-7.43	-0.0123	-7.77	-0.0016	-1.25	-0.0002	-0.13
Age squared	0.0001	5.63	0.0001	6.49	-3.57E-06	-0.27	-1.49E-05	-0.77
Mean education of adult males	0.0158	14.62	0.0147	8.81	0.0162	12.27	0.0159	7.34
Mean education of adult females	0.0198	13.93	0.0250	11.36	0.0163	9.37	0.0149	4.53
No of adults completed post secondary	0.1910	12.26	0.2095	7.04	0.2125	12.39	0.2589	4.06
<b>Physical capital</b>								
Community average land size (ha) / holder							1.20E-05	5.81
No toilet in household	-0.1232	-12.41	-0.1143	-7.02	-0.1360	-11.35	-0.1033	-5.42

Logarithm of per adult equivalent consumption	Pooled 1995/99 <sup>2)</sup>		1995		1999		Extended 99 <sup>3)</sup>	
	Coef-ficient.	t-stat. <sup>4)</sup>	Coef-ficient.	t-stat.	Coef-ficient.	t-stat.	Coef-ficient.	t-stat
Own plough	0.0963	12.76	0.0842	6.8	0.0820	8.95	0.0689	5.4
Own farm animal	0.0605	8.13	0.0932	8.05	0.0507	5.06	0.0476	3.21
Own transport animal	0.1227	17.63	0.0781	6.81	0.1390	16.41	0.1334	11.49
Own bicycle	0.1247	4.34	0.0602	1.36	0.2042	5.79	0.2292	3.1
Own TV/Radio	0.2082	24.56	0.2007	14.67	0.2122	21.08	0.2027	13.16
<b>Livelihoods</b>								
Obtain some income from coffee (1=yes))	0.0253	3.15	0.0170	1.45	0.0299	2.7	0.0421	2.68
Obtain some income from chat (1=yes)	0.0945	7.16	0.1376	6.8	0.0811	4.86	0.0899	3.79
Share of income from agriculture	0.0790	5.02	0.0467	2.15	0.1487	6.62	0.0315	0.75
Share of income from wages	-0.0292	-1.82	-0.0316	-1.38	-0.0506	-2.34	0.0373	0.66
Share of income from other sources	-0.3020	-14.78	-0.3193	-8.27	-0.2619	-10.86	-0.5780	-11.35
Number of livelihood strategies engaged in	-0.0777	-13.15	-0.0482	-4.66	-0.0851	-12.51	-0.0860	-8.25
<b>Public endowments</b>								
Electricity as source of household energy	0.0607	3.77	0.0682	2.64	0.0668	3.32	0.0052	0.1
Distance to food market (km)	-0.0017	-2.43	-0.0006	-0.51	-0.0034	-3.33	-0.0027	-1.78
Distance to water (km)	-0.0028	-5.63	-0.0008	-1.06	0.0022	1.37	0.0053	2.14
Distance to health facility (km)	0.0017	3.59	0.0015	2.01	0.0029	4.35	0.0032	3.38
Distance to transport services (km)	-0.0018	-8.17	-0.0021	-6.19	-0.0002	-0.44	0.0002	0.45
Distance to dry weather road (km)							-0.0016	-3
<b>Cultivation practices</b>								
% of cultivated land fertilized naturally							0.4692	3.23
% of cultivated land fertilized naturally) squared							-0.6149	-2.9
% of cultivated land fertilized chemically							0.3935	3.26
(% of cultivated land fertilized chemically) squared							-0.4144	-3.17
Urban	0.1403	8.14	0.1834	6.84	0.1242	5.51		
Year (=1 if year==1999)	0.0233	3.41						
Constant	7.7939	253.34	7.8398	167.38	7.6816	195.87	7.5660	109.55
Number of observations	<b>27,081</b>		<b>11,273</b>		<b>15,808</b>		<b>6,422</b>	
R-squared	<b>0.4508</b>		<b>0.5243</b>		<b>0.4935</b>		<b>0.5313</b>	

1) Woreda Fixed Effect Model. Coefficients on woreda dummies not included.

2) In this model, we pool the observations for both the 1995 and 1999 samples.

3) As we only have information on mean land size and fertilizer variables in the rural areas in 1999, this model is limited to only rural areas in 1999. Land size and fertilizer use are community level averages.

4) As a rule of thumb, the coefficient is statistically different from zero if the absolute value of the t-stat exceeds 1.96.

4.19 **As is commonly observed, larger households and households with more dependents tend to be poorer.** This relationship is robust across the different specifications. The relation between population growth and poverty at both the macro and micro level is explored in more depth in ongoing World Bank ESW on poverty and population. Somewhat more surprising is the large and significant relationship between the ratio of females in the house and consumption. However, this result is largely driven by the fact that the dependent variable is in terms of per adult equivalents, which by design results in women placing less of a burden on household expenditure as men of equal age.<sup>117</sup> We do not find the regular lifecycle effects whereby households with older heads tend to be better off. This may be related to the fact that we already control for land holdings and that part of the lifecycle effects work through increasing landholdings as discussed in previous section. Note furthermore, that while the lifecycle effects are found to be negative in 1995, they disappear altogether in 1999.

4.20 **Urban (but maybe also rural) female-headed households appear worse off.** While female-headed households tend to be poorer according to the 1995 results, this is not confirmed by the 1999 results. When controlling for land size, female households in rural areas may even be slightly better off. Given that we already control for many important determinants of consumption, which are also correlated with the headship of the household (household size, dependency ratio, age, education of household members, ownership of land and other assets), it may not come as a surprise to not find a clear-cut effect of the gender of the headship per se on consumption.<sup>118</sup> Analysis of the endowment base of male- and female-headed households suggests that educational endowments are substantially less among female headed households.<sup>119</sup> Given the high returns to education, as indicated below, the lack of educational endowment implies a significant handicap for female-headed households. Female-headed households have less farm equipment, are less engaged in cash crop production and earn more of their income from off-farm activities, which appear less remunerative, as illustrated below. Further disaggregation by space shows that female-headed households are especially worse off in urban areas, where their consumption tends to be nine percent lower, though not in rural areas. This difference may be a result of the breakdown of traditional social support systems in urban settings.<sup>120</sup> We also observe some differences across the regions, with female-headed households seemingly slightly better off in SNNPR and potentially slightly worse off in Oromiya.

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<sup>117</sup> Running a similar test on per capita expenditures results in a loss of significance in 1995 and a reversal of sign in 1999.

<sup>118</sup> Quisumbing, Haddad, and Pena, 2001.

<sup>119</sup> While the female adults in female-headed households are on average better educated than the female adults in male-headed households (1.23 versus 0.77 grades), female adults attained on average 0.6 grades less than the male adults in the male-headed households. Also, those few male adults present in the female-headed households are also less educated than their male counterparts in male-headed households.

<sup>120</sup> Among rural households in the Kilimanjaro Region of Tanzania, female-headed households were found to be especially likely to receive transfers from family members in times of need; in urban settings these households, while still needy, may receive less such support. (Christiaensen, Hoffmann, and Sarris, 2004).

**4.21 Marginal returns to education are positive and high, both for male and female adults.**<sup>121</sup> They also tend to be higher for female than for male adults, especially in urban areas. In particular, increasing average male adult education in the household by one grade would enhance per adult equivalent consumption by 1.6 percent (Table 4.9, col. 1), while an additional year of education among female adults in the household would increase per adult equivalent consumption by two percent. The magnitude of this result is simply astounding. While these findings would be very misleading if they were mainly driven by substantially higher returns to secondary schooling, further decomposition shows that this is not the case. When we include primary and secondary schooling separately in the regression analysis (results not reported in table), we still find that one additional grade of primary schooling for male adults would increase consumption by 1.4 percent, while one additional grade of secondary schooling would increase consumption by 1.8 percent. When increasing primary and secondary schooling among female adult women by one grade, average consumption would go up by 1.7 and 2.1 percent respectively.

**4.22** To better appreciate the magnitudes of these effects, note that over the past 12 years GDP in Ethiopia grew on average at 1.7 percent per capita. Given that, it follows that increasing average female adult primary education by one grade from its currently low level of grade completion of 0.8 grades would yield the same effect on consumption as one year of economic growth at its current pace. Post-secondary education also has a great effect on expenditure, though the returns are much higher in urban areas. In 1999, for each extra household adult having completed a post-secondary education, expected household expenditure increased by an average of about 20 percent. This result is robust across all specifications. In sum, at average adult grade completion rates of 0.8 for female adults and 1.8 for male adults, promoting primary school enrollment as well as adult literacy will clearly have to be at the center of any poverty reduction policy. Chapter 10 will explore further which are the more promising interventions to enhance primary school enrollments.

**4.23 In line with our expectations, the larger a household's landholdings, the higher its welfare.** Controlling for all other individual, household, and community characteristics as well as geographic conditions, the estimated effect of landholdings on consumption suggests that households which are at the 75th percentile in terms of their landholdings (corresponding to 1.30 ha/holder) are on average 12 percent richer than those at the 25th percentile (who have 0.32 ha/holder).<sup>122</sup> This raises a series of important policy questions. On the one hand, these results would lend some support to a focus on fostering labor mobility, either to other unexploited areas (agricultural extensification--the government's current resettlement policy only being one variant of that), or out of agriculture. Yet, the evidence could also be taken to support the need for concerted efforts to raise labor productivity in agriculture (agricultural

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<sup>121</sup> It is noted that there is no issue of reverse causality (i.e. consumption levels affecting the observed education levels) because it concerns the effect of education of the adults in the household, and not the effect of the education of the children. While it cannot be excluded that the education variables may pick up unobserved individual characteristics—the more entrepreneurial and savvy individuals are also those with education—it is unlikely to play an important role given the importance of supply side factors (distance to schools) in determining children's enrollment (see Chapter 9). It could be safely assumed that the correlation between the placement of schools and people's innate characteristics is very tenuous indeed.

<sup>122</sup> The existence of potential non-linearities in the consumption-land holding relationship suggested by the bivariate evidence in Jayne et al. (2003) needs to be further explored.

intensification). This in turn would increase real incomes and generate demand for locally produced goods and services which in turn would generate off-farm employment opportunities for the emerging landless class.

**4.24 The estimated results regarding the use of chemical fertilizer suggest that there is still some scope in terms of economic growth and poverty reduction from increased fertilizer use,** also in food insecure areas. Chemical fertilizers are currently only used on 13 percent of the total cultivated area in food insecure areas (see Table 5.1). Raising the total cultivated areas fertilized with commercial fertilizer in these areas to the level in the food secure areas (32 percent) would increase consumption per adult equivalent by four percent. While the results do only represent an *average* effect identified from a single cross-section, the estimated coefficients on commercial fertilizer use appear suggestive after taking into account several considerations.<sup>123</sup> We control for differences in soil quality and rainfall which may also affect the effectiveness of fertilizer use by using woreda fixed effects. It is possible that the effects of fertilizer use are slightly overestimated as they may also pick up the positive effects of improved seed use, for which we do not control. Yet, the bias is likely to be small given that the use of improved seeds is still extremely low and largely limited to two cereals (maize and wheat). We return to the critical importance of using combined improved seed-fertilizer packages to maximize the effect of technology adoption in Chapter 5. Also, some crops are more responsive to fertilizer, which is consistent with the estimated declining marginal returns on commercial fertilizer use beyond 47 percent of the total cultivated area at which expenditures peak (see Figure 4.1). Current application rates are usually less than the recommended amounts, so it is not improbable that the estimated effects represent lower bounds. Potential contamination from individual unobserved effects such as individual managerial capabilities and entrepreneurship is avoided through the use of average fertilizer use per holder per community. We also control for the education level of the adults in the household.<sup>124</sup>

4.25 In sum, the estimated returns to increased fertilizer use suggest that there is still scope for agricultural intensification through increased use of modern inputs, also in food insecure areas. It is thus imperative to better understand the current constraints to further technology adoption including the farmers' incentive structures to adopt fertilizer and the effectiveness of the current delivery mechanisms.<sup>125</sup> Anecdotal evidence also suggests that the demand for fertilizer by poorer households may be limited because of the downside risks involved in case

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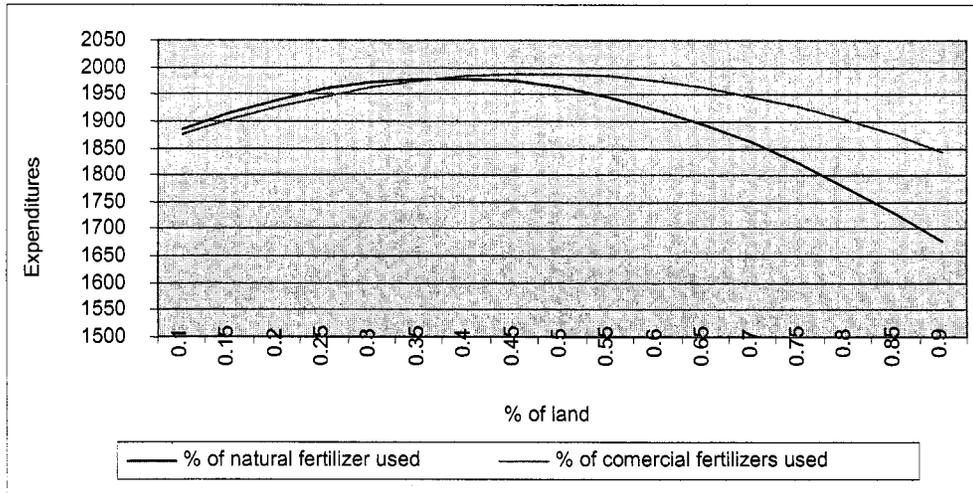
<sup>123</sup> The effect of fertilizer on agricultural income and consumption depends on a series of other factors, such as soil characteristics, adequate and timely rainfall, or food prices. Furthermore, commercial fertilizers tend to be more effective when used in combination with improved seeds, and certain crops are much more responsive to fertilizer use than others. Fertilizer users also tend to be more productive and entrepreneurial farmers. The reported estimates on the effect of fertilizer may be affected by these different factors and thus not picking up the effect of fertilizer alone, but rather the combined effect of fertilizer and these other factors (agro-ecological environment, use of other inputs, managerial capacity of farmer, etc.).

<sup>124</sup> Finally, the simulations only represent a partial equilibrium analysis and it might be argued that increased fertilizer use would depress cereal prices, and thus also the return to fertilizer use. This requires a broader discussion including an analysis of the net market position of farmers (net cereal buyer/seller) as well as the price and income elasticities of demand and supply of cereals, to which we will return in Chapter 6.

<sup>125</sup> This will be addressed at length in the ongoing ESW undertaken by the Rural Development Sector of the Africa Region.

of rainfall failure.<sup>126</sup> At the same time, other measures (soil conservation) and other agricultural (livestock, bee keeping) and remunerative non-agricultural activities will have to be promoted as well. The role and potential for agricultural intensification in further poverty reduction in Ethiopia in relation to other strategies such as market development and migration out of low potential areas are discussed in more depth in Chapter 5 and 6.

**Figure 4.1: Effect of fertilizer use on per adult equivalent expenditures**



**4.26 Productive assets, consumer durables and sanitation are all correlated with higher consumption.** Consumption appears highly correlated with ownership of animals and farm equipment. Possession of bicycles is a clear sign of wealth, with consumption per adult equivalent in households with a bicycle up to 12 percent higher than those without. Those lacking access to proper sanitation, proxied here by use of buckets or the surrounding area for toilet needs, have an average of 12 percent lower expenditures across all specifications, underscoring the critical importance of proper sanitation.

**4.27 Diversifying as a coping strategy.** While the move out of agriculture portrayed in the descriptive statistics may suggest a diversification into better livelihoods, the regression results suggest otherwise. Those who engage in more livelihood strategies tend to be substantially poorer. The results hold both in rural and urban areas. While surprising at first sight, this is very much in line with the empirical findings of the livelihood diversification literature. Several authors<sup>127</sup> have observed a U-shaped relationship between the proportion of income earned from off-farm activities and total income in Sub-Saharan Africa, with the poorer and the richer getting a larger share of their income out of off-farm activities, but with quite different returns to these activities. Those in the middle are found to have a larger share in agriculture as they may have land holdings sufficient to earn a living and not be pushed into low-return off-farm activities, but not enough capital to engage in the more remunerative off-farm activities open to richer households.

<sup>126</sup> The role of households' risk coping capacity in adopting fertilizer is addressed in depth in an ongoing study by Christiaensen and Dercon, as part of a multi-country study on the role of agriculture in reducing poverty in Sub-Saharan Africa.

<sup>127</sup> Collier and Gunning, 1999; Barret, et al., 2000; Reardon et al., 2000; Toulmin et al, 2000.

4.28 The diversification literature often makes the distinction between “push” and “pull” factors promoting diversification out of agriculture into non-farm activities.<sup>128</sup> Adoption of non-farm activities may occur because households are “pushed” to do so when returns to agriculture are inadequate (either because of a low asset base or low productivity, or in response to shocks such as droughts). They may also engage in non-farm activities despite higher average returns in agriculture because of seasonal shortages of cash for consumption or agricultural inputs or due to a need to diversify their risks. This often occurs in the absence of functioning formal or informal credit or insurance markets as in Ethiopia. However, households may also be pulled into off-farm activities because they offer higher returns. Yet, this often requires access to skills, capital and (urban) land. The latter is continuously identified as a key constraint to set up non-farm businesses in Ethiopia.<sup>129</sup> Evidence from the ERHS shows that poorer households diversified into activities with low access constraints but also low returns, such as charcoal, firewood collection or weaving, while the richer were more able to engage in off-farm activities requiring human and physical capital.<sup>130</sup> The increasing diversification out of agriculture and the reported negative effect of this livelihood diversification suggest that diversification in Ethiopia has so far mainly been driven by “push” as opposed to “pull” factors. These findings further underscore the need for a complementary approach to agricultural led development, i.e. the need to reduce the barriers to entry to more remunerative non-farm activities. We will elaborate on this in Chapter 6.

4.29 **Coffee and chat producers tend to be better off.** Contrary to the bi-variate descriptives presented in Table 1.11 (Part I, Chapter 1), which show lower consumption and higher rates of poverty among coffee growers compared with other cash crop producers, being a coffee grower generated, *ceteris paribus*, a premium of 1.7 percent in overall consumption in 1995, which even increased to 2.9 percent in 1999. While several households moved out of coffee, these results suggest that the wealthier stayed on. This is also consistent with the small drop in poverty incidence observed among coffee growers. A similar pattern has lately been observed in the Kilimanjaro Region of Tanzania, where the poorer coffee producers dropped coffee production first.<sup>131</sup> Chat producers on the other hand fetched an even higher consumption premium of 13.7 percent in 1995, which declined to eight percent in 1999, consistent with the observed increase in poverty incidence among chat producers. Without further detailed information on the income portfolios of the coffee growers it is impossible to conjecture what has happened to their incomes over the past few years when coffee prices collapsed.

4.30 **Access to infrastructure and market connectivity are key.** Households using electricity as their main source of energy have on average six percent higher consumption. Distance to food markets, water and transportation services are also highly correlated with consumption. These variables together pick up the benefits of lower shadow prices, as well as

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<sup>128</sup> Reardon, 1998; Ellis, 2000b; Kydd et al, 2001.

<sup>129</sup> Difficulties in obtaining land was identified as one of the three key bottlenecks for private sector development in the EDRI-World Bank Investment Climate Study. Similarly, Sharp and Devereux (2003) report that access to land in rural towns was often identified as a key constraint to set up a small business in their destitution study of the Northeastern Highlands (Amhara Region).

<sup>130</sup> Dercon and Krishnan, 1996.

<sup>131</sup> Christiaensen, Hoffmann and Sarris, 2004.

the role of information spillovers and network externalities resulting from connectivity.<sup>132</sup> Distance to health centers, on the other hand, is positively related to higher expenditures. While proximity to health services would supposedly boost expenditures indirectly by promoting health and thus productivity, this surprising result may be picking up placement effects whereby clinics are targeted to areas of higher illness incidence where they can be more effective.

**4.31 There appear to be important returns to access to information.** The estimated results suggest that households with a radio/TV are significantly better off than those without, with the difference estimated at 20 percent. Further exploration of this general result confirms the critical importance of access to information (see Tables A.4.1 and A.4.2, Appendix). When we split up radio and TV ownership, include average radio ownership in the community to capture externality effects, control for household wealth, and explore the effects in rural and urban areas separately, we find that in rural areas households with a radio are 17.5 percent richer than those without, and that an increase in the proportion of households owning a radio in a community ownership by 10 percentage points increases a household's consumption in that community by 3.9 percent. As expected, given much wider dispersion of individual radio ownership, the externality effect is less in urban communities. Given that only 14 percent of rural households own a radio, there is clearly tremendous scope for improving people's well being by enhancing their access to information, especially given their current isolation from the outside world. Increasing radio ownership emerges as an important and cost effective intervention to do so, which deserves much more attention.

#### **4.2.2 Returns across space**

**4.32** We now broaden our analysis to provide a spatial perspective of poverty and consumption in Ethiopia. We examine in particular how returns to endowments differ across different spatial classifications: rural versus urban as well as by region (Tigray, Amhara, Oromiya, and SNNPR). The estimated results (Table 4.10) are based on a woreda fixed effects and are described in more detail below. Understanding the differences in returns across space can help target investments to optimize their effect on growth and poverty reduction.

**4.33 Education matters a great deal across the regions.** Returns to female education tend to be higher in urban areas than in rural areas and in urban areas they are about twice as high relative to returns to male education. Returns to primary and secondary schooling are especially high in SNNPR, though surprisingly there seems to be no pay-off from completing post secondary school. This justifies extra efforts to raise primary school attendance and completion in SNNPR, especially for girls. The effect of household amenities and asset ownership appears relatively robust across space. Returns to electricity, however, are especially high in Tigray.

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<sup>132</sup> We refer to the World Bank, 2004c, for a more detailed discussion of the role of public infrastructure in promoting economic growth.

**Table 4.10: Variations in returns to endowments across space**

	Rural		Urban		Tigray		Amhara		Oromiya		SNNPR	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
<b>Private endowments</b>												
<b>Human Capital/Demographics</b>												
Size of household	-0.0982	-46.95	-0.1006	-42.02	-0.0967	-15.92	-0.0910	-23.37	-0.0969	-32.52	-0.0982	-26.19
Dependency ratio	-0.0108	-2.76	-0.0580	-10.05	-0.0238	-2.25	-0.0358	-4.83	-0.0122	-2.1	-0.0100	-1.37
Ratio of Females in house	0.1529	8.83	0.2474	10.69	0.2773	5.98	0.1368	4.77	0.1496	5.49	0.1592	4.86
Female head of house	0.0037	0.39	-0.0879	-7.57	-0.0247	-0.97	0.0064	0.38	-0.0224	-1.58	0.0291	1.66
Age	-0.0053	-4.01	-0.0198	-10.26	-0.0061	-1.75	-0.0076	-3.18	-0.0069	-3.46	-0.0059	-2.28
Age squared	4.00E-05	2.97	0.0002	8.04	0.0001	1.92	0.0001	2.68	4.84E-05	2.41	0.0000	1.49
Grade obtained by adult males	0.0186	11.82	0.0101	7.44	0.0083	1.9	0.0115	4.17	0.0186	8.95	0.0191	7.66
Grade obtained by adult females	0.0156	6.62	0.0213	14.18	0.0010	0.25	0.0228	6.65	0.0191	6.49	0.0316	7.89
No of adults completed post secondary	0.1927	3.76	0.2050	16.94	0.3414	4.39	0.1282	2.56	0.1830	4.47	0.0188	0.3
<b>Physical capital</b>												
Own plough	0.0899	9.83	0.1301	5.78	0.0442	1.46	0.1053	6.08	0.0961	6.83	0.0602	3.56
Own farm animal	0.0588	6.41	0.0559	3.39	0.0801	2.88	0.0870	5.13	0.0610	4.33	0.0663	3.7
Own transport animal	0.1202	14.44	0.0055	0.23	0.0906	3.75	0.1104	7.63	0.1061	8.31	0.1200	6.21
Own bicycle	0.0981	1.99	0.1691	5.94	0.2066	2.46	-0.0037	-0.04	0.0859	1.59	0.2064	3.21
Own TV/Radio	0.1902	16.49	0.2348	19.9	0.1847	6.31	0.2425	10.29	0.1751	11.74	0.2192	10.58
No toilet in household	-0.0903	-6.37	-0.1573	-12.36	-0.0446	-1	-0.1942	-6.58	-0.1259	-6.78	-0.0999	-5.12
<b>Livelihoods</b>												
Obtain some income from coffee (1=yes)	0.0337	3.4	-0.0460	-2.44	0.0697	1.61	0.0053	0.27	0.0196	1.27	0.0251	1.57
Obtain some income from chat (1=yes)	0.0849	5.23	0.0969	2.39	-0.0786	-0.98	0.1221	2.54	0.1055	5.24	-0.0095	-0.28
Share in income from agriculture	0.0387	1.6	0.0517	1.8	0.1500	2.68	-0.0765	-2.37	0.0775	2.65	0.0200	0.55
Share of income from wages	0.0587	1.73	-0.0455	-3.21	0.0689	1.08	0.1822	4.67	-0.1279	-3.79	-0.0242	-0.53
Share of income from other sources	-0.5491	-16.08	-0.0005	-0.02	-0.0046	-0.07	-0.3492	-7.37	-0.3409	-8.33	-0.6742	-11.68
Number of livelihood strategies engaged in	-0.0820	-10.17	-0.0558	-6.23	-0.0881	-4.33	-0.1337	-9.68	-0.0655	-5.68	-0.0537	-3.93
<b>Public endowments</b>												
Electricity as source of household energy	0.0807	2.16	0.1003	6.14	0.1943	4.04	0.1229	2.89	0.1028	3.8	0.1624	4.29
Distance to food market (km)	-0.0009	-1.13	0.0124	4.51	-0.0020	-0.71	-0.0014	-1.09	-0.0052	-3.45	-0.0008	-0.44
Distance to water (km)	-0.0024	-4.11	-0.0105	-3.16	-0.0007	-0.2	-0.0038	-4.83	-0.0010	-0.89	0.0065	3.05
Distance to Health (km)	0.0016	2.76	-0.0026	-1.33	-0.0042	-1.82	0.0009	0.86	0.0048	4.86	0.0005	0.56
Distance to transport services (km)	-0.0017	-6.29	0.0007	1.1	-0.0017	-2.1	-0.0020	-4.54	-0.0025	-5.3	-0.0011	-2.28
Year (=1 if year=1999)	7.7387	181.96	8.2540	168.87	-0.0617	-1.92	0.1402	9.91	-0.0393	-2.82	0.0277	1.53
Constant	7.7387	181.96	8.2540	168.87	7.5078	66.52	7.9625	118.22	7.9312	136.19	7.6880	110.1
Number of observations	14984		12097		1787		5724		6930		4275	
R-squared	0.4570		0.4098		0.4955		0.4281		0.4161		0.4953	

**4.34 Returns to market connectivity vary substantially, as do returns to livelihood diversification.** The results on several of the distance variables appear unstable across the regions, which may be related to the use of the woreda Fixed Effects Model in addition to the region-specific regressions. If access to services and markets are largely woreda-specific, their effects would be largely captured by the woreda dummies. However, proximity to transportation services, a measure of market connectivity, emerges as an important correlate

of consumption in all regions, though the size of the effect differs. The results on diversification are also robust across all regions: increasing the number of sources from which a household receives their income is negatively correlated with expenditures. Such apparent distress diversification seems especially prevalent in the Amhara Region.

### 4.3 Geography and Poverty

**4.35 Having discussed the spatial variations to returns, we now analyze the specific effects of geographic characteristics on poverty.** We look in particular at the effect of agro-ecological characteristics, population density, measures of soil degradation (or proxies thereof), malaria risk, and rainfall shocks. To do so, we replace the woreda-level dummies with proxies of these geographic characteristics. Most of our geographic measures are at the woreda level. We continue to use pooled 1995 and 1999 data. Table 4.11 presents our results. The first column is our base household woreda fixed effects model for comparison.<sup>133</sup> In the second column, we introduce all relevant and available geographic variables. Note that for these models, we drop all observations that do not having matching data for these secondary community-level variables. As a result, we lose about 10,000 of the 27,000 observations of the base (pooled) model.<sup>134</sup> The estimated effects on household and public endowments remain robust to the replacement of the woreda dummies by the actual geographical characteristics. In the third column we introduce crop damage, dropping all urban observations, for which no crop damage data are available.

**Table 4.11: Effects of agro-ecology, population density, soil degradation and shocks on consumption**

	Base <sup>1)</sup>		Model 1 <sup>2)</sup>		Model 2 <sup>3)</sup>	
	Coef.	t	Coef.	t	Coef.	t
<b>Private endowments</b>						
<b>Human Capital/Demographics</b>						
Size of household	-0.0962	-48.09	-0.0929	-42.99	-0.0939	-35.9
Dependency ratio	-0.0176	-4.61	-0.0225	-5.41	-0.0161	-3.25
Ratio of Females in house	0.1612	9.63	0.1716	9.33	0.1656	7.52
Female head of house	0.0013	0.15	-0.0063	-0.63	-0.0080	-0.67
Age	-0.0075	-5.8	-0.0085	-6.04	-0.0059	-3.52
Age squared	0.0001	4.44	0.0001	4.62	0.0000	2.5
Grade obtained by adult males	0.0161	11.62	0.0139	9.29	0.0157	8.1
Grade obtained by adult females	0.0203	10.63	0.0169	8.13	0.0122	4.15
No of adults completed post secondary	0.1433	4.85	0.1289	3.94	0.2014	3.11
<b>Physical capital</b>						
Own plough	0.0967	10.63	0.0493	5.3	0.0418	3.87
Own farm animal	0.0607	6.71	0.0621	6.43	0.0655	5.76
Own transport animal	0.1221	14.54	0.1382	15.64	0.1338	13.18
Own bicycle	0.1043	2.76	0.0806	1.95	0.0541	0.87
Own TV/Radio	0.2020	18.91	0.2215	19.15	0.2175	15

<sup>133</sup> Note that for the base model we continue to include woreda-level dummies. This permits us to gauge the robustness of the effects of the household and community characteristics when replacing the woreda dummies with their actual geographical characterizations.

<sup>134</sup> As a result of dropping all observations without information on the relevant secondary woreda variables, we lose all observations on Somali, Afar, as well as observations in some other regions. Tigray, Amhara, Oromiya, SNNPR and Benishangul all remain in the reduced sample.

	Base <sup>1)</sup>		Model 1 <sup>2)</sup>		Model 2 <sup>3)</sup>	
	Coef.	t	Coef.	t	Coef.	t
No toilet in household	-0.1148	-9.15	-0.1044	-8.09	-0.0958	-5.75
<b>Livelihoods</b>						
Obtain some income from coffee (1=yes)	0.0284	2.94	0.0255	2.94	0.0259	2.57
Obtain some income from chat (1=yes)	0.0889	5.45	0.1341	9.89	0.1219	7.79
Share in income from agriculture	0.0707	3.58	0.0591	2.84	0.0347	1.19
Share of income from wages	0.0181	0.79	0.0086	0.35	0.0509	1.22
Share of income from other sources	-0.3779	-13.87	-0.4496	-15.6	-0.6109	-14.89
Number of livelihood strategies engaged in	-0.0834	-11.32	-0.1055	-13.22	-0.1083	-10.78
<b>Public endowment</b>						
Electricity as source of household energy	0.0622	3.02	0.0523	2.59	0.1576	3.48
Distance to food market (km)	-0.0009	-1.13	-0.0005	-0.77	0.0000	0.06
Distance to water (km)	-0.0019	-3.05	-0.0008	-1.37	0.0002	0.3
Distance to transport services (km)	-0.0016	-6.21	-0.0011	-6.27	-0.0010	-5.1
<b>Risk factors/Shocks</b>						
Household head was sick in last 2 months (1=yes)			0.0007	0.09	0.0109	1.22
High Malaria Risk (1=yes)			0.0470	4.33	0.0392	2.96
High Malaria Risk*Dist. To health			-0.0022	-3.09	-0.0018	-2.15
1 year lagged rain shock			-0.1491	-8.34	-0.2049	-9.24
1 year lagged rain shock squared			-0.0992	-2.28	-0.1406	-2.57
Contemporary rain shock			0.0775	4.48	0.0956	4.69
Contemporary rain shock squared			-0.0078	-0.15	0.0039	0.07
Percentage cultivated land area damaged <sup>4</sup>					-0.1588	-4.96
<b>Agro-ecological characteristics</b>						
Mean Altitude (m)			0.0005	8.52	0.0005	7.41
Mean Altitude (m) squared			0.0000	-8.54	0.0000	-7.52
Long Run Average Rainfall (mm)			-0.0001	-4.49	-0.0001	-4.62
Long Run Coefficient of Variation of Rain			-0.1541	-3.21	-0.1814	-3.13
<b>Soil degradation</b>						
DAP equiv. nutrient loss (tons/yr/woreda) due to dung and crop residue collection			-0.0002	-8.05	-0.0002	-7.34
Average soil loss (tons/ha/year)			-0.0002	-0.49	-0.0004	-0.9
<b>Rural Population per arable area (people per km<sup>2</sup>)</b>						
Urban	0.1294	6.09	0.1508	7.91		
Year (1 if year = 1999)	0.0414	4.81	0.0682	7.87	0.1162	10.95
Constant	7.7931	203.85	7.4902	102.21	7.4819	83.98
<b>Number of observations</b>	<b>17,168</b>		<b>17,166</b>		<b>11,685</b>	
<b>R-squared</b>	<b>0.4484</b>		<b>0.2922</b>		<b>0.2653</b>	

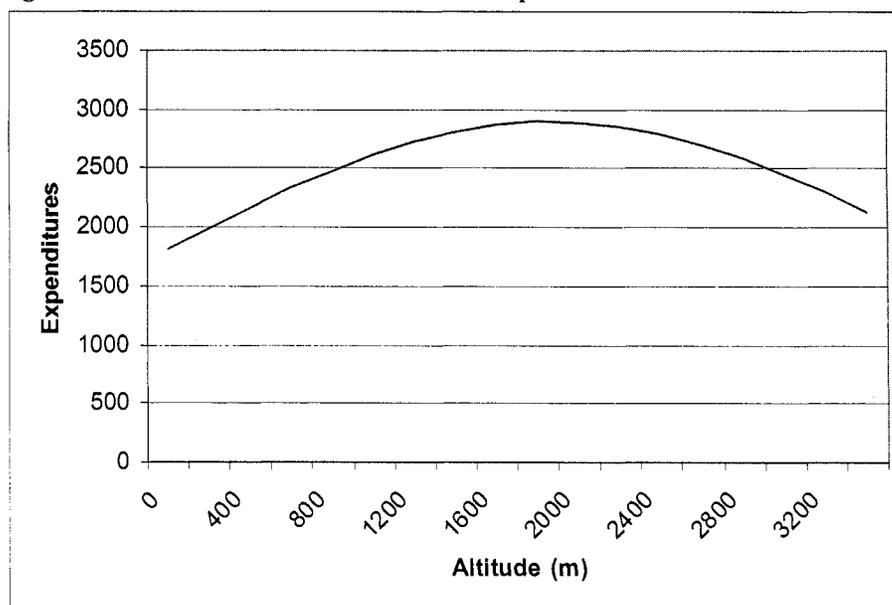
<sup>1)</sup> The Base is presented for comparison and continues to incorporate woreda-level dummies, which we do not report. We use the same observations as Model 1 to facilitate observations

<sup>2)</sup> Model 1 is run over the pooled observations, adding all geographic variables for which data were available, and constrained by the addition of secondary variables for which data was not available across all observations.

<sup>3)</sup> Model 2 adds the variable on cultivated land damaged to Model 1, thereby losing all urban observations for which no information on crop damage was collected.

**4.36 Living at higher altitudes is generally associated with higher levels of consumption.** Figure 4.2 captures the relationship between altitude and expenditures which, given the significance of the altitude and altitude squared coefficients, are estimated with extreme precision. While expenditures initially increase with altitude, the negative coefficient on altitude squared signifies a concave relationship, and mean expenditures eventually reach a maximum around 2,200m after which the squared term dominates and higher altitudes are correlated with lower expenditures. In sum, there seems to be a premium to living in the 1,800-2,400 m altitude range, consistent with the historical and political focus on the highlands.

**Figure 4.2: Correlation between altitude and expenditures**

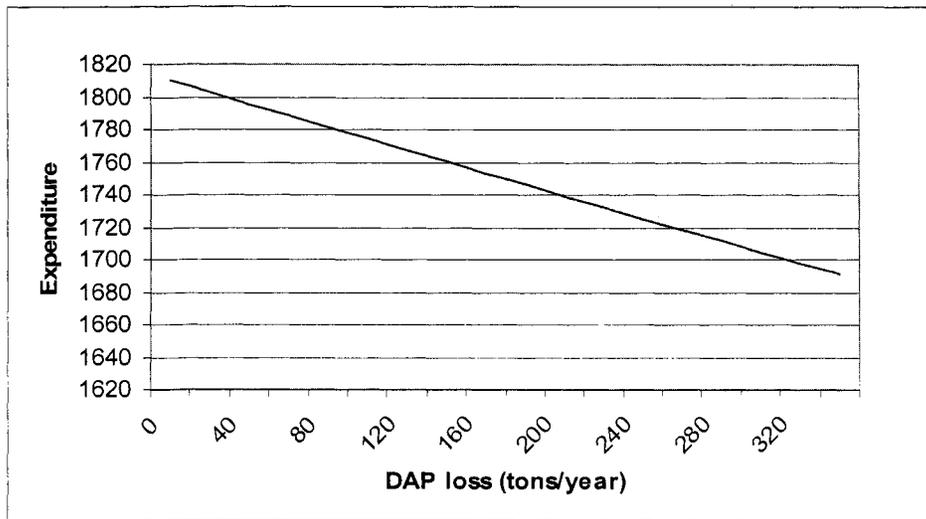


**4.37 Stable rainfalls correlate with higher consumption.** For populations whose livelihoods depend largely on rain-fed agriculture, the amount and especially the variability of rainfall would appear critical. Fluctuations in rainfall are indeed inversely related to consumption. The larger the coefficient of variation in rainfall totals, the lower is consumption. Moreover, households in areas at the 75th percentile in terms of rainfall fluctuation consume on average two percent less than those in areas at the 25th percentile, which corresponds to a difference in the coefficient of variation of 0.13. This underscores the importance of appropriate risk management interventions such as water management and ex-post insurance schemes to reduce the detrimental effects of rainfall fluctuations on welfare. From Figure 1.6 we further recall that larger fluctuations in rainfall go hand in hand with lower average rainfall, suggesting that those households would be penalized twice. Yet, contrary to intuition, we don't find a positive effect of long-run rainfall averages on consumption. Our estimated results indicate even a negative effect.

**4.38 Welfare losses from using dung collection as energy source appear to be substantial.** Our estimated results suggest that the welfare reducing effects of using dung as an energy source are sizeable. For example, reduction of annual DAP equivalent nutrient loss

due to dung collection in Amhara from the current estimated average of 325 tons to the national average of 185 tons per woreda could increase average per capita consumption by 2.8 percent, equivalent to more than one and a half years of economic growth at its historical pace of 1.7 percent per capita. Dung removal could affect welfare in different ways. An important channel will undoubtedly be soil depletion, though several environmental economists have emphasized that the extent of nutrient loss critically depends on the nature of composting, the timing of the application and the cultivation techniques through which dung is worked into the soil. Furthermore, welfare loss from dung collection may also follow from the strenuous demands it places on household labor, especially girls and women. While negative, the effect of annual topsoil loss, another proxy for soil degradation, is much less precisely estimated. This may partly follow from the fact that its effects largely depend on the depth of the topsoil, which determines the moisture retention capacity. Annual topsoil runoff may be too imperfect a proxy to capture this. As further illustrated in Figure 4.3, these results suggest the urgent need to promote the use of alternative energy sources to dung cakes and the use of more efficient cooking stoves. Increased fertilizer use would further help counteract soil depletion.

**Figure 4.3: Effect of DAP equivalent nutrient loss due to dung collection on expenditures**



**4.39 The larger the rural population density over arable land, the lower is average consumption.** Population density may affect household consumption in several ways. On the one hand, larger population density would be conducive to attract off-farm employment due to network externalities and a reduction in transaction costs. Yet, in a rain-fed rural economy, and without controlling for the possession of land, it may also capture increasing land pressure. The latter effect clearly dominates in our results, with woredas with a rural population density of 100 more people per square kilometer of arable land being on average one percent poorer.

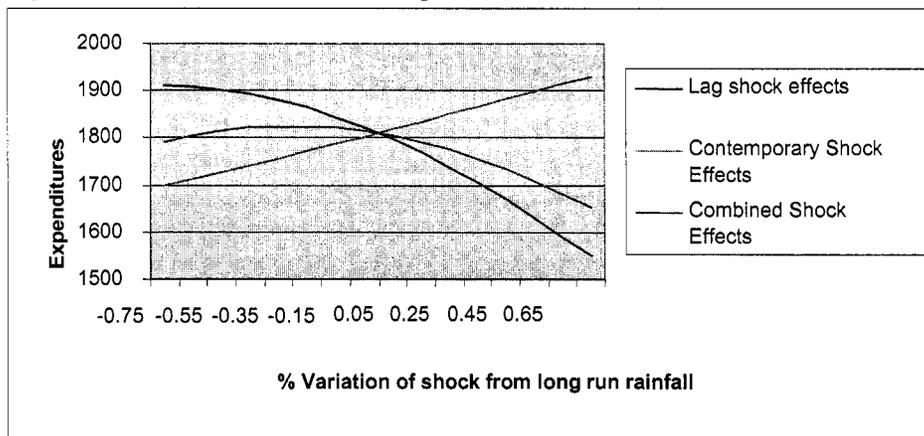
#### 4.4 Risk and Poverty

**4.40** As discussed in Chapter 1, risks permeate daily life in Ethiopia. To explore the contours of the effect of risks on welfare, we empirically estimate the effect of risk as well as

the occurrence of actual shocks on observed consumption. We look in particular at harvest failure (due to such natural occurrences as droughts, floods, pests, and frost), which has been identified as the most frequently occurring shock, and at health indicators.<sup>135</sup> We first present the results from the national surveys (Table 4.11) and complement the findings with those from the large emerging body of rigorous empirical work on risk, vulnerability and poverty in Ethiopia.

**4.41 The effects of rainfall shocks appear inconclusive.** We examine the effect of both current and lagged rainfall shocks.<sup>136</sup> This is partly motivated by the fact that our expenditure data are out of phase with the agricultural year. By introducing squared terms, we also try to capture non-linearities in the effect of rainfall shocks on consumption—larger negative shocks are likely to have larger negative effects. Figure 4.4 graphs the estimated relationship between expenditures and the lagged and contemporary shocks as well as their combined effect. While the effect of the contemporary shocks is consistent with our intuition, the lagged effects suggest that those who experience larger negative shocks tend to be better off on average. When combining the effects of both shocks, the latter (perverse) effect dominates. Conforming with our regression results, descriptive investigation indeed shows positive correlations between the contemporary shocks and expenditures, though much higher expenditures among those who experienced the largest shocks in 1994 and 1998, the years lagging the survey years. These ambiguous results may be related to unobserved effects of food aid in response to shocks. Food aid distributions were especially high in 1994 despite average rainfalls, and these may have offset the negative effects of the shocks. Moreover, there are still large differences in rainfall within a woreda which our rainfall shock measure does not capture.

**Figure 4.4: Effect of rain shocks on expenditures**



**4.42 Yet more precise measures of harvest failure point to strong negative effects.** When we take crop area damaged reported by the farmer as our measure of harvest failure as opposed to deviations from long run average rainfall measured at the woreda level, we do find substantial negative effects of crop damage on consumption. More precisely, a 10 percent

<sup>135</sup> Dercon and Krishnan, 2000

<sup>136</sup> Shocks are defined as the percentage deviation of current rainfall amount from the long run average.

increase in damaged land results in a 1.5 percent decrease in mean expenditure (see Model 2, Table 4.11 above). It could be conjectured that overall about 2.7 percent of consumption was lost due to crop damage.<sup>137</sup> Other micro evidence supports these findings. Using data from the ERHS panel between 1994 and 1997, it was shown that a 10 percent increase in rainfall resulted in approximately a 10 percent increase in agricultural output.<sup>138</sup> Further analysis of the same panel indicates that a 10 percent increase in rainfall increased total income (including from agricultural and non-agricultural sources) by about five percent between 1989 and 1995 and consumption expenditure by about four percent.<sup>139</sup> It was also found that 10 percent more crop damage relative to the mean reduced consumption by about 0.4 percent, while 10 percent more livestock disease would have resulted in a 1.5 percent reduction in consumption.<sup>140</sup>

**4.43 Although there is little evidence that short term illness affects incomes and consumption, malaria and serious illness episodes may have important (negative) effects on consumption.** Equally puzzling are our findings on the effect of malaria risk in Table 4.11 (above), which suggest higher consumption among those residing in highly infested areas. While consistent with our bi-variate findings on poverty and malaria incidence, it also suggests that our malaria incidence variables may be picking up some other unobserved effects. Yet case study evidence from Tigray estimates the value of preventing malaria with vaccines at about US\$ 36 per household or about 15 percent of the imputed annual household income.<sup>141</sup> We do not find a significant effect of reported illness on consumption. Other evidence from the ERHS does not indicate a strong effect of illness on consumption outcomes either—a 10 percent increase in illness was found to reduce consumption by 0.1 percent.<sup>142</sup> This could be caused by a variety of factors, including that communities and families are able to insure each other against this type of misfortune, and there is evidence that this indeed happens in many instances.<sup>143</sup> Furthermore, the relevant shocks are likely to be confined to serious illness episodes, not short periods of illness that temporarily affect individuals and households. A serious illness episode of one of the adults in the household in the last few years reduced consumption by about seven percent.<sup>144</sup> Other estimates suggested that illness of the household head reduced annual income of the household by 11.2 percent.<sup>145</sup>

**4.44 Food aid provides some protection against the fluctuations in living standards.** Food aid could be expected to help households to cope with these fluctuations. Both from nationally representative cross-section data and panel data there is some evidence of income targeting, with the poor more likely to receive either food aid or food-for-work, although targeting is typically relatively weak.<sup>146</sup> There is less evidence of a sensitivity of these forms

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<sup>137</sup> Given that 17 percent of all cultivated land was reported damaged, total consumption loss amounts to  $0.17 \times 0.16 = 2.68$  percent.

<sup>138</sup> Van den Broeck, 2004.

<sup>139</sup> Dercon, 2002.

<sup>140</sup> Dercon and Krishnan, 2000a

<sup>141</sup> Cropper, et al., 2004.

<sup>142</sup> Dercon and Krishnan, 2000a.

<sup>143</sup> Dercon and Krishnan, 2000b.

<sup>144</sup> Dercon, 2004.

<sup>145</sup> Asfaw, et al., 2004.

<sup>146</sup> Jayne et al., 2002; Dercon and Krishnan, 2004.

of support to local level common and idiosyncratic shock. One of the reasons may well be that support is often not timely, at times exacerbating fluctuations rather than dampening it.<sup>147</sup> Still, despite relatively poor targeting, the impact of food aid may be more positive than this would suggest, as food aid may be shared to some extent in communities, compensating for some of the targeting failures.<sup>148</sup>

**4.45 But large fluctuations in consumption and nutrition continue to occur.** Participatory work as a background to the World Development Report 2000/01 highlighted the large impact of shocks on households. Quantitative data confirm this, with poverty levels in relatively bad harvest years, i.e. years with substantial rainfall failure and crop damage, about a quarter higher than those in a reasonably good year, i.e. years without serious drought or crop damage.<sup>149</sup> Seasonal movements are also substantial, suggesting that mechanisms to keep consumption stable are even deficient in coping with predictable fluctuations. These fluctuations in consumption translate in some of the highest recurring fluctuations in adult nutrition observed in the world.<sup>150</sup> Furthermore, these fluctuations in consumption related to risk and seasonality seem to have important gender dimensions, with men typically experiencing less fluctuation than women.<sup>151</sup>

**4.46 The impact of uninsured shocks is not confined to fluctuations, but its effects are persistent and contribute to continuing poverty subsequently.** Qualitative data has shown the ratcheting effects of adverse shocks in rural Ethiopia, with people's livelihoods permanently affected by the loss of assets and the need for further coping strategies.<sup>152</sup> There is also quantitative panel data evidence of the long term implications for poverty persistence of shocks. Past rainfall shocks continue to affect consumption subsequently, not just rainfall in the immediate past. For example, a 10 percent reduction in rainfall one or two years ago, relative to the long run mean, reduced consumption by about 3.5 percent, while a similar shock between three and five years ago reduced consumption by about 1.5 percent. This implies that a shock in one year will also further reduce consumption in subsequent years. The persistent effects of a serious crisis were noticeable more than 10 years later. Evidence on the impact of the famine in the mid-1980s was linked to household consumption in the 1990s, using an index of severity of impact based on the type of coping strategies households had to resort to, such as cutting back meals, eating wild foods or moving to feeding camps. The results indicate that households more seriously affected in 1984-85 experienced much lower growth in the period 1989 to 1997: comparing the 25<sup>th</sup> and 75<sup>th</sup> percentiles of famine impact meant that the less affected group experienced at least three percent higher per capita growth in consumption than those more affected.<sup>153</sup>

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<sup>147</sup> Barrett et al., 2004.

<sup>148</sup> Dercon and Krishnan, 2004.

<sup>149</sup> Dercon and Krishnan, 2000a.

<sup>150</sup> Dercon and Krishnan (2004) find that the average lowest versus highest level of the body mass index was about 90 percent in the ERHS sample.

<sup>151</sup> Dercon and Krishnan, 2000b.

<sup>152</sup> Rahmato and Kidanu, 1999.

<sup>153</sup> Dercon, 2004.

**4.47 The options available to households to manage risk are limited, and there would be substantial scope for broader interventions beyond food-for-work and other safety nets.** The evidence on the large impact of shocks, and especially their ratcheting, persistent effects highlight the high benefits of containing any crisis and the need to find ways of supporting those affected by a crisis well beyond the initial crisis period. Food-for-work and other safety nets clearly have a role to play but by their nature targeting is often difficult while timing issues affect their effectiveness to handle local level crises, not least those caused by idiosyncratic or localized effects. Existing mutual support systems, part of many communities' social capital, provide some additional assistance but they are not suitable to handle large, covariate shocks, for example related to climatic conditions.

4.48 Reducing household vulnerability to crisis will also have to imply reducing the dependence on a small number of agricultural-based livelihood strategies. Finding ways to get people to diversify their livelihoods towards higher return and sustainable agricultural and non-agricultural activities is clearly essential. However, the issue highlighted above is relevant here as well: access to profitable diversification is seriously restricted. Evidence from Dercon and Krishnan (1996) suggests that despite the benefits from diversification as part of a risk management strategy, many poor households cannot engage sufficiently into it, since profitable diversification into high return agricultural activities (including intensification or high value livestock) or non-agricultural activities (such as business or wage employment) is restricted to those households with sufficient access to physical and human capital.

**4.49 Pastoralists employ a variety of risk coping strategies, with mixed success.** As indicated in Chapter 1, pastoralists are especially exposed to risks. Mobility of herds is the traditional strategy to reduce exposure to risk among pastoralists, but it is proving increasingly difficult due to a combination of regulation, urbanization, insecurity in areas away from towns, and growth in agriculture. In the absence of insurance markets, investing in greater herd size is a costly, but effective way of ensuring that the animal stock does not fall below threshold levels which would threaten households' livelihoods. Income diversification can be a risk-reducing strategy, though it happens to be differently motivated at the high and at the low end of the distribution as discussed above. There is evidence that income is increasingly diversified for pastoralist households, though there seems to be a lot of heterogeneity in the opportunities as well as the motivation for doing so. Depending on the climate and on the characteristics of the towns whose markets they can access, households might engage in agriculture (to secure food supplies or to sell their crops on the market), gather natural resources (e.g. wood, out of which coal is often made), or send household members to work for wages.

**4.50 This complex picture suggests that three policy areas should be addressed to better cater to the needs of pastoralists.** The first is collecting data to document the monetary and non-monetary dimensions of the poverty experienced by pastoralists and compare their most urgent needs with those of the settled population. The second is to take into account the heterogeneity of pastoralists and the differential risks and opportunities to which they are exposed when targeting assistance, favoring for example self-targeting to community based modalities.<sup>154</sup>

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<sup>154</sup> Lentz and Barrett, 2004.

4.51 **Policies to strengthen households' asset base should be supplemented with promoting a broad range of ex-ante risk management strategies**, including broadening micro-finance activities to include savings and insurance to cope with shocks, further insurance initiatives such as related to rainfall insurance, and activities to strengthen existing community based institutions such as the iddirs (originally funeral societies, but increasingly offering broader support). Promotion of better water management (either through water harvesting, micro dams or irrigation) is also important to reduce dependence on rainfall. To help pastoralists better manage their risks, policies should aim to facilitate rather than to hinder pastoralists' own mechanisms of risk-reduction and coping, including increased herd mobility and size. With respect to the latter, it has been pointed out that in resource-constrained contexts, this means redirecting newly stockless or near-stockless pastoralists out of pastoralism through managed purchases and skills training which offer the means to more sustainable livelihoods.<sup>155</sup>

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<sup>155</sup> McPeak and Barrett, 2001.

## CHAPTER 5. PERFORMANCE AND POTENTIAL OF THE AGRICULTURAL SECTOR

5.1 As discussed in Chapter 1, failure of the agricultural sector to exceed population growth lies at the heart of the observed stagnation or only limited decline in poverty reduction over the past decade and a half. This underscores two key strategic points. First, agriculture will continue to have to play an important role in Ethiopia's development, which is still in the early stages of its structural transformation. This is not because agriculture has an inherent superior growth rate compared to the non-agricultural sectors, but rather because of its size in the economy and its importance for the livelihoods of virtually all rural people.<sup>156</sup> Second, in-depth analysis of the causes for the lackluster performance of the agricultural sector, despite concerted efforts by the government to boost agricultural productivity over the past decade and a half (see Box 5.1), is called for. In doing so, it will be important to account for the agro-ecological diversity of Ethiopia.

### Box 5.1: Agricultural policies in Ethiopia since 1992

**Agricultural Development-Led Industrialization (ADLI) has been the cornerstone** of Ethiopia's poverty reduction strategy since the EPRDF assumed power. In a first step to reinvigorate the agricultural sector and the overall economy more broadly, the government introduced a series of policy reforms to stabilize its economy and to liberalize output and input markets. It removed quantitative restrictions on private grain trade and abolished the compulsory delivery of grain quotas at prices well below the market price. These measures, together with the elimination of export taxes (except for the reduced one on coffee) and the devaluation of the Ethiopian Birr, improved price incentives and fostered the integration of food markets<sup>157</sup>.

**Empirical evidence suggests that these early (food market) reforms paid off** both in terms of economic growth and poverty reduction. In a purposively selected sample of six villages across Ethiopia, Dercon (2002) observed an average reduction in poverty by 29 percentage points between 1989 and 1995, of which 18 percentage points could be attributed to better producer prices and 23 percentage points to increased returns to road infrastructure and proximity to urban centers. Both changes were largely fuelled by the reforms, and to a lesser extent, also helped by peace. While the studied sample is admittedly small (and not nationally representative), the results are nonetheless striking and illustrative.

**In the mid 1990s the focus shifted from policy reforms designed to "get the prices right" to public investment in agricultural extension** aimed at boosting productivity through the use of improved technologies. Through the Participatory Demonstration and Training Extension System (PADETES) the government delivered off-the-shelf packages of fertilizer, improved seed and credit, as well as information on input use and better agricultural practices. The promotion of the credit-fertilizer packages was accompanied by a further liberalization of the fertilizer market. By 1997, fertilizer subsidies were completely removed and retail prices were fully liberalized, which also resulted in higher fertilizer prices. The use of fertilizer increased, though diffusion and adoption rates remained disappointing despite—some even argue because of—strong-handed promotion of the credit-fertilizer packages at times.<sup>158</sup> On average, agricultural output continued to fall behind population growth.

**Acknowledging the limited success of PADETES, the government revisited the program** and formulated an integrated rural and agriculture development strategy which was launched in 2002. Agricultural development through agricultural extension combined with credit-fertilizer-seed packages remained one of the corner stones of the strategy. However, a much wider array of packages adapted to particular agro-ecological circumstances is now being promoted in recognition of the geographic diversity of Ethiopia. Promotion of water harvesting and

<sup>156</sup> Mellor, 1995.

<sup>157</sup> Dercon, 1995.

<sup>158</sup> Rahmato and Kidanu, 1999.

market development form other key pillars. The need for additional measures to ensure land tenure security was recognized, though ultimately ownership of land will remain with the government. The strategy was further complemented in 2003 by the Poor Area Program, developed by the government/donor Coalition for Food Security in response to the looming threat of a massive famine in 2003. Key components of the program include the planned resettlement of 2.2 million people by 2005, and the development of a safety net program for the chronically food insecure.

**5.2 The potential for the agricultural sector to help reduce poverty in Ethiopia is indeed hotly debated,** though the debate is often not well served by rigorous empirical evidence. Key questions dominating the policy debate in Ethiopia include the following: Is there a future for agricultural development given the increasingly small plots from which farmers must earn their living? How much growth and in particular poverty reduction can we expect from the agricultural sector by imparting better technologies (modern inputs, improved cultivation techniques and reversal of soil degradation), better institutions (markets and land tenure security), and better risk management tools (irrigation and water harvesting; safety net programs and rainfall or index-based insurance)? Have the current policies and extension programs, which have mainly focused on liberalizing input and output markets (early 1990s) and promoting the use of modern inputs (late 1990s) paid off? When looking at country-wide averages, successes in high potential areas could for example have been obscured by the failures observed in the low potential areas, due among other factors to increasing soil depletion. More recently, agricultural policies have been broadened to also focus on promotion of water harvesting and market development.

**5.3 This chapter seeks to contribute to this debate and shed some light on these questions from a micro/behavioral and poverty reduction perspective.** In particular, it will explore the scope for increasing productivity and income in staple crop production by analyzing the relative importance of the different determinants of staple crop productivity. The focus is on staple crop production because most rural farmers are engaged in staple crop production and staple crops make up 50 to 70 percent of total expenditures among the rural poor and 40 to 50 percent among the urban poor.<sup>159</sup> For this analysis, the chapter draws on the nationally representative agricultural sample surveys which the Central Statistical Authorities have kindly made available for the first time, as well as the emerging empirical literature on the determinants of cereal production in Ethiopia. Nonetheless, given the scope and complexity of the issue, our discussion is inevitably partial. More specifics from a sectoral perspective (such as micro-finance, environmental degradation, labor markets, input and output markets) will be provided in a series of other sectoral studies currently under way.<sup>160</sup> The focus in this report is on the strategic directions of investments and policies across sectors from a poverty-reducing perspective.

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<sup>159</sup> Staple crops include cereals, pulses, oilseeds and root crops (especially enset). Cereals are the most important staple, making up between 35 and 50 percent of the total expenditures among the rural poor and 30 and 35 percent of total expenditures among the urban poor.

<sup>160</sup> World Bank, 2004c. A detailed and comprehensive study on the challenges to improve the performance of the agricultural sector is being prepared by the World Bank's Rural Development Sector of the Africa Region; a report on rural finance is being prepared by the Finance Sector of the Africa Region; a report on poverty and environmental degradation is being prepared by the Environment Sector of the Africa Region; a labor market study is being prepared by the Poverty Reduction and Economic Management sector of the Africa Region.

5.4 The chapter begins by providing a broad review of the sector's performance from a macro perspective. This is followed by a micro analysis of the determinants of staple crop production as well as a discussion of the potential for increasing smallholders' income from staple crop production across different geographical areas. A brief discussion of the different options to foster broad-based agricultural development highlighting key policy implications and identifying areas which merit further analysis concludes the chapter. Chapter 6 will then build on the insights obtained from this partial equilibrium analysis and comment further on the role of agriculture and its different sub sectors (staple crops, livestock, traditional and non-traditional export crops), as well as the role of the non-agricultural sector in poverty reduction from a more integrated macro and strategic perspective, also taking into account the geographical diversity.

## **5.1 Stagnating Agricultural Performance—A Macro Perspective**

### **5.1.1 Stylized facts**

5.5 **Ethiopia still finds itself at the very beginning of its structural transformation**, despite a decade and a half of policy and investment focus on agricultural development. Even today, agriculture is still responsible for 85 percent of employment, 45 percent of national income and more than 90 percent of exports.<sup>161</sup> With 96 percent of the rural population employed in agriculture, rural households continue to rely almost exclusively on low input, low output, subsistence-oriented, rained agriculture and agriculture related activities. Some four to five million people are considered chronically food insecure and annually in need of food aid. An additional six to seven million are transitorily food insecure and in need of food aid when the rains or harvests fail.

5.6 **Labor productivity in agriculture remains extremely low**, with Ethiopia ranking 78<sup>th</sup> in a comparison of 84 countries.<sup>162</sup> Of the total area under temporary crops in the 1990s, cereals, pulses, and oilseeds accounted for 88.7 percent, 8.7 percent and 2.7 percent respectively. Commercial fertilizer was applied to approximately 40 percent of total farmland under cereals over the past years, with wheat the most fertilized crop, followed by teff and maize (about 60, 50 and 25 percent of total cultivated area respectively). In 1999, improved seeds were applied on less than five percent and pesticides on less than 6.3 percent of the total cultivated cereal area. Less than one percent of the total cultivated area in Ethiopia is irrigated, despite massive fluctuations in rainfall.

5.7 **Agriculture is mainly concentrated in the highlands**, which contain nearly 85 percent of the population, 95 percent of the cultivated land, and 80 percent of the country's 35 million cattle, which form a critical part of Ethiopia's ox-plow cultivation system.<sup>163</sup> Staple crop production (which is largely dominated by cereal production, though enset is an important staple in the southern parts) makes up 65 percent of the total agricultural value-added, with livestock production ranking second at 26 percent and non-traditional export

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<sup>161</sup> Exports include coffee (the country's main export until recently), chat, oilseeds, pulses, livestock products and increasingly horticulture products. The importance of coffee has declined over the past years following the collapse in international prices.

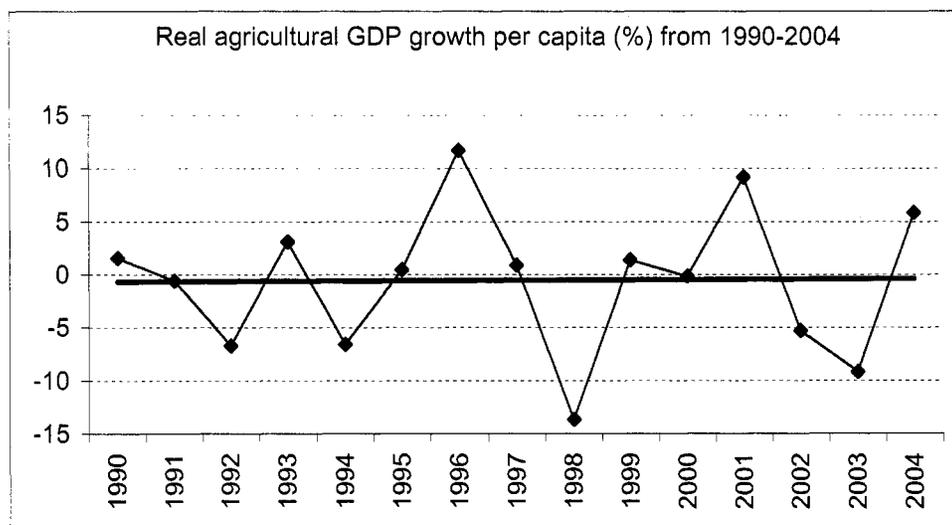
<sup>162</sup> World Bank, 2005,

<sup>163</sup> Milas and El Aynaoui, 2004.

crops and coffee ranking third and fourth with 4.4 and 4.8 percent respectively. When compared to the total economy, staple crops make up one-third of the total economy, the livestock sector 13.5 percent and non-traditional export crops and coffee 2.3 and 2.5 percent respectively.<sup>164</sup> The dominant farming system in the highlands of Ethiopia is mixed cereal-livestock production with dairy production becoming more important in the central highlands in urban and peri-urban areas around Addis Ababa. While cereals (mainly barley, wheat, maize, teff and sorghum) are the dominant crops in the sub humid central and northwestern highlands (within Oromiya and the western part of Amhara), especially coffee and enset, but also cereals (maize) are grown in the humid high potential southern and western highlands (mostly within Oromiya).<sup>165</sup> Barley and sorghum are the more important crops in the northern and northeastern highlands (Tigray and eastern Amhara), where livestock holding continues to be important. Most pastoralists live in Afar and Somalia as well as southern Ethiopia (Borena plateau).

**5.8 Analysis of agricultural performance over the past 15 years paints a bleak picture** (Figure 5.1). Despite agricultural policy reforms in the early 1990s and substantial investments in extension afterwards, agriculture has failed to keep up with population growth, resulting in zero growth in agricultural GDP per capita. The picture is further characterized by huge fluctuations from year to year, largely in response to erratic rainfall (as opposed to price fluctuations). This can be seen from Figure 5.2 which shows that agricultural GDP closely tracks overall food production. The correlation coefficient between agricultural GDP and rainfall is estimated at 0.26.

**Figure 5.1: Agricultural performance in Ethiopia during 1990-2004.<sup>1)</sup>**

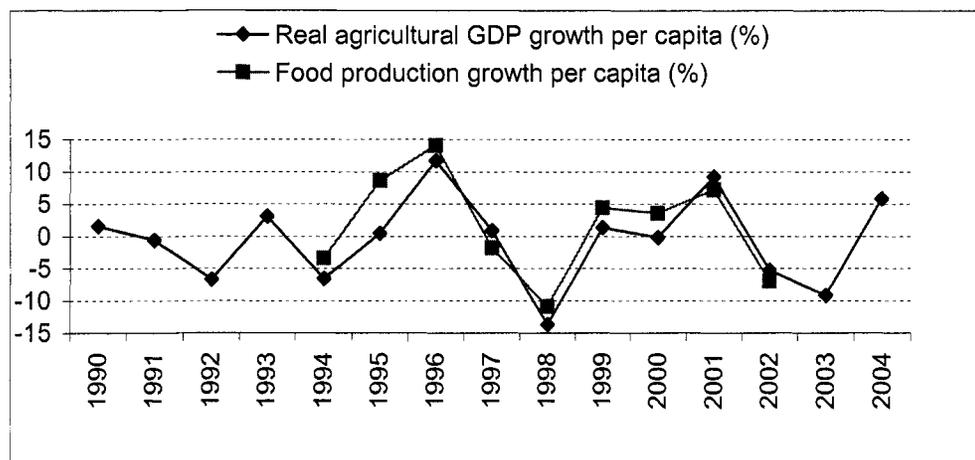


<sup>1)</sup> Data points for 2003 and 2004 are based on projections.

<sup>164</sup> Diao, et al., 2004.

<sup>165</sup> Ehui and Pender, 2004.

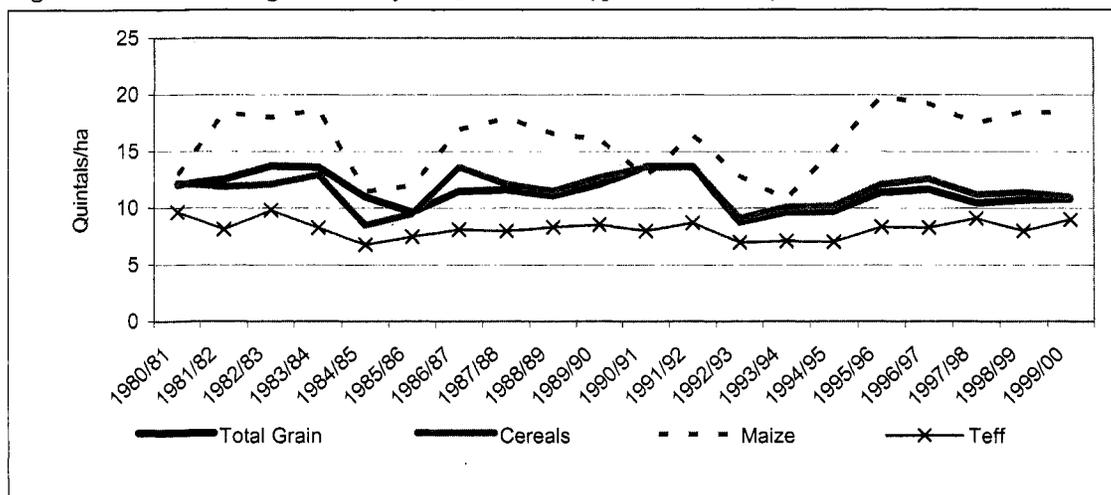
**Figure 5.2: Trends in the value of agricultural output and food production 1990-2004.<sup>1)</sup>**



<sup>1)</sup> Data points for 2003 and 2004 are based on projections.

**5.9 Moreover, land expansion, rather than productivity gains, still contributed importantly to the observed increase in (cereal) output.** Between 1994 and 2000, land under cereal cultivation increased by 5.6 percent while cereal yields increased by only 2.5 percent. It was thus estimated that between 1996 and 2002, about 90 percent of the increase in total crop production and 70 percent of the increase in cereal production were due to area expansion.<sup>166</sup> Figure 5.3 further shows that higher yields are mainly driven by an increase in maize yields, largely due to increased fertilizer use. Overall, cereal yields have hovered around 1.1 to 1.2 tons per hectare over the past two decades, or still only one-fifth the yields observed in Asia since the Green Revolution.<sup>167</sup>

**Figure 5.3: Trends in agricultural yields, 1980-2000 (quintals/hectare)**



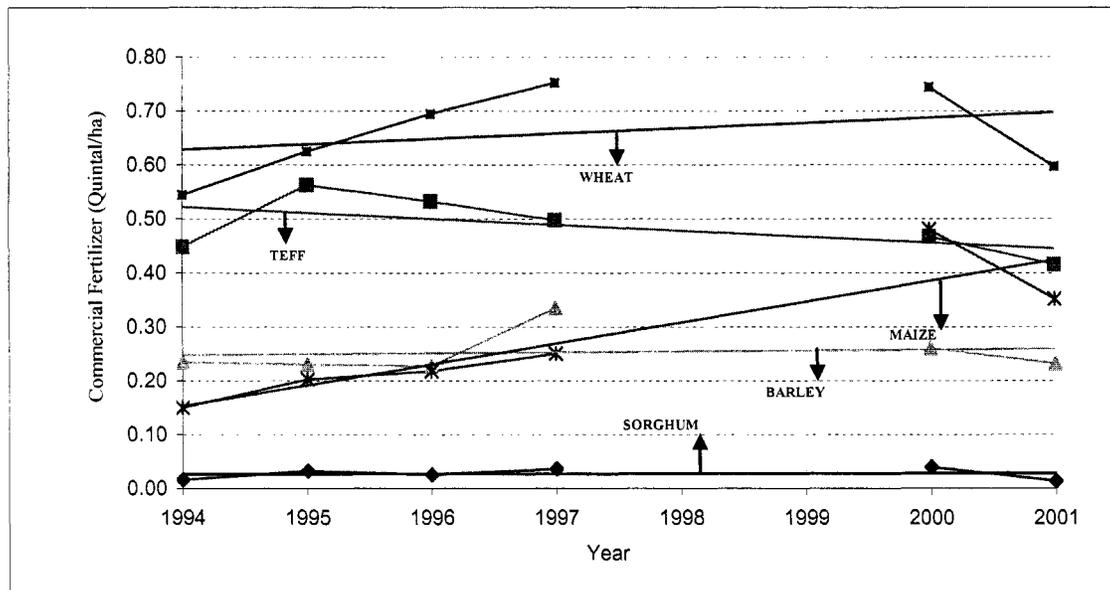
Source: Kuma, 2002

<sup>166</sup> Diao, et al., 2004.

<sup>167</sup> Gabremadhin, 2004.

5.10 Use of commercial fertilizer per ha has gone up, but breaking this down by crop we find that maize and wheat accounted for all of the increase, with fertilizer use on barley and sorghum constant, and even decreasing on teff (Figure 5.4). This is in line with yield responses across crops, which tend to be highest for maize and wheat, and are much lower for teff.

Figure 5.4: Commercial fertilizer use per ha per crop over time<sup>1)</sup>



<sup>1)</sup> Because of apparent measurement error, data for 1998 and 1999 have been omitted.

### 5.1.2 Spatial differentiation in productivity response

5.11 The trends in national averages presented so far should not necessarily be taken as proof that the agricultural extension policies have completely failed. Increased use of fertilizer may for example have helped stem a further decline in agricultural productivity due to soil erosion and soil nutrient depletion. Furthermore, national averages may mask important differences in productivity response across different geographical areas and population groups.

5.12 While it has often been argued that the extension programs and the accompanying fertilizer-improved seed-credit packages paid off in terms of yield increases in the high potential but perhaps not in the low potential areas, finding yield increases in high potential areas has proven to be somewhat elusive. For example, when comparing the evolution of yields in two high potential (Arsi and West Shewa) and two low potential (East and West Hararghe) zones, yields actually improved in the low-potential zones, while they remained stagnant or even dropped in the high potential zones. Fertilized area grew in all four zones.<sup>168</sup> High and low potential had been defined in this exercise in

<sup>168</sup> MacMillan, 2003.

terms of yields per ha in 1994/5, before PADETES was launched.<sup>169</sup> (see Box 5.2 for alternative definitions of high and low potential areas). While these results are striking, firm conclusions cannot be drawn based on the comparison of only four zones. Yet even though some geographical patterns of yield evolutions emerge when the analysis is extended to the national level and using other definitions of high and low potential, the picture remains largely mixed (see Box 5.3).

**Box 5.2: Alternative definitions of high and low potential areas**

The agricultural potential of an area depends broadly on its agro-ecological endowments (soil fertility, climate, water availability), its connectivity to markets, its population density, and the risk factors governing the area. While these factors are usually fixed in the short run, most of them can be changed in the long run through investments and policies. For example, lack of water or rainfall variability could be overcome through irrigation schemes. Distances to markets could be reduced through road and telecommunication infrastructure. Population settlement patterns could be influenced through migration policies and urbanization strategies. Health risks (e.g. malaria and tse-tse fly contamination) could be eradicated. The cost-benefit ratios of these investments will of course depend on the original endowment structure of the area, with investments presumably more cost effective in high potential areas than low potential areas.

Classification of areas into low and high potential is usually based on a combined assessment of how the area scores on these different factors, i.e. innate agro-ecological potential, market connectivity, population density, health and climate risks, and cost effectiveness of different investments. This also holds for Ethiopia. However, there is currently no commonly agreed-upon classification, and different institutions and authors continue to use different classifications. For example, areas have been classified as high and low potential based on: (1) the proportion of food insecure people in the woreda in the mid 1990s; (2) the existence of a food deficit or food surplus at the zonal level (Diao et al., 2004); (3) the creation of an index combining all the different factors mentioned above (World Bank, 2004c). Nonetheless, there is a core of low and high potential areas which is shared by most classifications. In the absence of a uniformly accepted classification, we will use the classifications used by the different studies we draw upon, carefully indicating the particular definitions used, with the implicit understanding that they share a common set of areas with low and high agricultural potential across these different classifications, even though it is acknowledged that there is not a perfect match.

**5.13 This hypothesis is only borne out when we follow the government's classification of high and low potential zones** based on the number of food insecure people in 1994/95 (see Figures 5.5 and 5.6).<sup>170</sup> As in the other classifications, we find cereal yields to be substantially higher in the food secure tercile than in the food insecure tercile (1,272 kg/ha on average during the 1994-2001 period versus 994 kg/ha) (Figure 5.6). Average yields in the middle tercile closely approximate those in the food secure tercile. Yet contrary to the results from the other classifications, yields have trended upward in the food secure (and medium food secure) zones, while they stagnated in the food insecure zones. Yields in the food secure zones were estimated to increase annually on average by 26.6 kg per ha from 1,153 kg/ha in 1994 to 1,338 kg/ha in 2001. The annual increase in the medium tercile was estimated at 15.2 kg per ha per year, while yields increased only by seven kg per ha per year in the food insecure zones.

<sup>169</sup> The high potential areas averaged above two metric ton/ha during the 1994-2000 period and the low potential ones 1.2 metric ton/ha.

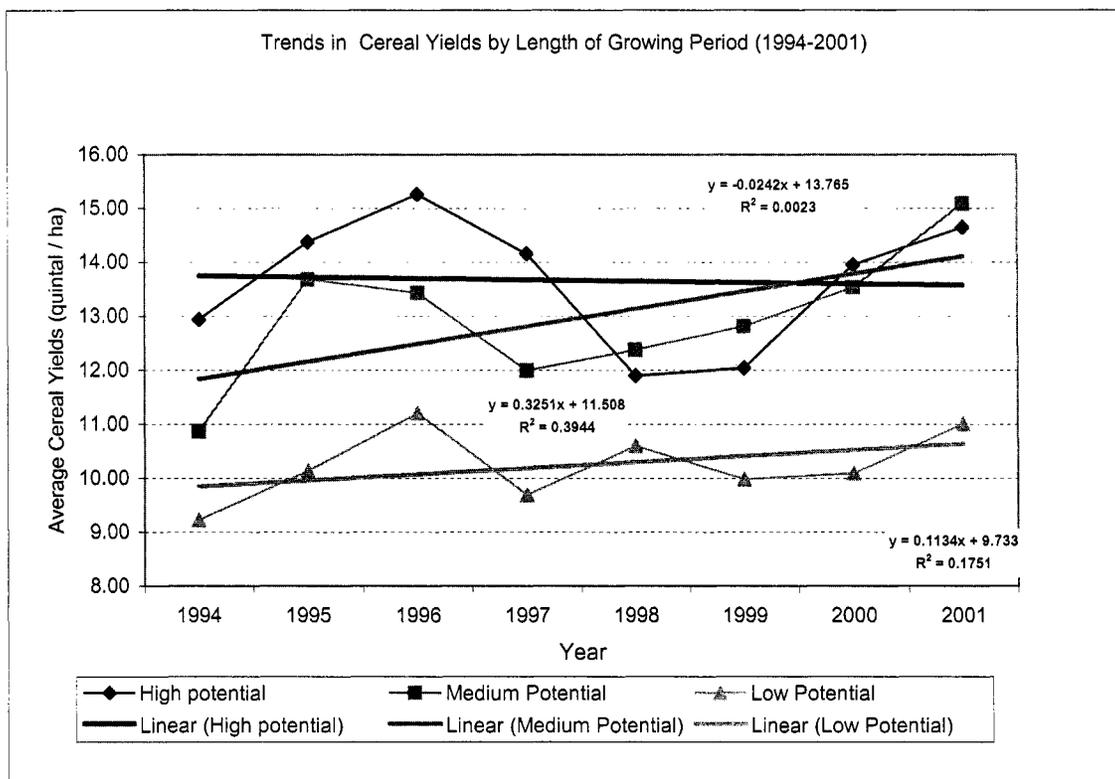
<sup>170</sup> In effect, the classification is based on the average number of people estimated to be in need of food aid in each Woreda in 1994 and 1995.

**Box 5.3: Trends in cereal yields in low, medium, and high potential zones**

Figures B5.3.1 – B5.3.3 below present trends in cereal yields across administrative zones by terciles of length of growing period, by average distance from the nearest all weather road, and by highland and lowland, similar to the categories used by IFPRI in a forthcoming study to explore the potential for agricultural growth in Ethiopia.<sup>171</sup> When classifying the zones by terciles of length of growing period, we see that yields are indeed substantially lower in the low potential group compared to the medium and high potential ones, though changes in yields do not follow the expected pattern (Figure B5.3.1). They have been upward trending between 1994 and 2001 for the medium potential group of zones, slightly upward trending for the low potential group, and stagnating in the high potential group.

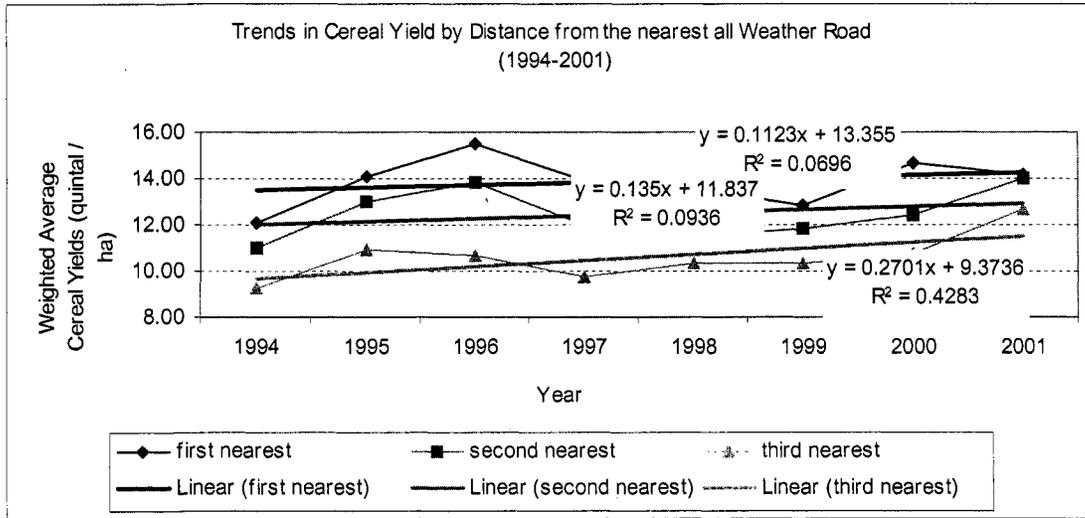
Similarly, cereal yields are closely related to market connectedness as captured by the distance to an all-weather road, though they have been slightly upward trending irrespective of the distance to the road (Figure 5.3.2). Yields in highlands and lowlands are very similar on average, as has been their evolution over time. The upward sloping trend for the highlands disappears when the 2001 observation is dropped. This illustrates the larger point that great caution is warranted in interpreting these results given the relative short time period under consideration and substantial fluctuations in yields. Nonetheless, while the evidence points to higher yields in higher potential and more accessible areas, it does not confirm the hypothesis of upward trending yields in high potential areas.

**Figure B5.3.1: Trends in yields by length of growing period between 1994 and 2001**

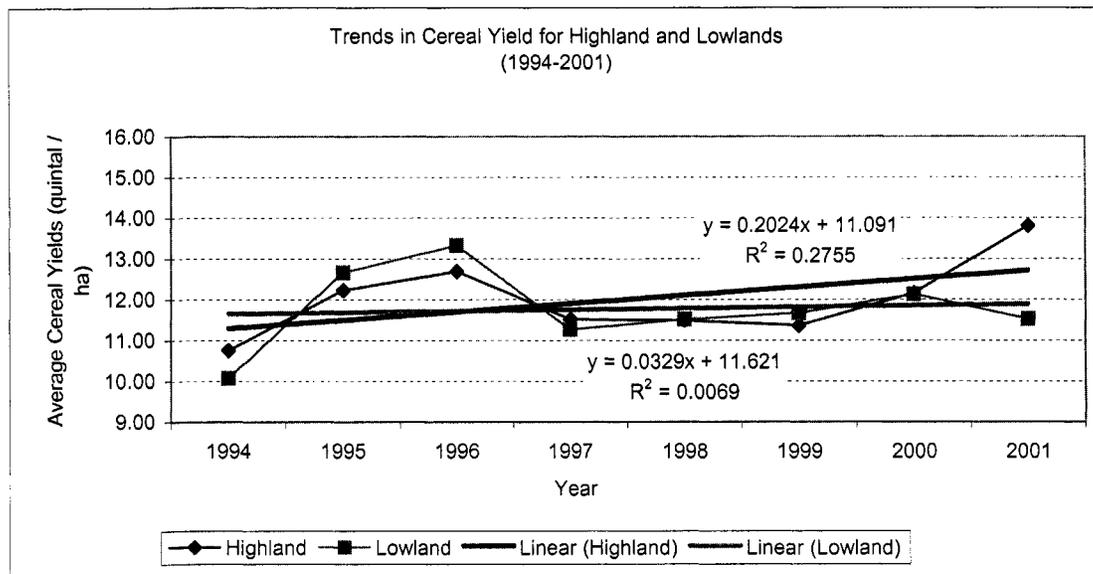


<sup>171</sup> Diao, 2004.

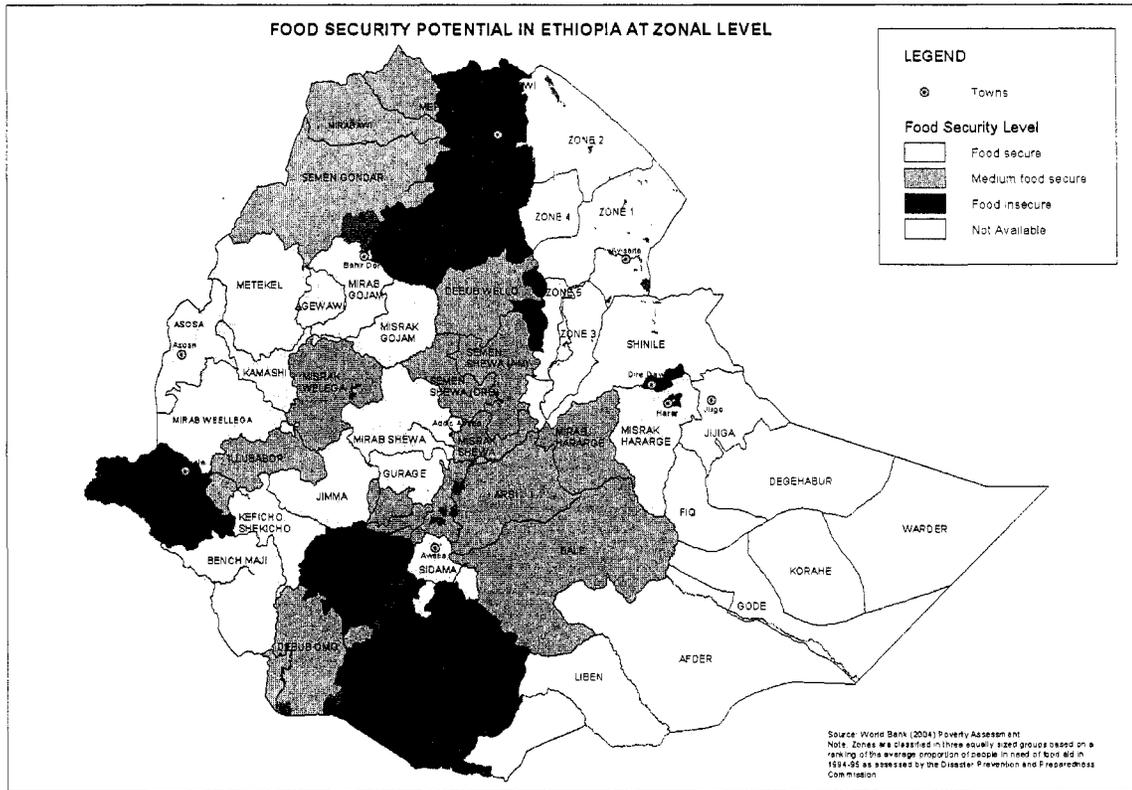
**Figure B5.3.2: Trends in cereal yields by market access between 1994 and 2001**



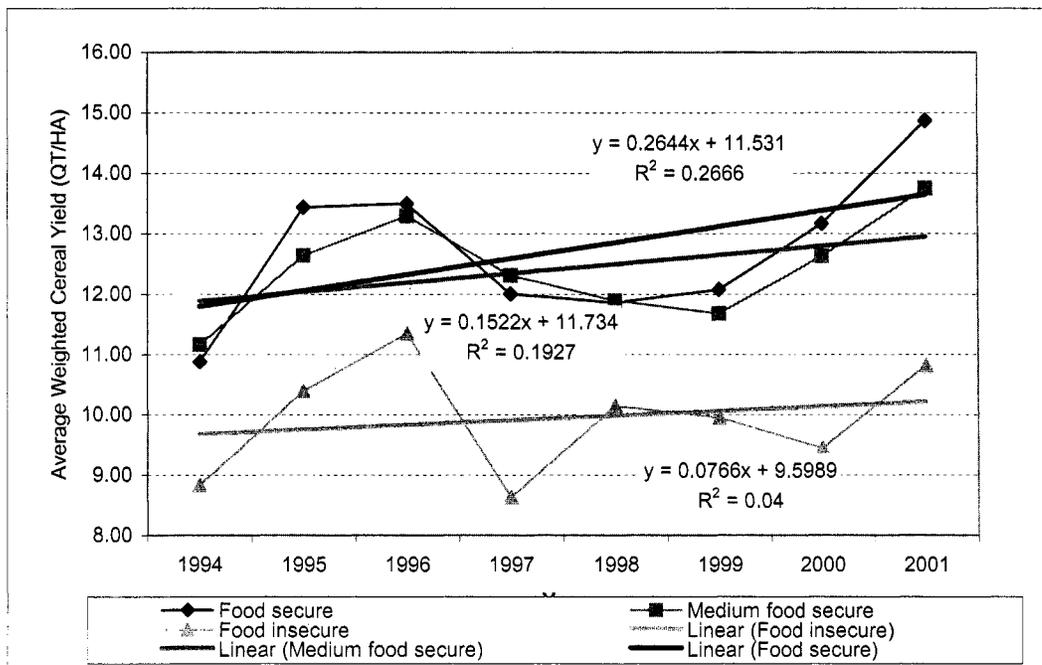
**Figure B5.3.3: Trends in cereal yields in high and lowlands between 1994 and 2001**



**Figure 5.5: Food security potential in Ethiopia**

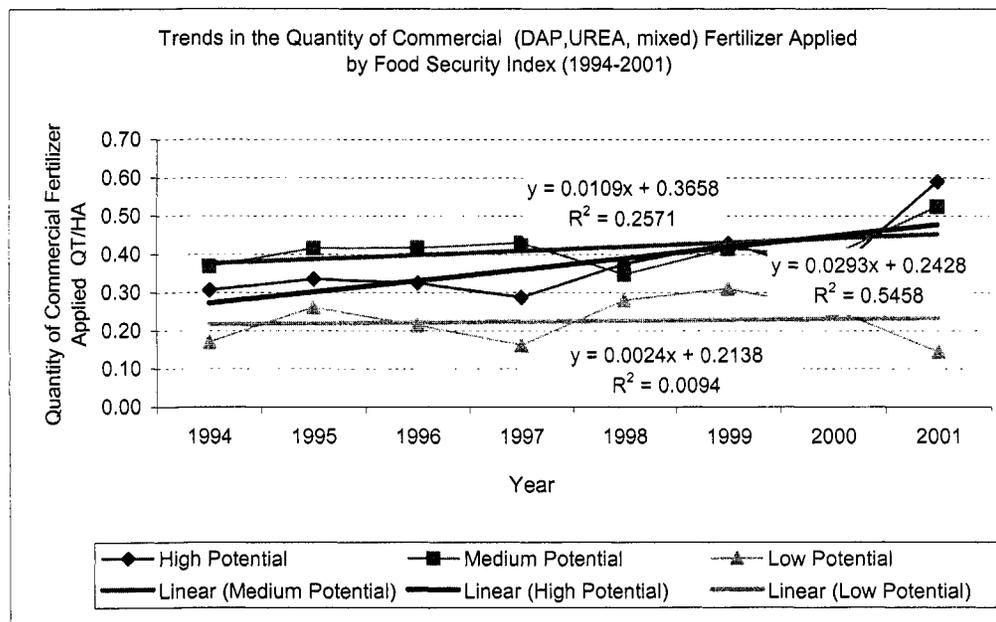


**Figure 5.6: Trends in cereal yields by food security index between 1994 and 2001**



5.14 Starting in 1996, the roll-out of the extension-fertilizer-credit packages has been the pillar of the government's agricultural policy. Given the close relationship observed in Figure 5.6 above between change in commercial fertilizer use and change in yields, we would thus expect an upward trend in commercial fertilizer use in the food secure zones and stagnation in the food insecure zones. This is confirmed in Figure 5.7.

**Figure 5.7: Trends in commercial fertilizer use by food security index between 1994 and 2001**



5.15 **These findings raise a number of important questions regarding the diffusion and adoption of fertilizer and its potential for poverty reduction.** The distinction between high and low potential appears to be a misnomer as it implicitly assumes that farmers would be more inclined to adopt commercial fertilizer in high potential areas since it would be most productive in these areas. Yet fertilizer adoption depends both on its diffusion/availability as well as the determinants of adoption such as profitability, credit availability, access to input and output markets, etc. It appears that there have been important program placement effects at work during the earlier phases of PADETES, which may explain why we fail to observe a clear-cut relationship between indicators of inherent production potential (such as agro-ecological indicators) and trends in yields. On the contrary, when we follow the government's conceptualization of high and low potential areas, which it may have used to channel its extension packages, a positive correlation emerges.

5.16 **The more food secure areas may indeed have been more conducive to fertilizer diffusion and adoption than the food insecure areas (Table 5.1).** Not only do the food secure areas have greater agro-ecological potential (higher levels of rainfall, less variability and flatter arable lands), they also have better road infrastructure and higher population density. Market connectivity and agglomeration effects reduce transaction costs of fertilizer distribution and provide producers with outlets for their products. Furthermore, even before PADETES, fertilizer use was already more widespread and its application rates more intense

in the food secure (and medium food secure) zones (Figure 5.7, above). This would suggest that the farming population was already aware of the usefulness of fertilizer, which provides a fertile ground for promoting further uptake.

**Table 5.1: Characteristics of food secure and food insecure (rural) zones in 2000<sup>1)</sup>**

	Food Insecure Zones	Medium Food Insecure Zones	Food Secure Zones
Average proportion (%) of people in need of food aid per zone	21	08	02
<b>Household characteristics</b>			
Total Value of agricultural production (Birr in 2000 nominal prices)	867	1354	942
Household size	5.1	5.4	5.3
Number of individuals working in the agricultural sector (imputed)	2.1	2.1	2.1
Age of head	46	43	43
Head female (%)	19	19	19
Completed grade 1-3 (%)	14	14	15
Completed grade 4-6 (%)	06	07	09
Completed grade 7 or above (%)	03	04	06
Land area per holder (ha)	0.83	1.23	0.97
<b>Agricultural practices</b>			
% of land irrigated	1	1	0
% of land using improved seeds	2	2	4
% of land using commercial fertilizers	13	24	32
Quantity of commercial fertilizers used (Kilograms per Hectare)	14.5	29.0	45.4
% of land using natural fertilizers	12	6	11
% of land using pesticides	00	8	12
Number of cattle for mainly agricultural use	.84	1.14	.89
<b>Shocks</b>			
% of crop area damaged	22	16	14
% deviation from average rainfall in 2000	2	-1	1
<b>Agro-ecological characteristics</b>			
Average rainfall (1967-2000, mm)	920	1060	1253
Coefficient of Variation of Rainfall	.27	.24	.21
Slope	14.0	9.8	9.5
Altitude (meters)	1976	1875	1996
<b>Market connectivity &amp; agglomeration</b>			
Distance to Food Market (km)	7.4	7.3	6.0
Distance to all weather road (km)	15.7	12.9	11.0
Rural Population density (population / km <sup>2</sup> )	121	110	153
<b>Soil degradation</b>			
Nitrogen loss (ton / year / woreda)	355	291	246
Phosphorus loss ( (ton / year / woreda)	99	79	63

<sup>1)</sup> Zones are classified based on the weighted average proportion of people per woreda assessed to be in need of food aid by the Disaster Prevention and Preparedness Commission in 1994 and 1995. Following a ranking of the proportion of food aid-needy in each zone, the zones were distributed in three equal groups from food secure to food insecure.

**5.17 When in pursuit of quick success in raising agricultural output in Ethiopia, channeling fertilizer packages to the areas which are more likely to adopt and where it is less costly to roll-out the package makes political and economic sense. Nonetheless, two important observations remain.** First, while cereal yields in the food secure areas grew at a rate of 2.1 per cent per year, at an average of 1,338 kg/ha cereal yields are still quite low compared to international standards. Second, taking a more distributional perspective, many of the (chronically) poor live in the food insecure zones,<sup>172</sup> and they also face greater land pressure (average land size per holder is 0.83 versus 0.96 in the food secure areas) and more soil degradation due to dung and crop residue collection. While these conditions would seem conducive to the use of land-saving technologies such as improved seeds and commercial fertilizer,<sup>173</sup> application of these technologies have so far been limited in these areas. These observations raise several important questions. Is limited application of fertilizer and improved seeds in fact not profitable in these areas, or are there important constraints (e.g. associated risks and limited ability to cope with shocks ex post, limited access to credit, input supply constraints, input delivery mechanisms) which prevent farmers from using these modern inputs? What is the scope for further yield increases both in the food secure and food insecure areas? What is the role of non-price factors, such as modern input use, soil conservation, water and risk management, and market access, in this process? What is the role of price factors such as input and output prices? These are the issues taken up in the following section using multivariate regression techniques.

## **5.2 Enhancing Staple Crop Productivity—A Micro Perspective**

**5.18 To explore the scope for enhancing staple crop productivity and thus reducing poverty by increasing agricultural income in food secure and food insecure areas, we investigate the relative importance of modern input use and other agro-ecological and geographical characteristics in determining the total value of staple crop production.** In particular, we estimate a Cobb-Douglas production function linking the total (nominal) gross value of staple crop production per holder (cereals, pulses and oilseeds)<sup>174</sup> in 2000 to total land and labor input,<sup>175</sup> household characteristics, input use and geographical endowments. We do so for each of the three groups of zones: food secure, the medium food secure, and the food insecure. The results are presented in Table 5.2.

5.19 The first three columns of Table 5.2 present the estimated effects controlling for unobserved community variables by inclusion of community dummy variables. This provides assurance that the estimated effects of the different inputs and household characteristics do not pick up any other unobserved (community or price) effects. To further explore the effects of community variables we explicitly include community and woreda characteristics (long run average rainfall and rainfall fluctuations, rainfall deviation from the long run mean in 2000 to capture the effect of covariant shocks, and the average slope in a woreda to proxy soil moisture retention capacity). Separate production functions were also estimated at the plot

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<sup>172</sup> Sharp, Devereux and Amare, 2003.

<sup>173</sup> Ruttan and Hayami, 1985.

<sup>174</sup> We do not have information on the production of enset or other roots and tubers.

<sup>175</sup> The actual labor variable used is the imputed number of active adults working in the agricultural sector using the household and community characteristics reported in the agricultural survey, and their relationship to the number of adults employed in the agricultural sector as estimated from the Welfare Monitoring Survey.

instead of the holder level and for each of the cereal crops. The results were largely consistent with the ones presented here, and the additional insights will be highlighted in the discussion. All the coefficients in the table represent either elasticities (if the variable is expressed in logs),<sup>176</sup> or a percentage change in the total value of output (if the variable is expressed as a dummy variable i.e. taking the value of either one or zero).<sup>177</sup>

**Table 5.2: Estimated determinants of the value of cereal output in 2000 by food security potential of the area<sup>1)</sup>**

Dependent variable = log (nominal) total value of agricultural production in 2000	Food insecure	Medium food secure	Food secure	Food insecure	Medium food secure	Food secure
Log cultivated area (m <sup>2</sup> )	1.053***	1.081***	1.079***	1.030***	1.081***	1.094***
Log adult labor in agriculture	-0.013	-0.016	-0.006	-0.031	-0.064**	-0.011
Log age (years)	-0.004	-0.001	0.039*	0.084**	0.013	0.036
Education: 1-3 years (dummy)	0.016	-0.005	-0.004	0.047	0.035	-0.020
Education: 4-6 years (dummy)	-0.007	-0.031	0.025	0.000	-0.089***	0.039
Education: 7+ years (dummy)	0.017	0.042	0.009	-0.032	-0.053	-0.001
Holder is female (dummy)	-0.003	-0.017	-0.011	0.016	-0.022	-0.020
Log (number of oxen)	0.011**	0.007	0.006	0.028***	0.014	0.012
Log (%area on which natural fertilizer used)	0.004	0.002	-0.004	0.001	0.019***	-0.005
Log (%area on which commercial fertilizer used)	0.012***	0.012***	0.018***	0.030***	0.035***	0.028***
Log (% crop not damaged)	0.090***	0.238***	0.144***	0.236***	0.210***	0.240***
Log (% area on which pesticides used)		0.012***	0.007**		0.009**	0.003
Log (% area on which improved seeds used)		0.005	0.001		-0.009	-0.002
Log mean rainfall (1967-2000)				0.046	-0.305***	-0.336***
Percentage deviation from mean rainfall in 2000				0.824***	0.432***	-0.308**
Log altitude (m)				0.947***	0.583***	0.510***
Log (average slope percentage in a woreda)				-0.169***	-0.061*	0.067
Constant	-2.805***	-2.949***	-3.334***	-9.794***	-4.957***	-4.985***
EA fixed effects?	YES	YES	YES	NO	NO	NO
Observations	4490	4631	4898	4011	4370	4785
R-squared	0.95	0.93	0.95	0.87	0.87	0.91

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

<sup>1)</sup> Zones classified based on the weighted average proportion of people per woreda assessed to be in need of food aid by the Disaster Prevention and Preparedness Commission in 1994 and 1995. Following a ranking of the proportion of food aid-needy in each zone, the zones were distributed in three equal groups from food secure to food insecure.

5.20 In discussing the insights deriving from these regressions, which are based on nationally representative household data, we further draw upon the emerging Ethiopia-specific empirical literature on the determinants of agricultural production. This permits us to triangulate the robustness and the magnitudes of the estimated results with other evidence. It also allows us to explore the role of other factors, in particular, output and input price factors,

<sup>176</sup> So, for example, according to the estimated coefficient reported in column 1, a 10 percent increase in the cultivated area in food insecure zones would result in a 10.53 percent increase in the total value of staple crop production.

<sup>177</sup> So, for example, according to the estimated coefficient reported in column 1, the total value of the staple crop production among households in food insecure zones whose head had obtained one - three years of education is on average 1.6 percent higher than in those households whose head has no formal education. Note however, that the coefficient is not statistically significant, indicating that there is no statistical ground to reject the hypothesis that household education has no effect at all.

as well as access to markets, which were either not explicitly considered in this analysis due to data limitations or which turned out to be statistically insignificant.

### ***Marginal values of labor and land***

**5.21 There are strong signs of labor surplus and land scarcity in cereal production.** Perhaps the most robust, but somewhat striking results across all specifications (including those by crop and by plot not reported here) are the estimated elasticities of land and labor. The elasticity on labor is consistently estimated at zero implying that an additional unit of labor does not add any value to overall production. For each percentage increase in landholdings, on the other hand, the value of total output rises by at least one percent. If true, this would imply that across the nation, there is a labor surplus, with people working at zero (if not negative) marginal returns on their land, and that the size of current landholdings is suboptimal given the amount of family labor available.

5.22 While we likely overestimate the amount of labor actually applied to the production of cereal, pulses and oilseeds in this analysis, which partly explains the extremely low estimated marginal returns to labor,<sup>178</sup> other empirical studies of agricultural production in Ethiopia also report few gains from additional labor use in agricultural production, holding other inputs constant, and a strong correlation between the amount of land and output, though the estimated elasticities are not quite zero and one respectively.<sup>179</sup> These econometric results mirror farmers' testimonies collected during participatory work pointing to increasing land pressure and the emergence of a class living on hunger plots.<sup>180</sup> Finally, low marginal productivity of labor and farming on sub-optimal landholdings are consistent with the observed absence of functioning land and labor markets, which prevents an optimal allocation of land and labor.

**5.23 The low marginal value of labor in terms of additional agricultural income from cereal production, given current landholding size and the higher marginal values of expanding landholdings, point to four possible policy routes to expand households' income from staple crop production and reduce poverty.** First, the land frontier could be pushed further and new areas could be exploited (*agricultural extensification*). As discussed before, this has so far been the major natural source of growth in agricultural GDP, not the increase in yields. The ongoing resettlement program is consistent with this philosophy, though not necessarily an optimal policy to foster migration to unexploited areas given the related humanitarian crises it often generates. Land redistribution does not seem a valid

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<sup>178</sup> Labor input in the production of cereals, pulses and oil seeds is proxied by the predicted number of household members employed in agriculture (see footnote 172). This is not only an inaccurate measure, but likely also an overestimate as households may only work part of their time in agriculture, and even within agriculture, they are likely to devote some of their time to other agricultural activities (such as livestock, cash crops, or cultivation of perennials). Technically, measurement error in the labor variable leads to a downward bias of the estimated marginal effect of labor use. Nonetheless, labor and land elasticities of zero and one respectively, have been reported elsewhere in the literature as well (see Hoddinott, et al., 2003, for Zimbabwe).

<sup>179</sup> Croppenstedt and Muller, 2000; Demeke, Mekonnen, Admassie, and Aredo, eds., 2003; Amacher, et al., 2004; Pender and Gebremedhin, 2004.

<sup>180</sup> Rahmato and Kidanu, 1999.

option, given that the observed land inequality does not result from a small minority holding the majority of land, but rather from the emergence of a land poor class following continuous fragmentation into ever smaller holdings of the current, already small, landholdings.

5.24 Second, the marginal productivity of labor and land could be raised through *agricultural intensification* (e.g. modern input use and more effective water and land management). Increasing modern input use has been the focus of PADETES, which has recently been further complemented with better water management. Third, labor productivity could be increased through *diversification into non-cereal* (tradable) agricultural production, including cash crops (coffee, chat, cotton), tree production (eucalyptus), livestock (dairy, meat), bee keeping, medicinal plants, and others. Fourth, land pressure could be reduced and labor productivity enhanced through *diversification out of agriculture* into highly remunerative non-agricultural activities. The optimal (combination of) routes will obviously differ across space depending on the regions' comparative advantage in terms of agro-ecological potential, and market access as determined by population density and access to infrastructure.<sup>181</sup> We focus here on the scope for agricultural intensification in food secure and food insecure areas in a partial equilibrium setting. Chapter 6 will revisit these issues and the optimal combination of routes from a broader economic (as opposed to sectoral and micro) perspective, and discuss the linkages between performance in the cereal, non-cereal and non-agricultural sectors, and relatedly the critical role of food price levels and fluctuations.

#### *Other non-price factors*

5.25 **There is substantial scope for agricultural intensification, especially through combined use of fertilizer and improved seeds.** Farmers' practical experiences indicate that cereal yields could be more than doubled when using fertilizer combined with improved seeds (Table 5.3). However, while there appears to be a high premium from using fertilizer-improved seed packages, these are currently only applied in four per cent of the cultivated cereal area. On the other hand, yield gains from using fertilizer alone, a cultivation practice currently applied in about 30 percent of the cultivated cereal area, would only increase cereal yields by 18.7 percent when compared with no modern input use. This positive, though somewhat limited, effect of fertilizer use alone is consistent with the relatively small estimated elasticities of value of staple crop production reported in Table 5.2 (holding all other inputs constant) which range from 0.012 to 0.035, as well as those found in other empirical studies from Ethiopia which report elasticities to fertilizer use in the range of five to eight percent.<sup>182</sup> The effect of jointly using fertilizer and improved seeds has not been estimated in Table 5.2.

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<sup>181</sup> Ehui and Pender, 2004.

<sup>182</sup> Croppenstedt and Muller, 2000; Demeke, Mekonnen, Admassie, and Aredo, eds., 2003; Deininger, Jin, Adenw, Gebre-Selassie, Demeke, 2003; Amacher, et al., 2004.

**Table 5.3: Cereal area and yield by modern input use, 1997/98-2001/02**

	Area (percent in total cereal area)	Yield <sup>1)</sup> (metric ton/ha)	percent difference with no input use
No input use	60.6	1.15	-
Fertilizer only	30.1	1.36	18.7
Fertilizer & improved seeds	3.8	2.46	114.3
Irrigation only	1.7	1.87	62.8
Improved seed only	0.2	1.73	50.8
Total	100	1.28	

<sup>1)</sup> Averages calculated from Agricultural Sample Surveys 1997/98-2000/01 and Agricultural Census, 2001/02, Central Statistical Authority.

Source: *Extracted from Diao et al., (2004)*

**5.26 Substantial yield gains from combined fertilizer-improved seed packages are not limited to food secure/food surplus areas**, though the gains are likely smaller in the food insecure/food deficit areas. Farmers' experience from the 2001/02 season suggests that yields were 50 to 80 percent larger in food insecure/food deficit areas and food secure/food surplus areas<sup>183</sup> respectively when using both fertilizer and improved seeds, compared to the overall average (Table 5.4).

**Table 5.4: Cereal yield and input use in food deficit, food balanced and food surplus areas, 2001/02<sup>1)</sup>**

	Food deficit	Food balance	Food surplus
Cereal yield (ton/ha)	1.08	1.19	1.44
Cereal yield using fertilizer only	1.24	1.25	1.44
Cereal yield using fertilizer & improved seed	1.65	2.20	2.63
Absolute difference between using fertilizer & improved seed compared to average cereal yield (ton/ha)	0.57	1.01	1.19
% difference between using fertilizer & improved seed compared to average cereal yield (ton/ha)	53	85	84
Fertilizer use rate in cereals (% area)	29.12	26.40	56.13
Fertilizer combined with seed rate (% area)	3.08	3.15	4.88

<sup>1)</sup> Calculated from Agricultural Census, 2001/02 (Federal Democratic Republic of Ethiopia, Central Statistical Authority).

Source: *Diao et al., 2004*

**5.27 Given that improved seeds and fertilizer are applied to only four percent of the total area, there is clearly still substantial scope for increasing agricultural incomes from enhanced input adoption, even if the estimated yield gains may be smaller than suggested above.** Given that results reported above are based on bi-variate analysis, it is possible that they overestimate the gains from the combined fertilizer-improved seed package, as other factors associated with the use of this package (e.g. improved cultivation techniques, soil quality, etc.) may partly be driving the results. Also, not all cereals may be equally responsive to the package, and the observed gains may have been largely driven by yield

<sup>183</sup> Zones are classified into food deficit, food balanced and food surplus if the zonal level per rural household cereal equivalent output is 20 percent below the national average, between 80 and 120 percent of the national average, and 20 percent above the national average respectively (Diao, X. et al., 2004).

gains among certain cereals. To the extent that these two issues are important, they would reduce the gains to be expected from only promoting the fertilizer-improved seed package. Further analysis of the current experience suggests that maize and sorghum are most responsive to the combined package, with yields for maize increasing from 1.57 to 2.70 ton/ha and yields for sorghum increasing from 1.28 to 2.07 ton/ha. Together they account for 40 percent of the cultivated cereal area. Yet currently only 10 percent of the sorghum area and 39 percent of maize area is fertilized, and virtually no improved seeds are used in sorghum production while only 13 percent of the maize area was cultivated with improved seeds. Sorghum is usually grown in the drier areas and maize in the more humid areas, suggesting that yield gains could be obtained both in the food insecure and the food secure areas. Moreover, even though yield gains are less when fertilizer alone is used, this does not mean that there are no gains from using fertilizer alone. Clearly, given that the use of basic modern inputs is currently so limited, there is still substantial scope for increasing productivity from broadening adoption of these inputs, especially when combined with adequate technical advice on optimal input application and use. For adoption of these technologies to be sustainable, it must further be ensured that they are compatible with farmers' incentive structures.

**5.28 Results from experimental and demonstration plots indicate that the observed improvements represent only lower bounds** compared to what could be achieved through improved management practices and inputs both in food secure and food insecure areas (Tables 5.5 and 5.6).

**Table 5.5: Potential for yield gains under improved management**

Crop	Yield with traditional practices (ton/ha) <sup>1)</sup>	Yield with improved practices (ton/ha)			
		Experimental plots <sup>2)</sup>	Farmers' Demonstration plots <sup>2)</sup>	SG 2000 EMTPs <sup>3)</sup>	
				Average	Range
Maize	1.63	4.5-9.0	5.0-6.0	5.5	3.4-9.5
Teff	0.86	2.0-3.0	1.4-2.2	1.75	1.46-2.7
Wheat	1.28	2.0-5.0	2.0-4.0	3.1	2.1-6.0
Sorghum	1.32	2.5-6.0	1.5-4.0	-	-
Barley	1.13	2.1-4.5	1.8-3.5	-	-

<sup>1)</sup> Source: CSA Agricultural Sample Surveys 1988/89, 89/90, 91/92 (average).

<sup>2)</sup> Proposed agricultural technology recommendations

<sup>3)</sup> SG – Sasakawa-Global: EMTPs: Extension Management Training Plots

Source: *World Bank, 2001*

**Table 5.6: Average yield data from SPA practice compared to traditional practice**

Zone	Traditional (ton/ha)	No. of demonstrations	Yield in ton/ha	
			Average	Range
North Gondar	0.5	120	1.26	0.76-1.8
South Tigray	0.5	41	1.12	0.43-2.03
North Wollo	0.55	129	0.78	0.29-2.01
Total	0.5	290	1.05	0.49-1.98

Source: *Sodhi, Manna and Wadhawan, 1999*

**5.29 Topsoil runoff negatively affects agricultural income, especially in the food insecure areas** (Table 5.2). Given high land pressure, farmers in food insecure areas are increasingly forced to cultivate plots on steep slopes, most often without appropriate land cultivation techniques or terracing. Average slopes in the food insecure areas were estimated at 14 percent while those in the other zones were estimated at about 9.5 percent (Table 5.1). Clearly, farmers in the food insecure areas are at a natural disadvantage in terms of farming conditions. Experiments in Tigray indicated that for stone bunds three to 20 years old, soil loss decreased on average by 68 percent. Cereal yield increases through use of stone bunds were estimated at 50 kg per ha (an increase of about five percent) on average across 150 plots in Dogu'a Tembien (Tigray) in 2002.<sup>184</sup> Other evidence from the highlands in Tigray found the value of production on plots with stone terraces to be 17 percent higher, and 41 percent higher when trees were planted. Food for work programs could be cost effectively used to build technically sound stone bunds and terraces. Given the strong relationship found between dung collection practices and consumption, it was somewhat surprising not to find a statistically significant effect between DAP equivalent loss and agricultural income. The relationship between dung collection practices and agricultural productivity deserves further investigation, preferably with more detailed micro-data.<sup>185</sup>

**5.30 Agricultural income loss associated with crop damage and droughts can be substantial.** The elasticity related to crop area damaged was estimated at about 0.15, indicating that interventions which would help a farmer protect an additional 10 percent of his cultivated crop area would raise his agricultural income by 1.5 percent (Table 5.2). Reported crop damage reflect damage resulting from droughts, floods, insect or pest attacks, frosts or other reasons. While these numbers may not speak to the imagination, for those already well below the poverty line who see half their crop area damaged, a 7.5 percent loss in agricultural income can push them into starvation. This is especially the case when crop damage is widespread and results in a collapse of the off-farm labor market. Public work programs for those who have experienced a shock may provide welcome relief in this case.

5.31 Moreover, given that the estimated elasticity on crop damage reported above is derived from the community fixed effect model, it only reflects idiosyncratic risks. When we unbundle the community effects as reported in columns 4-6 (Table 5.2), we see that the elasticity on crop damage increases to 0.21-0.24. In addition, covariant rainfall shocks measured at the woreda level also have a strong negative effect on agricultural income, especially in the food insecure areas. A 10 percentage point deviation from the long run average rainfall is estimated to reduce agricultural income for farmers residing in food insecure areas by eight percent. Other empirical studies confirm the critical importance of rainfall, especially in the food insecure areas.<sup>186</sup>

**5.32 Output appears responsive to market accessibility.** We also examined the effect of remoteness by including the average distance to a road among members in a community, though no precise relationship was found between this variable and the value of total output,

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<sup>184</sup> Zala-Daget Project, 2004.

<sup>185</sup> The ongoing study on poverty and environmental degradation by the Environment Sector of the Africa Region will explore this further.

<sup>186</sup> Abrar, Morrissey and Rayner, 2004.

and it was subsequently dropped (Table 5.2). This result may follow from the fact that the effect of market access on cereal production works largely through fostering agricultural intensification (i.e. the adoption of modern inputs) which was already controlled for.<sup>187</sup> Aggregation across cereals may also have confounded the results. Other micro evidence points to a strong effect of market accessibility of cereal output, especially of teff and maize in the more food secure areas (Central and Southern Zone in Table 5.7). Output of cash crops (coffee and chat) and enset is also very responsive to market access.

**Table 5.7: The impact of market accessibility on output for different crops**

Output elasticity (kgs) with respect to market accessibility <sup>1)</sup>	Northern <sup>2)</sup> Zone	Central <sup>2)</sup> Zone	Southern <sup>2)</sup> Zone
Teff	-0.03	+1.23***	-0.03
Maize	0.00	+1.30***	+0.25***
Wheat	0.00	+0.54***	+1.07***
Sorghum	0.43***	-	-
Coffee	-	-	+1.07***
Chat	-	-	+2.41***
Enset	-	-	+1.56***

\*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%

<sup>1)</sup> Market accessibility is defined as the population size of the nearest town (or big market) divided by the road distance to this town or market.

<sup>2)</sup> Pooled 1994, 1995, 1997 EHRS data – 1,500 households in 18 villages.

Source: Abrar, Morrissey and Rayner, 2004

**5.33 Age, gender and education of the holder appear not to affect the value of agricultural output, while oxen ownership has a positive effect** (Table 5.2). While the results regarding education could be somewhat surprising, the effects of education are likely to operate more through the adoption and diffusion of new technologies (e.g. fertilizer) rather than through better allocative efficiency. Empirical evidence for Ethiopia suggests that educated farmers tend to be early innovators, providing an example to others, and that they also tend to be better at copying those who innovate first, thereby spreading the innovations more rapidly within the location.<sup>188</sup> Oxen ownership positively affects total agricultural output. The reported elasticities are similar to those found in other studies.<sup>189</sup> Follow-up analysis shows that the critical difference lies in having at least one ox versus having none. Having at least one ox can enhance total agricultural output by three to 10 percent.

### **Price factors**

**5.34 Overall, cereal production is price inelastic, with maize and teff production in the food secure areas tending to be more price responsive.** During the 1980s and the 1990s it was generally perceived that the overall policy bias against agriculture depressed agricultural prices, preventing the necessary supply response from farmers. Getting the prices right was believed to be an important factor in increasing agricultural production. This also inspired the GoE to liberalize the cereal markets in the early 1990s. Table 5.8 presents output supply

<sup>187</sup> Pender and Gebremedhin, 2004.

<sup>188</sup> Weir and Knight, 2000.

<sup>189</sup> Abrar, Morrissey and Rayner, 2004.

elasticities to own prices for major cereal (and other crops) across different agro-ecological zones.

**Table 5.8: Output supply elasticities with respect to own price**

Output elasticity (kgs) with respect to own price	Northern <sup>1)</sup> Zone	Central <sup>1)</sup> Zone	Southern <sup>1)</sup> Zone
Maize	0.08	0.62***	0.57***
Teff	0.06	0.44***	0.35**
Wheat	0.20**	0.24**	-
Sorghum	0.20**	-	-
Coffee	-	-	+0.35***
Chat	-	-	+1.08***
Enset	-	-	+0.13*

\*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%

<sup>1)</sup> Pooled 1994, 1995, 1997 EHRS data – 1,500 households in 18 villages which have been classified in three agro-ecological zones (northern, central and southern)

Source: Abrar, Morrissey and Rayner, 2004

5.35 Several observations emerge from this table. First, **especially maize, but also teff emerge as the more price responsive crops** from this study, with a 10 percent increase in (expected) prices leading to a six and four percent increase in output in the more food secure areas. Given that maize is quite responsive to the use of fertilizer and improved seeds, its production can be more easily adapted to changing price levels. In combination with price inelastic demand for maize (see Chapter 6), this implies that maize prices are likely to fluctuate more, as we also observed during the 2000 and 2001 bumper harvests. Teff is often grown in rural areas as a cash crop, explaining its higher supply elasticity. This is consistent with the fact that 50 percent of the teff area is fertilized and the relatively high estimated elasticity of fertilizer demand (in the Central zone) to teff prices (0.43). The own price supply elasticity for barley on the other hand was even estimated at zero.

5.36 Second, **farmers appear much less responsive to prices in the northern zone, which is also more remote and characterized by subsistence farming.** In other words, non-price factors will be much more important to increase staple crop output in the food insecure zones. Third, as expected, short run price elasticities of the production of perennial crops such as coffee and enset are small, given that one cannot easily switch to another crop once coffee and enset “trees” have been planted. Nonetheless, own price supply elasticity of coffee is still estimated at 0.35, indicating that even though trees will not be uprooted immediately, through input management (fertilizer, pesticides, maintenance) coffee production can still be somewhat managed in response to expected coffee prices. Supply of chat on the other hand is price elastic.

#### *Summary of micro-evidence and related emerging policy issues*

5.37 **In conclusion, the micro-evidence suggests that: (1) the marginal productivity of labor in staple crop production is very low; (2) there is still ample scope for expanding staple crop production through agricultural intensification, including in food insecure areas; and (3) there is a pressing need for appropriate risk management strategies.** Based on the available evidence reviewed above, rough and conservative estimates suggest

doubling yields in the more food secure areas and increasing yields by 50 percent in the food insecure areas would lie well within the realm of the possible. Much could be gained from expanding adoption of the fertilizer-improved seeds packages and increasing market access, especially in the more food secure areas, while broader adoption of the fertilizer-improved seed packages will have to be complemented with the promotion of soil conservation and better water and risk management techniques as well as improved market access in the food insecure areas.

**5.38 At the same time, these insights raise a series of policy questions surrounding agricultural technology adoption, institutional arrangements, and risk management.** In particular:

- What are the major factors constraining wider adoption and diffusion of land saving technologies such as fertilizer, improved seeds, and pesticides, both in the food secure and food insecure areas, despite their apparent benefits and concerted efforts by the government to promote their adoption and diffusion. Relatedly, what is the role of land tenure insecurity in the adoption of environmentally sustainable cultivation practices to help stem the alarming rate of soil degradation?
- How can current institutional arrangements governing the input (land, labor, capital) and output markets be made more effective in improving productivity in agriculture? For example, what are the factors constraining labor mobility, which could relieve some of the land pressure, and what is the role of land ownership and tenure security in increasing agricultural productivity?
- What are appropriate risk management tools both in food secure and food insecure areas to help farmers protect their productive assets from shocks, and to help them adopt higher return/higher risk technologies and portfolios.

5.39 Addressing these critical questions regarding technology adoption, the road map to get the markets right, and the appropriate set of risk management tools adequately falls beyond the scope of this study. Here, we conclude by referring to other ongoing studies which address these issues in more depth, frame some of the key issues and summarize key emerging insights. In Chapter 6, we further reflect on the sustainability of rapidly increasing productivity in staple crop production, its anticipated effect on food prices, the linkages with other agricultural and non-agricultural sectors and its ultimate effects on poverty.

**5.40 For an in depth discussion of the role of land tenure insecurity in raising agricultural productivity and the behavioral determinants of technology adoption** including the importance of an input delivery mechanism compatible with farmers' incentive compatible and the role of households' risk coping capacity we refer to ongoing World Bank Rural Development Economic Sector Work as well as the ongoing World Bank Rural Finance Economic Sector Work. The impact of land tenure insecurity on agricultural productivity and the environment is particularly explored at length in the ongoing World Bank Environment and Poverty ESW. Highlights include that empirical evidence confirms common wisdom that farmers perceive their land tenure as insecure<sup>190</sup> and that there is emerging evidence that

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<sup>190</sup> Ethiopian Economic Association, 2002.

security of land tenure encourages long term investments in land improvements (such as terracing, soil bunds). While the pay-offs to these investments can be high, the benefits are usually not immediate and it may take time (up to four years) before substantial yield increases are realized.<sup>191</sup> Use of seasonal inputs (e.g. fertilizer and improved seeds) appear not to be affected by tenure security. How current tenure arrangements<sup>192</sup> affect labor mobility is explored in the upcoming World Bank Labor Market Study.

**5.41 Addressing the “three I’s”—incentives, infrastructure and institutions—emerges as key to get the markets right.** A comprehensive discussion of how the functioning of the output markets could be substantially improved is provided in “Can Agriculture Lead Growth in Ethiopia? The Importance of Linkages, Markets, and Tradability” (Gebre-Madhin, 2004), a background paper to the World Bank Country Economic Memorandum, 2004. In particular, the report underscores the need to (1) rectify the incentive structure for traders, i.e. lower income tax and less levies, introduction of proper licensing and elimination of food aid distortions, (2) improve the institutional framework, i.e. better contract enforcement, the establishment of standards and grades, and the creation of a market information systems; and (3) expand the communication (roads and telecom) and storage infrastructure networks.

**5.42 Finally, supplemental irrigation, weather based insurance and productive safety nets are the three interventions particularly highlighted in the World Bank Vulnerability Assessment, 2004** which provides a detailed discussion of the appropriate mix of risk management instruments. There are compelling reasons for Ethiopia to focus on irrigation in general, and small scale irrigation in particular, for poverty reduction. First, unreliable rainfall is the leading cause of harvest failure and hunger. Second, the availability of new irrigation technologies (low cost drip systems) make small scale irrigation possible, and open up new opportunities for water conservation. Finally, the country already has successful experience with such a strategy: over 66,000 Ethiopians are reported to enjoy higher crop yields due to small scale irrigation through the Ethiopian Social Reconstruction Development Fund. A recent evaluation of the experience in Tigray suggests that household incomes could be substantially increased through investment in rainwater harvesting ponds provided that they are close to the homestead, that they are properly constructed, that households grow high value crops (such as vegetables) on the irrigated plots, and that households receive adequate extension support.<sup>193</sup> The government has recognized Ethiopia’s irrigation potential and has identified small scale irrigation as key instrument for reducing vulnerability and poverty in the SDPRP. Yet, further evaluation of the current water harvesting program and the constraints to wider adoption of irrigation techniques is called for, as poorly planned irrigation programs introduce their own risks (e.g. increased malaria incidence).

**5.43 An innovative low-cost risk management tool which is much less prone to the usual moral hazard issues, is to insure farmers against drought risk through formal contracts with private insurance companies or public institutions.** Irrigation will not be possible for many farmers and rainfed agriculture will continue to be at the core of their

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<sup>191</sup> Gebremedhin et al, 1999; Gebremedhin and Swinton, 2002.

<sup>192</sup> If a household leaves its village for more than two seasons, it may also lose the user rights to its lands.

<sup>193</sup> Landell Mills, 2004.

livelihoods for years to come. In this context rainfall based insurance contracts provide a useful alternative. Such contracts insure the contracting party against a specific and objectively verifiable rainfall outcome, e.g. drought, and may be entered into by farmers directly, by credit institutions, or by governments. Such weather-based insurance mechanisms are already available to poor farmers in India, Mexico, and South Africa. There are many ways to deliver this insurance. The contract could stipulate a cash payment to participants upon the realization of the event, or it could forgive partial loan repayment on an input (e.g. fertilizer) if rainfall failure of a certain threshold occurs.

**5.44 Existing safety nets have saved lives but have been largely unproductive and often not well targeted. Yet they can continue to serve their vital insurance function while being made more productive** through a mix of programs aimed at building productive physical and human assets. In particular, guaranteed multi-annual transfers to households in return for participation in public works and targeted health and education programs can: (1) encourage risk-taking behavior among small-holder farmers by insuring against downside risk of consumption loss; (2) build public infrastructure and maintain community assets, which provide complementary inputs to private inputs and improve the productivity of individuals; and (3) promote market development by increasing demand in places that are otherwise too poor.

## CHAPTER 6. GROWING OUT OF POVERTY: THE ROLE OF AGRICULTURE AND AID

6.1 We now turn to the key challenge of the Poverty Assessment: shedding light on the feasibility of achieving substantial poverty reduction, and providing guidance regarding the appropriate policy and instrument mix to do so. An important benchmark to guide us in this exercise is the first Millennium Development Goal, by which the Government of Ethiopia has committed itself to halve the incidence of income poverty by 2015 from its 1990 level.

6.2 To address both the prospect and policy question, we take a threefold and complementary approach. We begin with a macro-perspective and examine the overall economic growth needed to reach the income poverty MDG as well as the conditions under which such growth can be expected to deliver substantial poverty reduction. Building on insights from macro-economic modeling undertaken in the World Bank's Country Economic Memorandum as well as the rapidly expanding literature on the relationship between aid and development, we also explore the role of external aid in this process.

6.3 We subsequently move toward the meso-level and discuss growth linkages between the agricultural and non-agricultural sector in a qualitative and quantitative manner in Section 6.2. We empirically characterize cereal demand behavior (income and price elasticities of cereal demand) in Ethiopia as well as the net market position of rural Ethiopian households (net buyer versus net seller). We further explore the poverty reducing effects of different agricultural growth patterns (enhanced staple crop productivity, expansion of the livestock production and non-traditional agricultural export growth), drawing on the findings from the multi-market model developed for World Bank-commissioned research on rural development performed by the International Food Policy Research Institute, which will be discussed in more detail in the World Bank Rural Development ESW.<sup>194</sup> We also reflect on the optimality of different agricultural growth and non-agricultural growth strategies for different geographical areas, depending on their comparative advantage.

6.4 Finally, in Section 6.3 we complement the insights obtained from the macro and meso analyses with a micro perspective. That section explores how pro-poor growth can best be brought about by simulating the effect of different investment programs aimed at enhancing people's private (education, health) and public (infrastructure, environmental quality, information) endowments. We also include simulation of the effect of increasing people's access to better cultivation practices and risk management tools.<sup>195</sup> In this micro approach, distributional considerations are explicitly taken into account. We further reflect on the importance of policy measures to facilitate the necessary supply response by the off-farm sector.

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<sup>194</sup> Diao et al., 2004.

<sup>195</sup> For a more detailed account of how people's private and public endowments can be enhanced see Chapters 8-10 of this report, World Bank, 2004a and 2004b, as well as the different Sector Development Programs. Measures needed to reduce land degradation and to improve risk management are extensively discussed in the ongoing Economic Sector Work on the environment and the recently completed Risk and Vulnerability Assessment by the World Bank (World Bank, 2004e).

## 6.1 A Macro Perspective

6.5 Since the EPRDF's ascent to power in 1991, the Ethiopian economy has grown at a decent pace of 4.3 percent (or 1.7 percent per capita)<sup>196</sup>. Despite this healthy growth, the estimated decline in poverty incidence seems to have been marginal (from 38.4 percent in 1990 to 36.2 percent in 2004) and characterized by substantial movement in and out of poverty<sup>197</sup> (see Tables 1.14 Chapter 1). These results mirror the strong relationship between household consumption and income from agriculture<sup>198</sup>, which has been flat and highly volatile over the past decade (Figure 1.1, Chapter 1). As a result, the number of poor people in Ethiopia is actually expected to have increased from 18.8 million in 1990 to 24.3 million in 2004. To explore the prospects of reaching the poverty MDG, we simulate the poverty reducing effects of three broad sets of growth scenarios which differ in the following ways: (1) their overall growth potential; (2) the sectoral composition of their growth (agriculture, industry, and services) and the labor mobility assumed across sectors over time; and (3) the explicit consideration of increased foreign aid to help finance the investments necessary to enhance economic growth.

6.6 The poverty reducing effect of the different growth scenarios is obtained by applying (sectoral) GDP growth rates to the income distribution observed in the 1995 HICES. Household income was approximated by total expenditure per adult equivalent. In each scenario, the period 1995-2015 is taken as our projection horizon (2015 is the target year of the MDGs). In each scenario, actual observed sectoral growth rates<sup>199</sup> have been applied from 1995 to 2004 and the projected sectoral growth rates according to the different scenarios have been applied thereafter. Similarly, observed population growth rates have been applied through 2004 and the medium variant quinquennial population growth projections from the United Nations Population Division are used thereafter.<sup>200</sup> The strengths and weaknesses of this approach as well as other assumptions commonly used in simulations of this nature are discussed in more detail in Box 1.2, Chapter 1. To benchmark our results, we begin with a "business as usual" scenario and examine the evolution of the consumption poverty head count if the Ethiopian economy were to continue at the historical average sectoral growth rates observed between 1992 and 2004 without sectoral mobility (Scenario 1, Table 6.1).

### 6.1.1 The role of agriculture in achieving growth with poverty reduction

6.7 **"Business as usual," or no improvement in the current rate of annual agricultural growth, would translate into virtually no reduction in the poverty rate and a larger overall number of people living below the poverty line.** During the past 12 years, overall GDP grew at a healthy pace of 4.3 percent, albeit with substantial differences across sectors. While the industrial and service sectors evolved at 5.4 percent and seven percent respectively, well above population growth (estimated at 2.6 percent), average agricultural

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<sup>196</sup> Average growth rate between 1992 and 2004.

<sup>197</sup> Dercon and Krishnan, 2000a; Dercon, 2004.

<sup>198</sup> Dercon, 2004.

<sup>199</sup> Estimated sectoral growth rates reported in the African Living DataBase were used for 2003 and 2004.

<sup>200</sup> These were 2.49 percent in 2005, 2.40 percent between 2006 and 2010, and 2.36 percent from 2011 till 2015. The urbanization rates used are 4.36 percent between 2006 and 2010 and 4.58 percent between 2011 and 2015 compared to 2 and 1.85 percent rural population growth respectively.

growth was only 2.2 percent. Abstracting from any structural transformation in the economy (i.e. not allowing for labor mobility across sectors) poverty incidence in 2015 under these assumptions is projected to be 36 percent, or similar to its 2004 level and only marginally less than in 1990. Yet, seven million more people would have joined the ranks of the poor (up to a total of 31.3 million) and inequality would have increased from 0.33 to 0.40 as measured by the Gini coefficient. While these simulations are admittedly crude, the results are consistent with the findings obtained from an advanced macro-economic model which captures the linkages between the level and composition of public investment, foreign aid, growth and poverty reduction when applying the “base case” or “business as usual” scenario.<sup>201</sup> This poses the critical questions of whether, and how, such a disastrous outcome can be avoided.

**Table 6.1: Growth, poverty, and inequality under alternative sectoral growth scenarios.<sup>1)</sup>**

	Growth rates (percent)				Projected Poverty Head Count (percent)			Projected Gini coefficient
	Agri-culture	Industry	Services	GDP	2005	2010	2015	2015
<b>Scenario 1: Historical growth rates (1990s)</b>								
Average sectoral growth 1992-04	2.2	5.4	7.0	4.3	36.2	35.9	36	0.4
<b>Scenario 2: Differential sectoral composition of growth and labor mobility</b>								
<b>Scenario 2a)</b> Successful agriculture (1.5% per capita growth as opposed to negative per capita growth) and reasonably successful services and industry (growing at their historical average rates)	4.1	5.4	7.0	5.4	35.1	28.5	23.2	0.37
<b>Scenario 2b)</b> As scenario 2a , but with labor shifting out of agriculture into industry and services induced by urbanization (structural transformation)	4.1	5.4	7.0	5.4	34.9	27.4	21.1	0.35
<b>Scenario 3: Permanent increase in foreign aid</b>	Real private consumption per capita growth in case of permanent 5% increase in current aid-GDP ratio <sup>2)</sup>				34.6	23.5	15.6	0.33

<sup>1)</sup> All scenarios use the 1995 income distribution derived from the HICES/WMS as baseline; they use actual sectoral and population growth rates through 2004 (last two years for GDP are based on projections) and different growth scenarios thereafter. The national population growth projections as well as projected urbanization rates are obtained from the UN Population Division. Population growth in 2005 is projected at 2.49 percent; between 2005-2010 at 2.4 percent; and between 2010-2015 at 2.36 percent.

<sup>2)</sup> Agénor, Bayraktar, and El Aynaoui, 2004.

**6.8 Buoyant agricultural growth provides hope.** The second set of scenarios considers the importance of the sectoral composition of economic growth, the effect of increased overall economic growth, and the effect of the structural transformation by which labor absorption by the non-agricultural sectors increases as agriculture becomes more productive and people migrate to the cities. We begin by examining the effects of a successful agricultural sector (Scenario 2a). In particular, we keep growth in the service and industrial sector at their reasonably successful historical pace of seven per cent and 5.4 percent respectively, but allow the agricultural sector to grow at 4.1 percent, which corresponds to 1.5 percent per capita growth as opposed to its historical record of -0.38 percent per capita. The overall economy would grow at 5.4 percent in this scenario. The results are striking. The poverty head count

<sup>201</sup> Agénor, Bayraktar, and El Aynaoui, 2004.

would decline by about one third to 23.2 percent, not so far from the poverty MDG of 19.2 percent. The number of poor people would decline to about 20 million from the current estimate of 24.3 million, despite population growth continuously exceeding 2.36 percent. Inequality, as measured by the Gini coefficient, would slightly increase to 0.37 from its 2004 level of 0.33.

**6.9 Accounting for structural transformation.** In scenario 2a, we have assumed the sectoral employment shares to be constant over time. However, as agricultural productivity increases, people will move out of agriculture to take up off-farm employment (industry and services) in the urban centers. To account for this structural transformation of the Ethiopian economy, we assume that labor moves across the different sectors in line with the urbanization rate projected by the UN Population Division<sup>202</sup> and that they adopt the existing employment patterns of the urban areas as they move from the countryside to the cities.<sup>203</sup> With a successful agricultural sector growing at 4.1 percent, non-agricultural sectors growing at their reasonably successful historical rates, and accounting for labor mobility, the poverty head count would decline to 21.1 percent, slightly above the poverty MDG of 19.2 percent (scenario 2b). Moreover, under this scenario, inequality would largely be contained (Gini coefficient estimated at 0.35 compared to 0.33 in 2004 and 0.30 in 1995). Given buoyant agricultural growth of 4.1 percent, slightly faster growth in the non-agricultural sectors and slightly faster urbanization would likely suffice to reach the poverty MDG. Alternatively, slightly faster agricultural growth (which may be more difficult to bring about) would also suffice (scenarios not presented).<sup>204</sup> We return to the feasibility of 4.1 percent sustained agricultural growth below.

**6.10 The case for agricultural development.** Several key insights emerge from this analysis. First, the extent to which the Ethiopian economy will be able to deliver poverty reduction critically hinges on the composition of its economic growth, much more so than on the overall growth itself. In the absence of robust agricultural growth, there is virtually no decline in poverty (scenario 1), despite decent growth in services and the industrial sector. Indeed, as Mellor (1995) observed, agriculture plays an important role in a country's structural transformation in its early stages not because of its growth rate, but rather because of its size in the economy. As a matter of fact, agriculture is likely to have an innately slower growth rate due to its structural parameters,<sup>205</sup> underscoring the importance of the nature of growth as opposed to growth per se. While trickle down of growth in non-agriculture to those currently employed in agriculture cannot be excluded, a strong relationship between growth in agricultural incomes of households and poverty reduction has also been observed in the micro data<sup>206</sup> and the observed poverty reduction from growth in the non-agricultural sector in Ethiopia has so far been limited.

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<sup>202</sup> According to the UN Population Division projection rates, total population will amount to 92.1 million people in 2015 of which 19.2 million (or 20.8 percent) will be living in urban centers, compared to 11.9 million (or 16.7 percent) now.

<sup>203</sup> In 1995, 24 percent of the working population in urban areas was involved in agriculture, five percent in industry and 72 percent in services, compared to 96, zero and four percent respectively in rural areas.

<sup>204</sup> For example, were the agricultural sector able to grow at 4.6 as opposed to 4.1 percent annually over the next decade, poverty incidence would decline to 18.2 percent.

<sup>205</sup> Typically, agriculture's share of employment falls more slowly than its share of income, with the result that labor productivity lags behind that of the non-agricultural sector.

<sup>206</sup> Dercon, 2002; Dercon, 2004.

6.11 Second, while these findings provide support to a central role in the strategic focus of the GoE on agricultural development, they point at the same time to the failure of the government's current policies in bringing about sufficient, broad-based, sustainable agricultural growth. With agricultural GDP growth continuously falling behind population growth over the past decade, a revision of the current agricultural and development policies and public investment strategies is called for. As Ethiopia still finds itself at the very beginning of the structural transformation process, with 85 percent of its population employed in agriculture, broad based agricultural development will have to be at the center of any poverty reduction strategy for years to come, even though it will have to go hand in hand with relaxing supply constraints in the off-farm sector to maximize the virtuous linkages from agricultural growth as discussed further below.

6.12 **Is a decade of 4.1 percent agricultural growth feasible?** Given that Ethiopia's agricultural system is currently operating well within its production frontier, with extremely limited use of modern inputs and tools, a 1.9 percent increase from its current historical growth rate seems feasible. To begin with, the agricultural sector could already grow one percentage point faster if it managed to better protect itself from droughts and thereby reduced its negative growth rates by half. Furthermore, the micro evidence from Ethiopia also suggests that a decade of 4.1 percent sustained agricultural growth should be well within reach. Such agricultural growth rates are also consistent with international experience. China for example, sustained 10 decadal periods of above 4.5 percent agricultural GDP average growth<sup>207</sup> over the past 25 years and India and Vietnam have experienced several decadal periods of more than 4 percent agricultural growth. Irrespectively, concerted efforts by all development stakeholders will be needed to sustain an agricultural growth rate of more than 4 percent over the next decade and an appropriate institutional framework as well as massive public investment (in agricultural research and development, extension, soil conservation, irrigation, rural infrastructure, rural education and health) will be needed. In section 6.2 we will explore further how balanced growth across the different agricultural sub-sectors (staple crop production, livestock, non-traditional agricultural exports) and across different locations can generate the overall agricultural and GDP growth necessary to substantially reduce poverty in Ethiopia through its multiplier effects.

6.13 **The false debate of agriculture versus non-agriculture.** However, to maintain the current historical growth rates in the non-agricultural sectors, and to facilitate the movement of farmers out of agriculture into off-farm employment, further institutional and policy changes as well as public investment, especially in infrastructure, will be needed to permit the development of a dynamic private sector. While non-agricultural growth (as well as economic growth more broadly) over the past 15 years has been largely driven by growth in the public sector (see Chapter 1), to be sustainable, agricultural growth will have to become increasingly more important in fostering non-agricultural growth. An elastic supply response of the off-farm sector will indeed be necessary to maximize the multiplier and linkage effects between agriculture and non-agriculture which provide the rationale for agriculture led development (see Section 6.2).

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<sup>207</sup> These numbers are based on 11 year moving averages.

**6.14 Excessive tax rates and poor tax administration, limited access to urban land (reflected in excessive rent), and lack of access to credit in addition to poor telecommunication services and unreliable electricity supplies feature as the more important constraints hampering the development of private enterprise.**<sup>208</sup> Clearly, substantial improvement in labor productivity in non-agriculture can be obtained through policy changes which do not place a burden on limited public financial resources. Moreover, public investment in rural education and rural infrastructure will not only stimulate the development of the agricultural sector, it will also help generate much needed off-farm employment opportunities. From this perspective, the debate about the relative returns from public investment in agriculture versus non-agriculture in terms of poverty reduction seems ill-conceived. We will elaborate further on the theoretical, empirical and historical rationale for agricultural led development and the critical need for a balanced growth path in Section 6.2.

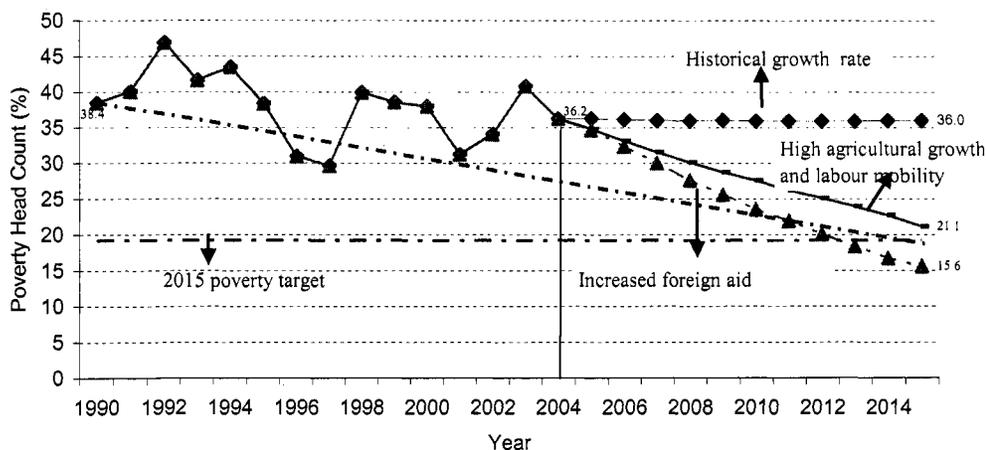
### **6.1.2 Aid and aid absorption**

**6.15 Additional resources will be required to finance the public investments needed to reach the poverty MDG.** Using a one sector macro-economic model Agénor, Bayraktar and El Aynaoui (2004) calculate that a permanent increase of five percentage points of the aid/GDP ratio (all donated as non-food aid) over the next decade would reduce poverty sufficiently to reach the poverty MDG. Increased aid is modeled to foster growth in private consumption and poverty reduction through a substantial increase in public investment which in turn leads to more and better infrastructure and increased labor productivity through enhanced education and health. The authors do not find evidence of “Dutch disease” effects, in which rapid and large increases in a country’s income through foreign currency inflows have negative impacts on unexpected sectors of the economy. The model assumes distribution-neutral growth and the same growth across all sectors. In scenario 3, we apply the resulting private consumption growth rates uniformly to the 1995 household consumption distribution from 2004 onwards. The poverty headcount drops to 15.6 percent, well below the MDG target of 19.2 (Figure 6.1).

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<sup>208</sup> A more detailed account of the obstacles to private business development is given in the World Bank/EDRI’s Investment Climate Assessment in Ethiopia, 2004.

**Figure 6.1: Economic Growth Scenarios and Poverty Reduction**

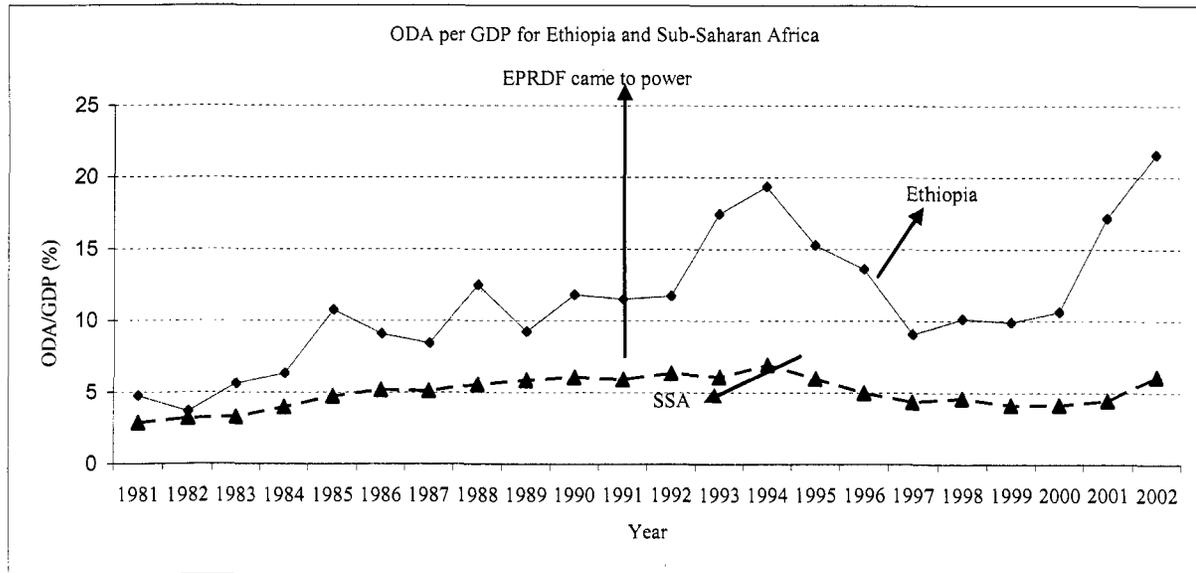


**6.16 Historically unseen levels of foreign aid would be necessary for Ethiopia to reach the poverty MDG.** A five percentage point increase in the aid/GDP ratio would bring total net official development assistance (ODA) progressively up to about US\$ 32 per capita in 2015 from the 2002 level of US\$ 19.4.<sup>209</sup> This would entail a substantial mark-up in the assistance historically given to Ethiopia (US\$ 13 per capita during the 1980s and US\$ 16 per capita during the 1990s), and would bring Ethiopia in line with the US\$ 32 average per capita ODA assistance given to Sub Saharan African countries over the past decade (1991-2002).<sup>210</sup> However, the aid/GDP ratio would continue at the 2002 level of 21-22 percent, which is substantial both by historical and comparative standards. While such high levels of aid/GDP have been sporadically observed in some smaller high aid African countries such as Malawi, Mozambique, and Rwanda, they have rarely been sustained for a decade, especially not in populous countries like Ethiopia, and have never been experienced in Ethiopia's recent history (since 1981), not even for one year. The average aid/GDP ratio for Sub Saharan African countries was 6.1 percent in 2002, the highest level ever during the past 30 years (Figure 6.2). The highest average level ever experienced by the Highly Indebted Poor Countries was 13.5 percent in 1994. Clearly, sustaining the aid level needed to reach the poverty MDG over the coming decade is a tall order, especially given that Ethiopia finds itself already at its highest levels historically.

<sup>209</sup> Total net official development assistance includes both concessional loans and grants. In 2002, about 46 percent of total assistance consisted of loans and 54 percent of grants. In dollar terms, Ethiopia received about US\$ 19.4 aid per capita in 2002, of which US\$ 8.9 was in the form of loans, US\$ 5.4 was development grants, and US\$ 5 was relief aid.

<sup>210</sup> The figures mentioned here are in current dollar terms (i.e. not corrected for inflation or changes in exchange rate). Average per capita assistance in current dollar terms to Sub Saharan African countries during the 1980s is US\$ 25.

**Figure 6.2: Net official development assistance per GDP for Ethiopia and Sub-Saharan Africa 1981-2002**



6.17 Even if the international community could be rallied to the cause, could such a massive inflow of aid<sup>211</sup> yield the intended economic growth and poverty reduction? The problems related to massive aid inflows such as Dutch disease effects, adverse effects on tax collection, and deteriorating governance,<sup>212</sup> all of which negatively affect growth and poverty reduction, are well known. The international experience documented by Collier and Dollar (2001) suggests that Ethiopia may not yet have reached the levels of aid at which such phenomena start to affect growth negatively (Box 6.1).

<sup>211</sup> During the late 1990s, which coincided with the border war with Eritrea, aid levels stood at about US\$ 10 per capita, or about 10 percent of GDP. During the immediate post Derg period in the early 1990s (1991-1994), Ethiopia received about US\$ 20 per capita, which corresponded to about 15 percent of overall GDP.

<sup>212</sup> Bräutigam and Knack, 2004.

### Box 6.1: The relationship between growth, aid, and institutions

Based on 349 (four-year) growth episodes from 62 developing countries between 1974 and 1997, Collier and Dollar estimate the relationship between economic growth, aid and the quality of the institutional and policy environment. They follow Knack and Keefer (1995) and use the International Country Risk Guide Economic (ICRGE) indicators to capture the quality of the institutional environment. They use the World Bank's Country Policy and Institutional Assessment scores (CPIA) as a proxy for the quality of the country's policy and institutional framework for long term growth and poverty reduction in line with Easterly (1999).<sup>213</sup> They find that the marginal effect of aid on economic growth per capita turns negative once the aid/GDP ratio exceeds 2.5 times the CPIA.<sup>214</sup> Given the current CPIA for Ethiopia of 3.3, this implies that marginal returns to aid would turn negative at aid to purchasing power parity (PPP) GDP levels of 8.2 percent. According to Collier and Dollar, the aid to real PPP GDP ratio for Ethiopia stood at 2.9 percent in 1996. Following the recent influx of aid, it increased to 3.3 percent in 2002. The proposed scenario of a permanent five percent increase in aid would further increase this ratio to about 4.2 percent<sup>215</sup>, still within the estimated 8.2 percent turning point beyond which aid affects growth negatively, though diminishing returns may begin to set in.

6.18 While the empirical analysis by Collier and Dollar is clearly not without its problems,<sup>216</sup> the order of magnitude of the results appears sufficiently large to suggest that aid could still be productively used even when increased beyond its historical high levels, provided that the current policy framework is maintained (or improved). Similarly, the Agénor-Bayraktar-El Aynaoui model does not find any evidence of "Dutch disease" effects, adverse effects of aid on tax efforts, or declining marginal returns of (non-food) aid on GDP.

<sup>213</sup> Annually the World Bank assesses the quality of the policy and institutional environment of its client countries for long term growth and poverty reduction. The assessment is comparative/relative in nature and is carried out by World Bank staff through an extensive internal consultative process. It assigns scores from two (unsatisfactory) to five (good) to 20 equally weighted components grouped in four broad areas: (1) issues of macro-economic policies (e.g. inflation and macro-economic policies, fiscal policies, debt management); (2) issues related to structural policies (such as trade, financial sector policies, competitive environment for private sector development, factor and product markets, environmental policies); (3) policies for social inclusion/equity (gender, equity of public resource use, human capital development, social protection and labor, monitoring and analysis of poverty); and (4) public sector management issues and institutions (property rights and governance, quality of budgetary and financial management, efficiency of revenue mobilization, quality of public administration, transparency, accountability and corruption). In case of an extended period (more than three years) of a very low (=2) or a very high (=5) score on a particular area, the scores get recoded to one (=unsatisfactory for an extended period) or six =(good for an extended period) respectively. In 2003, as in 2002, the overall rating for Ethiopia is 3.3. For comparison, in 2003, Mozambique scored 3.3, Malawi 3.4, Tanzania 3.8, Uganda 3.9 and Botswana 4.4.

<sup>214</sup>  $Ga=0.185P-0.072A$  with  $G_a$  denoting the marginal effect of aid on (four-year average) GNP growth per capita,  $P$ , the policy level as captured by the CPIA index, and  $A$ , the aid/GDP ratio as captured by the net official development assistance (from OECD) divided by the real PPP GDP per capita from Summers and Heston (1991). The marginal effect of aid on economic growth turns negative if  $A/P > 0.185/0.072=2.5$ .

<sup>215</sup> Collier and Dollar estimated 1996 aid per real PPP GDP in Ethiopia at 2.9 percent. Using the World Development Indicator series on net official development assistance, population growth and real purchasing power per capita GDP, we observed that aid per capita increased from US\$ 14.04 per capita in 1996 to US\$ 19.44 per capita in 2002, and that PPP per capita GDP rose from 568 to 693 respectively. Application of the ratio  $[19.44/14.04]/[693/568]$  to the 1996 aid per real PPP GDP ratio of 2.9 yields 3.3 percent. Similarly, assuming US\$ 25 per capita aid as in scenario 3, we obtain an aid to real GDP ratio of 4.2 percent, which is likely an overestimate as it does not account for the increase in GDP as a result of increased aid.

<sup>216</sup> While the analysis implicitly assumes that the causality runs from good policies and institutions to enhanced growth, it could equally run the other way, namely prospering economies cause good policies and institutions. The analysis does not control for this potential source of endogeneity. This may bias the estimated coefficients if both are determined by some unobserved third factor.

Nonetheless, caution is warranted given that experience with high aid levels has been mixed.<sup>217</sup>

**6.19 The shift to higher aid flows will need to be properly paced and sequenced to account for Ethiopia's absorption capacity.** In sum, based on the available evidence, the simulations suggest that an increase in international aid by US\$ 5 per capita or about US\$ 350 million per year over the coming decade should enable Ethiopia to reduce its poverty head count by half from the 1990 level. Nonetheless, rallying the international community to this cause will pose a challenge, despite the relatively small amounts. Moreover, while admittedly small from an international perspective, the proposed aid flows are massive compared to the overall Ethiopian economy (21-22 percent of GDP) and highly unusual even in other highly indebted countries. The shift to higher aid flows will need to be properly paced and sequenced. While budgetary and program support programs are mechanisms by which substantial aid flows can be channeled at relatively low transaction cost for donors and government alike, the conditions for these aid modalities to be effective in reducing poverty depend critically on the government's own administrative capabilities to absorb this massive influx of aid, as well as the private sector's capacity to supply the necessary goods and services.

**6.20 Important processes have been set in motion to facilitate increasing fiscal flows.** In particular, the intergovernmental system needed to facilitate fiscal flows across tiers of government necessary to finance investment and recurrent costs of service delivery has been made more transparent, and the responsibilities of the different layers of government have been clarified. First, the role of the federal subsidy has been clarified and two additional specific purpose transfers from the federal to the regional governments have been created (the Public Sector Capacity Building Program [PSCAP] and the food security grants). Second, fiscal flows from regional to local governments are becoming more predictable and transparent through the system of Woreda block grants and other municipality grants. Moreover, not only have the right channels been created to facilitate increasing fiscal flows, substantial efforts are also underway to strengthen the channels under PSCAP and the financial sector reform. The planning, budgeting, accounting, and procurement capacities of the different layers of government are being reinforced to ensure allocative efficiency of increased aid flows within acceptable fiduciary risks.

**6.21 Moving forward, substantial risks remain.** Implementation of the different capacity building and reform programs to reinforce the fiscal pipelines has only just begun. Important constraints to make the current system of government operations translate these additional aid flows into outputs and poverty reduction remain. They include among others: (1) the limited availability of qualified manpower in government positions; (2) the limited ability to contract out the supply of services to the indigenous private sector; and (3) the limited capacity of the private sector itself to provide the necessary supply response. Furthermore, if aid flows are to increase along the lines outlined above, the tax generating capacity of the different layers of government needs to be strengthened to stem potential relaxation of tax collection efforts. Clearly, during the first years of increased aid flows, much attention will have to go to strengthening the capacity of the public and private sector. The processes set in motion to do

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<sup>217</sup> Brautigam and Knack, 2004.

so will need to be closely monitored. The role of reinforcing tertiary education in this process will also be critical. Without well directed and properly functioning pipelines, increased aid flows needed to finance Ethiopia's massive investment needs may end up fueling wage inflation and corruption, but not poverty reduction. Moreover, the success of increased aid flows in terms of poverty reduction critically hinge on the assumption that a stable macro-economic and policy framework is maintained and that aid actually translates into growth. Both tendencies will have to be equally monitored very closely.

**6.22 Halving the poverty head count from its 1990 level by 2015 emerges as a daunting task, which may not be feasible. Irrespectively, agricultural development and increased aid flows to help finance the necessary public investments will have to be core components of any road towards achieving this objective.** The task poses fierce challenges to the Ethiopian government and its development partners. Not only must the institutional architecture to channel large aid flows be strengthened, difficult choices in terms of the nature and location of public investments as well as in terms of economic and institutional policies will have to be made to promote both agricultural and non-agricultural development to facilitate the exodus of labor and resources out of agriculture into non-agriculture as the former grows. Before returning to the micro-evidence presented in Chapter 4 to provide further guidance as to the optimal composition of the public investment portfolio to reduce poverty, we first explore further in the next section the role of agriculture, its sub sectors, and its critical linkages with non-agriculture in fostering poverty reduction.

## **6.2 Toward a Feasible Pro-Poor Agricultural Growth Strategy**

6.23 The macro-simulations presented above clearly indicate that it is hard to conceive how even spectacular growth in the non-agricultural sectors could be sufficient to generate enough employment to pull the rural poor, which make up 85 to 90 percent of all poor people in Ethiopia, out of poverty. Nonetheless, it remains useful to review the rationale behind agriculture led development industrialization as a poverty reduction strategy, to explore the assumptions underpinning this strategy and their validity in the Ethiopian context. Furthermore, agricultural growth can be brought about in many different ways, and the poverty reducing effects of different strategies are likely to differ. Agricultural strategies may for example differ in their emphasis on location (high versus low potential), the nature of production (food crops versus cash crops or livestock), the appropriate technology (irrigation versus agricultural intensification through adoption of modern inputs and soil conservation techniques), the optimal farm size (large commercial farms versus family farms), or the role ascribed to the public and the private sector.

6.24 This section will reflect on these strategic issues, taking into account the structural features of the Ethiopian economy such as the net market position of rural households, their cereal demand behavior as captured by cereal price and income elasticities of household demand for cereals, as well as differences in comparative advantage across space. In light of the collapse of maize prices in 2001/2 following a bumper crop and mismanagement of food aid, special attention will go to the need to avoid extreme food price fluctuations for ADLI to maximize poverty reduction. Attention will also be given to the need to develop markets and balance growth in staple crop production with growth in the non-food and non-agricultural

sectors to keep up demand for food and thus prevent cereal prices from collapsing. The role of food aid in this context will also be highlighted.

### **6.2.1 The theoretical case for agriculture led development**

**6.25 The contribution of increased agricultural productivity to economic growth and poverty reduction works through consumption and production linkages.** In particular, a productivity increase in non-tradable activities such as cereal production leads to lower prices, effectively increasing consumers' real incomes. There will be important direct gains through decreased food prices for all net cereal buyers, which in most years make up the majority of the Ethiopian population. However, the greatest benefits are usually indirect, through the consumption linkages, whereby the increase in people's real income stimulates the demand for locally produced goods and services which in turn generates employment and subsequently increases the demand for food as well. To generate sizeable multiplier effects, the income elasticity for locally produced goods and services must be large, and local supply of these non-food non-tradables must be elastic and labor intensive. Moreover, the productivity gain must concern a non-tradable with a high average budget share such as cereals, which constitute about 30 to 40 percent of total expenditures among the poor. However, net cereal sellers could potentially lose if demand is inelastic.

**6.26 Production linkages can occur when increased productivity or higher prices in the production of tradables positively affect the incomes of producers.** The direct poverty reducing effect may be substantial if the assets necessary for production of these goods are equally distributed and access to complementary inputs (e.g. fertilizer, improved seeds) is universal. To maximize the poverty reducing effect, promoted technologies should be scale-neutral and labor intensive. Multiplier effects through backward linkages (increased demand for inputs) are usually limited, since inputs are generally capital intensive and imported. Nonetheless, important externalities may exist through increased local availability of inputs for other (non-cash crop) agricultural activities. When production does not happen by the poor themselves, it must have a high labor content to have strong poverty reducing effects. Apart from primary resource extraction (mining, forestry, fishery) for which there appear only limited opportunities in Ethiopia, it is hard to imagine many other non-farm activities which engender broad employment opportunities in Ethiopia at this stage. Expansion of the production of agricultural tradables (e.g. coffee, chat, horti- and floriculture and livestock) offers much more potential with direct gains from increased income and employment opportunities for the poor as well as gains in forward linkages (e.g. employment opportunities in processing).

**6.27 There are important synergies from a simultaneous pursuit of productivity increases and market development in both agricultural tradables and non-tradables.** While progress in cash crop production technologies offers important opportunities for poverty reduction, greater opportunities for the poor are usually expected from combining consumption linkages resulting from productivity increases in non-tradable food production. The majority of households in rural Ethiopia are subsistence farmers and net food buyers. So are urban households. Food price decreases following technological change thus hold the promise of substantially increasing their incomes. Yet, in the face of inelastic demand for cereals, (reversible) productivity increases may lead to sharp declines and fluctuations in food

prices, rendering the obtained price decline unsustainable, thereby eroding the poverty reducing effects from earlier reversible technology adoption. To prevent cereal prices from collapsing, a parallel increase in income and demand for food through growth in the non-food (e.g. agricultural tradable) sector, reduction of transaction costs through better development of the market channels to cater to this increase in food demand, and better management of food aid, must be pursued. We discuss in more detail below how these issues play out in the Ethiopian context. A more comprehensive discussion of the consumption and production linkages arising from increased agricultural productivity including further empirical and historical evidence is provided in Appendix 4.

### Box 6.2: Reflections on four common critiques to agriculture led development in Sub-Saharan Africa

1. *The obstacles to agricultural development in Africa are so severe that agriculture is not viable as an engine of development.*

Major obstacles to agricultural development do exist due to limited water availability, soil deterioration, agro-ecological heterogeneity, lack of agricultural research and information, population density not adequate to stimulate intensification in many areas, and difficulties in market access. However, these obstacles are not insurmountable. For example, irrigation in Africa has often failed due partly to social, political and institutional reasons (e.g. poor management, gender discrimination, violent conflict) which can be overcome in time given a policy environment that supports transition from a traditional to a modern economy. In this context it is important to note that Ethiopia has been involved in internal or external conflicts totaling more than two decades over the past 40 years, a factor which has clearly hampered the development of irrigation and the development of the private sector more broadly. Moreover, many of the obstacles that constrain the agricultural sector also limit the returns to other sectors. As such, the key pillars of most stimulus packages, including improvements in transport, communication and financial infrastructure, are not sector specific.

2. *As intensification proceeds, smallholder farms will be at an increasing disadvantage relative to large commercial farms due to economies of scale. However, a large farm based development strategy for Africa would be less equitable, and slower to deliver poverty reduction.*

The evidence on this is mixed. While transaction costs related to the monitoring and enforcement of labor contracts in agriculture rapidly increase with the number of workers, as intensification proceeds scale advantages in markets for outputs, inputs, and finance grow in importance relative to smallholders' labor advantage. To fully exploit the welfare creating potential of smallholder agriculture, it is necessary to have policies and institutional supports (e.g. marketing cooperatives) to reduce the disadvantage suffered by smallholders in non-labor markets. In this regard, policy makers should begin to structure the smallholder sub-sector to take advantage of the growing preference for organic produce and fair trade witnessed in key Western food markets.

3. *An agriculture-based development strategy will not reach the rural poor, as they live in marginal areas, and/or have land holdings too small to provide more than a secondary contribution to livelihoods.*

First, it must be emphasized that not all areas are low potential—this is also true for Ethiopia—and different strategies may have to be pursued depending on the area's comparative advantage. Second, even in the low potential areas, agriculture must be compared with alternative ways to generate rural incomes. In most marginal rural areas, there are few viable alternatives: diversified (or diversifiable) rural economies with attractive alternatives to agriculture are the exception rather than the rule. While education and fostering migration provides one alternative, poor area development is often found to be more pro-poor. The finding that higher yields and agricultural income are also possible on smaller farms in food insecure areas is important, as this indicates that *some* development in these areas is still possible through agricultural intensification. There are basically two broad strategies to help with so-called low potential areas. One strategy seeks to promote out-migration toward high potential areas (and urban centers). This strategy was followed by Ethiopia in the 1970s and 1980s, and has often been promoted in other parts of the world, including Punjab in India, Central Luzon in the Philippines, and Sonora in Mexico. Yet, this strategy is not without risk either, as greater dependence on a smaller area increases the risk of nationwide harvest failure in case of drought. Secondly, massive migration may lead to rapid overcrowding and increasing poverty in the high potential areas. A balanced strategy focused on promoting agricultural intensification and risk reducing inputs (irrigation, pest management, soil conservation), appropriate crop mixes, diversification out of agriculture, and public work programs may thus be more appropriate.<sup>218</sup>

4. *It is difficult to envisage in what exportable agricultural products Africa will be able to develop competitive advantage on a large scale.*

Presently, Africa still holds competitive advantages in a range of unprocessed primary products. Nevertheless, it will be important for policy makers to invest resources into improving the institutional environment supporting agriculture to boost productivity. This is especially important as the market evolves to favor high levels of capital investment, information, and supervision as product specifications continue to get ever more complex, a trend that promises to diminish any existing competitive advantages. The recent boom in Ethiopia's floriculture for export illustrates that it holds competitive advantage in agricultural exportables. The role of the government in facilitating investment in this sector by private entrepreneurs (as opposed to public investment per se) has been critical.

Source: adapted from Kydd et al., 2001

<sup>218</sup> Lipton and Ravallion, 1995.

## 6.2.2 Patterns of agricultural growth and poverty reduction

6.28 While it is important to qualitatively understand the channels through which productivity growth in the tradable and non-tradable agricultural sectors affect economic growth and poverty reduction, the size of the effects is ultimately an empirical matter, which depends on the structure of the rural economy and the rural-urban linkages. Computative General Equilibrium Models are frequently used to model the economy and simulate the effect of change in agricultural productivity in different sectors on poverty. This is the approach taken in the World Bank Country Economic Memorandum, though it does not include an explicit consideration of the poverty effects.<sup>219</sup> Here we limit ourselves to a discussion of some key features of the rural economy in Ethiopia such as households' net market position with respect to cereals (net seller/buyer) as well as their cereal demand and supply behavior, both of which are critical in gauging the effect of an increase in the productivity of staple/non-tradable crop and non-staple/tradable crop production on poverty. Based on the multi-market model by Diao, et al., (2004) we subsequently explore the poverty reducing effects of productivity gains in different agricultural sub-sectors, separately as well as combined, and discuss the results in relation to the poverty MDG. The section concludes by reflecting on the optimality of different agricultural growth patterns across different geographical locations.

### *Evidence suggests significant numbers of net cereal buying poor households in rural Ethiopia*

6.29 From our earlier discussion of the size of households' landholdings (Chapter 4) we recall that landholdings are increasingly too small for households to meet their cereal needs at current average production technology, which challenges conventional wisdom that the large majority of the rural poor are net sellers of grain and would therefore benefit from high cereal prices. If there are significant numbers of net cereal buyers among poor households in rural areas, policy measures aimed at fostering a gradual decline in cereal prices (such as staple crop productivity increasing measures) would be welfare enhancing for those poor households, as well as for the urban poor. It is thus critical to obtain solid empirical evidence of the net cereal market position of rural households in Ethiopia. We explore this question using (1) nationally representative data which provide direct information on households' cereal market position during 1995/96, and (2) indirect information on households' cereal production potential compared to their average cereal needs. These results are contrasted with those of other African countries. We further provide a brief profile of net buyers and sellers according to their location and welfare levels.

6.30 **Net cereal buyers may outnumber net cereal sellers in rural Ethiopia.** To explore the net market position of rural households we examined the food security survey conducted by the Ministry of Economic Development and Cooperation (MEDAC) and the CSA in June 1996. Respondents were asked a detailed set of questions regarding their production, sales and purchases of the six major grains (maize, wheat, sorghum, teff, barley and millet) between October 1995 and September 1996. As the survey took place in June 1996,

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<sup>219</sup> See also de Janvry and Sadoulet, 2002 for a stylized model of African economies and the effect of an increase in total factor productivity in agriculture on poverty.

respondents were asked to anticipate their sales and purchases between July and the end of September. Table 6.2 categorizes each rural household as either net buyer, autarkic, or net seller on the basis of the volume (kgs) and the value (ETB) of their net sales<sup>220</sup> (purchases – sales) during the survey period, aggregated across all six grains.<sup>221</sup>

**Table 6.2: Cereal market position of rural households in 1995/96**

	Market Position	Percent	Production	Purchases	Sales	Net Sales
Volume (Kgs)	Net Buyers	53.75	506	585	44	-541
	Autarkic	8.09	629	23	23	0
	Net Sellers	38.16	1472	75	533	458
Value (Birr)	Net Buyers	53.23	556	782	65	-717
	Autarkic	7.86	593	0	0	0
	Net Sellers	38.91	1579	88	601	513

Source: Own calculations from CSA Food Security Survey, 1996

6.31 Fifty-three percent of rural households are net buyers of grain, while only 38 percent are net sellers. Or, in 1996, an average production year, there were 15 percentage points more net cereal buyers in rural areas than there were net cereal sellers. The remaining eight percent of households were autarkic. This clearly goes against the prevailing belief that the majority of rural households are net cereal sellers. Looking at values versus volumes does not change the emerging picture. In the remainder of the text the net buyer/seller classification will be based on values.<sup>222</sup> Note furthermore that the average sales volumes/value among net buyers is very small (around 10 percent of their production) indicating that these classifications are not driven by “distress” sales at low prices immediately after the harvest to repay credit and relax liquidity constraints and repurchases at high prices during the hunger season. Also, the limited sales volumes among the net buyers suggest that while substitution among cereals may take place (e.g. sell teff to buy barley), this is not driving these results. In other words, the majority of rural (in addition to urban) households would stand to benefit from gradual declines in cereal prices. Autarkic households are consuming far less than the others suggesting that they are also likely to benefit from a price decrease. Appendix 5 elaborates further on the effect of intra-annual price fluctuations on households’ market position, and the incidence of substitution across cereals given its policy implications in terms of credit access and repayment modalities, as well as the potential focus of agricultural research and extension on different cereals.

<sup>220</sup> Sales do not include food aid. Food aid is fairly evenly distributed among net cereal buyers and sellers (Table A.6.1 in Appendix 3).

<sup>221</sup> For volumes, net buyers (sellers) are defined as households who purchase (sell) more kilos of all grains than they sell (buy). Kilos of all grains have been treated equally. To calculate values, we use individual producer (retail) grain prices to value sales (purchases) and define net buyers (sellers) as those households with less (more) total grain expenditure than revenues. Autarkic households are those with zero net sales in both volume and value.

<sup>222</sup> While there is slight variation in the outcomes between volume and value based definitions of market position due to price differences in producer and retail prices, positional and relative measures are fairly robust to the definition used. The correlation coefficient between both variables is 0.94, indicating a high degree of sameness.

**6.32 Livestock, off-farm wages and businesses provide sources of cash income to buy food.** Given that rural households largely depend on agriculture, it is natural to ask from where this large group of net cereal buyers get their cash income from. While reliable nationally representative data on income is currently not available in Ethiopia, the direct and indirect evidence from three case studies show that especially livestock, but also off-farm work and income from business activities are important sources of cash income for rural households. Table 6.3 presents a break-down of income into the various components across six different communities in Ethiopia that differ across agro-ecological conditions and market access. While crop income provides usually more than 50 percent of household income, we find that on average most households obtain income from a plurality of sources. Important alternative sources of cash income include earnings from sales of livestock or their products, from off-farm wages, or from business profits.

**Table 6.3: Income per capita and income sources across several communities**

	Debre Berhan (67 hhs)	Dinki (54 hhs)	Koro-Degaga (89 hhs)	Adele Keke (60 hhs)	Gara-Goro (56 hhs)	Domma (79 hhs)
Mean annual p.c. income (ETB)	236	145	71	163	46	40r
Mean annual per capita inc (US\$)	114	70	34	79	22	19
<i>Composition of incomes (%)</i>						
Crops (including subsistence)	43	78	54	51	66	73
Livestock products	14	0	0	8	4	0
Livestock Live Sales	26	4	6	13	2	10
Off- farm(wage & business)	16	10	38	24	19	7
Remittances	2	6	1	5	10	8

Source: Dercon and Krishnan, 1996

**6.33 Grain trading, collection of water and fuel wood, food for work, weaving, pottery, beer brewing, and government employment are the more important off-farm activities.** Analysis of the activities of the 1,477 households in the 1994 ERHS data shows that of the 4,321 adults in the sample (> 14 years), 71 percent were either full time farmers or domestic workers not involved in any kind of off-farm activity or paid work. Another 19 percent were mainly involved in farming or domestic work, but they also participated in off-farm activities either as wage laborer (7 percent) or other income earning activities (12 percent). About half of those involved in part-time wage work were involved in food for work and about half of those involved in part time income earning activities were involved in collecting and selling wood, water or fuel, with about 20 percent involved in grain trading. Only 10 percent were full-time off-farm workers. About one third were self employed (potters, weavers, processed food sellers), one third of them were traders, and 15 percent were government employees (government officials/administrators, teachers, soldiers). Average monthly salaries for adult males who were part time wage workers, part time income earners and non-farmers amounted to 109, 178, and 234 ETB respectively.<sup>223</sup>

6.34 Evidence from Tigray<sup>224</sup> shows that while cereal production is the primary source of income for 97 percent of households, they usually also have other sources of income. In about one-third of the households the secondary source of income is cattle production. Production of other crops, including perishable annual and perennial crops, is the secondary

<sup>223</sup> Verwimp, 1999.

<sup>224</sup> Pender and Gebremedhin, 2004.

source of income in about seven percent of households. Non-farm activities are an important source of additional income for about one quarter of the population, including trading activities (6.5 percent of households), food for work (6 percent of households), salary employment (1.6 percent) and other activities (handicrafts, brewing beer, priest, local officials) (10 percent). About one fifth of the sample did not have a secondary source of income.

**6.35 The observed evidence on the composition of rural households' income portfolios is consistent with the finding of a large number of net cereal buyers in rural areas.** While the available evidence indicates that cereal production is the major activity for most rural households, it also shows that rural households usually hold some livestock and that they are often engaged in off-farm activities which help generate cash income to buy cereals. Furthermore, income from cash crops (coffee, chat) also forms an important source of cash income in some regions.

**6.36 Rural households' net cereal market position fluctuates over time, though even in good agricultural years a non-negligible number of rural households are net cereal buyers.** Our empirical results on rural households' net cereal market position presented so far are based on experience in 1995/96, a reasonable agricultural year. It is however likely that people's net cereal market position will change annually depending on the rainfall patterns that year. Nonetheless, a substantial portion of the rural population is made up of net cereal buyers, even in good years (see Box 6.3).

### Box 6.3: Rural households' cereal market positions

To investigate how rural households' net cereal market position fluctuates over time, we present households' expectations regarding their expected market position for each of the different cereals, assuming that they were either faced with a good, an average, or a bad cropping season (Table B6.3.1).<sup>225</sup> As expected, the share of households in a particular marketing season is clearly a function of the year's cropping conditions. The proportion of net buying households increases from about one-third to about one-half the rural population when going from very good to good years and from one-half to more than three-quarters of the population when going from good to bad years.

**Table B6.3.1: Households' expected net cereal market position given annual cropping conditions**

Expected Market Position per cereal per household	Good		Average		Bad	
	Percent per cereal transaction	Percent of total buying and selling transactions	Percent per cereal transaction	Percent of total buying and selling transactions	Percent per cereal transaction	Percent of total buying and selling transactions
Net Buyers	20.08	31.39	31.97	53.99	56.27	79.83
Autarkic	36.03	-	40.79	-	29.51	-
Net Sellers	43.89	68.61	27.25	46.01	14.22	20.17
Total	100.00	63.97	100.00	59.22	100.00	70.49

Source: Own calculations from CSA Food Security Survey, 1996

**6.37 The finding that there is a large number of net cereal buyers in rural Ethiopia is consistent with evidence from other surveys in Ethiopia and in line with international experience.** The findings regarding household's net cereal market positions in Ethiopia are also consistent with the more indirect estimates derived from the relationship between aggregate land productivity and mean land sizes in rural areas. Calculations show that to meet the daily minimum cereal requirement given current dietary patterns, at least 0.148 ha per person is needed for a household to be self sufficient in cereals. Only 48 percent of the rural population has currently enough land to do so. In other words, more than half of the rural population are currently net buyers of cereals<sup>226</sup>, and these may also be the poorer as poverty and land size are closely correlated especially among the lower half of the land distribution.<sup>227</sup> Add to this the urban population and on average close to 60 percent of the

<sup>225</sup> Before turning to a more detailed interpretation of Table 6.4, it must be noted that a much larger fraction of the households are seemingly autarkic compared to the actual market positions reported above. This follows from the fact that we report here a household's expected position per cereal as opposed to its expected position across all cereals per household. Information on household's net cereal market position could not be compiled from the reported expected positions which were per cereal. While many more households are likely to be autarkic for particular grains, this will not hold when aggregating across the different cereals. To facilitate interpretation of the table we will assume that proportion of net buying (selling) *transactions* out of the total cereal *transactions* corresponds to the proportion of net buying (selling) *households* (see column 3, 5, 7). This provides a reasonable approximation of the expected changes in the proportion of net cereal buying and net cereal selling households across seasons, though it likely leads us to overestimate the proportion of net selling households. To see this, note that the actual proportion of net buying, autarkic and net selling households in 1995/6 was estimated at 53, 8 and 38 percent respectively, while the expected proportion of net buying and net selling households in an average year according to our estimation is 53 and 46 percent respectively.

<sup>226</sup> Evidence from a nationally representative sample of 4,338 households conducted between October 1995 and June 1996 estimated that 48.2 percent of the rural households in Ethiopia were net buyers of cereals, even though the 1995/96 was a good production year (Demeke, Said, and Jayne, 1997).

<sup>227</sup> Jayne et al., 2003. See also Section 6.2.2.

Ethiopian population are actually net buyers of cereals.<sup>228</sup> These numbers on the existence of a large group of net staple crop buyers among rural households are very much in line with the empirical evidence from other Sub Saharan African countries (Table 6.4). The large group of net cereal buyers would directly benefit from lower cereal prices.<sup>229</sup>

**Table 6.4: Market participation profile for rural households in selected African locations**

Location (year)	Crop(s)	Market Involvement Indicator			Percent of Total Production Marketed (Excluding Gifts)	Sales Concentration Indicator (Percent of Total Market Sales)		
		Net Buyers	No Net Sales or Purchases	Net Sellers		50	70	80
	(% of households)			(%)	(% of households)			
Mali (1985-86)	Course grain	39	13	48	8	8	16	23
Senegal (1986-87)	Course grain	30	40	29	5	7	11	15
Somalia (1986-87)	Maize	61	0	39	57		13	20
Rwanda (1986-87)	Beans	73	5	22	10	2	4	6
Zimbabwe (1984-85)	Sorghum Maize (Communal sector)	67 15-25	9 18-30	24 67-45	21 40	2	4	5 10

Source: Weber et al., 1988

**6.38 The bulk of the marketed surplus is produced by a minority of producers, also in Ethiopia.** Based on the current distribution of land it can be shown that the majority of the marketed surplus of cereals is produced and sold by a minority of larger surplus producers. In particular, back of the envelope calculations suggest that 80 percent of the marketed surplus is produced and sold by only 20 percent of the producers.<sup>230</sup> These findings are consistent with observed market behavior by rural households in 1995/96, which shows that 18 percent of the net selling households capture 68 percent of the total sales (Table 6.5). The pattern is also in line with the sales concentration of marketed cereals observed in other poorer African countries (Table 6.4). These statistics are critical to price-policy debates for agricultural commodities, and suggest that measures to keep prices above the market rate would be tantamount to subsidizing a small fraction of farmers who produce the bulk of marketed output. Even in countries like Zimbabwe where between 45 and 67 percent of rural households are net sellers of maize, 70 percent of these sales accrue to only 10 percent of the sellers.

**6.39 Moreover, the bulk of net purchases are bought by a small percentage of the net buying households.** To gauge the welfare effects of cereal price evolution it is also important to further characterize the net buying households. To do so, we split net buyers (and net sellers) into quintiles of net sales values. As with cereal sales we also find that the bulk of the net purchases are concentrated among a small group of net buying households. While net buyers in the lowest quintile of net purchases only account for 0.74 percent of the total purchases, net buyers in the top quintile account for 80 percent of the total purchases (Table

<sup>228</sup> This is likely to be an underestimate as 15 to 20 percent of the cultivated land is allocated to permanent crops and not all land allocated to temporary crops is allocated to cereals. A small amount is also cultivated with oilseeds.

<sup>229</sup> Evidence from the ERHS indicates that the households in the sample were on average 10 weeks per year without homegrown food, with 31 percent of the households more than three months per year without homegrown food. Many people depend on the market at least some part of the year (Dercon, 2002).

<sup>230</sup> It is further estimated that 40 percent of the marketed surplus is produced by only five percent of the farmers.

6.5). In other words, both the supply and demand sides of the market are heavily concentrated among a small subset of richer households in rural Ethiopia.

**Table 6.5: Profile of market position and degree of concentration by net sales quintiles**

Net Sales Quintiles	Market Position	Values					Percent Share of Market
		No. of hhs per Quintile	Percent of hhs per Quintile	Mean PAE Expend	Harvest	Dry	
1	Net Buyers	427	18	1103	-4	-27	0.74
	Net Sellers	306	21	1113	40	-11	1.20
2	Net Buyers	434	19	1155	-41	-60	2.52
	Net Sellers	287	20	1104	108	-8	4.00
3	Net Buyers	453	19	1131	-97	-113	5.40
	Net Sellers	295	20	1121	182	30	8.78
4	Net Buyers	458	20	1202	-235	-197	11.24
	Net Sellers	293	20	1168	354	87	17.84
5	Net Buyers	563	24	1251	-769	-2043	80.11
	Net Sellers	265	18	1212	1559	232	68.19
	Autarkic	306	100	1049	0.00	0.00	-

Source: Own calculations from CSA Food Security Survey, 1996

6.40 **While data do not permit an estimate of the number of net cereal buying households which are poor, evidence suggests that an important subset of poor households would stand to gain from a gradual decline in cereal prices.** Further characterization of households by their net cereal marketing position and wealth shows that net buying households are more concentrated in the richest quintile, while net selling households are more concentrated in the fourth quintile (Table 6.6). These net buyers are most likely rural households who earn most of their living out of farming (traders, self-employed, government officials) and who tend to be richer, while the rich net sellers are likely households with larger landholdings. However, despite the fact that not strong correlations could be observed between wealth and poverty overall, given that net buyers outnumber net sellers among the poorest two quintiles, the rural poor would still stand to lose more from an increase in cereal prices.

**Table 6.6: Net market position by welfare level in 1995**

Quintiles of Expenditure <sup>1)</sup>	Average PAE Expenditure <sup>1)</sup>	Number of households			Average proportion per quintile of			Volume of net cereal sales per household (kgs)		Value of net cereal sales per household (ETB)	
		Net buyers	Autar -kic	Net sellers	Net buyers	Autar -kic	Net sellers	Net sellers	Net Buyers	Net Buyers	Net Sellers
1	630	898	132	521	58	9	34	-367	338	-500	460
2	926	796	81	508	57	6	37	-592	374	-753	436
3	1188	820	106	541	56	7	37	-380	341	-462	469
4	1529	765	96	576	53	7	40	-637	690	-848	760
5	2524	731	59	319	66	5	29	-437	366	-565	446

<sup>1)</sup> Average 1995 expenditure per adult equivalent per community in ETB.

**6.41 While significant numbers of (poor) households stand to benefit from a cereal price decline, large price fluctuations must be avoided for price declines to be sustainable, and welfare gains will be much more substantial if prices decline gradually.**

Large price fluctuations could come about as follows: If prices decline rapidly in the face of (reversible) productivity increases and price inelastic demand, net cereal sellers will be hurt, which would induce them to reduce their use of inputs and thus overall production in the subsequent year; a reversal of productivity and overall production will lead to high prices in the subsequent year, given price inelastic demand, and thus large price fluctuations. To the extent that the productivity increases are irreversible (e.g. agricultural intensification through investment in irrigation, soil conservation, or better cultivation techniques as opposed to use of modern inputs), adopting farmers will in the face of inelastic demand see most of the gains from technological change being transferred to rural and urban consumers through falling prices, which will force them to either further increase their productivity to stay afloat, a phenomenon known as the price treadmill, or else leave agriculture. Mismanagement of food aid may further compound the occurrence of both phenomena.

**6.42 An increase in income through, for example, a productivity or production increase in non-food production may attenuate these phenomena (price fluctuations and price treadmill).** The extent to which this will be effective depends largely on the price elasticities of cereal supply and cereal demand as well as the income elasticity of cereal demand. Given that these behavioral parameters may differ across cereals, the threat of price fluctuations and the phenomenon of a price treadmill will differ somewhat across cereals as well. For example, if productivity gains in staple crop production are accompanied with productivity and income gains in non-staple crop production (e.g. livestock sector or off-farm employment opportunities), an increase in the demand for staple crops will (partly) offset the decline in food prices resulting from the increase in food crop productivity. This underscores the critical importance of balanced growth in both the food and the non-food sectors. Before we discuss how these different forces play out in the Ethiopian context based on multi-market model simulations, we first present the key parameters describing the demand behavior of rural and urban households for the different cereals. This will help us gauge the potential for large cereal price fluctuations and the danger of the price treadmill following increases in agricultural productivity in a qualitative manner, and it will also help us to interpret the simulation outcomes from the multi-market model.

### *Cereal demand behavior in Ethiopia, price fluctuations and the price treadmill*

**6.43 Demand for cereals is price inelastic, but there are substantial differences across cereals and location.** Demand for cereals is more price inelastic in urban areas than in rural areas.<sup>231</sup> The demand for teff (and also wheat) is the least price inelastic (around -0.7 and -0.5 respectively) indicating that household consumption is relatively more responsive to changes in their availability and price. Both crops are also well traded in the market (see Table 6.7).

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<sup>231</sup> Demand is own price inelastic if it is below one. This implies that a 10 percent increase in prices would lead to a less than 10 percent decrease in demand. For example, if own price elasticity of the demand for maize is -0.41, then an increase in the maize price by 10 percent would lead to a decrease in the aggregate demand for maize by 4.1 percent. Demand for goods tend to more price inelastic, i.e. less sensitive to price, the less substitutes there are, and the smaller the share of total expenditures it takes.

The demand for barley and sorghum is very price inelastic (estimated at around  $-0.1$  to  $-0.2$ ), followed by millet. The price elasticity for maize, a much traded crop is estimated at  $-0.4$ .

**6.44 Income elasticity is especially high for teff and wheat (around one and 0.7 respectively in rural areas), around 0.5 for maize and around 0.2-0.3 for sorghum and barley.** This implies that increased income will especially result in increased demand for teff and wheat, which make up the largest share of cereal expenditures in urban areas. While both make up about eight and seven percent respectively of total expenditures in rural areas, maize is more important in rural diets, making up 10 percent of total expenditures on average (compared to only two percent in urban areas). Moreover, in both rural and urban areas the share of maize in total expenditures increases relative to wheat and teff the poorer households become.<sup>232</sup>

**Table 6.7: Estimated cereal demand and supply elasticities in Ethiopia**

	Demand <sup>1)</sup>				Supply
	Own price elasticity		Income elasticity		Own price elasticity <sup>2)</sup>
	Rural	urban	rural	urban	
maize	-0.41	-0.22	0.53	0.27	0.60
wheat	-0.53	-0.29	0.70	0.35	0.20
teff	-0.72	-0.44	0.96	0.53	0.40
sorghum	-0.17	-0.13	0.21	0.16	0.20
barley	-0.24	-0.14	0.32	0.17	
millet	-0.38	-0.22	0.54	0.27	

<sup>1)</sup> Average elasticities across all zones estimated from Linear Expenditure Systems by Diao et al., 2004; differences in elasticities across zones were minor.

<sup>2)</sup> Estimates in higher potential areas from Abrar, Morrissey and Rayner, 2004.

**6.45 In sum, while especially teff, but also wheat, emerge as the preferred cereals, they are also two of the more expensive sources of calories** (see Table (A5)1 Appendix 5). The fact that fertilizer is also mostly used on these two crops and that they are also more widely marketed is consistent with the observed demand behavior. However, their marketing pattern differs substantially. The majority of marketed wheat is produced by a small number of producers. On the contrary, it is the consumption (as opposed to the production) of teff which appears more concentrated among a smaller number of (richer) rural farmers, consistent with its high income elasticity, and the number of net selling teff farmers actually outnumbers the number of net buying households (Table (A5)4, Appendix 5). In other words, teff is likely a cash crop for many farmers. This is consistent with the observed price elasticities of supply, which are higher for teff than for wheat.

**6.46 Maize, on the other hand, is generally less preferred (lower income elasticity), but also a cheaper source of calories** (see Table (A5)1 Appendix 5), and as a result it is more consumed by poorer households. Maize generates higher yields than all the other cereals and is more responsive to improved seeds and fertilizer application, though given that it is a long maturing crop, it is also more prone to drought shocks. Given its responsiveness to modern inputs, supply is also more price elastic. As a result, it is widely marketed, with the production of the marketed surplus concentrated in the hands of smaller group, and the net

<sup>232</sup> Diao, et al., 2004, Table 13.

buying households of maize outnumbering the net selling households (Table (A5)4 Appendix 5).

**6.47 Sorghum and barley<sup>233</sup> emerge as the less preferred caloric sources and are likely important subsistence crops,** especially in the drylands, even though they are also traded, most likely more locally. Demand for sorghum and barley is least responsive to prices and income changes, and their supply is much less responsive to price changes or changes in market access.<sup>234</sup>

**6.48 The danger of large price fluctuations or a price treadmill occurring in response to a reversible (e.g. modern input use) or irreversible (e.g. investment in irrigation) increase in productivity differs across crops, with maize most exposed to these threats and wheat and teff least exposed.** According to the available evidence, the demand for maize is price inelastic (around -0.4). As a result, an increase in the productivity of maize production is likely to induce a substantial decline in maize prices. While this is likely to have a positive welfare effect in the first round, given that net maize buyers outnumber net maize sellers this is likely unsustainable. The productivity increase may not suffice to compensate net sellers for the price decline, inducing them to reduce their production through diminished use of modern inputs during the next cropping season. This has the potential to lead to a stark increase in prices during the next season and unstable price patterns more generally. This is consistent with the observed pattern in maize prices in 2000-2001, when bumper crops resulted in a collapse of maize prices, inducing farmers to use less fertilizer during the next cropping season, which compounded by a drought shock led to a large decline in overall production and the threat of famine for up to 14 million people. Although food aid imports continuing in the face of bumper crops exacerbated the collapse in maize prices<sup>235</sup>, it is nonetheless important to note that maize is especially susceptible to this phenomenon, given its particular responsiveness to the combined package of fertilizer and improved seeds, allowing big gains in yields.

**6.49 A simultaneous productivity increase in non-staple crop production will be necessary to facilitate the desired, gradual and sustainable decline in maize prices.** While a decline in maize prices is desirable, given that it constitutes a larger budget share in the diet of poorer households and that there are twice as many net maize buyers than net maize sellers, a price collapse will have to be avoided for price declines to be sustainable. It will thus be important to increase productivity in the production of non-staple tradables (e.g. livestock, coffee, chat, and other cash crops as well as non-agricultural products) in tandem with increases in maize productivity, to help raise households' incomes and foster their demand for maize, which will help offset the price decline resulting from the maize productivity increase. A decline in maize prices is to be expected given that (1) demand for maize is not very income elastic (0.5), (2) substantial gains in income will be needed to increase the demand for maize, and (3) such an increase in demand will usually only lead to a limited increase in maize prices since supply is not as price inelastic as demand. A simultaneous productivity increase in non-staple production will thus be necessary to help

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<sup>233</sup> Millet is the less important cereal of the three.

<sup>234</sup> Abrar, Morrissey and Rayner, 2004.

<sup>235</sup> See World Bank Country, 2004c, for a more detailed account of the negative effect of food aid on cereal prices during the 2001/02 season.

facilitate a gradual and sustained decline in maize prices. It will be equally important to better manage food aid through local purchases while at the same time fostering the development of markets to lower transaction costs and facilitate interaction between sellers and buyers.

**6.50 Teff, on the other hand, appears to be less susceptible to a large price collapse in the face of an increase in productivity.** First, given that the demand for teff is less price inelastic (around  $-0.7$  in rural areas and around  $-0.5$  in urban areas), an increase in productivity and production will not result in such a large decline in prices. Moreover, given a relatively high income elasticity (elasticity is about one), increases in income will translate into substantial increases in the demand for teff, which will help keep prices up. As there are more net seller transactions than there are net buying transactions for teff, and given that teff consumption is relatively more important the richer the household, keeping prices up would appear to be welfare enhancing. In other words, given current tastes and market conditions, increasing productivity of teff (which is more difficult to do given a lack of improved varieties and less responsiveness to fertilizer) combined with simultaneous income enhancing measures outside staple crop production would pay off. This is consistent with the fact that fertilizer is currently heavily used on teff and the observation that teff production is highly elastic to increased market accessibility.

**6.51 Demand for wheat appears to be moderately price inelastic (-0.5), and supply also appears to be price inelastic (0.2-0.3).** Many more rural households are net wheat buyers than there are net wheat sellers, indicating that a gradual decline in prices would be desirable. Increasing productivity of wheat would not lead to as large a decline in prices as increasing the productivity of maize would, and given rather inelastic supply and relatively strong income elasticity (0.7), prices can be more easily kept up with simultaneous income growth due to activity expansion in non-staple crops. In this context, a continued focus on increasing productivity in wheat production (which seems quite feasible given the limited use of improved seeds and irrigation)<sup>236</sup> would be justified.

**6.52 Demand and supply for sorghum and barley are price inelastic, and income elasticity is also low.** Yet there are many more net buying transactions than net selling transactions, suggesting that the number of households who would benefit from a decline in prices would exceed the number who would suffer, and these may also be the larger ones. Increase in productivity (e.g. through combined use of fertilizer and improved seeds) would lead to a strong decline in prices and hurt the net sellers (who may be the larger farmers). Little demand stimulation is to be expected from income growth outside the staple crop sector to dampen the decline in prices, given limited responsiveness of supply to price and low income elasticities of demand (especially for sorghum). Nonetheless, sorghum and barley are important staples in the rural diet, and many households appear to be net buyers and stand to benefit from a gradual and sustained decline in prices. To help sustain productivity increases, demand management could happen through local purchases of these cereals as food aid.

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<sup>236</sup> Wheat production appears most responsive to irrigation among the different cereals according to Diao et al., 2004.

**6.53 In conclusion, this qualitative discussion indicates the following:**

- 1) A sustained gradual cereal price decline is desirable from a poverty/welfare perspective;
- 2) Given that the demand for cereals is price inelastic, productivity increases in cereal production could lead to strong declines in cereal prices, which would either (a) not be sustainable if brought about through reversible productivity increases (e.g. modern input use) or (b) lead to a price treadmill if brought about through irreversible productivity increases (e.g. irrigation);
- 3) These threats are most severe for maize, also for sorghum and barley, but less for teff and wheat;
- 4) Regardless of these points, cereal price declines must be gradual to be sustainable and thus most effective in terms of poverty reduction, which requires a balanced growth pattern whereby both an increase in staple crop productivity and an increase in non-staple tradables (livestock, traditional and non-traditional agricultural export crops) and off-farm employment is simultaneously pursued. Such a growth pattern must be accompanied with market development and proper management of food aid which does not distort the markets.

## *Agricultural growth options and poverty reduction*

6.54 Given this characterization of the rural economy and demand behavior, we now proceed to explore the effect of different agricultural growth patterns on poverty based on a multi-market model (see Box 6.4 for a description of the assumptions underpinning the model).

### **Box 6.4: Assumptions underpinning the multi-market agricultural growth-poverty model**

Geographic diversity in production and consumption patterns across different agricultural commodities is taken into account and separate demand and supply functions have been estimated per zone. Rural and urban differences in demand patterns are accounted for. Growth in non-agriculture is assumed exogenous. Total expenditures spent on all the commodities equal the rural or urban income at the zonal level. Zonal rural and urban total income is endogenously determined and is equal to the sum of production revenues from zonal level agricultural and non-agricultural activities. An integrated national market is assumed with differential price levels across zones, with producer prices for commodities in food surplus zones lower than the price in Addis and prices for the same commodity produced in food deficit zones higher than the Addis price. Domestic markets are linked to the international markets. Though given high transaction costs, prices for most (food) commodities are endogenously determined by the domestic market. Changes in poverty have been calculated using distribution-neutral shifts in response to exogenous productivity shocks across the different agricultural sub sectors of the zonal expenditure distributions. The basic assumptions underpinning the model are described in Table B6.4.1, For a full description of the model, we refer to Diao et al., 2004.

**Table B6.4.1: Base line characteristics and base run growth assumptions of the agricultural multi-market model.**

	Base line characteristics				Base run assumptions (historical growth rates)	
	Share in economy (%)	Share in agriculture (%)	Share in consumption among poor (%)		area	yield
			rural	urban		
<i>Agricultural sub-sectors</i>						
Staple crops <sup>1)</sup>	33.6	64.7	50-60	40-50	1.3	0.8
Livestock	13.5	26.0	4 - 6	3 - 6	-	4.8
Non-traditional export crops <sup>2)</sup>	2.3	4.4	-	-	-	4.6
Coffee	2.5	4.8	-	-	-	1.8
Ag sector growth (%)	-	-	-	-	-	2.8
Non-ag sector (%)	-	-	-	-	-	3.7
GDP growth (%)	-	-	-	-	-	3.2
Poverty reduction (%points)(base=44.5)	-	-	-	-	-	46.2

Cereals, pulses, oil crops, and root and tubers.

<sup>1)</sup> Exportable vegetables, fruits, other horticultural products, chat, cotton, sugar, and sesame seed.

Source: Adapted from Diao, et al., 2004.

6.55 Table 6.8 describes the effects on economic growth and poverty reduction of different agricultural growth patterns. Four scenarios are considered. The first three scenarios explore the growth and poverty reducing effects of 1.5 percent additional growth in staple crop productivity, 3.5 percent additional growth in the livestock sector, 8.7 percent additional

growth in non-traditional exportables,<sup>237</sup> and 10.1 percent additional growth in the coffee sector respectively between 2003 and 2015. The fourth scenario examines the combined effect of a simultaneous implementation of the first three scenarios. The exogenous additional growth in productivity across the different sub-sectors is chosen to yield comparable overall agricultural sectoral growth rates of about 3.8 percent. Note that this is comparable with the agricultural growth rates considered in the key macro scenario presented in Section 6.1, where we considered agriculture growing at 4.1 percent. When combined with the assumed historical growth rates in each of the sub sectors (see Box 6.4), the scenarios considered here yield a productivity growth rate of staple crop production of 2.3 percent (+ 1.3 percent historical area expansion), 8.3 percent growth (4.8+3.5) in the livestock sector, 13.3 percent growth (4.6 +8.7) in the non-traditional export sector, and 11.9 percent growth in the coffee sector (1.8 +10.1). Growth in the non-agricultural sector is exogenously assumed at 3.7 percent, which is somewhat below the historical average observed over the past decade and a half. The 1999 poverty head count rate of 44.5 percent reported by the government is taken as the base line.

**Table 6.8: Growth and poverty reducing effects of different agricultural growth patterns**

	Staple crop only <sup>1)</sup>	Livestock only	Non traditional. export only <sup>2)</sup>	Coffee only	Combined productivity growth (staple, livestock and non-trad export)
<b>Additional productivity growth (%) (only in sub sector)<sup>3)</sup></b>	1.5	3.5	8.7	10.1	
<b>Additional growth and poverty reduction</b>					
Ag Sector growth (%)	3.8	3.9	3.6	3.5	5.5
Non-ag sector growth (%)	3.7	3.7	3.7	3.7	3.7
GDP growth (%)	4	4.1	3.7	3.6	5.3
Poverty headcount after the intervention (base=44.5)	37.7	40	41	42.8	28.4

<sup>1)</sup> Cereals, pulses, oil crops, and root and tubers.

<sup>2)</sup> Exportable vegetables, fruits, other horticultural products, chat, cotton, sugar, and sesame seed.

<sup>3)</sup> Productivity growth in addition to historical (i.e. base run) annual growth, which is estimated at 1.3 percent area expansion for staple crops and 0.8 percent yield increase (or 2.1 percent total growth); 4.8 percent for livestock; 4.6 percent for non-traditional export crops and 1.8 percent for coffee.

**6.56 Growth in staple crop production is critical for poverty reduction.** We begin by considering the growth and poverty reducing effects of separate interventions in each of the agricultural sub sectors. From Table 6.8, it is clear that the largest poverty reducing effects are brought about by productivity growth in staple crop production. This follows from the fact that productivity increases in staple crop production directly benefit many small farmers, thereby generating a substantial drop in rural poverty. Moreover, given that the poor in rural and urban areas spend respectively 70 and 50 percent of their total income on staple crop food, increased food supply which lowers food prices benefits the poor indirectly.

**6.57** Two caveats must be noted here. First, the implicit assumption of perfect market integration underpinning the model is tenuous, and an increase in staple crop productivity will need to be complemented with better incentive structures for the traders, improved

<sup>237</sup> These include exportable vegetables, fruits, other horticultural products, chat, cotton, sugar, and sesame seed.

institutional arrangements, and the development of transport and storage infrastructure to bring about well-functioning cereal markets.<sup>238</sup> Second, as discussed above, while the threat of collapsing cereal prices in response to productivity enhancements should not be exaggerated, and a gradual decline in food prices is indeed desirable, these cannot be automatically assumed. Both better market development and an increase in the demand for food through development in the non-food sector will be necessary to better facilitate a gradual and sustainable decline in food prices. In the model, productivity growth in staple crop production is imposed exogenously and gradually, and does not allow for a “corrective” reaction of surplus producers through which they could reduce the use of inputs and thus output production, leading to large price fluctuations in the face of price inelastic cereal demand.

**6.58 Growth in the livestock sector alone has the largest effect on overall economic growth, but a smaller effect on poverty reduction.** The livestock sector has historically been growing at a faster pace (4.8 percent between 1995 and 2002) than staple crop production and because it still has more growth potential than staple crop production, an additional growth rate of 3.5 percent is assumed. While in this scenario more overall growth is generated, the poverty reducing effects are smaller because livestock accounts for a relatively small share of poor farmers’ income. Further, poor consumers benefit much less from price declines in livestock products (meat and dairy) induced by increased livestock production, as these constitute only a small share of their total expenditures (four and three percent respectively). Nonetheless, productivity gains in the livestock sector could be a route out of poverty for subsets of households which rely heavily on the livestock as a major source of income.

**6.59 Finally, growth in the non-traditional export sector may have less poverty reducing effects. However, growth in this sector may currently not require much additional public investment and it could help relieve pressure on land by generating employment and demand for food while at the same time preventing food prices from collapsing.** Growth in some nontraditional exportables (e.g. export of roses) has been booming in recent years, indicating that there is still a lot of growth potential in this sector. An additional annual growth rate of 8.7 percent is comparable to an additional growth rate of 3.5 percent in livestock and 1.5 percent in staple crop production. International experience suggests that segments of traditional exports have the potential to multiply in value, given the size of export markets, once established. However, since such activities often only involve a small group of farmers, mostly concentrated in certain regions and around big cities, especially during the early stages due to technology and credit constraints, it will be important to examine the value chains involved to ensure broader involvement of smallholders and their capture of a sizeable share of that value. Consumers tend to benefit little given that the products are intended for the export markets.

**6.60** In addition, growth in labor intensive non-traditional exportables may generate important employment opportunities, thereby relieving land pressure on households in the more traditional cereal producing zones. This linkage effect has not been accounted for in this model, even though it is heavily emphasized in the Ethiopian Computable General

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<sup>238</sup> Gabremadhin, 2004.

Equilibrium Model.<sup>239</sup> For this linkage effect to be important, labor has to become much more mobile. It will also require timely expansion of export markets to sustain the necessary annual increase in exports by 29 percent. This will in turn require a substantial reduction in transport and transaction costs. Nonetheless, as illustrated by the recent boom in floriculture, substantial progress can be made in these areas without substantial public investment by the government, especially around Addis Ababa. The role of the government as facilitator, coordinator and thus generator of a conducive investment climate has proven to be much more crucial than public investment to attract the necessary private investments at this stage.

**6.61 Balanced growth strategies complemented with market development have the largest poverty reducing potential.** The separate simulations underscore the critical importance of continued and concerted efforts to increase staple crop productivity for maximum poverty reduction. Yet they are only part of the solution. Growth in other agricultural sub-sectors (e.g. livestock and non-traditional agricultural exports) as well as non-agricultural sectors, must be simultaneously pursued. Simultaneous additional productivity growth in all three sectors would reduce poverty to by 16 percentage points to 28.4 percent. Balanced growth strategies and market development will facilitate the necessary gradual decline in food prices as well as the transition out of agriculture into non-agricultural activities. Some of the linkages between growth in the different sectors go as follows. Growth in staple crop production and non-traditional exports increase domestic demand for livestock products and help support livestock prices. This helps farmers raise income from livestock production. Growth in the livestock sector generates demand for animal feed and increased income from livestock and non-traditional exports raises demand for cereals, which both help support cereal prices, preventing a collapse in cereal prices.

**6.62 Lower agricultural growth rates than the ones assumed in the multi-market model may actually be necessary to reach the poverty MDG if one also accounts for the consumption linkages.** Note that the multi-market model under discussion here assumed that the non-agricultural sectors grow exogenously at 3.7 percent. In doing so, it has neglected the important consumption linkage effects discussed above. As food prices decline, households' real income increases, which will generate demand for locally produced goods and services and thus generate off-farm employment, which in turn will stimulate the demand for food and thus help prevent food prices from collapsing. As a result, lower agricultural growth rates may be necessary to reach the poverty MDG, as assumed in the macro simulations in Section 6.1, Table 6.1 where it was found that an agricultural growth rate of 4.1 percent would almost suffice to reduce poverty by half from its 1990 level, given that the non-agricultural sector continued to grow at its historically observed average pace of 6.5 percent per year since 1992. Yet while non-agricultural growth has so far been largely driven by government expansion, it will be critical in the future that off-farm supply is sufficiently elastic to the increased demand for local goods and services to fully capture the consumption linkages.

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<sup>239</sup> World Bank Country, 2004c. An undesirable feature of the current scenarios based on the Ethiopian Computable General Equilibrium Model is that they lead to less food production, higher food prices, and less food imports. This seems at odds with the need fill the food gap in Ethiopia.

### *Toward more spatially differentiated growth strategies, also for agriculture*

6.63 **From Section 5.2 we recall that a decade of three to four percent sustained annual growth in staple crop production is technically within reach** with intensified use of fertilizer and improved seed packages coupled with soil conservation (and water management). Irrigation is especially profitable when applied to non-traditional exportables (vegetables) and coffee, but less so when applied to cereal production.<sup>240</sup> Moreover, given the limited area expansion under irrigation which can be expected compared to the total cereal area cultivated, it is unlikely to make an important contribution to overall cereal production. Nonetheless, while it is crucial to know that such productivity increases are technically possible, it will be equally critical for the success of an agricultural growth-based poverty reduction strategy to better understand the reasons behind the current limited adoption rates of these technologies (modern inputs, soil conservation techniques, and water management). Moreover, given the geographical diversity which characterizes Ethiopia, it will be important to further reflect on the optimality of different (agricultural) growth strategies across different locations.

6.64 **Staple crop production growth appears to be more poverty reducing in food surplus areas, while livestock production growth appears to be more poverty reducing in food deficit areas.** Further disaggregation of the poverty reducing effects of the different scenarios under the multi-market model by food deficit and food surplus areas<sup>241</sup> indicates that while productivity growth in staple crop production has significant poverty reducing effects across Ethiopia, its effects are more pronounced in the food surplus areas. The poverty head count in rural areas in the food surplus zones falls from 30 to 23 percent by 2015, while it drops from 62 to 54 percent in the food deficit rural areas. Under the livestock growth scenario on the other hand, poverty falls only from 30 to 27.6 percent in the rural food surplus areas, while it drops from 62 to 53 percent in the food deficit areas.

6.65 **In the northern dry lands of Ethiopia, while there is still scope for intensification of food production which will continue to be important for food security purposes, there is more potential for promoting livestock production and tree planting** (for construction poles and fuel wood), indicating the desirability of the broader extension packages currently pursued by the government.<sup>242</sup> Moreover, to successfully intensify food production, promotion of the use of fertilizer and improved seed packages (e.g. for sorghum) will need to be complemented with the adoption of soil conservation structures (stone terraces) and sustainable land management practices such as reduced (or zero) tillage, reduced burning and application of manure, and better water management (water harvesting, micro dams and small scale irrigation). Better land management practices help reduce soil erosion and increase the soil moisture content. Zero tillage could also greatly benefit female headed households, since women are culturally not allowed to plough and thus often constrained to share cropping, or other households without oxen. Small scale irrigation would increase the use of fertilizer and

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<sup>240</sup> See World Bank, 2004c and World Bank, 2003b for more detailed discussions on the costs and benefits of different water management techniques across different crops.

<sup>241</sup> A zone is considered food deficit/surplus if the zonal level per rural household cereal equivalent output is 20 percent below/above the national average. Otherwise the zone is considered food balanced.

<sup>242</sup> For more details, see Ehui and Pender, 2004.

offer the potential for higher productivity. It would also facilitate the shift toward higher value crops such as vegetables.

6.66 Improvement of livestock production will require institutional changes in the management of grazing and crop lands. Investments in chicken and beehives appear to be profitable, with returns exceeding 30 percent. Allocation of unused degraded land for private tree planting or other economic uses to communities and households has proven to be quite successful in fostering tree planting, wood lot management, and wood production. Food and cash for work programs will remain an important complement to farm income, yielding on average about 40 percent of off-farm income and about 10 percent of total income in Tigray in 1998-99. Finally, continued investment in education is key, both to increase incomes and human development outcomes locally as well as to foster out-migration.

**6.67 In the high potential cereal producing areas of the central and northwestern highlands, a continued focus on intensive cereal production through increased use of input packages is warranted given the existing scope for substantial yield increases.** This strategy could be usefully complemented with the development of dairy production in areas closer to urban markets. Such a strategy will also need to be complemented with further market development to enhance the tradability of the produced surplus.

**6.68 In the humid high potential perennial zones in the southern and western highlands, continued focus on intensification of food production through improved seeds and fertilizer use, along with concerted efforts to increase productivity and marketing efficiency for coffee hold promise.** Intensification of food production, which is little marketed given high transaction costs, would alleviate land pressure in these areas, where it is the highest in all of Ethiopia, as well as the tension between food and cash crop (coffee or chat). There appears ample scope for increasing productivity in coffee production especially through the adoption of higher yielding improved cultivars resistant to coffee berry disease, which is faced by more than half of the coffee planted in Ethiopia. Better management of coffee quality and reduction of the marketing margins, estimated at 50-60 percent of export prices in 2000 and 2001 could further substantially enhance agricultural incomes.

**6.69 In Central Ethiopia around Addis Ababa, further intensification of cereal crop production, development of the dairy industry in peri-urban areas, tree planting and the promotion of non traditional agricultural exports hold much promise.** To further promote the intensification of cereal production through adoption of modern input packages, the provision of these inputs along with credit for their purchase may have to be complemented with rainfall based insurance to protect farmers from shocks. This also holds for the other regions, and experiments are currently underway to provide interlinked credit-insurance packages to farmers in Tigray. While the agro-ecological conditions in this part of the country are similar to those of central Kenya, dairy production in Ethiopia is very underdeveloped compared to Kenya. Development of the dairy sector will require addressing some of the following constraints: (1) high transaction costs in collecting and marketing dairy products; (2) limited adoption of higher yielding cross-bred cows, despite evidence that they are profitable, due to lack of credit to buy them as well as concerns about larger susceptibility of cross-breds to diseases; (3) limited quality and irregular supply of fodder. Eucalyptus production in areas unsuitable for crop production or on uncultivated slopes also appears to be

quite profitable, especially in areas with good market access.<sup>243</sup> Finally, given the proximity to export markets, excellent airport facilities, good road infrastructure around Addis, and favorable agro-ecological conditions, non-traditional exports such as horti- and floriculture appear internationally competitive and have excellent growth potential if the business environment is accommodating. Promotion of these activities will generate employment, increase the demand for food, relieve land pressure and help facilitate the transition out of agriculture.

### 6.3 Toward an Optimal Public Investment Mix—a Micro Perspective

6.70 **While an agricultural led growth strategy does require continued agriculture-specific investments in such areas as research and extension, many of the necessary investments to foster agricultural growth (both in the food and the non-food sector) actually lie outside agriculture,** such as investments in infrastructure, education, health, access to information, etc. As both agricultural as well as non-agricultural activity typically stand to benefit from these investments, the debate about agriculture versus non-agriculture is often ill conceived from this perspective. To gauge the relative marginal benefits from different non-agricultural specific public interventions, we use the estimated results from the regression analysis presented in Tables 4.9 and 4.11, Chapter 4. While we do not have information on the cost of the various interventions and thus cannot evaluate their cost effectiveness, these simulations nonetheless help illuminate which interventions are likely to be critical for reducing poverty. Furthermore, it is implicitly assumed that the estimated marginal returns remain stable over time and that they do not change as the variables themselves change. The further in the future one projects and the larger the simulated change in a particular variable, the more tenuous this assumption becomes.<sup>244</sup> Nonetheless, these simulations can provide useful guidance to inform changes at the margin in the current public investment mix, along with insight into the size and optimal mix of investments needed to reach the poverty MDG. Simulation scenarios 1-10 are based on the pooled woreda Fixed Effect Model (Column 1 of Table 4.9), while we use the estimated results in Table 4.11 with an explicit geographic characterization of the woredas for scenarios 11-14.<sup>245</sup>

6.71 **There are substantial poverty reducing effects associated with increasing educational achievements.** We begin by simulating the effect of attaining the literacy-centered MDG: having all adults educated to the primary level. However, to mitigate the Lucas critique<sup>246</sup> we only simulate the effect of endowing all adults with at least a fourth grade level of education (the first level of primary education). The results are impressive and

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<sup>243</sup> Holden et al., 2003; Okumu et al., 2002.

<sup>244</sup> To see this, note that it is likely that the returns to education will change if the political and economic climate in a country change. Similarly, when many people start to obtain primary education, the returns to primary education in the labor market will probably decline compared to when virtually nobody had primary education.

<sup>245</sup> For the education simulations, we use a quadratic specification, since we simulate the effect of an increase in primary education and we want to control for the differential returns between primary and secondary education, even though they are limited.

<sup>246</sup> The Lucas Critique argues that a large increase in educational outcomes may affect the returns to education, which would bias our simulations (Lucas, 1976). The increase in mean education levels may reduce individual returns to education following an increase in the supply. Conversely, a more educated population might unlock new growth opportunities, stimulate a culture of entrepreneurs, etc., and by these positive externalities increase the returns to education. Furthermore, changes in education might also indirectly affect the returns to other endowments in the model.

lend substantial support to massive investment in primary education in Ethiopia as a primary policy objective. As simulation 3 shows, providing all adults with a fourth grade education would raise consumption levels by eight percent and reduce poverty incidence by eighteen percent. The poverty gap would be reduced by almost a quarter. Moreover, the poverty alleviation response to female education is almost twice as high as the poverty response to male education. What it would take to drastically enhance male and especially female enrollment and completion rates is explored in Chapter 9. Given its immediate effects, the role for adult literacy campaigns in imparting literacy on adults should also be explored as a complementary and timely intervention.

**Table 6.9: Simulated effects on consumption and poverty reduction of different policy interventions**

	Expenditure ETB			Head Count Poverty <sup>1)</sup>			Poverty Gap <sup>1)</sup>		
	Pre Inter- vention	Post Inter- vention	% change	Pre Inter- vention	Post Inter- vention	% change	Pre Inter- vention	Post Inter- vention	% change
<b>Woreda Fixed Effects: Pooled 1995/99</b>									
<b>Education<sup>2)</sup></b>									
1) all male adults with at least 4 <sup>th</sup> grade education	1435	1474	2.70	38	36	-6.24	9.94	9.07	-8.79
2) all female adults with at least 4 <sup>th</sup> grade education	1435	1514	5.47	38	34	-11.62	9.94	8.37	-15.79
3) joint intervention (1) & (2)	1435	1555	8.34	38	31	-17.64	9.94	7.59	-23.60
<b>Infrastructure</b>									
4) providing poorest quintile with access to electricity	1435	1443	0.52	38	38	0.00	9.94	9.23	-7.17
5) providing poorest quintile with access to proper sanitation	1435	1450	1.04	38	38	0.00	9.94	8.52	-14.29
6) bringing everybody within 10km of bus/taxi service	1435	1461	1.76	38	37	-3.84	9.94	9.39	-5.52
7) bringing everybody within 2km of clean water source	1435	1440	0.32	38	38	-0.57	9.94	9.86	-0.84
8) joint intervention (4), (5), (6) & (7)	1435	1489	3.75	38	36	-5.15	9.94	7.05	-29.10
9) full intervention (3) & (8)	1435	1614	12.45	38	27	-27.96	9.94	4.51	-52.73
<b>Information</b>									
10) providing poorest quintile with a radio	1435	1506	4.96	38	34	-10.82	9.94	5.82	-41.45
<b>Unbundling woredas: Model 1<sup>3)</sup></b>									
<b>Nutrient Loss</b>									
11) reducing DAP nutrient loss in all woredas to present average	1398	1418	1.41	39	38	-3.28	10.14	9.74	-3.94
12) full intervention (9) & (11) <sup>4)</sup>	1398	1596	14.16	39	26	-34.33	10.14	4.52	-55.43
<b>Unbundling woredas: Model 2<sup>5)</sup></b>									
<b>Vulnerability</b>									
13) limiting crop damage to a maximum of 20%	1348	1356	0.61	40	40	-1.23	10.52	10.32	-1.91
14) limiting crop damage to a maximum of 10%	1348	1365	1.29	40	39	-2.54	10.52	10.11	-3.99
<b>Woreda Fixed Effects: Extended 99<sup>6)</sup></b>									
<b>Cultivation practices</b>									
15) Limiting minimum use of commercial fertilizer to 32% of cultivated land	1351	1402	3.61	39.18	36.04	-8.73	10.03	8.88	-12.95
16) Limiting minimum use of natural fertilizer to 32% of cultivated land	1351	1434	5.79	39.18	34.56	-13.37	10.03	8.51	-17.89

	Expenditure ETB			Head Count Poverty <sup>1)</sup>			Poverty Gap <sup>1)</sup>		
	Pre Inter- vention	Post Inter- vention	% change	Pre Inter- vention	Post Inter- vention	% change	Pre Inter- vention	Post Inter- vention	% change
<i>Expected poverty reducing effects of public investment in education and roads between 1999 and 2004</i>									
17) adding .19 of a grade to each adult male <sup>2)</sup>	1435	1437	0.14	38.08	37.98	-0.25	9.94	9.90	-0.42
18) adding .22 of a grade to each adult female <sup>2)</sup>	1435	1436	0.06	38.08	38.05	-0.07	9.94	9.92	-0.16
19) joint intervention (18) & (19) <sup>2)</sup>	1435	1438	0.21	38.08	37.95	-0.33	9.94	9.88	-0.57
20) Decreasing distance to dry weather road by 1.2 km	1351	1353	0.14	39.18	39.11	-0.20	10.03	9.99	-0.43
21) joint intervention (21) & (30)	1351	1356	0.35	39.18	38.96	-0.58	10.03	9.93	-1.03
22) Decreasing distance to dry weather road by 3.8 km	1351	1356	0.39	39.18	38.90	-0.72	10.03	9.92	-1.18

- 1) We use the lower poverty line as our poverty threshold.
- 2) Instead of using the reported regression results in Table 4.9, Chapter 4, the simulations on education use a quadratic specification for education to capture non-linearities in returns (i.e. lower returns to primary than to secondary education).
- 3) Note that the full intervention in this case uses the coefficients for the education and infrastructure variables from the regression on Unbundling woreda Effects: Model 1. As we did not have information on DAP nutrient loss and most of the additional variables used in Model 1, for all woredas, we use approximately 17,000 observations for Model 1 as opposed to 28,000 for the woreda Fixed Effects Pooled Model. Note also that the intervention for education consists of providing universal primary education for all adults and the full intervention simulation used coefficients from the reduced observations model.
- 4) The quadratic specification was only significant for the pooled woreda Fixed Effect Model and as such we use the linear, grade 4 education intervention (4) & (5) for the education component of this full intervention.
- 5) As we only had crop damage information for rural areas, Model 2 is limited only to our rural sample, which consists of just over 11,500 observations.
- 6) This specification only uses 1999 data as no data on cultivation practices was collected in 1995.

**6.72 Improvements in infrastructure affect consumption not only directly by lowering transactions costs and increasing access to opportunities and information, but also indirectly through their effect on the returns to endowments.** We take a direct targeting approach in our simulations, even though that may not be the most cost-effective pro-poor approach overall given the costs of public service delivery to certain poor areas. We either target our interventions to the poorest households in our sample when the intervention is dichotomous (either you have electricity or access to proper sanitation or you do not), or we improve accessibility for those who are most remote from the service first. Providing all households in the poorest quintile with electricity such that 35 percent of the population, as opposed to the current 10 percent<sup>247</sup>, have access to electricity only increases average consumption by 0.5 percent. Providing the households in the poorest quintile with proper sanitation, an intervention that increases the percent of households with proper sanitation from 16 to 39 percent,<sup>248</sup> results in a one percent increase in consumption. When taken in isolation,

<sup>247</sup> Note that the intervention does not result in a full 20 percent addition of households with electricity as a small fraction of the poorest quintile already had access to electricity. Recall too that all household level means we present are population weighted and thus affect the result.

<sup>248</sup> While maximum 20 percent of the households would get access to sanitation, more than 20 percent of the people may gain access to sanitation since the intervention is targeted to the poorest households which also tend to be larger.

neither of these two interventions singularly affects the poverty incidence. This is clearly a function of targeting the poorest households. Despite the fact that their mean consumption levels will increase, their poverty is too deeply rooted for it to be erased by these interventions alone. Indeed, when we look at the effect of these interventions on the poverty gap, we notice that these interventions reduce the poverty gap by seven and 14 percent respectively.

6.73 Next, we simulate the effect of investments in transport infrastructure and water provision. We bring everybody within at least 10 kilometers of bus/taxi service. This drops the mean from 16.69 to 6.47 km and benefits 31 percent of the sample. In the case of water, we place a two kilometer limit on distance to water, dropping the mean from 1.57 to 0.51 km and affecting 12 percent of the sample. Improved access to transport has a more substantial effect, reducing poverty incidence by 3.84 percent, as opposed to 0.57 percent for improved access to clean drinking water.

**6.74 Direct poverty targeted investment in public infrastructure could substantially reduce the poverty gap, though it will need to be complemented with other investments to substantially reduce poverty incidence.** While each of the infrastructure interventions has somewhat modest, though non-negligible, effects on consumption, their joint effect is much larger than the sum of the parts. Together, the simulated infrastructure investments would reduce poverty incidence by 5.15 percent. The simulations would further suggest that when the infrastructure interventions are combined with bringing all adults to 4<sup>th</sup> grade completion, Ethiopia would be able to reduce poverty incidence by about 28 percent, i.e. more than half the distance of reaching the poverty MDG. The poverty gap would be reduced by one half.

**6.75 Estimated benefits from reduced dung collection are significant.** Our regression results already pointed to sizeable negative effects of dung collection on expenditure. According to our simulations (11), bringing all woredas with DAP nutrient loss due to dung (and crop residue) collection greater than the mean back down to the mean would reduce poverty by 3.28 percent. Clearly, actions to reduce dung collection and increase soil fertility are likely to have substantial effects on poverty. For comparison, bringing DAP loss due to dung collection everywhere back to the current nationwide average is estimated to have an effect similar to that of bringing everybody within 10 km of bus/taxi service, or giving all male adults two extra years of primary schooling. The combined effect of 4<sup>th</sup> grade completion for all adults, the simulated infrastructure improvements, and reduction in dung collection would reduce poverty by 34 percent to 26 percentage points. While these results are somewhat less optimistic than those based on the pooled fixed effect simulations, they nonetheless indicate that substantial reductions in poverty could be achieved by improving educational achievements, increasing access to infrastructure and promoting alternative fuel use.

**6.76 Tremendous gains are possible from increasing access to information by providing a radio to the poorest quintile of the population, with effects similar to bringing all female adults to 4<sup>th</sup> grade completion** (see simulation 10 in Table 6.9). As indicated in Chapter 4 (see also Appendix 3, Tables A.4.1 and A.4.2), households and communities with a radio appear substantially better off than those without a radio. Information is a powerful transformer indeed, especially when people are illiterate and

completely isolated from the rest of the world, virtually excluding them from any source of information and knowledge, as in Ethiopia. In such circumstances, radio is a powerful tool to promote better farming techniques, to enhance people's knowledge of health and nutrition and promote better hygiene and nutritional practices, to facilitate market integration by communicating food prices, and to foster development more generally throughout Ethiopia. Radio is also a major dialogue initiator, explaining the important observed externality effects of radio ownership within communities. It is estimated that providing the poorest quintile of the population with a radio would increase average consumption by five percent, it would reduce poverty incidence by 11 percent, and it would reduce the poverty gap by about 40 percent. These effects are similar to those of bringing all female adults to 4<sup>th</sup> grade completion, and exceed the combined effects of the infrastructure package.

**6.77 Marginal beneficial effects of radio ownership are real, high compared to the marginal costs, and not simply a reflection of people's wealth position.** While one would be justified in being suspicious about the magnitude of the estimated effects and one could argue that these estimated effects merely capture a person's wealth position (those who are wealthier are more likely to have a radio), it must be underscored that the estimated effects of radio ownership on household welfare are over and above people's wealth position as captured by their possession of livestock, farm equipment, consumer durables (bicycle and TV) as well as the quality of their housing (quality of material of walls and roofs). Moreover, this effect is in addition to the effect of other public infrastructure (electricity, access to roads, health centers, markets, water and sanitation) as well as the overall wealth position of the woreda (woreda dummy variables have been used) (see Appendix 3, Tables A.4.1 and A.4.2 for a detailed specification). The effect furthermore holds in both rural and urban areas, though the externality effect is especially strong in rural areas. Even if the effects would be slightly overestimated, enhancing radio ownership and access to information more generally emerges as a very cost effective intervention, with the marginal benefits largely exceeding the marginal gains at the current stage of development in Ethiopia.

**6.78 While the direct estimated poverty reducing effect may appear small, providing better risk management tools will be critical given the long-lasting damage of shocks.** Providing farmers with irrigation to protect themselves against droughts, increased use of pesticides, or ex post insurance schemes such as rainfall based insurance so that their crop damage would not exceed 20 percent of their total cultivated area would reduce poverty 1.2 percent. This appears rather small. Yet this is likely to be an underestimate of the negative effects of shocks on human welfare, as shocks do not only affect current consumption but are also likely to suppress future consumption. The micro-evidence from Ethiopia presented by Dercon (2004) indicates a long lasting growth penalty of two to three percentage points for households heavily affected by the 1984-85 drought shock. Moreover, consumption smoothing by households may cause long lasting damage to the future earnings stream of their children. As indicated in Chapter 10, households in Ethiopia often withdraw their children, and especially girls, from school in response to crop damage shocks. Moreover, crop damage also appears to negatively affect early child growth, causing long-lasting permanent damage to their cognitive ability and future earning potential.<sup>249</sup>

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<sup>249</sup> Yamano, Alderman and Christiaensen, 2005.

**6.79 Increasing the share of cultivated land covered by commercial fertilizer to 32 percent—the current average in food secure areas—promises to increase overall consumption levels by 3.6 percent and reduce poverty by about eight percent.** While our simulations may admittedly also capture the effects of other technologies coming along with fertilizer use (such as the effects of improved seeds, pesticides, better cultivation practices, etc.),<sup>250</sup> agriculture in Ethiopia has clearly not yet reached its current production frontier, and there remains substantial scope for wider diffusion and adoption of basic agricultural inputs. This finding is consistent with those presented in Chapter 5, especially since the estimated coefficients are based on current practices while the findings from Chapter 5 indicate that many gains will come from combined fertilizer and improved seed packages, which are currently still only applied on about four percent of the cultivated cereal areas. Enhanced formal education, better access to roads and transport services, improved availability of insurance schemes, and increased access to information about farming techniques, expected timing of the rainfall (weather forecasting) and market prices through increased radio ownership and broadcasting will all be instrumental in promoting the adoption of modern inputs and the use of more efficient application rates and farming techniques.

**6.80 Additional improvements in policies and the institutional environment will be necessary to maintain and further enhance the estimated marginal returns to these public investments.**<sup>251</sup> In particular, further improvements in the investment climate will be needed to facilitate a private sector response and reinforce the expected benefits. The government has recently introduced new policies in favor of the private sector and has been very active in improving its dialogue with the sector. Progress has been achieved in the areas of land availability, business registration, tax management and customs. Sector specific policies granting incentives and removing key obstacles to private investment have already paid off, for example in the significant growth of the floriculture sector. Nonetheless, significant obstacles remain to the development of the private sector. The system of laws and regulations still deters private sector investment. Weak domestic competition and contestability in many sectors, the nature of state interventions, and the numerous state-owned enterprises taken together result in an uneven playing field. Inefficiency of the banking sector, which is almost wholly state-owned, leads to high cost of capital and difficult access to credit. A particularly critical issue to facilitate private sector response (and urban growth) relates to the availability and cost of (urban) land. While the reform of urban land is now in full swing, progress has been slow and substantial residual uncertainties for private investors persist, hampering private sector investment.

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<sup>250</sup> Note however, that the use of these practices is so limited that our coefficients are unlikely to pick up their effects.

<sup>251</sup> See World Bank, 2004c for more details.

## CHAPTER 7. ENHANCING PEOPLE'S INCOME –CONCLUDING REMARKS

### *Households start from an extremely low endowment base*

**7.1 Ethiopia's private endowment base is extremely low and has largely remained so over the past decade.** While the educational status of Ethiopia's population has been steadily improving over the past decade, educational attainment remains limited. Male adults completed on average only 1.8 grades, and female adults only 0.88 grades, with the gender gap somewhat less pronounced in Tigray. Disease and malnutrition (see further Chapter 8) further erode labor productivity. Land pressure has increased tremendously over the past decades, with average landholdings declining from 0.5 ha per person in the 1960s to 0.11 ha per person in 1999. While about 40 percent of the population have at least one ox, only 30 percent have two, the number necessary for an ox-span to plough the fields.

**7.2 A land poor class living on "hunger" plots has emerged.** Since the land reform under the Derg regime, Ethiopian agriculture is essentially characterized by smallholder farming. Nonetheless, land inequality is high, as a result of continuous fragmentation of landholdings and the emergence of a rapidly growing group of people living on "hunger plots". For example, given current technology, about one-fifth of all rural households (excluding SNNPR) do not manage to produce half of their annual cereal caloric needs from their plots, despite being mainly dependent on agriculture.

**7.3 Soil nutrient depletion continues at an alarming pace.** The most important source of cooking fuel is firewood, used by almost 75 percent of households. About one in six households uses mainly dung cakes as source of cooking fuel, resulting in a continuous depletion of the soil at alarming rates. Preliminary estimates suggest that the annual phosphorus and nitrogen loss nationwide due to dung removal is about equivalent to the total amount of commercial fertilizer annually applied. While the extent to which the nutrient content of dung translates into actual alimationation of the soil with phosphorus and nitrogen depends on the handling of the dung and the cultivation methods used, these results are sufficiently significant to warrant a closer investigation of the effect of dung collection on agricultural productivity and poverty.

**7.4 Remoteness epitomizes daily life in rural Ethiopia.** Only 14 percent of the rural population has a radio, exemplifying the sheer disconnect of Ethiopia's population from the rest of the world, not only in terms of market access, but also in terms of access to information. Rural households are on *average* 10 kilometers away from a dry weather road and 18 kilometers from any public transport, rendering people immobile. Average distance to drinking water, however, improved substantially from 2.8 km in 1995 to 0.8 km in 1999. On the other hand, access to services in urban areas deteriorated, likely due to an influx of rural immigrants.

**7.5 Risk and drought shocks have severe and long lasting effects on poverty.** *Ceteris paribus*, households in areas characterized by larger rainfall fluctuations were found to be poorer. The effects of crop damage due to droughts, pests, insects, frosts, or other causes on

consumption were substantial. For example, it was estimated that 2.7 percent of consumption per adult equivalent was lost in 1999 due to crop damage, a year characterized by average rainfall. This corresponds to about 1.5 years of GDP growth per capita. Moreover, not only are households unable to protect their consumption from continuously recurring shocks, but the effect of these shocks are often long lasting. Micro-econometric evidence shows that households that suffered substantially during the 1984-5 drought, which resulted in a nationwide famine, continued to experience two to three percent less annual per capita growth during the 1990s than those who weren't hit as hard.

*Livelihoods are agriculture based, but labor productivity in agriculture is low*

**7.6 Ethiopia still finds itself at the very beginning of its structural transformation, with rural households continuing to rely heavily on low input, low output, subsistence-oriented, rained agriculture and agriculture related activities.** Agriculture is responsible for 85 percent of employment, 45 percent of national income and more than 90 percent of exports. Of the total area under temporary crops in the 1990s, cereals, pulses, and oilseeds accounted for 88.7 percent, 8.7 percent and 2.7 percent respectively. Commercial fertilizer is applied to approximately 40 percent of total farmland under cereals and heavily concentrated on a few cereals (wheat, teff, and maize). Improved seeds are only applied on about five percent and pesticides on about seven percent of the total cultivated cereal area. Less than one percent of the total cultivated area in Ethiopia is irrigated, despite massive fluctuations in rainfall. The limited (and only slowly expanding) use of inputs and modern technology combined with the small and decreasing landholding sizes is consistent with the consistently low yields in cereal production and the low marginal productivity of labor observed in the data.

**7.7 Evidence suggests significant numbers of net cereal buying poor households in rural Ethiopia.** This is consistent with the evidence from other poor SSA countries. Poorer households are more likely to engage in multiple (often non-remunerative) activities as a coping strategy. Especially livestock products, but also business activities (collection of water and fuel wood, artisanal activities, grain trading,) and off-farm wage work (especially food and cash for work) provide sources of cash income to buy food. In addition to the urban poor population, these rural households stand to gain from a (gradual) decline in cereal prices. This is in contrast to another smaller set of poor rural households which are net cereal sellers, a poverty reduction dilemma.

**7.8 Substantial potential remains for increasing productivity in staple crop production through agricultural intensification, especially in food secure areas.** Based on a review of the available evidence, rough estimates suggest that doubling cereal yields in the more food secure areas and increasing cereal yields by 50 percent in the food insecure areas lie well within the realm of the possible. Much could be gained from broader adoption of both fertilizer and improved seeds, and increasing market access (better access to roads and rural towns) in the more food secure areas, while broader adoption of fertilizer-improved seed packages will have to be complemented with the promotion of soil conservation and better water and risk management techniques as well as improved market access in the food insecure areas. To realize these benefits, it will be important to further our understanding of the major factors constraining wider adoption and diffusion of land saving technologies. The role of

political and land tenure security in the adoption of irrigation and environmentally sustainable cultivation practices respectively, as well as the role of having effective risk management strategies in adopting modern inputs deserve further investigation. Anecdotal evidence suggests that the demand by poorer households for certain packages is limited because of the downside risks involved. Similarly, input delivery systems may have to be made more efficient and demand driven.

**7.9 Nonetheless, the low marginal value of labor in terms of additional agricultural income from cereal production, given current landholding size, and the higher marginal value of expanding landholdings, suggest complementary policy routes to expand households' income.** As noted, one option is raising marginal productivity of labor and land through agricultural intensification in cereal production. Second, the land frontier could be pushed further and new areas could be exploited, i.e. agricultural extensification. Third, labor productivity could be increased through diversification into non-cereal (tradable) agricultural production. Fourth, land pressure could be reduced and labor productivity enhanced through diversification and migration out of agriculture into highly remunerative non-agricultural activities. The optimal combination will obviously differ across space depending on the region's comparative advantage in terms of agro-ecological potential, and market access as determined by population density and access to infrastructure.

***Balanced agricultural growth is critical for achieving overall growth with poverty reduction***

**7.10 Macroeconomic projections suggest that reaching the MDG of halving poverty incidence by 2015 from its 1990 level will not be possible without buoyant agricultural growth.** Simulations indicate that a decade of 4.1 percent agricultural growth would bring us close to reaching the poverty MDG. While such growth in agriculture will be necessary to sustain the required growth in the non-agricultural sectors and facilitate the structural transformation with labor shifting out of agriculture into industry and services over time, it will not be sufficient. Across all these sectoral dimensions, enhancement of individual agency, both in the economic and social space, and increased foreign aid will be equally necessary to achieve growth with poverty reduction.

**7.11 This raises the question of how to bring about robust and sustained agricultural growth. Agricultural extensification has so far been the key factor driving growth in agriculture, though its potential to further boost agricultural growth is limited.** Not only has pushing the land frontier not been sufficient for growth in agriculture to keep up with population growth, let alone to sustain growth of 4.1 percent, the scope for further agricultural extensification is rapidly decreasing, especially in light of continued population growth of 2.5 to three percent per year. There remains some potential in the lowlands when they become more accessible through malaria and tse-tse fly eradication, and given better public services. This is consistent with the philosophy behind the ongoing resettlement program, though sustainable population movements would be better stimulated by fostering voluntary and less programmatic migration.

**7.12 Agricultural intensification in cereal production through the promotion of increased modern input use will continue to have to play an important role in raising incomes and reducing poverty.** Given the large share of cereal consumption in (poor)

people's budget, and the existence of a substantial group of (poor) net cereal buyers (rural and urban), it will be important to sustain the focus on increasing cereal productivity to prevent cereal prices from rising rapidly which would hurt the poor (as well as many non-poor). Evidence suggests that there is still a lot of scope to do so through increased use of modern input packages (fertilizer and improved seeds), especially in the food secure areas. However, agricultural intensification in cereal production through increased modern input use alone will clearly not suffice and the constraints to further technology adoption (risk management, input delivery systems, market development) must be better understood.

**7.13 Increasing cereal production in the face of price inelastic cereal demand may lead to large cereal price declines.** When increased production follows from reversible productivity increases (e.g. through the use of fertilizer and improved seeds), this may subsequently generate large (and undesirable) cereal price fluctuations. Or, when productivity increases follow from irreversible investments (e.g. infrastructure facilitating better water and soil management), it may put cereal producers on a price treadmill whereby producers see the gains from their investments being eroded by lower cereal prices, which will force them to either retire from agriculture or engage in another round of productivity increases.

**7.14 However, these risks must be put in the right context and can also be managed.** First, for the 2000-2002 experience, it is generally agreed that the observed collapse in (especially) maize prices was compounded by food aid mismanagement, with food aid being imported while it could have been locally procured to help support local cereal prices. Clearly there is a role for more effective and non-distortive management of food aid. Second, in contrast to maize, the demand for other cereals such as teff and wheat is much less price inelastic (and their supply is also more price elastic)—the observed price collapse in 2000-2002 was indeed the largest for maize. Third, it is important to recognize that for many (rural) poorer households who are net cereal buyers as well as the urban population, declining cereal prices increase their real incomes.

**7.15 To avoid large price fluctuations and/or a price treadmill in cereals, better food aid management and complementary actions especially in market development and agricultural diversification are needed.** A simultaneous increase in the production and productivity of non-staple tradables (livestock, traditional and non-traditional agricultural export crops), in addition to increased cereal production, can foster the production linkages, help generate off-farm employment, and generate demand for food which will prevent food prices from collapsing. A more balanced agricultural growth pattern will also facilitate migration out of the food insecure areas and maximize the linkage effects and thus poverty reduction. To do so, focused interventions in staple and non-staple agriculture such as agricultural research and extension will need to be complemented with market development, i.e. proper incentives for farmers and traders, a facilitating institutional environment, and infrastructure to improve market connectivity.

**7.16 Furthermore, agricultural growth strategies will need to be spatially diversified.** While there is still some scope for intensification of food production in the northern dry lands of Ethiopia, this should be complemented with promoting livestock production and tree planting, indicating the desirability of the broader extension packages currently pursued by the government. Moreover, to successfully intensify food production, promotion of the use of

fertilizer and improved seed packages (e.g. for sorghum) will need to be complemented with the adoption of soil conservation structures (e.g. stone terraces) and sustainable land management practices as well as better water and risk management. The current food for work programs when complemented with sufficient technical assistance could be usefully used to help build these infrastructures.

7.17 In the high potential cereal producing areas of the central and northwestern highlands, a continued focus on intensive cereal production through increased use of input packages is warranted given the existing scope for substantial yield increases. This strategy could be usefully complemented with the development of dairy production in areas closer to urban markets. Continued focus on intensification of food production through improved seeds and fertilizer use and concerted efforts to increase productivity of coffee production and marketing efficiency hold promise to foster agricultural growth and reduce poverty in the humid high potential perennial zones in the southern and western highlands. In addition to further intensification of cereal crop production, development of the dairy industry in peri-urban areas, tree planting, and the promotion of non-traditional agricultural exports, including floriculture and horticulture products also hold promise in Central Ethiopia around Addis Ababa, initially without much additional public investment.

#### ***Returns to public investment at the margin and the role of foreign aid***

7.18 **Many public investments benefit both agricultural and non-agricultural growth.** While an agricultural led growth strategy does require continued investments in agricultural research and extension and other agricultural specific investments (e.g. soil conservation), many of the necessary investments to foster agricultural growth (both in the food and non-food sector) lie actually outside of agriculture, such as investments in infrastructure, education, health, and access to information. As both agricultural as well as non-agricultural activity usually stand to benefit from these investments, the debate about agriculture versus non-agriculture seems often ill conceived from this perspective.

7.19 **The pay-offs to education both for rural male and especially for rural female adults are still huge, warranting a continued focus on public investment in education, even though the benefits will only be felt over time.** The micro-simulations suggest that bringing all male and female adults up to at least a 4<sup>th</sup> grade education could potentially reduce poverty incidence by 18 percent, with the gains from enhancing female primary education twice those of enhancing male primary education. Education will be necessary to help households adopt new technologies and thus enhance their agricultural productivity. In addition, the more educated are usually more likely to migrate, and education is strongly correlated with the adoption of off-farm work. Targeting education and training efforts to the landless as well as the more food insecure areas may facilitate their migration out of agriculture and poverty, and provide the necessary trained workforce to respond to increased demand for locally produced goods and services following agricultural intensification. Yet while the next generation is being educated, the scope for adult literacy campaigns should also be explored to generate a more immediate impact. The determinants of primary school enrollments and the policy implications of rapidly increasing school enrollments will be discussed in more detail in Chapter 10.

**7.20 Tremendous gains are possible from increasing access to information.** Providing a radio to the poorest quintile of the population having similar poverty reducing effects as bringing all female adults to 4<sup>th</sup> grade completion, warranting some reallocation of the current investment portfolio at the margin. Information is a powerful transformer, especially when the majority of the population is illiterate, living in isolation, and virtually excluded from any source of information or knowledge, as in Ethiopia. In such circumstances, radio is a powerful tool to promote better farming techniques, to enable better timing of farming through weather forecasting, to facilitate market integration by communicating food prices, to enhance people's knowledge of health and nutrition and promote better hygiene and nutritional practices, and to foster development more generally throughout Ethiopia. Radio is also a major dialogue initiator, explaining the important observed externality effects of radio ownership within communities. It is estimated that providing the poorest quintile of the population with a radio would increase average consumption by five percent, reduce poverty incidence by 11 percent, and reduce the poverty gap by about 40 percent. These effects are similar to those of bringing all female adults to 4<sup>th</sup> grade completion. Moreover, the marginal beneficial effects of radio ownership are real, empirically robust, and high compared to the marginal costs, making investment in increasing access to information a very cost effective and especially timely intervention to connect rural Ethiopia to the rest of the world and reduce their poverty.

**7.21 Promoting market connectivity through improved access to roads in addition to access to information will be critical to stimulate and distribute the benefits from increased agricultural and non-agricultural production.** Access to markets as proxied by proximity to urban centers and roads contributes greatly to increased agricultural production, diversification of agriculture into non-food production and thus overall poverty reduction. Roads bring direct short term employment, generate access to markets and services, facilitate migration and exchange of information and ideas, and bring long term off-farm employment opportunities. Continued emphasis by the government on expanding especially the rural road network as envisaged in the current road development plans is warranted.

**7.22 Policies to strengthen households' asset base should be supplemented with promoting a broad range of ex-ante and ex-post risk management strategies.** The evidence on the large impact of shocks, and especially their ratcheting, persistent effects highlight the high benefits of containing any crisis and the need to find ways of supporting those affected by a crisis well beyond the initial crisis period. Public works programs and other safety nets clearly have a role to play, but targeting is often difficult and timing issues continue to impact their ability to handle local level crisis. Moreover, both in food secure and food insecure areas risks and the absence of efficient tools to cope with them ex post may prevent many poorer people from adopting more productive, but higher risk, production technologies such as fertilizer and more remunerative crop portfolios. While the empirical existence of such a risk-induced poverty trap needs to be further documented, there are nonetheless good indications that many synergies could be obtained from the joint provision of insurance (e.g. rainfall-based insurance), credit, and inputs. Effective insurance mechanisms (including productive safety nets and public work programs) would also reduce asset depletion in the face of a shock, preventing households from falling into a poverty trap. Reducing household vulnerability to crisis will also have to imply reducing the dependence on

a small number of agricultural based livelihood strategies, and effectively promoting the use of water management techniques.

**7.23 Institutional and resource obstacles to the generation of off-farm employment and the enhancement of returns to the current endowment base must be removed.**

While agricultural intensification should generate demand for locally produced goods and services, and thus stimulate local employment, institutional supply constraints in factor markets must be addressed. As testified by several citizens close to rural towns, there is increasing competition among farmers and non-farmers for land, which is often allocated in favor of the former. Limited availability of land for residential and business purposes appears to be an important constraint to the development of off-farm employment. Other obstacles include access to credit and knowledge to start off-farm businesses.

***The need for increased aid flows must be carefully balanced against absorption capacity constraints***

**7.24 The need for massive public investment is undisputed.** As indicated, people's private and public endowment bases are extremely low. Moreover, many of the necessary investments such as those in children's education, children's nutritional status and health, and those in infrastructure will only pay off in the long or medium term respectively, while the immediate demands (e.g. food crises, health expenditures) are huge compared to the available resources. The necessary trade-offs between investment in the future and the need to cater to immediate demands partly traps the country in poverty. Along with the recognition of these needs and discrepancy in timing comes the imperative for increasing foreign assistance.

**7.25 To be sustainable and effective, increased aid flows will need to be carefully balanced against simultaneously increased absorption capacity.** While the simulations indicate that substantial aid flows will indeed be needed to reach the poverty MDG, the capacity of the current system of government to translate these increased aid flows into poverty reduction within acceptable fiduciary risks will need to be closely monitored. Important processes have already been put in motion over the past years to facilitate increasing aid flows under the public sector reform program and the Public Sector Capacity Building Program. Yet concerns remain regarding the limited number of qualified government employees to properly channel these additional fiscal flows, the limited ability of the government to contract out the supply of services to the local private sector, and the limited capacity of the private sector to supply such services. How the tensions between the need for massive public investment and foreign aid and the limited absorption capacity can be properly managed will need to be at the center of our attention for increased aid flows to be effective in reducing poverty.



### **Part III: Determinants of Non-Monetary Well-Being**

As discussed in Part I, assessing people's non-monetary dimensions of well-being (their human capabilities and their empowerment status), as well as exploring how these dimensions could be improved form an integral part of an evaluation of people's overall well-being. In this part of the report, we will focus particularly on the determinants of human capabilities, which are both intrinsically and instrumentally valuable, and comment briefly on other interventions necessary to enable people to make effective choices in their lives. Indeed, only individuals who are able to live free from hunger and preventable illnesses, and with adequate numeracy and literacy skills to participate in civic and market activities, are able to realize their maximum potential as human beings. Widespread subscription to the Millennium Development Goals is evidence of the intrinsic value ascribed to achievements in human development across countries and cultures.

From Part II it is also clear that improvements in human development outcomes have tremendous instrumental value and are in fact essential for inclusive, equitable and sustainable economic growth, vulnerability mitigation and poverty reduction. This is especially true of the nutrition, health and education outcomes of women and children. Early childhood malnutrition creates a nutrition-productivity poverty trap from which escape later in life may be impossible. Poor nutritional status among pregnant women and infants can have irreversible impacts on the cognitive development of children, reduce their educational attainment, and thereby negatively affect their labor productivity and earnings as adult workers. While in many countries, including Ethiopia, households maintain a bias against investing in female schooling, the individual and social returns to female education are extremely high, as discussed in Chapter 4. Moreover educated mothers are also less likely to have malnourished children and children who die prematurely from infectious disease, and are more likely to enroll their children in school.

In identifying causal pathways and policy levers that can be used to improve human capabilities in Ethiopia, this part of the report also seeks to fill some of the knowledge gaps identified in Ethiopia's SDPRP. We will try to shed light on the relative importance of demand and supply side factors in reaching the MDGs, especially in the education sector. Building additional schools and supplying new teachers and financial resources to the educational system may not be enough to engender broad-based expansion of the human capital base of the country's workforce if the demand for schooling remains low. Low enrollment rates may be perpetuated by demand side factors such as income poverty, labor shortages on smallholder farms, gender-based discrimination within the household, and risk and vulnerability considerations which force poor people into making tradeoffs between meeting immediate consumption needs versus investing in their children's schooling. Poor people themselves identify education as a road out of poverty over the long-run<sup>252</sup> and this is also borne out in our quantitative analysis in Chapter 4.<sup>253</sup>

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<sup>252</sup> Rahmato and Kidanu, 1999; Legovini, 2004.

<sup>253</sup> A large beneficial effect of education in household welfare is reported by Kronlid (2001). Data comes from three waves of the Ethiopian urban socio-economic survey for the years 1994, 1995 and 1997. The author estimates returns to education in terms of the effect of main income earner's education on log of per adult monthly income of the household, and finds returns of 13 percent, 28 percent, 37 percent and 153 percent respectively for primary, secondary, post-secondary and tertiary education. These effects are all significant at

We also explore cross-sectoral linkages and spillover effects across MDGs, and comment on the trade-off between equity and efficiency in reaching these targets. For example, female educational attainment may influence demand for child education as well as child mortality outcomes. Health services interventions (such as deworming or improving health care access) may boost primary school attendance among children. As governments and policy makers seek to maximize the human development impact of public spending over the next decade in pursuit of the MDGs, it will be crucial to carefully consider synergies between different types of interventions, as well as the sequencing of interventions that will lead to the largest improvements in human development outcomes. While the cost calculation and budgetary impacts of spending programs that seek to improve human development outcomes have been considered at length in Sectoral Country Status Reports, PERs, and macroeconomic management discussions, the microeconomic perspective of what drives outcomes and which interventions might have the most direct impact on specific human development outcomes has been the missing link thus far in policy discussions. This part of the study aims to fill this link. In doing so, we also highlight the magnitudes and nature of disparities in human development outcomes among poorer and richer households (as indicated by their asset or consumption levels).

Part III of the study is organized around three interlinked pathways to improving basic human capabilities of people. These comprise: reducing child malnutrition (Chapter 8); improving health outcomes with an emphasis on child mortality (Chapter 9); and improving primary school enrollment and completion (Chapter 10). For each pathway, we highlight the magnitude of disparities in key human development outcomes across regional, rural/urban and gender lines, explore their determinants using microeconomic data, and pinpoint policy levers and interventions that would be most effective in reducing these disparities and accelerating progress toward the MDGs in Ethiopia. This chapter is not meant to provide an exhaustive account of the challenges facing the education and health sectors in Ethiopia.<sup>254</sup> Rather, our focus is on the determinants and cross-sectoral linkages between key MDG outcomes and interventions, and the opportunities that policy-makers have to substantially improve people's human capabilities, and especially those of the poor, beyond the policy levers immediately available in their sector. Chapter 11 concludes.

## **CHAPTER 8. CHILD MALNUTRITION, FOOD SECURITY AND ECONOMIC GROWTH**

### **8.1 The Nutrition-Poverty Trap—Another Lost Generation in the Making**

**8.1 Not only is being well-nourished widely considered one of people's primary capabilities, malnutrition also poses a large burden on current and future economic growth.** Early childhood malnutrition (among children between six and 36 months) can cause irreversible damage to brain and motor-skill development, stifle human capital

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the conventional level. However, other studies have found low private returns to primary education in Ethiopia (Appleton, 1995; Krishnan, et. al., 1998).

<sup>254</sup> For a detailed account of the education and health sector please see World Bank, 2004a and 2004b.

formation by causing delays in enrollment and later increasing the probability of grade repetition and drop-out, lower current health status, and increase the lifetime risk of chronic diseases associated with premature mortality. Through impairing the cognitive function and process of skill formation in the next generation of workers, and increasing vulnerability to chronic illness, child malnutrition can have lasting impacts on long-run economic growth and poverty alleviation. Even among adults, hunger and malnutrition can have severe economic consequences. Poor nutritional status reduces an individual's ability to concentrate and engage in strenuous physical activity necessary to grow crops. Micronutrient deficiencies such as anemia are associated with lower worker productivity and reduced earnings.<sup>255</sup> Adult workers who do not consume sufficient calories to be productive in manual labor jobs will earn less<sup>256</sup> and may also face greater risk of unemployment and illness. As a result their children may also run a higher risk of experiencing severe malnutrition.

**8.2 Ethiopia has one of the highest child malnutrition rates in the world** and due to its extreme vulnerability to recurring droughts coupled with its dependence on rain-fed agricultural production for survival, the Ethiopian population is especially susceptible to both long-term and transient malnutrition.<sup>257</sup> Nonetheless, child malnutrition has slipped from the policy agenda over the past two decades. Ethiopia's SDPRP does not even consider the problem of child malnutrition.

**8.3 The current lack of focus on malnutrition in the policy arena is in stark contrast to the attention child malnutrition received prior to the 1990s**, when Ethiopia was recognized as an African center of excellence in the area of nutrition policy, research, and practice. Many of Ethiopia's neighbors looked to the Ethiopia Health and Nutrition Research Institute as among the best of its kind. After the early 1990s, however, advocates saw a decline in the prominence given to nutrition in both programs and policy debate, accompanied by a "brain-drain" of top professionals in related disciplines out of the country. In addition, the status of the Ethiopian Health and Nutrition Research Institute was downgraded, and responsibility for formulating nutrition policy was dispersed across three different agencies (the Ministry of Health, the Bureau of Food Security under the Ministry of Rural Development, and the Disaster Prevention and Preparedness Commission) each of which has significant other responsibilities and agendas.

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<sup>255</sup> Li., et al., 2003; Basta, et. al., 1979.

<sup>256</sup> Croppenstedt and Muller (2000), provide Ethiopia-specific evidence from the 1994 EHRS of the negative effects of adult undernutrition on agricultural production and wages. They find an output elasticity of 1.90 to 2.26 with respect to adult weight for height of the household head (a measure of short run malnutrition), which means that at the mean an increase in weight for height by one standard deviation would increase total value of agricultural output by 27 percent. Similarly, they find an elasticity of weight for height and Body Mass Index (BMI=body weight /body height squared) of 3.02 and of 3.04 respectively on wages. This means that at the mean an increase in weight for height and the BMI by one standard deviation would increase wages earned in rural areas by 29 percent and 26 percent respectively. In either case, undernutrition appears to have a strong negative effect on adult labor productivity (production or wages). These figures are toward the upper end of the range reported in the literature, consistent with the observed severity of adult undernutrition in Ethiopia. The average BMI among wage workers in the 1994 EHRS sample is 19,8 with a standard error of two. People with a BMI below 1.85 are considered undernourished.

<sup>257</sup> Children between six and 24 months were found to experience about 0.9 cm less growth over a six-month period in communities where half the crop area was damaged compared to those without crop damage (Yamano, Alderman and Christiaensen, 2005).

**8.4 This dispersion of responsibility has prevented the formulation of, and agency ownership over, a coherent and comprehensive agenda aimed at reducing child malnutrition** during both drought and non-drought years. At the institution level, the problem of malnutrition has been given second or third priority behind competing sector objectives. Even in cases where malnutrition has received attention, the weak linkages between the various agencies working on different aspects of nutrition policy—including food security, disaster response planning, health, sanitation, and agriculture—has exacerbated the disconnected way in which nutrition policy is formulated in Ethiopia. The lack of transparency concerning the institutional responsibilities regarding nutrition has left nutrition policy largely abandoned despite its importance for long-run economic growth.

**8.5 What is malnutrition and how do we measure it?** Malnutrition is a condition in which an individual lacks adequate macronutrients (protein and calories) and micronutrients (including zinc, iodine, and iron) to live a fully productive life. Poor nutritional status is an immediate function of dietary intake and health status. Infectious diseases such as malaria, intestinal parasites and infectious diarrhea can lead to malnutrition among children even if micro and macronutrients are available by preventing absorption of key nutrients and reducing effective caloric intake. Broader underlying causes of child malnutrition at the household level include household food security, the availability and quality of health services and the sanitary environment, as well as the use of appropriate caring practices by the household. Physiological measures used to identify an individual who is suffering from malnutrition include: anthropometric indicators (such as low birth weight, stunting, wasting and underweight status in preschool or school-age children, and low body mass index among adults or adolescents); clinical indicators (including iodine deficiency); and laboratory indicators (including low hemoglobin in preschool or school-age children and non-lactating, non-pregnant women).<sup>258</sup> Key measures of nutritional status and their interpretation are shown in Table 8.1 below.

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<sup>258</sup> Behrman, Alderman, and Hoddinott, 2003.

**Table 8.1: Measures of nutritional status**

Indicator	Interpretation
<b>Anthropometric Indicators</b>	
Low birth weight	An indicator of intrauterine growth retardation resulting from short maternal stature, poor maternal nutrition before or during pregnancy, infection and smoking.
Low height-for-age (stunting) in preschool or school-age children	Children's skeletal (linear) growth compromised due to constraints to one or more of nutrition, health, or mother-infant interactions. This is an indicator of chronic nutritional deprivation.
Low weight-for-age (undernutrition) in preschool or school-age children	Children suffer thinness resulting from energy deficit and/or disease-induced poor appetite, malabsorption, or loss of nutrients. This is an indicator of transitory nutritional deprivation, though it usually correlates well with low height for age. This is an MDG indicator.
Low weight-for-height (wasting) in preschool or school-age children	Children suffer thinness resulting from energy deficit and/or disease-induced poor appetite, malabsorption, or loss of nutrients. This is an indicator of transitory nutritional deprivation.
Low body mass index in adults or adolescents	Adults suffer thinness as a result of inadequate energy intake, an uncompensated increase in physical activity, or (severe) illness.
<b>Clinical Indicators</b>	
Iodine deficiency	Iodine deficiency results from low intake of iodine in the diet.
<b>Laboratory Indicators</b>	
Low hemoglobin (anemia) in preschool or school-age children	Children suffer from anemia either as a result of low iron intake or poor absorption, or as a result of illness. Severe protein-energy malnutrition and vitamin B12/folate deficiency can also lead to anemia.
Low hemoglobin (anemia) in non-lactating, non-pregnant women.	Women suffer from anemia as a result of low iron intake, poor absorption, illness, or excessive loss of blood. Severe protein-energy malnutrition and vitamin B12/folate deficiency can also lead to anemia. Anemia is rare in adult men except in conditions of extreme iron deficient diets.

Source: Behrman, Alderman, and Hoddinott, 2003, quoting ACC/SCN, 2000a, Morris, 2001

## 8.6 There are three key channels through which child malnutrition can create poverty traps.

**First, severe malnutrition during the first few years of life negatively impacts the cognitive and psycho-motor development of infants, often causing irreversible damage.** Fetal iodine deficiency is known to cause irreversible damage to central nervous system development.<sup>259</sup> Children who have suffered from nutritional deficiencies early in life perform worse on aptitude tests.<sup>260</sup> Some studies suggest that the retardation of psycho-motor development in young children due to early childhood malnutrition may also be permanent. In particular, the motor development skills of infants hospitalized for severe malnutrition were found not to recover at all, even after six months of intensive nutritional rehabilitation.<sup>261</sup>

<sup>259</sup> Dasgupta, 1997.

<sup>260</sup> Pollitt, 1990; Dasgupta, 1997.

<sup>261</sup> Chavez and Martinez, 1984.

**Second, child malnutrition directly impacts health status as well as risk of illness during childhood and adult years.** Low-birth-weight (LBW) babies tend to be sicker and have higher mortality rates than non-LBW babies. Alderman and Behrman (2003) find that in low income countries for every birth that occurs in the 2,500-3,000 gram range instead of the 2,000-2,499 gram range, the probability of neonatal or post-neonatal infant mortality decreases by 7.8 percent. Likewise, a study on both fraternal and identical twins suggests that an additional pound at birth decreases the probability of infant death during the period 28 days to one year by 14 percent.<sup>262</sup> In addition, malnutrition during childhood is found to be associated with chronic diseases that can cause premature death among adults, including coronary heart disease, non-insulin dependent diabetes, high blood pressure, obstructive lung disease, high blood cholesterol, and renal damage.<sup>263</sup>

**Third, malnutrition and poor nutritional status among children directly impacts their educational attainment, learning effectiveness and efficiency, as well as their probability of grade repetition.** Malnutrition and poor nutritional status may cause caregivers to be less willing to invest in schooling for a child (due to poor cognitive capacity). Malnourished children tend to have delayed entry into primary school (which is associated with lower lifetime earnings), and are more likely to repeat grades. Empirical research from Ghana suggests that for each year of delay in entry to primary school a student loses three percent of lifetime wealth.<sup>264</sup> Girls who have low educational attainment are more likely to have malnourished children later in life and children who die prematurely.<sup>265</sup> Malnourished children are less likely to pay attention in school and less able to study productively than well-nourished peers.<sup>266</sup> This is true even if the cognitive capacity of malnourished children has not been permanently impaired. Malnutrition among school children thus may impede human capital formation and reduce educational effectiveness.

**8.7 Early childhood malnutrition has long-run impacts on the economic and physical well-being of the poor throughout their lifetimes.** Physical stunting caused by severe malnutrition during childhood is associated with lower earnings as an adult. Thomas and Strauss (1997) find that a one percent increase in height among adult workers in urban Brazil leads to a two-2.4 percent increase in lifelong wages or earnings. In addition, physical height has been found to be a statistically significant explanatory variable for wages in the United States.<sup>267</sup> Workers who suffered from early childhood malnutrition are likely to have low cognitive achievement as adults, and low schooling attainment which translates into lower labor productivity and lifetime earnings.<sup>268</sup> Lowered stature as a pre-schooler following

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<sup>262</sup> Conley, Strully and Bennett, 2003.

<sup>263</sup> Barker, 1998.

<sup>264</sup> Glewwe and Jacoby (1995) find delayed enrollments among the malnourished in their cross-sectional study, but not different in the total years completed. By contrast, Alderman, Hoddinott and Kinsey (2003) track a cohort of Zimbabweans over two decades and find both delayed school entry and lower grade completed for malnourished children. Corroborating evidence from India suggests that better nourished children start school earlier and repeat fewer grades (Glewwe, Jacoby and King, 2001).

<sup>265</sup> Alderman, Hoddinott, and Kinsey, 2003.

<sup>266</sup> Behrman, Alderman, and Hoddinott, 2003.

<sup>267</sup> Strauss and Thomas, 1998.

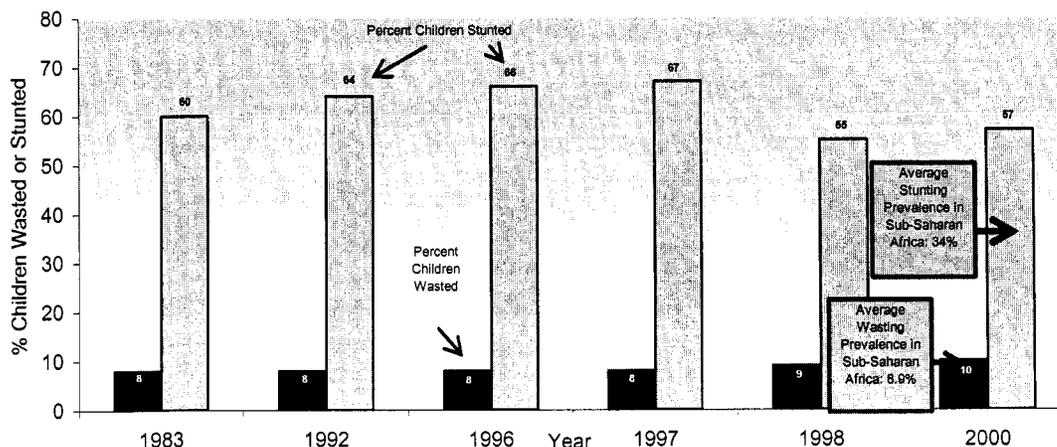
<sup>268</sup> See Martorell, 1995; Martorell, Rivera and Kaplowitz, 1989; Haas et al., 1996; Martorell, 1999; and Martorell, Khan and Schroeder, 1994.

exposure to the 1982-84 drought in Zimbabwe was found to result in a permanent loss of stature of 2.3 cm, a delay in starting school of 3.7 months, and 0.4 grades less of completed schooling. The combined effect of these different factors was estimated to reduce lifetime earnings by seven percent.<sup>269</sup> Against this background, we consider recent trends in, and causal determinants of, child malnutrition in Ethiopia, and seek to highlight inexpensive policy options that could potentially enable the country to significantly reduce malnutrition, especially among children.

## 8.2 A Profile of Child Malnutrition in Ethiopia

8.8 Since the early 1980s, child stunting prevalence in Ethiopia has persisted at around 60 percent, and is among the highest in the world.<sup>270</sup> Child stunting, which is measured as abnormally low height for age in children, is an indicator of poor long-run nutritional status. Although the prevalence of child stunting in Ethiopia decreased during the second half of the 1990s, the prevalence in 2000 was still significantly above the Sub Saharan African average of 34 percent (estimate excludes Ethiopia), and only slightly below the 1983 level of 60 percent, indicating significant scope for further reduction over the next decade (Figure 8.1). Child wasting (or abnormally low weight for height) is a measure of short-run nutritional deprivation in children. Child wasting prevalence in Ethiopia has recently increased, from eight percent during the 1990s to 10 percent in 2000, which is slightly above the sub-Saharan average of nine percent.

Figure 8.1: Percent of children wasted and stunted in Ethiopia, 1983-2000



<sup>1)</sup> stunted = height-for-age z score < -2; wasted = weight-for height z score < -2.

<sup>2)</sup> The 1983 nutrition survey covers about 9,000 children across all rural areas except Tigray; the 1992 nutrition survey covers more than 20,000 children across all rural areas; the 1995/96, 1997, 1998, and 1999/2000 Welfare Monitoring Surveys cover about 6,000, 8,000, 29,000, and 15,000 children respectively.

<sup>3)</sup> 1983 and 1992 surveys comprise 6-59 months old children, the other surveys 3-59 months old children.

<sup>4)</sup> 1996 and 2000 figures based on 1<sup>st</sup> and 2<sup>nd</sup> round of the WMS (June 1995/January 1996, and June 1999/January 2000 respectively)

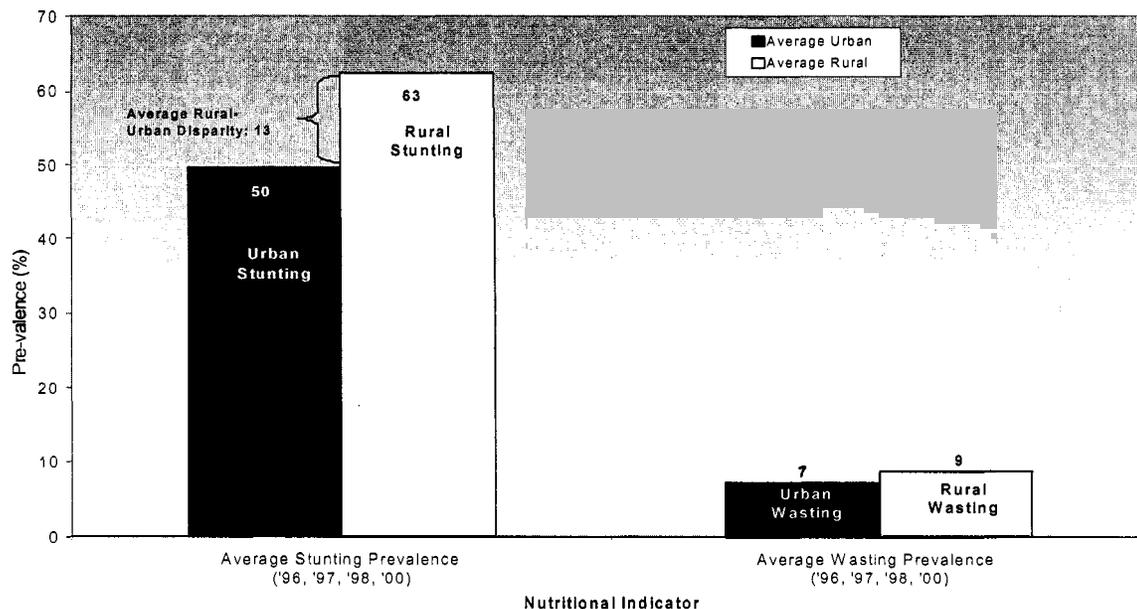
Source: CSA, *Rural Nutrition Survey, 1983*; CSA, *Rural Nutrition Survey, 1992*; CSA, *Health and Nutrition Survey, 1998*; CSA, *Welfare Monitoring Surveys, 1995/96, 97, and 1999/2000*

<sup>269</sup> Alderman, Hoddinott, and Kinsey, 2003.

<sup>270</sup> Christiaensen and Alderman, 2004.

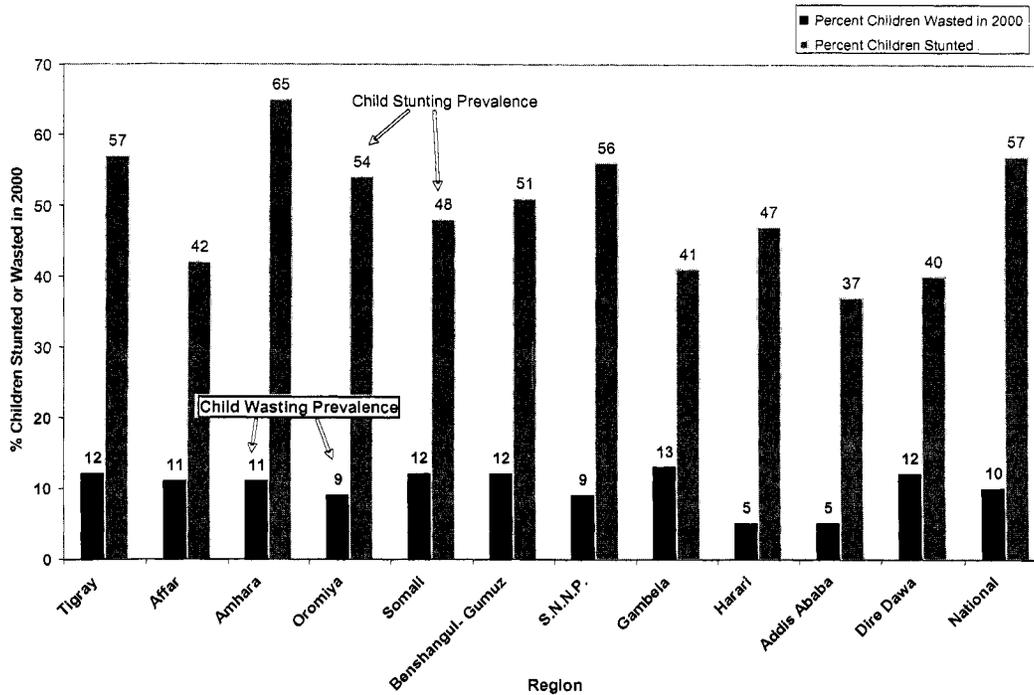
8.9 **The national estimates of child stunting and wasting prevalence mask significant urban-rural and regional variations** (Figures 8.2 and 8.3). Perhaps the largest and most persistent disparities in child nutritional outcomes in Ethiopia exist between rural and urban areas. Taking averages over the four most recent years for which we have data, child stunting prevalence in rural Ethiopia is 63 percent, versus 50 percent in urban areas. The average disparity in wasting prevalence between rural and urban areas is not as large, with prevalence averaging nine percent in rural areas and seven percent in urban areas.

Figure 8.2: Child stunting and wasting in urban vs. rural areas, 1996-2000



8.10 The regions with the poorest long-run nutritional indicators are Amhara, Tigray, Oromiya and SNNP (Figure 8.3). Amhara is the only region with a higher child stunting prevalence than the national average (65 percent versus 57 percent) in 2000. Addis Ababa, Dire Dawa, Afar and Gambela all have relatively lower child stunting prevalence (falling in the range of 37 to 42 percent). Improvements in the long-run nutritional status of children have been slowest in Amhara and Oromiya, two regions with among the highest child stunting prevalence in Ethiopia. The regional variations in child wasting prevalence are not as large. While Gambela had a relatively low child stunting prevalence in 2000 (41 percent versus 57 percent for the country overall) child wasting prevalence is above the national average (13 percent versus a 10 percent national average). Most regions in Ethiopia have child wasting prevalence in the 11-12 percent range. Notable exceptions are Oromiya and SNNP (each with nine percent child wasting prevalence), and Harari and Addis Ababa (each with five percent prevalence, half the national average). Child wasting and stunting prevalence are not perfectly correlated across Ethiopia's regions, suggesting that transient malnutrition is more pervasive in some regions of Ethiopia, and chronic malnutrition in others. Regional variations in child nutritional outcomes may be linked to differences in drought incidence and severity, illness prevalence, and coverage of food security programs.

Figure 8.3: Child wasting and stunting in Ethiopia by region, 2000.<sup>1)</sup>



<sup>1)</sup> Child stunting is defined as height-for-age z score < -2.

Source: CSA, Rural Nutrition Survey, 1983; CSA, Rural Nutrition Survey, 1992; CSA, Health and Nutrition Survey, 1998; CSA, Welfare Monitoring Surveys, 1995/96, 97, and 1999/2000

**8.11 Gender-based disparities are relatively small in Ethiopia, and opposite to the commonly expected direction.** Malnourishment among boys is larger than among girls. Averaging across four years for which we have data, male stunting prevalence has averaged 63 percent, or four percentage points higher than the prevalence among girls. Similarly, while nine percent of boys in Ethiopia are wasted, only eight percent of girls are. The finding that boys are more likely to be malnourished than girls in Ethiopia is consistent with nutritional outcomes in other African countries<sup>271</sup>, but opposite the patterns observed in Asia and Latin America, where girls are consistently discriminated against in the allocation of food resources within the household. The reasons for this difference are not fully understood.

<sup>271</sup> Svedberg, 1990; Sahn and Stifel, 2000.

### 8.3 Determinants of Child Malnutrition

8.12 Empirical analysis using three years of Welfare Monitoring Surveys augmented with data on food prices was used to model the determinants of children's long-run nutritional status in Ethiopia as measured by height for age z-scores (HAZ-scores)<sup>272</sup> among children aged three to 60 months.<sup>273</sup> The results suggest that the key determinants of long-run child nutrition outcomes in Ethiopia include the following: household income, female adult education, community nutritional knowledge, and food prices. We review the empirical findings of this study in greater detail below. Full regression results are presented in Table A.8.1 in Appendix 3.

8.13 **There is only limited catch up growth after the age of three.** The coefficients on the age variables suggest that a malnourished child's standardized height deteriorates up to the age of three, and only slightly improves thereafter. This shows that there is very limited scope for catching up on child growth performance after age three, and is consistent with the growing body of evidence indicating that growth lost in early years is at best only partially regained during childhood and adolescence, especially when children grow up in poor environments. In other words, interventions to improve children's nutritional status must be targeted to those below three years.

8.14 **The effect of female education is about twice as large as that of male education, though both have a large positive effect.** Each year of primary or secondary education of the most educated female adult in the household increases, *ceteris paribus*, a child's HAZ-score by 0.03. In other words, were all women to complete six years of primary schooling, the current average gap between the nutritional status of Ethiopia's children and the nutritional status of the reference population would be reduced by seven percent.

8.15 **Post secondary schooling also has a strong and positive effect on child nutritional outcomes.** The HAZ-score of children in households where a female adult has obtained post secondary education is on average 0.23 larger than those in households where the most educated female adult completed secondary schooling, and 0.60 larger than those in households with no formally educated female adults. The current average HAZ-score of Ethiopian children between six and 60 months old is -2.48. Children with HAZ-scores below two are considered stunted and those with HAZ-scores below three are considered severely

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<sup>272</sup> To assess chronic child malnutrition, a child's height for age score is compared to the average height for age score of a child of the same sex in a well nourished reference population. By dividing the difference between the child's height for age and the average of the reference population by the standard deviation, one obtains the HAZ-score. Children with a HAZ-score below minus two, implying that that 95 percent of the reference population has a higher height for age score, are usually considered stunted; those with HAZ-scores below minus three, implying that 99 percent of the reference population has larger HAZ-scores, are considered severely stunted.

<sup>273</sup> Data sources used in the analysis include individual, household and community level data used in the empirical analysis are taken from the 1995/96, 1997 and 1998 Welfare Monitoring Surveys (WMS), the 1995/96 household income and expenditure survey (HICES), the 1998 Health and Nutrition Survey (HNS), and regional price data from various quarterly statistical bulletins of the Ethiopian Central Statistical Authority (Christiaensen and Alderman, 2004).

stunted. The education effects discussed here are supplementary to the positive effects of education on child malnutrition through the enhancement of income.

**8.16 Increasing income helps reducing child malnutrition, but other complementary actions will be needed.** As expected, households with greater financial resources have less stunted children, though the effects of income are not large. A 10 percent increase in expenditures removes only 0.7 percent of the gap between the current average HAZ-score in Ethiopia and the reference standard. This estimated effect of income on nutritional status is within the range estimated in other countries across the world, highlighting the fact that economic growth alone will not suffice to reduce child malnutrition in Ethiopia.

**8.17 The presence of a private tap and flush toilet in a household has a positive effect on child height.**<sup>274</sup> This finding suggests that there may be important health linkages with child nutritional outcomes. In both cases the effect is substantial, though the coefficients on flush toilets are estimated with less precision. No correlation was found between child height and indicators that capture access to communication infrastructure, such as ownership of radios or televisions.

**8.18 Children's HAZ-scores are very responsive to relative price variations for staples and key inputs in the cooking process.** Higher teff, kerosene, and charcoal prices are associated with shorter children and the effect is large and statistically significant. The negative effect of higher teff prices on child malnutrition holds after controlling for long run geographical price differences, though it becomes less pronounced. Higher maize, sorghum, beef, and milk prices on the other hand are associated with taller children.<sup>275</sup> However, when accounting for geographical price differences, the signs on the sorghum and beef coefficients reverse.

**8.19 The most striking finding is the positive effect of maternal nutritional knowledge**<sup>276</sup> **on child growth faltering,** over and above the effect of maternal formal education, household income, and other determinants of child malnutrition. As indicated by other studies<sup>277</sup>, if mothers obtain their nutritional information outside school, communal nutritional practices and attitudes must be key in shaping individuals' nutritional knowledge, especially in areas where communication infrastructure (like radios and television sets) are virtually absent. The empirical analysis suggests that increasing the community's ability to correctly diagnose stunted and nonstunted children by 25 percentage points would have effects similar to providing at least one female adult per household with primary education.

**8.20 Harvest failure causes substantial child growth faltering.** Empirical examination of the impact of shocks on child growth in Ethiopia indicates that children between six and 24

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<sup>274</sup> Access to other sources of drinking water which are generally deemed safe, such as public taps and protected wells, did not (positively) affect children's height. They were subsequently omitted from the analysis.

<sup>275</sup> To understand the positive effect of beef prices on chronic child malnutrition, note that people tend to substitute beef for other foods when beef prices decline. As calories and proteins from animal products are relatively more expensive, people's net nutrient intake tends to drop in the process. A similar process would lead to a positive association between milk prices and the height of children.

<sup>276</sup> Proxied by the community's diagnostic capability of growth faltering.

<sup>277</sup> Glewwe, 1999.

months experienced about 0.9 cm less growth over a six month period in communities where half the crop area was damaged compared to those without crop damage.<sup>278</sup> Furthermore, contrary to the usual gender bias against girls, the growth of girls under two suffered less from income shocks than the growth of boys under two. This could be related to greater biological resilience or intra-household dynamics, and is consistent with the observation that boys are more malnourished than girls.

**8.21 Food aid<sup>279</sup> has helped reduce child malnutrition, though its effectiveness in protecting child growth from shocks has been somewhat muted** due to inflexible targeting rules in the face of shocks. Children in communities that received food aid grew on average two cm faster in a six month period than if no food aid would have been available. This helps compensate poor child nutrition and growth in communities that are targeted for food aid. In addition, the total amount of food aid appears on average sufficient to offset the negative effects of plot damage on child growth in food aid receiving communities. This result is encouraging as it indicates that food aid has indeed been effective in protecting early childhood growth from droughts and other income shocks in food aid receiving communities. Yet at the same time food aid reception appears to be largely determined by factors other than shocks, and many communities that experience shocks do not receive food aid. In sum, while food aid has helped to reduce child malnutrition in Ethiopia, inflexible food aid targeting in the face of shocks, together with the endemic nature of poverty and extremely low levels of maternal education in Ethiopia, has also left child stunting rates at alarming levels. Given the large impact of shocks on child malnutrition, food aid targeting rules more responsive to shocks, as well as other insurance mechanisms, are called for.

#### **8.4 Policy Actions Needed to Halve the Prevalence of Pre-School Stunting**

8.22 What levers are available to government and donors to help reduce the incidence and severity of child malnutrition in Ethiopia? The authors of the nutrition study discussed above also simulate the effect of different policy interventions on long-term child nutritional outcomes (as measured by child HAZ-scores) in Ethiopia. These simulations, described in greater detail below,<sup>280</sup> enable us to determine the relative importance of enhancing private incomes versus expanding publicly provided services such as education, direct nutrition interventions, and programs to protect against large price and income shocks within the Ethiopian context.

**8.23 First, the study simulates the impact of sustained income growth of 2.5 percent per adult equivalent over a 15 year period.** Though challenging, this is similar to the per capita growth rate needed to reach the poverty MDG. The results suggest that fifteen years of sustained per adult equivalent income growth of 2.5 percent would reduce chronic child malnutrition prevalence by only up to four percent. Income growth alone will clearly not suffice to eliminate child malnutrition in Ethiopia.

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<sup>278</sup> Yamano, Alderman, and Christiaensen, 2005.

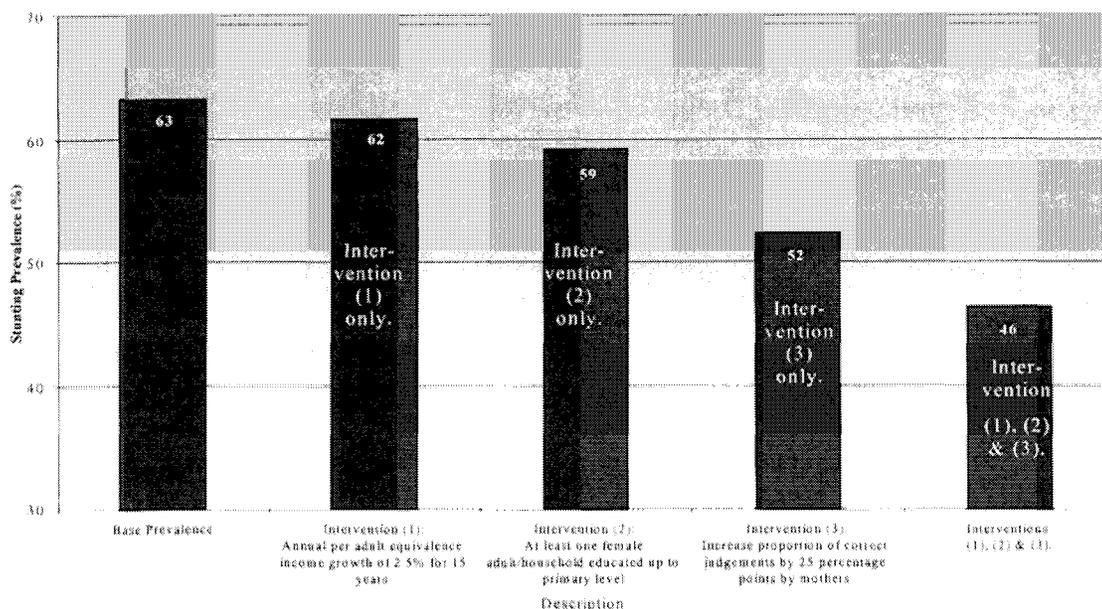
<sup>279</sup> Ethiopia is one of the major recipients of food aid worldwide. Approximately one-fifth to one-quarter of all food aid deliveries to Africa over the past decade have gone to Ethiopia, with food aid estimated at 20 percent of domestic production in drought years (Jayne et al., 2003).

<sup>280</sup> Complete regression results are provided in Table A.8.2 in Appendix 3.

8.24 **Second, the study investigates the impact of bringing at least one female adult per household up to the primary education level.**<sup>281</sup> This intervention would reduce child stunting prevalence by six to 12 percent in Ethiopia (depending on the model used). When one also accounts for the indirect effect of education on nutrition via its impact on household income (thereby increasing the income growth rate *above* the initial simulation), the prevalence of stunting would decrease by seven to 12 percent. While increasing male adult education also improves child nutrition, its effect is much smaller in magnitude. This follows from the smaller effect of male education on child malnutrition and the fact that male adults already have more education. If a combination of private income growth and enhanced female adult education were adopted, child growth faltering could be reduced by 10 to 20 percent of Ethiopia’s current prevalence (Figure 8.4).

8.25 **Third, the study investigates the effect of an increase in communities’ ability to correctly identify growth faltering.** Increasing a community’s capacity to correctly identify growth faltering in children by 25 or 50 percentage points would reduce the prevalence of stunting in the population by three to seven and five to 12 percent respectively. The effect of the latter intervention is similar to that of 15 years of 2.5 percent income growth, and is about as large as the total female schooling effect, suggesting that the gains from enhancing nutritional knowledge amongst mothers and communities are considerable. Taken together, income growth, increased female education and improved nutritional knowledge would diminish the prevalence of child stunting by up to 31 percent depending on the base distribution. While this would leave Ethiopia still far from the objective of halving child malnutrition by 2015, important progress can be made by taking a cross-sectoral approach.

Figure 8.4: Prevalence of child stunting in Ethiopia



<sup>281</sup> The authors considered 6<sup>th</sup> grade completion as completing primary schooling.

**8.26 Fourth, the study explored the effect of a 25 percent increase in real prices of maize, teff, and sorghum, corresponding to observed price increases during drier years.** This simulation is important given the drought-prone nature of the Ethiopian climate, and climate dependent nature of its economy. It sheds light on the malnutrition reducing potential of controlling price fluctuations by for example fostering cereal market integration and the use of grain reserves and warehouse receipts. The results suggests that an increase in cereal prices by 25 percent, not at all uncommon even within the time span of one year (Table A.8.2) would increase the prevalence of child malnutrition by three to four percent. While higher cereal prices would diminish the nutritional status of children in net cereal consuming households, they may also positively affect the nutritional status of children in net cereal producing households if the indirect income effect exceeds the direct consumption effect. However, as discussed in Chapter a substantial group of poor Ethiopian households are estimated to be net cereal buyers. Moreover, both net producers and net buyers may often sell at low prices during the immediate post harvest season and buy at high prices during the hunger season.

**8.27 Fifth, interventions reducing crop damage could substantially increase early childhood growth in the critical age range for intervention.** For example, interventions which reduced the crop area damaged by 25 percentage points could increase height growth among children between six and 24 months old by almost 0.5 cm over a six month period. Better targeting of food aid in response to covariant and idiosyncratic shocks at the household level is called for, though additional interventions to strengthen households' capacity to cope with shocks such as rainfall based insurance and strengthening of informal insurance mechanisms through local institutions (e.g. iddirs) should be explored as well. In addition, better pest and water management techniques would be important avenues through which to prevent the occurrence of crop damage in the first place. The relative cost effectiveness of strengthening ex ante risk mitigation versus ex post coping capacity needs to be further examined.

## **8.5 Concluding Remarks**

**8.28 Reducing the prevalence of child stunting and other forms of malnutrition is imperative for long-run economic growth.** Early childhood malnutrition impairs children's cognitive ability, delays their enrollment in school and reduces the number of grades completed. It further increases the risk of future illness. The combined effect on future earnings can be substantial. And yet despite the alarming prevalence of child stunting rates in Ethiopia which have persisted over the past two decades, child malnutrition has largely been neglected in the policy debate in Ethiopia.

**8.29 Simulations suggest that Ethiopia is unlikely to reach the MDG of halving the prevalence of child stunting from its 1990 level.** Nonetheless, substantial progress toward this goal can be made by expanding household income and increasing parental and especially female adult education. In addition, it appears that substantial benefits can be derived from strengthening households' ability to reduce crop damage caused by pests and droughts as well as from strengthening their coping capacities to deal with shocks ex post, either by more shock responsive targeting of food aid or through the development of other insurance mechanisms such as weather based insurance. Similarly, actions which reduce cereal price

increases during drier years would be helpful in reducing child stunting. Finally, interventions aimed at improving sanitary conditions and health infrastructure are likely to have positive effects as well, though this was not confirmed by the data and may in effect be related to the poor quality of current health services.<sup>282</sup>

**8.30 Child growth monitoring and maternal nutritional education programs could play an important complementary role** to other development actions such as promotion of food security, income growth, and parental education, which are already underway. Moreover, while it will take a considerable amount of time before these other interventions substantially affect pre-school child growth faltering, child growth monitoring and nutritional education programs could take effect immediately. The role of other direct nutrition interventions such as micronutrient supplements, promotion of exclusive breast-feeding, and appropriate complementary feeding should be equally considered.

**8.31 Most importantly, increasing awareness about the long term detrimental effects of early childhood malnutrition on future economic growth is necessary.** A comprehensive and coherent multi-sectoral nutrition policy will need to be developed, and the institutional responsibilities of the different ministries and coordination of their actions and interventions in the field of nutrition will need to be clarified. Given its critical importance for economic growth, this agenda should be of great concern to the Ministry of Finance and Economic Development.

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<sup>282</sup> World Bank, 2004b.



## CHAPTER 9. LIVING AND GROWING IN THE FACE OF DISEASE

### 9.1 Health and Poverty

9.1 **Life expectancy and the quality of life associated with good health form the most fundamental human capabilities.** In addition to its intrinsic value, good health has also instrumental value by enhancing worker productivity, facilitating human capital formation, and thus paving the way for long-run increases in living standards and the rate of economic growth. The private and social costs of poor health to society are very high. Children who suffer from infectious disease are more likely to be malnourished and less able to pay attention in school and to learn effectively.<sup>283</sup> Poor health among older workers can negatively impact labor productivity and reduce lifetime income. Infectious diseases that reduce labor supply on smallholder farms, and potentially deplete household savings as a result of increased burial and health care costs, may reduce food security and perpetuate the vicious cycle of illness, poverty and hunger. Certain illnesses, including malaria and HIV/AIDS, pose large threats to both the physical and economic well-being of the overall population in developing countries.

9.2 **Illness and chronic health problems have the ability to trap workers in a vicious cycle of poverty.** There are often large feedback effects between health and income for the poor. Workers in good health are better able to increase their income levels over time. Rising income makes it more likely that they will undertake health investments, thus ensuring better health status over the short and long run. Among children, poor health often interacts with malnutrition to prevent skill formation. Illness among school children is associated with poor performance on aptitude tests.<sup>284</sup>

9.3 **Achieving the health MDGs in Ethiopia will be a daunting task, and will require both supply and demand side interventions** that not only increase access to health care services among the poor but also increase individual awareness of the negative consequences and causes of poor health. Ethiopia currently has approximately 119 hospitals, 451 health centers and 311 pharmacies. Not only does a large proportion of the population thus lack access to a basic health clinic,<sup>285</sup> but the number of physicians and nurses per capita is among the lowest in the world. Presently there are approximately 1,888 physicians and 12,838 nurses for a population of around 67 million people, corresponding to a doctor-patient ratio of one to over 35,000, possibly the lowest in the world. Not only are health professionals in Ethiopia extremely scarce, but they are also predominantly male and concentrated in urban areas, which reinforces gender and rural-urban disparities in health access, utilization and outcomes. Attempts to increase the cadre of trained physicians will be constrained by the paucity of secondary school graduates, as well as the low wages among surgeons and general practitioners compared to what they could earn in other countries. This leads to high emigration and staff attrition rates among key health care workers.

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<sup>283</sup> Dasgupta, 1997.

<sup>284</sup> Pollitt, 1990; Dasgupta, 1997.

<sup>285</sup> Overall, 61 percent of the population (75 percent of urban households and 42 percent of rural households) is within 10 kilometers of a health facility.

**9.4 Even if the poor have access to health care services, their utilization rates are very low.** For example, results reported in the Health CSR (World Bank 2004b) suggest that 25.4 percent of households in the poorest quintile versus 19.3 percent of households in the richest quintile reported recent child diarrhea incidents within the two months prior to the survey. While only 21 percent of those in the poorest quintile sought treatment, a much higher 43 percent of households in the richest quintile sought treatment (see Table A.9.1, Appendix 3). Among those households that did seek treatment, households in the top quintile were more likely to seek treatment in hospitals and health centers where the quality of care is likely to be higher than households in the bottom quintile.<sup>286</sup> Poor access and low health service utilization rates reinforce poor health outcomes among the poor in Ethiopia. Policies that aim to improve the health outcomes of the poor will thus not only need to consider their level of access but also behavioral and institutional factors that influence their utilization of health services when they are available. Availability/access (38 percent) and quality of care (23 percent) were the two main reasons for choosing a facility.

**9.5** In light of these observations, we would ideally like to examine the effects of both health supply and demand side determinants on health outcomes, as we will do in the case of education outcomes in the next section. However, data limitations and methodological considerations prevent us from doing so. Instead, this chapter will focus on one key health outcome, the prevalence of child mortality under five, one of the health MDGs. It will in particular examine the relative importance of a series of household and community characteristics that are commonly found to be important in reducing child mortality, though it will not consider the effect of the quality of the health system per se. Before discussing the determinants of child mortality, we first present a brief health profile of the Ethiopian population.

## **9.2 Health Profile of the Ethiopian People**

**9.6 Illness incidence may be increasing, and women tend to be sick slightly more often than men.** Illness events are both widespread and frequent in Ethiopia, and a recent household survey suggests that their prevalence is increasing over time. While the percent of household heads that reported being sick within the two months prior to being surveyed was 26 percent in 1995, the illness prevalence had increased by 1999 to 37.7 percent. The average incidence of poor health varies regionally as well as between men and women. As illustrated in Table 9.1 below, women are typically more likely to have experienced illness events in Ethiopia than men during the two months prior to the survey.

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<sup>286</sup> World Bank 2004b.

**Table 9.1: Self reported incidence of health problems during the past two months**

	1995 (%)			1999 (%)		
	Male	Female	Both	Male	Female	Both
Tigray	19.7	20.1	19.8	30.5	31.1	30.8
Afar	19.0	17.5	18.8	23.8	26.5	25.1
Amhara	19.8	24.2	20.5	28.4	30.3	29.3
Oromiya	17.0	16.3	16.9	24.8	27.9	26.4
Somali	13.6	16.6	14.0	29.7	37.3	33.5
Benishangul	36.3	44.8	37.7	40.0	36.3	38.1
SNNPR	16.6	23.8	17.8	24.2	27.1	25.7
Gambela	24.8	30.3	26.3	31.0	34.5	32.8
Harari	11.0	8.6	10.4	23.6	26.2	25.0
Addis Ababa	8.9	8.6	8.8	15.7	18.0	17.0
Dire Dawa	9.1	5.6	8.1	34.5	37.6	36.2
Urban	14.1	13.9	14.0	17.5	21.2	19.5
Rural	18.2	22.0	18.8	27.2	29.7	28.4
National	17.8	19.8	18.1	25.9	28.4	27.2

Source: *Ethiopia Welfare Monitoring Surveys 1995 & 2000*

**9.7 Malaria is one of the leading causes of inpatient days in hospitals and outpatient visits in Ethiopia.** The disease burden in Ethiopia is heavily biased toward physical ailments that are associated with poverty, economic destitution and low health access and utilization. Communicable diseases are among the top 10 reasons for outpatient visits, inpatient admissions and death in Ethiopia, many of which can be easily prevented using a combination of targeted health marketing and inexpensive public interventions (Table 9.2). The top causes of death in Ethiopia imply an age distribution of illness that is heavily tilted toward infants and children. Again, the main causes of death among children in Ethiopia are communicable diseases. Approximately 28 percent of under-five child deaths in Ethiopia are attributed to pneumonia—a disappearing cause of death in many poor countries—and 24 percent to diarrhea. HIV/AIDS and malaria account for 6.2 and 4.5 percent of child deaths respectively.<sup>287</sup> HIV/AIDS is a growing cause of death of children in Ethiopia.

<sup>287</sup> World Bank 2004b.

**Table 9.2: Top 10 reasons for outpatient visits, inpatient admissions and death**

Rank		Outpatient Visits		Inpatient Admissions		Causes of Death			
		Number	%	Number	%	Number	%		
1	All types of malaria	328760	10.4	All types of malaria	16782	14.8	Tuberculosis of respiratory system	1005	10.0
2	Helminthiasis	213195	6.7	Pneumonia	10090	8.9	Pneumonia	734	7.3
3	Acute upper respiratory infection	205129	6.5	Tuberculosis of respiratory system	8881	7.8	All types of malaria	462	4.6
4	Bronchopneumonia	173123	5.5	Accidents	6976	6.2	Bacillary dysentery	224	2.2
5	Infections of skin and subcutaneous tissue	145680	4.6	Abortion	4449	3.9	Accidents	156	1.6
6	Gastric and duodenitis	137942	4.4	Pregnancy, childbirth & the puerperium	4326	3.8	Meningitis	149	1.5
7	Dysentery	111938	3.5	Cataract	2735	2.4	Hypertension	142	1.4
8	Tuberculosis of respiratory system	70526	2.2	Bacillary dysentery	1848	1.6	Gastroenteritis & colitis	109	1.1
9	Sexually transmitted infection	68733	2.2	Gastroenteritis & colitis	1707	1.5	AIDS	83	0.8
10	Bronchitis, chronic and unqualified	58594	1.8	Meningitis	1015	0.9	Leishmaniasis	48	0.5
	Total of all the above cases	1513620	47.8	Total of above cases	58809	51.9	Total of all the above cases	3113	31.1
	Total of all cases	3167514	100.0	Total of all cases	113365	100.0	Total of all cases	10006	100.0

1) PPD MoH 2002 version did not provide updated information based on the above format

Source: World Bank 2004b

9.8 The health MDGs cover four key outcomes in Ethiopia that are directly or indirectly related to the major causes of hospital visits and mortality in Ethiopia. We highlight these MDGs below.

### 9.2.1 HIV/AIDS

9.9 The MDGs call for halting the spread of HIV/AIDS by 2015, and beginning to reverse its spread. Currently, Ethiopia has a generalized<sup>288</sup> HIV/AIDS epidemic with about 1.5 million people living with the virus according to the most recent estimates<sup>289</sup> (see Table A.9.2 for further details on the burden of HIV/AIDS to Ethiopia and similar figures for other Sub Saharan African countries). As discussed in Chapter 1, unabated progression of the epidemic

<sup>288</sup> A generalized HIV/AIDS epidemic refers to a situation where HIV has spread far beyond the original subpopulations with high-risk, which are now heavily infected. Prevalence among women attending ante-natal clinics is five percent or more.

<sup>289</sup> Federal Democratic Republic of Ethiopia, 2004.

will bring not only greater human suffering, but also threatens Ethiopia's prospects for economic growth and poverty alleviation. The government has established a National HIV/AIDS Prevention and Control Office under the Prime Minister's Office. It includes members from across the different sectors and societal organizations and it has developed a multi-sectoral approach to combat the pandemic (The Ethiopian Multi-Sectoral Action Plan). The approach is unique in that it sought active community participation. Its implementation is anchored around three guiding principles: flexibility (learning by doing), speed (quick implementation) and coverage (scaling up).

**9.10 Despite a slow start, the program is now in full swing.** A functional institutional framework has been created with HIV/AIDS Councils and Offices at the national, regional, woreda and community levels coordinating and facilitating the different interventions. About 30 federal government offices and 125 regional bureaus have accessed funds to implement their HIV/AIDS prevention plans. 7,960 in-school and 400 out of school anti-AIDS youth clubs have been formed. The level of awareness on HIV/AIDS is now nearly 97 percent, and the demand for condoms has grown tremendously from 4.1 million in 1999 to 67.6 million in 2002, with kiosks, health institutions, NGOs, workplaces and anti-AIDS youth clubs as major outlets. There are currently 185 Voluntary Counseling and Testing (VCT) centers and the demand for VCTs is on the rise. It is, however, as of yet still unclear how all of these positive developments are affecting the incidence of HIV/AIDS given the absence of reliable data.

### **9.2.2 Malaria**

9.11 Similarly, the MDG for malaria is to halt its spread and to begin to reverse its incidence by 2015. Malaria is one of the leading causes of inpatient days in hospitals and outpatient visits in Ethiopia. Controlling the disease also has the potential to expand access to cultivable land, and to alleviate the intense land pressure that characterizes Ethiopian agriculture. The impact of malaria on the poor is further discussed in Chapter 4.

### **9.2.3 Maternal mortality**

9.12 Ethiopia has one of the highest maternal mortality rates in Sub Saharan Africa (if not the world), ranging from 790 to 3,200 (per 100,000 live births). High maternal mortality rates are related to the low levels of anti-natal care and birth attendance by health professionals—especially among the poor—in Ethiopia. The MDGs call for reducing the maternal mortality rate by three-quarters between 1990 and 2015. Reducing the maternal mortality rate in Ethiopia by the amount envisioned by the MDGs will be challenging given the country's extreme shortage of obstetricians and highly trained professional staff to attend births. Expansion of clinical services is indeed the only route to significantly reduce the rate, but this will take more time and resources.

### **9.2.4 Child mortality**

9.13 Ethiopia's under-five mortality rate is among the highest in the world, presently estimated at 166 per 1,000. Over the past decade, Ethiopia has made improvements in reducing child mortality. In fact, child mortality rates in Ethiopia have fallen steadily since

the 1960s, and Ethiopia has now caught up to the Sub Saharan African regional average. However, the rate of decline is far from sufficient to reach MDG goals in the foreseeable future. We turn now to a more careful examination of the variation in child mortality rates across different groups within Ethiopia, and the underlying determinants.

### 9.3 Determinants of Child Mortality

9.14 **Under-five child mortality rates vary by wealth and are highest in rural areas,** where low health access, malnutrition and extreme poverty interact to cause premature death among children. In Figure 9.1 we present child mortality rates by wealth quintile for rural households.<sup>290</sup>

Figure 9.1: Under-five child mortality by wealth quintile

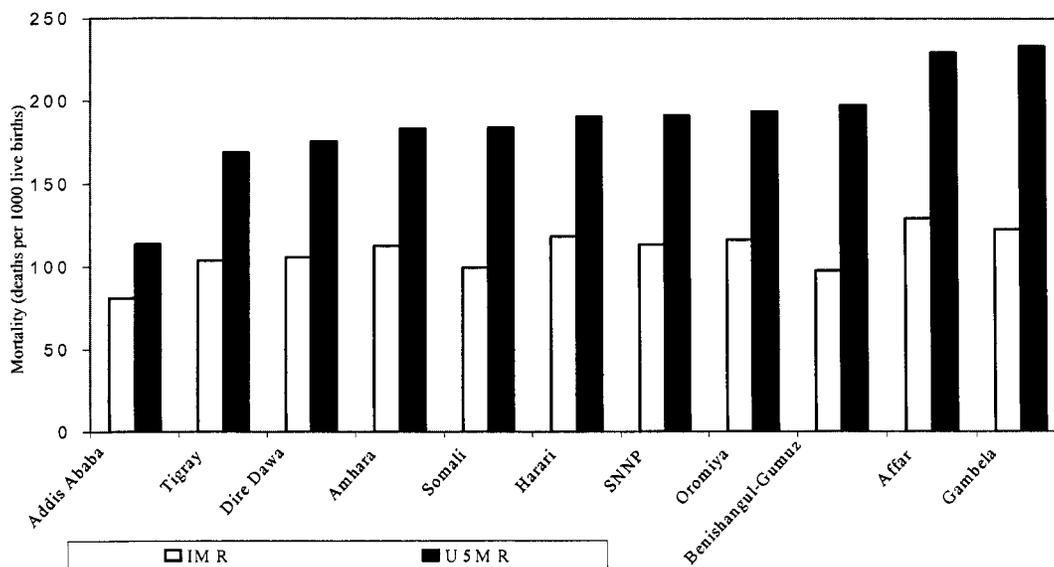


Source: World Bank, 2004b, using DHS 2000 data

9.15 Except for the lowest quintile, which surprisingly has a relatively low rate of child mortality, there is a steady decline in under-five mortality as wealth increases. However, even the richest families lose almost one in eight children before the age of five. In contrast to the gender bias observed in education, girls do not have higher mortality rates relative to boys. In fact, similar to other African countries, the child mortality rate is slightly higher for boys than girls. There are, however, significant differences across regions, with children in Addis Ababa twice as likely to survive to the age of five as those in Gambela (Figure 9.2).

<sup>290</sup> We draw upon data from Ethiopia DHS 2000. Note results are from rural households who have children born at least five years prior to the survey (to control for censoring).

**Figure 9.2: Regional variation in infant mortality and under five mortality rate<sup>1)</sup>**



1) Number of infants out of 1000 live births dying before their first birthday.

Source: World Bank 2004b

9.16 In order to examine the relative importance of key determinants of child mortality, we estimate a reduced-form equation (Table 9.3). The results presented in Table 9.3 highlight the fact that some of the key policy levers for achieving health outcomes, such as water and education, lie outside the health sector. Descriptive statistics on the determinants are reported in Table A.9.1 in Appendix 3.

9.17 **The strong positive effect of mother's education** is robust across these specifications: mothers in rural areas with an additional four years of education are 4.8 to 6.4 percentage points less likely to see their children die before the age of five. In urban settings, the effect is less but still strong: four more years of education reduces under-five mortality by between 2.4 and 3.2 percentage points. The beneficial effect of mothers' education on various dimensions of child health is one of the most robust empirical relationships ever established in the development literature.<sup>291</sup> In our rural sample, 92 percent of mothers have not completed primary schooling (see Table A.9.3, Appendix 3). This implies that even a modest increase in female education will have significant payoffs in improving child health, particularly in rural areas. Unfortunately, our empirical analysis of primary school enrollment decisions also suggests that Ethiopian households have a strong bias against investments in girls' education.

9.18 **Access to clean water emerges as an extremely important determinant of child mortality.** Children in rural households using uncovered ground water (spring or uncovered well) are two to three percentage points less likely to die before reaching the age of five,

<sup>291</sup> As indicated in our discussion of child malnutrition, the pathways through which schooling leads to better child health outcomes are still more of an empirical mystery.

compared to those in households using surface or rainfall water. In our rural sample 38 percent of households rely on surface or rainfall water, so this represents an area of great opportunity for effective intervention. Access to piped water (including communal taps) brings down the risk of childhood mortality even further, by five percentage points. The effect of safe water access is most pronounced in urban areas, where access to surface water is limited—children from urban households with access to a covered water source are 13 percent less likely to die before reaching their fifth birthday than those relying on rain and surface water.

9.19 Somewhat surprisingly, we do not find a discernable effect on child mortality rates in rural areas, nor in all but one of the urban specifications of access to sanitation. This may be because of low variation in access to sanitation facilities, or because of important threshold effects such that at least a minimum proportion of the community needs to use sanitation facilities to have an effect. In rural areas, 92 percent of households have no sanitation facility and the remaining eight percent use a traditional pit toilet. Even in urban areas, no facility is reported by 30 percent of households, with most of the rest (66 percent) using traditional pit latrines. The result is especially surprising and alarming in urban areas, given that households often live quite dispersed in rural areas, reducing the likelihood of contamination.

9.20 **Electricity is associated with child mortality in both rural and urban areas.** Children from rural households with access to electricity are 10 percent less likely to die before reaching the age of five; children from urban households with electricity are 6.5 percent less likely to die before the age of five. However, the effect disappears once we control for community effects, indicating that electricity may be a proxy for access to other community services.

9.21 **Girls from rural areas are 2.2 percentage points less likely to die before reaching age five compared to boys.** This finding is consistent with the empirical literature from Africa which suggests strong gender biases in investments in education, but no gender bias in investments in health. The ‘boy bias’ in child mortality, however, does not hold in urban areas, where there is no difference in child mortality by gender of the child.

9.22 While there was a strong bi-variate relationship between under-five child mortality and wealth in the previous descriptive section, after controlling for a host of other factors (many of which are strongly correlated with wealth), **the wealth effect on under –five child mortality rates is no longer significant.**

9.23 **Especially in rural areas, child survival would benefit from postponement of motherhood.** A rural mother who is five years older is 10 percent less likely to suffer the loss of her young child (the median age of first birth is 19 years in rural areas and 20 in urban areas).<sup>292</sup> Mothers’ nutritional status also affects under-five child mortality rates. We find that the mother’s height, which is proxy for nutritional status during childhood and adolescence, has a small but significant effect in all but one specification, indicating

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<sup>292</sup> Note that while the sign of mother’s age reverses in the urban sample, its effect is overwhelmed by the squared term.

persistence in health outcomes across generations. However, other measures of maternal nutritional status, including mother's weight and Body-Mass-Index, were not significant.

**Table 9.3: Determinants of under-five child mortality in rural and urban areas of Ethiopia**

Independent Variables	Rural			Urban		
	Rural (1)	Rural (2)	Rural (3) <sup>4)</sup>	Urban (4)	Urban (5)	Urban (6)
<b>Child's Characteristics</b>						
Female Child	-0.022* (2.08)*	-0.022* (2.05)*	-0.022^ (1.9)^	0.005 -0.26	0.004 -0.2	0.016 -0.71
<b>Mother's Characteristics</b>						
Mother's Age	-0.02 (2.65)**	-0.02 (2.64)**	-0.016 (1.96)^	0.044 (2.89)**	0.042 (2.76)**	0.053 (2.81)**
Mother's Age Squared	0.00 (2.55)*	0.00 (2.54)*	0.00 (1.91)^	-0.001 (2.83)**	-0.001 (2.71)**	-0.001 (2.70)**
Mother's Weight	0.00 -0.45	0.00 -0.42	0.00 -0.89	0.00 -0.87	0.00 -0.78	0.00 -1.85
Mother's Height	0.00 (2.33)*	0.00 (2.39)*	0.00 -1.37	0.000 (2.63)**	0.000 (2.39)*	-0.001 (3.70)**
Mother's Education (Years)	-0.016 (2.87)**	-0.016 (2.79)**	-0.012 (1.83)^	-0.006 (2.16)*	-0.008 (2.71)**	-0.007 (2.08)*
Female Headed Household Dummy	-0.013 -0.85	-0.012 -0.79	-0.007 -0.39	0.008 -0.36	0.016 -0.75	0.022 -0.81
<b>Wealth Quintile<sup>5</sup></b>						
Quintile 2				-0.039 -1.32		-0.034 -0.9
Quintile 3	-0.014 -1.09		-0.017 -1.19	0.051 -1.68		0.081 (2.08)*
Quintile 4	0.001 -0.03		-0.015 -0.78	-0.015 -0.51		-0.011 -0.29
Quintile 5	-0.027 -1.37		-0.006 -0.29	-0.023 -0.61		-0.028 -0.6
<b>Wealth Score</b>						
Wealth Score		0.292 -1.24			0.124 -1.12	
Wealth Score Squared		-0.097 -1.27			-0.101 -0.92	
<b>Infrastructure Access</b>						
Piped Water	-0.049 (1.97)*	-0.049 -1.95	-0.051 -1.33	-0.027 -0.72	-0.017 -0.47	-0.05 -0.94
Uncovered Ground Water	-0.028 (2.32)*	-0.03 (2.43)*	-0.025 -1.44	-0.054 -1.26	-0.047 -1.09	0.025 -0.32
Covered Water	-0.023 -1.22	-0.024 -1.28	-0.003 -0.09	-0.132 (3.10)**	-0.131 (3.04)**	-0.099 -1.34
No Sanitation	0.011 -0.63	0.01 -0.58	0.003 -0.14			
Flush-Toilet				-0.039 -0.54	-0.045 -0.64	-0.128 (2.02)*

Independent Variables	Rural			Urban		
	Rural (1)	Rural (2)	Rural (3) <sup>4)</sup>	Urban (4)	Urban (5)	Urban (6)
Pit-Toilet				-0.014 -0.53	-0.022 -0.84	-0.034 -0.98
Electricity	-0.099 (1.82)^	-0.1 (1.82)^	-0.101 -1.2	-0.065 (1.99)*	-0.082 (2.52)*	-0.065 -1.45
<b>Religion &amp; Region</b>						
Orthodox	0.017 -0.89	0.016 -0.85	-0.014 -0.47	0.061 -1.39	0.057 -1.31	0.091 -1.67
Muslim	0.051 (2.53)*	0.05 (2.53)*	0.048 -1.2	0.137 (2.63)**	0.134 (2.58)**	0.18 (2.73)**
Tigray	0.024 -0.72	0.025 -0.76	0.074 -0.33	-0.043 -1.07	-0.04 -1	-0.194 -1.32
Afar	0.04 -1.31	0.034 -1.14	0.247 -0.8	-0.1 -1.69	-0.103 -1.76	-0.181 (1.99)*
Amhara	-0.015 -0.51	-0.013 -0.43	0.477 -1.36	-0.037 -0.9	-0.03 -0.71	-0.184 -1.5
Oromiya	0.004 -0.14	0.004 -0.14	0.347 -1.23	-0.013 -0.32	0.001 -0.02	-0.113 -0.59
Benishangul	-0.013 -0.42	-0.012 -0.39	0.137 -0.42	0.081 -0.9	0.075 -0.83	-0.172 -1.34
SNNP	0.034 -1.11	0.034 -1.11	0.354 -0.92	-0.05 -0.97	-0.033 -0.6	-0.178 -1.52
Gambela	0.08 (1.98)*	0.082 (2.02)*	0.36 -1.09	0.103 -1.6	0.122 (1.85)^	-0.175 -1.38
Harari	0.066 (1.8)^	0.066 (1.77)^	0.063 -0.27	0.017 -0.49	0.022 -0.61	-0.082 -0.32
Dire Dawa	-0.02 -0.46	-0.021 -0.5	0.173 -0.52	0.006 -0.21	0.008 -0.27	-0.179 -0.82
<b>Observations</b>	5876	5876	5501	1451	1451	1194

<sup>1)</sup> Coefficients are reported as marginal probabilities; dependent variable takes on the value of one if the child died before reaching the age of five (0 otherwise).

<sup>2)</sup> ^ significant at 10 percent; \* significant at 5 percent; \*\* significant at 1 percent; robust (Huber-White) z-statistics in rows under coefficients.

<sup>3)</sup> Controlling for censoring (selection at least five years prior to the survey).

<sup>4)</sup> Specification (3) and (6) are run using cluster dummies to proxy for infrastructure, prices, and environment. The cluster dummies are not significant in the urban specification (6).

<sup>5)</sup> The poorest and second poorest households are the two left-out quintiles in the rural sample; the poorest quintile is the left-out quintile in the urban sample; households using surface or rainfall water form the left-out water category; household without access to any sanitation are the left-out categories; Protestant and others are the left-out categories; Somali is the left out region.

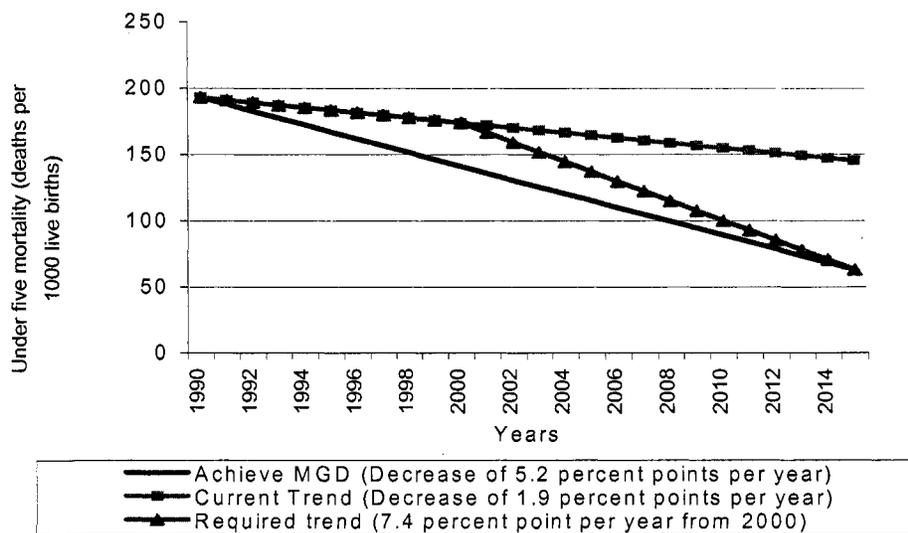
**9.24 There are also large and statistically significant ethnic and regional effects on child mortality.** In particular, being Muslim increases the probability of premature death by five percentage points relative to being Protestant (the omitted category) in the rural sample and between a shocking 13 and 18 percent among urban dwellers. There are also large and statistically significant regional variations in under-five child mortality rates. Relative to

children living in rural Somali communities, children in rural Gambela have an eight percent higher probability of dying before age five.

#### 9.4 Policy Actions Needed to Reach the Child Mortality MDG

9.25 While Ethiopia has made considerable progress in reducing child mortality over the past decade, the rate of decline is far from sufficient to reach the MDG goals in the foreseeable future.<sup>293</sup> Unless the pace of progress in improving health outcomes in Ethiopia is drastically accelerated, it is highly unlikely that Ethiopia will be able to meet its child mortality MDG goal by 2015 (Figure 9.3).

Figure 9.3: Achieving MDG goal for reduction in child mortality



9.26 Ethiopia’s overall progress in achieving the health MDGs will be largely determined by its success in reducing child mortality in rural areas, given the concentration of the population in rural areas as well as the disproportionate share of premature child deaths that take place there. We undertake three simple policy simulations that illustrate the challenges that lie ahead in achieving the envisioned reductions in under-five child mortality in Ethiopia.

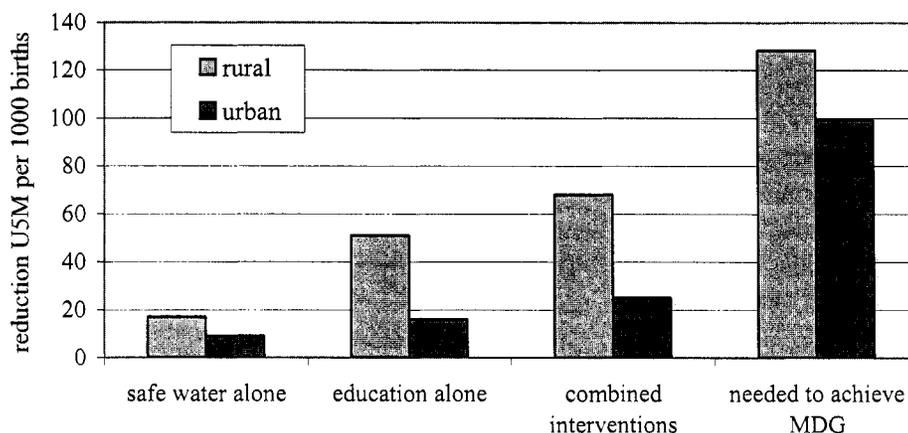
9.27 **First, we simulate the impact on under-five child mortality rates in Ethiopia of giving all mothers four years of education.** The average mother in our rural sample has less than 0.8 years of schooling; increasing this by 3.2 years increases the average rural child’s chance of survival by 5.1 percentage points, bringing down the rural under-five mortality rate from 192 to 141 deaths per 1,000 live births. In urban areas, with higher current educational attainment (1.3 years) and a lower marginal effect of mother’s education on child mortality, the decrease is a more modest 1.6 percentage points.

<sup>293</sup> World Bank 2004b.

9.28 **Second, we simulate the impact of providing access to safe drinking water (piped water) to those households which are currently using surface or rainfall water.**<sup>294</sup> This would reduce child mortality in rural areas by 1.7 percentage points, but in the already well-serviced urban areas by only 0.9 percentage points. Currently, 35 and seven percent of all rural and urban households respectively use surface or rainfall water.

9.29 **Together these two interventions would reduce child mortality by 6.8 percentage points in rural areas (or 68 deaths less per 1,000 live births) and 2.5 percentage points (or 25 deaths less per 1,000 live births) in urban areas.** From Figure 9.4, it is clear that any hope for achieving the child mortality MDG in Ethiopia lies in a focus on rural areas. This is where child mortality is highest, and also where the greatest gains from expanding education and infrastructure can be realized. These results also illustrate the considerable scope for making progress toward health targets through interventions in other areas, particularly in women's education.

**Figure 9.4: Effect of selected interventions on rural under-five childhood mortality**



9.30 **The simulations presented so far do not consider direct interventions in health** such as immunizations, better treatment of diarrhea, a major cause of child mortality, and improved access to medical care, which also prove to have much potential to reduce child mortality. The ongoing expansion of access to key professional preventive services delivered by two female health extension workers in every kebele, trained in one year, through the outreach component of the health extension package, is to be the backbone of the revised health system of Ethiopia. Increasing access to this basic extension package (which includes immunization and Vitamin A supplementation) to 65 percent of the population is estimated to buy a reduction of twelve percent in under-five mortality. It would cost an additional US\$ 0.59 per capita.

<sup>294</sup> For the rural households we simulate the effect of providing piped water; for the urban, covered.

## **9.5 Concluding Remarks**

9.31 The spread of HIV/AIDS (and malaria) threaten Ethiopia's prospects for economic growth and poverty alleviation. Over 50 percent of child deaths in Ethiopia are caused by pneumonia and diarrhea alone, ailments that are preventable at a fairly low cost. While there has been positive progress toward the health MDGs in Ethiopia, the challenges ahead are substantial and will require cross-sectoral interventions. Due to the legacy of both malnutrition and poor health access among the poor, a concerted effort on the part of government and its development partners will be necessary if Ethiopia is to achieve the reduction in under-five child mortality envisioned by the Millennium Development Goals. This effort would be most efficiently targeted at the rural areas. Interventions to expand access to safe water and to increase mother's education hold especially strong promise, as does the new health extension package mentioned above.



## CHAPTER 10. TOWARD AN EDUCATED PEOPLE

### 10.1 Literacy, Development and Ongoing Policy Challenges in Ethiopia

10.1 **As is the case with improving people's health, pursuing education is not only instrumentally valuable, but it is also important in its own right.** Like being well-nourished and healthy, being able to read and write is one of our primary capabilities as human beings. Education enables people to acquire information and convert it into knowledge, both critical components to make effective choices and translate them into desired actions. As illustrated throughout this document, education also has tremendous instrumental value. The large beneficial effects of education on economic growth and consumption poverty in Ethiopia have been highlighted in Chapter 4. Its critical role in facilitating the adoption of productivity-enhancing farming techniques and technologies,<sup>295</sup> which in turn leads to improved food security and agricultural development, has been discussed in Chapter 5. The importance of parental education in reaching many human capabilities cannot be sufficiently underscored, as illustrated with respect to child malnutrition and child mortality in the previous chapters of Part III. In particular, the pervasive effects of female adult education on human development outcomes (including education itself) has been one of the most robust empirical relations estimated in the empirical human development literature.

10.2 **Since 1994 Ethiopia has experienced dramatic increases in primary school enrollments.** Gross primary school enrollment rates have more than doubled from 24 percent in 1994 to 57 percent in 2000 for grades 1-8, and net enrollment rates have gone up from a mere 17.8 percent in 1994-5 to 48.8 percent in 2000. The boom in primary school enrollments has been largely attributed to growth in the number of grade 1 entrants. During the period 1994-1996, the number of new entrants exceeded those in the previous year by 20, 26, and 15 percent respectively, or by about 200,000 children in absolute terms.<sup>296</sup> Since 1996-97, the number of new grade 1 entrants has grown at a slower pace of just four percent each year.

10.3 **Ethiopia's phenomenal success in expanding primary school enrollment since 1994 had its foundations in the government's New Education Policy,** which was formulated and adopted in 1994. The major reforms included significant investments in government schools at the primary and secondary levels—which enabled the education sector to accommodate rapid growth in the number of children entering grade 1—as well as other policy reforms that sought to remove demand-side and institutional constraints to increasing educational attainment, especially among the poor. Key supply side reforms included: (1) the construction of new public schools; (2) an increase in the supply of private schools; and (3) an increase in the number of double-shift schools which essentially enabled the government to boost enrollments using its existing capital stock in the education sector. In particular, large public investments in government schools under the government's 1994 Education and Training Policy and Strategy program has been cited as the engine behind the massive increase in primary school enrollment between 1994 and 2001.<sup>297</sup> To foster the demand for

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<sup>295</sup> Weir, 1999; Knight et al, 2003.

<sup>296</sup> World Bank, 2004a.

<sup>297</sup> World Bank 2004a.

schooling and remove barriers to school entry, the government's New Education Policy abolished school fees in government schools and also implemented food-aid programs in primary schools.

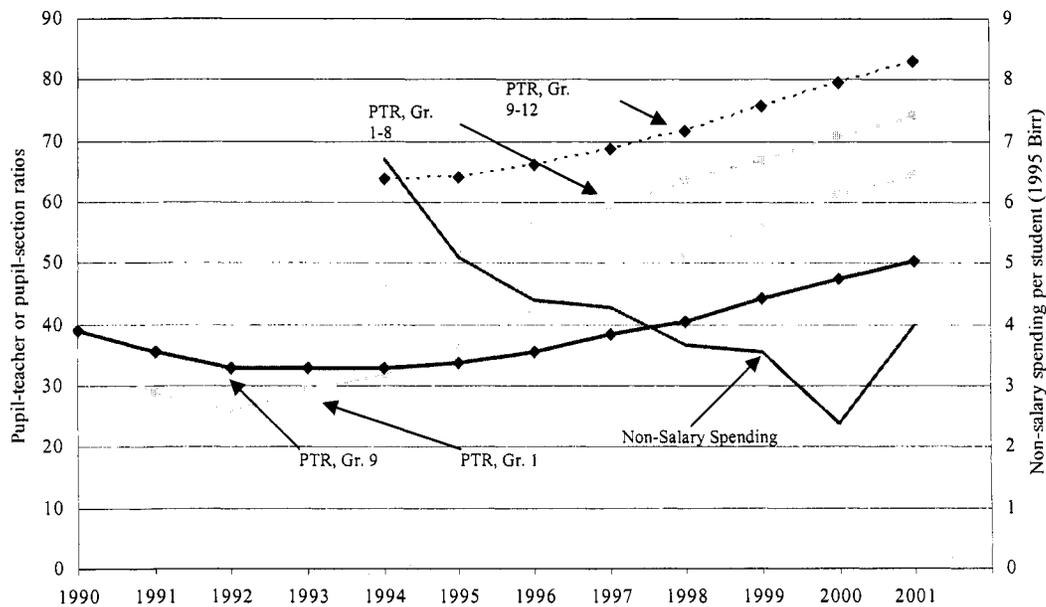
10.4 Other institutional reforms that help to explain the success of the government's efforts at boosting primary school enrollment in Ethiopia include a rigorous program of education sector decentralization that allowed for the introduction and use of native languages in the classroom, and greater community involvement in the construction of schools. In addition, the government has made efforts to increase the number of female teachers (which has been shown to increase female enrollments in primary and secondary schools) and the provision of school supplies that are important for learning, such as textbooks.

**10.5 Inefficiencies in spending levels remain and are attributed to the persistence of educational disparities and apparent deterioration in quality of schooling.** In particular, the primary school share of recurrent spending has decreased in favor of tertiary education, despite a dramatic increase in primary school enrollments implying an increasing demand for recurrent finance. The share of recurrent spending going toward the primary school sector in Ethiopia (50 percent) is far below the international benchmark of 67 percent envisaged under the Education For All Fast Track Initiative.<sup>298</sup> In addition, a large share of the primary education budget is consumed by teachers' salaries, leaving minimal amounts available for non-wage recurrent spending on supplies, textbooks and teaching materials which have direct impacts on the quality of educational services provided. Non-salary spending per student has been dramatically eroded over time from an average of around 7 ETB per student in 1994 to around 4 ETB per student in 2001. In addition, since 1994-95 pupil-teacher ratios have trended upward, averaging 70 children per classroom for grades 1-8, and 80 at the secondary school level, by 2001 (Figure 10.1).

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<sup>298</sup> World Bank, 2004a. This target is based on the pattern of spending in countries that have made good progress toward universalizing primary school completion as outlined in Bruns, Mingat and Rakotomalala (2003).

**Figure 10.1: Trends in pupil-teacher and pupil-section ratios and in non-salary public spending per primary and secondary student, Ethiopia, 1990-2001**



Note: The PTR is computed by dividing total enrollments by the total number of teachers, and the PSR by dividing total enrollments by the total number of sections. These calculations yield weighted ratios which differ from the unweighted ratios computed by averaging the ratios across schools. Non-salary public spending per student is computed by dividing the reported budget amount for this item by the total number of primary and secondary students in government schools.

Source: World Bank 2004a. Based on data supplied by the Ministry of Education on enrolments, teachers and sections; and on MoFED budget data on expenditure

**10.6 The education MDGs in Ethiopia call for achieving universal primary school completion** and enrollment by 2015 and ensuring gender parity in primary and secondary education by 2005. Increases in primary school enrollment rates require expansions in the coverage of the education system, while higher primary school completion rates require improvements in student flows through the education system. To further inform the appropriate mix of policy interventions needed to achieve the education MDGs in Ethiopia, we jointly examine the relative importance of both supply side (access to schools and the quality of schooling) and demand side (income, parental education, and gender) determinants of primary enrollment rates and fifth grade completion rates. We begin by exploring the nature of education outcomes in Ethiopia and the magnitude of the disparities across socio-economic groups.

## 10.2 Educational Profile in Ethiopia

**10.7 Since 1994, Ethiopia has made significant progress toward achieving the education MDGs, but significant improvements remain possible.** In 2000 gross primary school enrollment rates for the first cycle of primary school (grades 1-4) were 83 percent, and were 57 percent for grades 1-8. However, net primary school enrollment rates still lag at 49 percent (Tables 10.1 and 10.2). This difference between gross and net primary enrollment

rates reflects the big backlog in educational achievement Ethiopia had built up and which is now being closed as older children have also been enrolling in school.<sup>299</sup>

**Table 10.1: Gross primary enrollment in Ethiopia**

	Grades 1-4			Grades 5-8			Grades 1-8		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
1994-5	37.7	22.6	30.3	17	13.9	15.5	28.9	19	24.1
1995-6	58.3	33.2	46	19.3	13.8	16.6	39.8	24	32
2000-1	95.3	70.2	83	38.3	22.9	30.8	67.3	47	57.4

Source: *Indicators of the Ethiopian Education System (various years), Ministry of Education*

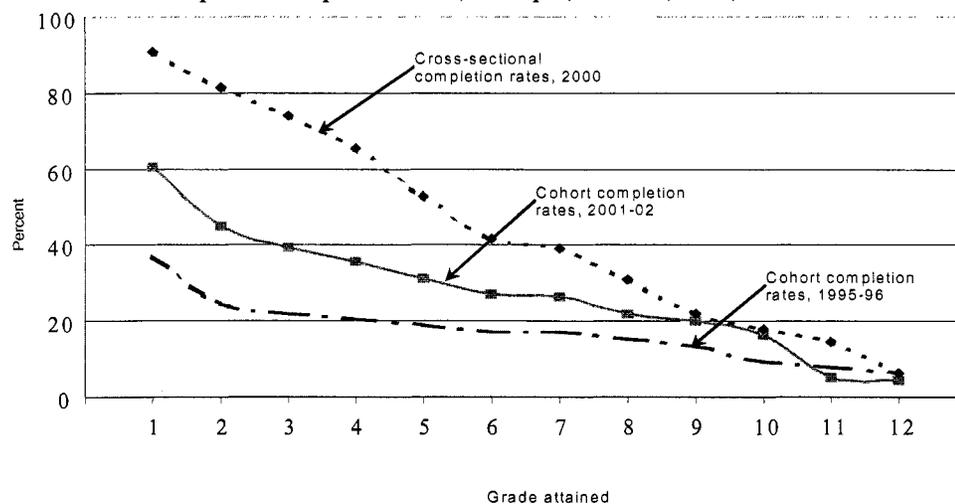
**Table 10.2: Net primary enrollment in Ethiopia**

	Grades 1-8		
	Boys	Girls	Total
1994-5	20.7	14.7	17.8
1995-6	28	18.6	23.4
2000-1	55.7	41.7	48.8

Source: *Indicators of the Ethiopian Education System (various years), Ministry of Education*

10.8 Figure 10.2 shows both cross-sectional and cohort completion rates in Ethiopia. While there has been an increase in the cohort completion rate at all grade levels since 1995-96, the overall completion rate remains extremely low. Presently only 60 percent of each cohort enters grade 1, of which one-quarter drop out by grade 2 and one-half drop out by grade 5. Low completion rates may reflect the low quality of educational services in Ethiopia (likely due to lack of public funds), or low returns to education in the labor market.

**Figure 10.2: Grade-specific completion rates, Ethiopia, 1995-96, 2000, and 2001/2**

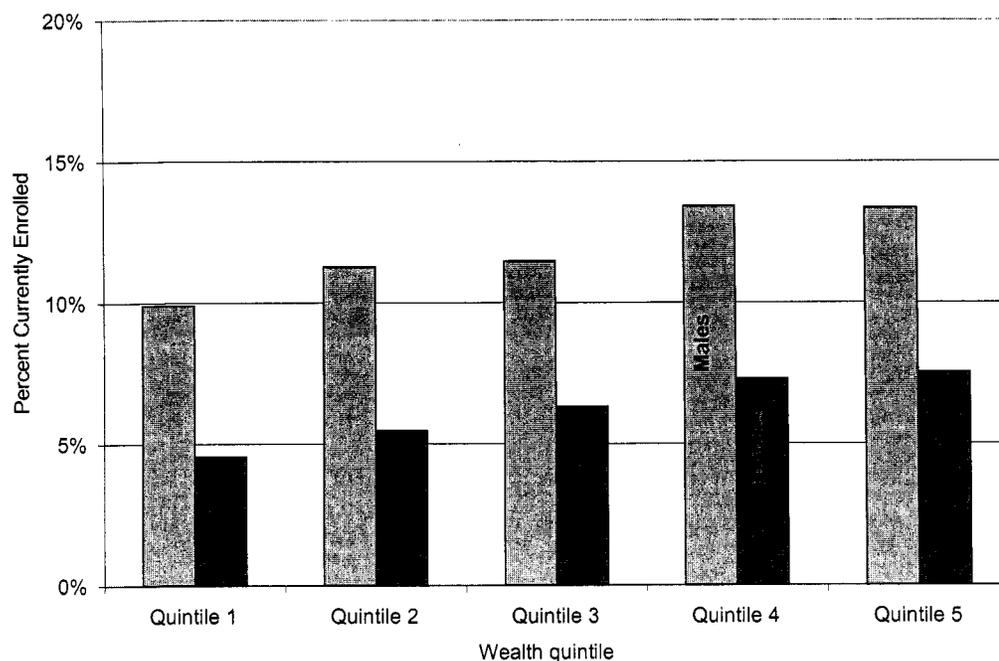


Source: *World Bank 2004a*

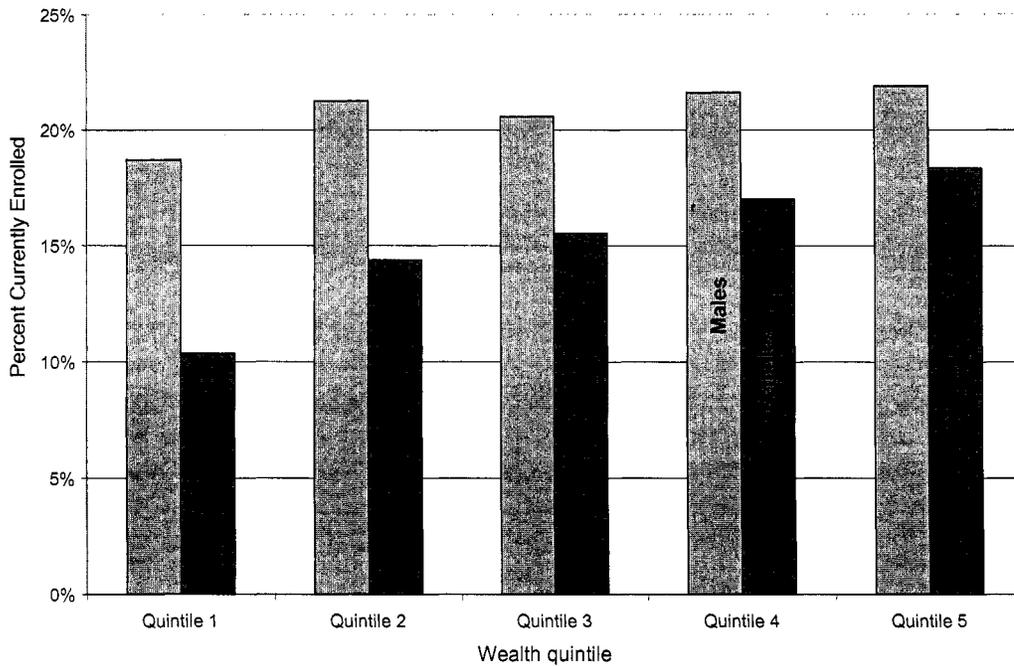
<sup>299</sup> Gross primary enrollment is defined as the number of children enrolled in primary school, regardless of age, divided by the population of the age group that officially corresponds to the primary level; net enrollment is the ratio of the number of children of official school age who are enrolled in primary school to the total population of children of official school age.

10.9 While we do not see stark disparities in educational attainment across wealth quintiles on average in Ethiopia, there is a wealth-gender nexus in educational outcomes which consists of larger disparities in educational outcomes between girls across different wealth groups. In addition there are large disparities in educational outcomes between girls and boys within the same wealth quintile, which implies that households tend to under-invest in girls' education in Ethiopia. We find a gender-biased pattern in gross primary school enrollment rates for both 1996 and 2000 (Figure 10.3 and Figure 10.4). The wealth gradient for boys in primary school enrollment appears to have flattened between 1996 and 2000, while the wealth-enrollment gradient for girls has persisted over time. The gender gap between male and female primary school enrollment rates within the upper quintiles decreased between 1996 and 2000.

Figure 10.3: Gross primary enrollment rates by gender and wealth quintile, 1996

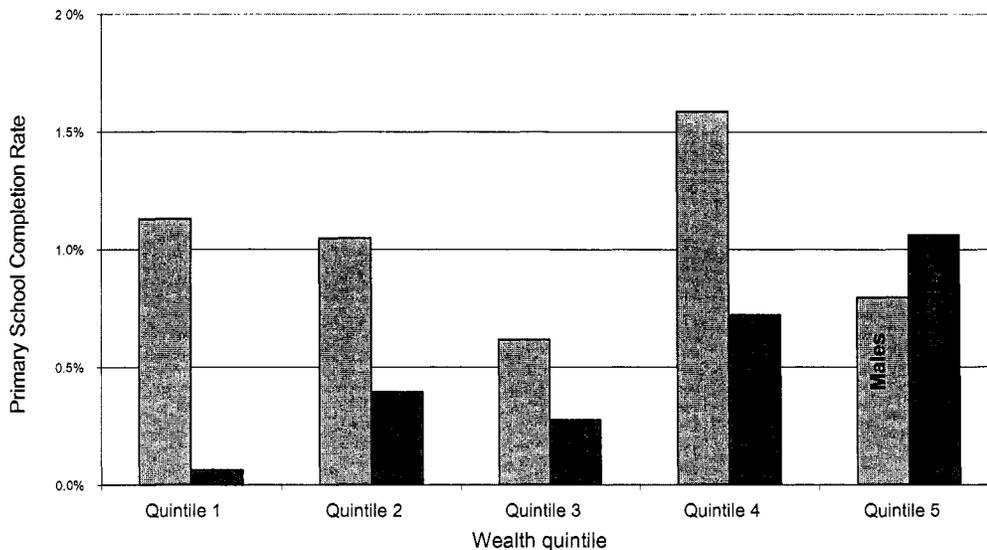


**Figure 10.4: Gross primary enrollment rates by gender and wealth quintile, 2000**

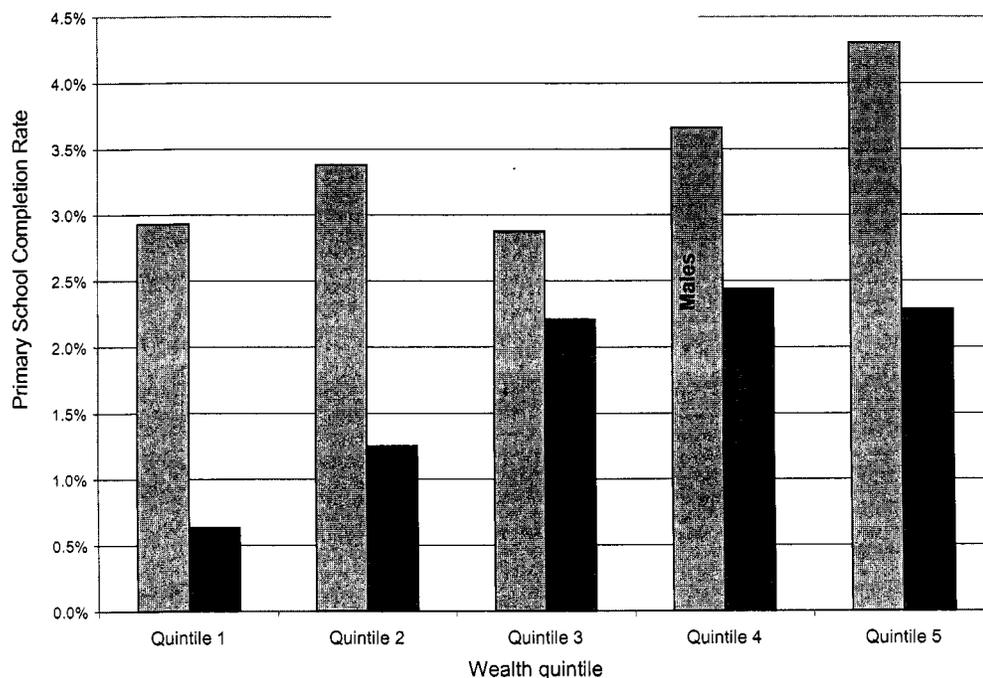


10.10 Wealth appears to be a stronger correlate of primary school completion than primary school enrollment in Ethiopia. This is particularly true for girls, as shown in Figures 10.5 and 10.6 below. Although there have been large increases in enrollments across all quintiles in Ethiopia between 1996 and 2000, overall primary school completion rates remain extremely low, less than five percent even for boys in wealthier families.

**Figure 10.5: Primary completion rates by gender and wealth quintile, 1996**



**Figure 10.6: Primary completion rates by gender and wealth quintile, 2000**



### 10.3 Determinants of Primary Schooling in Ethiopia

**10.11 Schooling outcomes are shaped through a complex intersection of factors, which often makes it extremely difficult to pinpoint causal pathways.** From the supply side, the delivery of schooling is plagued by a plethora of problems affecting the quantity and quality of services.<sup>300</sup> These include the possibilities that not enough money is allocated to schools;<sup>301</sup> that allocated funds are siphoned off thereby further reducing the actual budget available at the school level;<sup>302</sup> and that the money actually allocated to providing schooling is not spent effectively (e.g. poor teacher quality). From the demand side, factors related to household income, alternate uses of the child’s time, gender preferences within the household, social norms, and market signals, all influence the household’s decision of whether or not to invest in the child’s schooling. In the Ethiopian context, adverse weather shocks and credit and insurance market failures exacerbate the vulnerability of poor households, with often deleterious consequences on human capital investments. Furthermore, factors outside of the education sector have important consequences on educational outcomes.<sup>303</sup> For example, Glewwe and Jacoby (1995) highlight the effect of childhood malnutrition on primary school enrollment in Ghana, while Miguel and Kremer (2005) find that in one district in Kenya the most cost effective intervention to increase primary school enrollment was a deworming program.

<sup>300</sup> World Bank, 2004h.

<sup>301</sup> Devarajan, Miller and Swanson, 2002.

<sup>302</sup> Reinikka and Svensson, 2001.

<sup>303</sup> Particularly the relationship between health and education.

**10.12 We modeled the probability of primary school enrollment and completion in Ethiopia using data for the years 1996 and 2000.**<sup>304</sup> While we cannot do justice to all of the complex relationships mentioned above, we present the most comprehensive analysis to date on several important determinants of child schooling in Ethiopia. In particular, we highlight: (a) household factors which shape child schooling outcomes; (b) school quantity and quality factors; and (c) the impact of adverse shocks on schooling investments. In this endeavor, we merge three major types of data: (1) Welfare Monitoring Surveys (WMS) from the Central Bureau of Statistics, from which we access household data (income, child schooling); (2) school census data from the Education Management Information System (EMIS), Ministry of Education, from which we obtain information on schools; and (3) various data sources on adverse shocks (e.g. household plot-level crop damage). We estimate separate specifications by rural and urban samples.

### **10.3.1 Household and community characteristics**

**10.13 There is a strong bias against investment in female education.** The magnitude of the gender bias is undoubtedly one of the striking findings of the analysis. Controlling for all other supply and demand side factors such as distance to and quality of schools, household resources, and parental education, girls who reside in rural areas are 11.6 percentage points less likely to be enrolled in school compared to boys (see Table A4.4 in the appendix). To better appreciate the astounding magnitude of this effect, note that this implies that almost one million people of primary school age are denied schooling merely because of their gender, i.e. irrespective of the income of the household, the parental educational status, the distance to the school or the quality of the schooling.<sup>305</sup> Even in urban areas, girls are 4.3 percentage points less likely to be enrolled in school than boys. Given that most common supply and demand determinants have been controlled for, the reasons for this strong bias against female education must partially relate to cultural factors, and perpetuate the disempowered position of female citizens observed and discussed in Chapter 1. To further explore the reasons for this gender bias in school enrollment, we separately examine the effects of the various known determinants of enrollment and completion separately for girls and boys (see Tables 10.3 and 10.4; detailed regression results are presented in Tables A.10.1 – A.10.4 in Appendix 3).

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<sup>304</sup> Non-pooled regression results are quite similar (separate 1996 and 2000 results are not reported).

<sup>305</sup> According to the DHS 2000, there are about 28.65 million females residing in rural areas of which 28 percent are between five and 14 years old. Multiplying the total number of school age people by their reduced percentage likelihood of being enrolled yields 930,000.

**Table 10.3: Determinants of primary school enrollment in Ethiopia by gender and location<sup>1)</sup>**

Variable	Rural				Urban			
	Girls		Boys		Girls		Boys	
	Statistical Significance	Coef-ficient						
<b>Individual and household characteristics</b>								
Child age 8	Yes (1%)	0.114	Yes (1%)	0.103	Yes (1%)	0.07	Yes (1%)	0.08
Child age 9	Yes (1%)	0.214	Yes (1%)	0.24	Yes (1%)	0.115	Yes (1%)	0.116
Child age 10	Yes (1%)	0.282	Yes (1%)	0.323	Yes (1%)	0.155	Yes (1%)	0.122
Child age 11	Yes (1%)	0.249	Yes (1%)	0.352	Yes (1%)	0.15	Yes (1%)	0.11
Child age 12	Yes (1%)	0.258	Yes (1%)	0.38	Yes (1%)	0.148	Yes (1%)	0.13
Child age 13	Yes (1%)	0.252	Yes (1%)	0.408	Yes (1%)	0.103	Yes (1%)	0.121
Child age 14	Yes (1%)	0.294	Yes (1%)	0.391	Yes (1%)	0.113	Yes (1%)	0.118
Female head of household	No	0	No	0	No	0	No	0
Age of head of household	No	0	Yes (10%)	-0.001	Yes (5%)	0.002	No	0
Single head of household	No	0	Yes (5%)	-0.087	No	0	No	0
Schooling of household head	Yes (1%)	0.016	No	0	Yes (1%)	0.008	Yes (1%)	0.008
Other adult schooling	Yes (1%)	0.012	No	0	No	0	Yes (1%)	0.007
Log of per capita household expenditures	Yes (1%)	0.051	Yes (1%)	0.065	No	0	Yes (1%)	0.041
Rain damage	Yes (1%)	-0.053	No	0	No	0	No	0
EA- Average male adult literacy rate	Yes (10%)	0.055	Yes (1%)	0.17	No	0	Yes (1%)	0.206
EA- Average female adult literacy rate	Yes (1%)	0.454	Yes (1%)	0.374	Yes (1%)	0.24	Yes (1%)	0.149
<b>Community characteristics and supply side factors</b>								
Distance Primary School 1-2 km	Yes (1%)	-0.037	Yes (10%)	-0.033	No	0	No	0
Distance Primary School 3-4 km	Yes (1%)	-0.067	Yes (5%)	-0.046	No	0	No	0
Distance Primary School 5-6 km	Yes (1%)	-0.104	Yes (1%)	-0.093	No	0	No	0
Distance Primary School 7-12 km	Yes (1%)	-0.122	Yes (1%)	-0.177	No	0	No	0
Distance Primary School > 13 km	Yes (1%)	-0.16	Yes (1%)	-0.179				
Distance to secondary school	No	0	No	0	No	0	No	0
Distance to food market	Yes (5%)	0.003	No	0	No	0	No	0
Distance to health clinic	Yes (1%)	-0.002	No	0	No	0	Yes (5%)	-0.007
Distance to post office	Yes (10%)	-0.001	No	0	No	0	No	0
Number of schools per capita	Yes (1%)	0.363	Yes (1%)	0.706	Yes (5%)	0.179	No	0
Population density	Yes (5%)	0	No		No	0	Yes (1%)	0
Student-teacher ratio	Yes (1%)	0.001	Yes (1%)	0.001	Yes (1%)	-0.001	Yes (1%)	-0.002
Percent female teachers	No	0	No	0	Yes (1%)	0.005	Yes (1%)	0.004
Percent teachers with certification	No	0	Yes (10%)	0.106	No	0	No	0
Tigray	Yes (10%)	0.09	No	0	Yes (10%)	0.132	No	0
Amhara	Yes (5%)	0.105	Yes (10%)	0.118	Yes (5%)	0.166	No	0
Oromiya	No	0	Yes (1%)	0.176	No	0	No	0
Benishangul	Yes (10%)	-0.065	Yes (1%)	0.212	No	0	No	0
SNPR	No	0	Yes (1%)	0.189	Yes (10%)	0.149	No	0
Harari	No	0	Yes (1%)	0.272	No	0	No	0
Year 2000 dummy	Yes (1%)	0.14	Yes (1%)	0.157	Yes (1%)	0.103	Yes (1%)	0.069

<sup>1)</sup> All regression coefficients, when statistically significant at a level < 10 percent are reported as marginal probabilities.;

<sup>2)</sup> EA= enumeration area, which corresponds to a community.

**10.14 Households with better educated adults and those in better educated communities are more likely to have children enrolled in primary school.** For every additional year of educational attainment of the household head, the probability that a child is enrolled in school increases by 1.1 percentage points in rural areas. The positive effect of the household's education is especially strong in determining girls' initial enrollment, where each additional year of education increases the probability of a girl's enrollment by 1.6 percentage points. In urban areas, the effect is estimated at 0.8 percentage points for both girls and boys. There are also strong positive externality effects of educational attainment at the community level, particularly associated with female literacy. These are most pronounced in the rural areas, where a 10 percentage point increase in a community's female literacy rate results in a 4.5 percentage point increase in the probability of enrollment for girls, and a 3.7 percentage point increase in the probability of enrollment for boys. The effects are about half as large in urban areas. Interestingly, adult male literacy rate of the community seems to especially benefit the enrollment probability of boys. These results may indicate that the individual demand for education is partially shaped by community preferences and social norms. Alternatively, or in addition, community educational attainments could be proxying for average community wealth.

**10.15 Household income has a modest positive impact on the likelihood of primary school enrollment.** The effect is slightly stronger in rural areas and for the enrollment of boys. A ten percent increase in household income results in approximately a 0.5 percentage point increase in the probability that a rural child is enrolled in school.

### **10.3.2 Risk and shocks**

**10.16 Idiosyncratic and covariant shocks affect primary school enrollment, especially among girls.** Households with half of their plot area damaged are 2 percentage points less likely to send their child of school-going age to school. It further appears that harvest failure has asymmetric effects for male and female children of affected households. In the event that a household is faced with an adverse production shock, especially females are less likely to attend primary school, and also less likely to complete primary schooling. This suggests that when vulnerable households are forced to make tradeoffs in educational investments of their children they choose to protect their schooling investments in their sons rather than in their daughters. Strengthening farmers' risk management instruments will not only reduce their poverty and improve the nutritional status of their children, it will also enhance the educational achievements of their children, especially their daughters.

### **10.3.3 School characteristics**

**10.17 The distance of the nearest school from the homestead negatively impacts enrollment and completion probabilities, especially in rural areas.** The regression results suggest that households are reluctant to send their children to schools far from home. This effect may capture the opportunity cost of primary school attendance, which will increase as the child's distance to school increases. Given that schoolchildren must generally walk to school, distance may also serve as a direct barrier to attending primary school among children living on remote farms, particularly young girls. To illustrate, households seven to 12

kilometers away from a school are 12 percentage points less likely to send their daughters to primary school, and 18 percentage points less likely to send their sons. If a school is more than 13 kilometers away, children are 17.6 percentage points less likely to be enrolled in school. These findings suggest that supply side reforms in the education sector (e.g. construction of new schools and classrooms in unserved or underserved areas) will continue to be a critical factor in improving primary school enrollment and completion rates in Ethiopia.

**10.18 In general, student teacher ratios and the proportion of female teachers positively and substantially affect enrollment and completion rates, especially in urban areas.** To explore the effects of the quality of schooling we look at the effects of the student-teacher ratios, the percentage of female teachers and the percentage of teachers with a certificate. Overcrowding in the classroom decreases the chances of enrollment in urban areas and the effects can be substantial. A reduction in the student-teacher ratio in urban areas from the current average of 60 to 50 is estimated to increase enrollment by two percentage points. Surprisingly, however, we find a positive relationship between the student teacher ratio and enrollment in rural areas. This may reflect the fact that the system is still catching up with large increases in enrollment reflected in large student teacher ratios. In both urban and rural areas primary school completion rates (fifth grade) are negatively associated with student teacher ratios, though the effects are estimated with great imprecision.

10.19 The larger the percentage of female teachers, the larger the probability that urban children will be enrolled in school. We do not find a relationship between the gender of the teacher and enrollment in rural areas. Interestingly, the presence of female teachers has only a slightly larger positive effect on the enrollment of girls relative to boys. Overall the effects are substantial: raising the percentage of female teachers from its current average level of almost 30 percent to 50 percent would increase enrollment rates in urban areas by 10 percentage points for girls and eight percentage points for boys. Moreover, while the presence of female teachers positively affects the completion rates of boys in urban areas, it negatively affects their completion rates in rural areas. No effects on the completion rates of girls were discerned. These gender dynamics deserve further exploration. No clear pattern was detected regarding the effect of teacher certification.

**10.20 Finally, the quality of school infrastructure greatly increases the probability of male enrollment.**<sup>306</sup> Availability of water and toilets only affect boys' enrollment. Boys are 15 percentage points more likely to be enrolled if the closest school has drinking water and they are seven percentage points more likely to be enrolled if the closest school has a toilet. This not only highlights the importance of the school environment, but also further points to the fact that households are less likely to send their daughters to school, whatever the school environment.

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<sup>306</sup> Results are based on 2000 only, for which more school infrastructure information was available. Regression results are not reported here.

### 10.3.4 Determinants of fifth-grade completion in Ethiopia

10.21 **Many of the demand and supply side determinants of enrollment have similar effects on primary school completion rates, though overall the results are less significant,** potentially related to the low completion rates observed in Ethiopia and thus the lack of variation in our sample. Again, there exists a strong gender bias. Girls are eight to 10 percentage points less likely to complete fifth grade. Thus not only are girls less likely to be enrolled, when enrolled they are also less likely to complete primary schooling, controlling for a whole series of other demand and supply side factors. Interestingly, schooling of the household head only appears to affect completion rates in urban areas. However, there is a strong positive education externality of adult female literacy on the probability of primary school completion for girls. Similarly, in the urban sample, adult male literacy has strong positive externalities in increasing the probability of primary school completion among boys, but not for girls. We find a perverse income effect in our urban sample on the probability of primary school completion among girls. Distance to school and the number of schools also have gender-specific impacts in the urban sample. Girls are less likely to complete primary schooling if they live far from a school, while boys are more likely to complete primary schooling in communities with a greater availability of schools.

**Table 10.4: Primary school completion regression—rural and urban Ethiopia<sup>1)</sup>**

Variable	Rural				Urban			
	Girls		Boys		Girls		Boys	
	Statistical Significance	Effect						
Child age 13	No	0	No	0	Yes (1%)	0.147	Yes (1%)	0.252
Child age 14	No	0	No	0	Yes (1%)	0.287	Yes (1%)	0.355
Female head of household	No	0	No	0	No	0	No	0
Age of head of household	No	0	No	0	Yes (1%)	0.003	Yes (5%)	0.002
Single head of household	No	0	No	0	No	0	No	0
Schooling of household head	No	0	No	0	No	0	Yes (1%)	0.009
Other adult schooling	No	0	No	0	No	0	No	0
Log of per capita household expenditures	No	0	No	0	Yes (5%)	-0.037	No	0
Rain damage	No	0	No	0	No	0	No	0
EA- Average male adult literacy rate	No	0	No	0	No	0	Yes (5%)	0.203
EA- Average female adult literacy rate	Yes (10%)	0.126	No	0	No	0	No	0
Distance Primary School 1-2 km	No	0	No	0	Yes (5%)	-0.048	No	0
Distance Primary School 3-4 km	No	0	No	0	Yes (10%)	-0.078	No	0
Distance Primary School 5-6 km	No	0	No	0	No	0	No	0
Distance Primary School 7-12 km	No	0	No	0	No	0	No	0
Distance Primary School > 13 km	No	0	No	0	No	0	No	0
Distance to secondary school	Yes (5%)	-0.001	No	0	No	0	No	0
Distance to food market	Yes (5%)	0.003	No	0	No	0	No	0
Distance to health clinic	No	0	No	0	No	0	No	0
Distance to post office	No	0	No	0	No	0	No	0
Number of schools per capita	No	0	Yes (1%)	0.199	No	0	Yes (5%)	0.28
Population density	No	0	No	0	No	0	No	0
Student-teacher ratio	No	0	No	0	No	0	No	0
Percent female teachers	No	0	Yes (1%)	-0.003	No	0	Yes (10%)	0.003
Percent teachers with certification	No	0	No	0	No	0	No	0
Tigray	No	0	No	0	No	0	No	0
Amhara	No	0	No	0	No	0	Yes (5%)	0.312
Oromiya	No	0	No	0	No	0	Yes (10%)	0.26
Benishangul	No	0	No	0	Yes (10%)	0.246	No	0
SNPR	No	0	No	0	No	0	No	0
Harari	No	0	Yes (10%)	0.174	Yes (10%)	0.287	No	0
Year 2000 dummy	Yes (1%)	0.104	Yes (1%)	0.115	Yes (1%)	0.084	No	0
Number of Observations	2014		2290		2927		2731	

<sup>1)</sup> Coefficients are reported as marginal probabilities.

**10.22 In conclusion, specific policy interventions to increase rural enrollment and completion rates** should focus on: (1) increasing the availability of schools; (2) strengthening the set of risk management tools available to farmers (use of pesticides and irrigation as well as ex post coping mechanisms), which would especially help in raising girls' education; and (3) improving the infrastructure in schools in terms of sanitation and water availability.

10.23 **Actions to increase *urban* enrollments should focus more on** improving the quality of schooling by: (1) reducing student-teacher ratios; (2) increasing the deployment of female teachers; and (3) improving the school infrastructure in terms of water and sanitation facilities.

10.24 Overall economic growth will also positively affect enrollment rates both in rural and urban areas. The potential impact on enrollment rates of increasing awareness of the importance of schooling, combined with adult literacy campaigns, deserves further investigation. The large externality effects of overall educational attainments in the community and of female adult literacy in particular, suggest promise in such an approach, especially if successfully targeted toward women. Finally, a more detailed ethnographic investigation of why households are less likely to invest in girls' education is called for.

#### 10.4 Policy Actions Needed to Attain the Education MDG

10.25 **It is unlikely that Ethiopia will achieve universal primary *completion* by 2015 given current education outcomes**, which include a 60 percent cohort entry rate for Grade 1, a 25 percent attrition rate among entrants by Grade 2, and a 50 percent attrition rate by Grade 5.<sup>307</sup> To further inform the relative effectiveness of different interventions in increasing the gross enrollment rate, we perform a series of simulations. In particular, we explore: (1) how overall economic growth would affect enrollment rates in both rural and urban areas; (2) how much reducing the distance to schools and the occurrence of harvest failure would raise enrollment rates in rural areas; and (3) how much increasing the quality of schooling would increase enrollment rates in urban areas.<sup>308</sup> Note that for a complete analysis of the cost effectiveness of these interventions the results must be complemented with cost estimates of the different interventions.

10.26 **First, we simulate the impact of 11 years of 3.3 percent per capita income growth**, which corresponds to the required GDP per capita growth rate to reach the poverty MDG (see Table 6.1, Chapter 6). This corresponds to an increase in household income of 43 percent and would increase the enrollment rate in rural and urban areas by just two and one percentage points respectively. Clearly, income growth alone will not be sufficient to reach the enrollment MDG.

10.27 **Second, we simulate the impact of bringing all children in *rural* areas within two km from a primary school**, which currently is not the case for 54 percent of all rural children. Targeted construction of schools to bring all children within this distance would increase gross enrollment by 4.9 percentage points.

10.28 **Third, we simulate the impact of a ten percentage point reduction in the crop area damaged**. Weather and pest shocks are a constant source of vulnerability and income loss in rural Ethiopia. A 10 percentage point reduction in the crop area damaged, which corresponds to a 50 percent reduction in crop damage from their 1995 and 1999 levels, both moderately good years, would increase rural enrollment rates by one-half percentage point.

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<sup>307</sup> World Bank 2004a.

<sup>308</sup> For our simulations, we use the marginal effects reported in Table A.10.3, Appendix 3.

Given that girls suffer disproportionately from crop damage, this would also help reduce the gender gap in educational attainments.

**10.29 Fourth, we examine the effect of increasing the quality of schooling in urban areas.** Reducing the student teacher ratio from 60 to 50 would increase urban enrollment rates by two percentage points, and increasing the proportion of female teachers from its current level of about 30 percent to 40 percent would increase enrollment in urban areas by five percentage points. These effects are clearly substantial and would bring Ethiopia a good deal closer to universal primary enrollment.

**10.30 While reaching universal primary education by 2015 lies beyond Ethiopia's reach, concerted and comprehensive effort will also be needed to reach the more modest intermediate goal of 100 percent gross enrollment,** a pre-condition for reaching universal primary education. The simulations suggest that the combined effect of overall economic growth at a pace of 3.3 percent per capita over the coming decade, increased access to schools, reduced exposure to harvest failure in rural areas, and improved quality of schooling in urban areas would increase gross enrollment rates by 8.7 percentage points in rural areas and by 10.3 percentage points in urban areas. While this would bring Ethiopia close to reaching 100 percent gross enrollment in grades 1-4, the simulations suggest that in the absence of additional interventions, Ethiopia would still remain far removed from universal gross enrollment in grade 1-8.

## **10.5 Concluding Remarks**

**10.31 Our empirical findings suggest that supply side interventions remain critical to increasing primary school enrollment and completion rates in Ethiopia.** It further appears that in rural areas supply side interventions should be mainly focused on increasing accessibility to schooling, especially through the construction of new schools in unserved and underserved areas. Remoteness from a school increases the opportunity cost of primary school attendance, and given that school children must walk to school, distance may also serve as a direct barrier to attending primary school, especially for young girls. Supply side interventions in urban areas, where most children are already within two kilometers from a primary school, should focus on increasing the quality of schooling, as captured by the student-teacher ratio. The presence of female teachers may also have a substantial effect on school attendance and completion, especially by girls.

**10.32 On the demand side, there is a need for social protection programs,** which could help mitigate the negative impact of idiosyncratic shocks on school enrollment and completion, again especially for girls. There may also be opportunities to expand and improve risk mitigation practices on smallholder farms (e.g. small scale irrigation) and to introduce insurance programs (e.g., crop insurance schemes) which would help buffer household food consumption and income from idiosyncratic production shocks. Given the strong association between parental (and especially female adult) education and the educational achievements of the community, the role of awareness and adult literacy campaigns should be further explored. A more detailed examination of why households are less likely to invest in girls' education, particularly during times of adverse shocks, would help to inform the design of social risk management practices to protect female enrollment

during shocks, and to close the gender disparity in educational outcomes across wealth quintiles in Ethiopia. Differential returns to education among men and women may influence household investment decisions. Empirical analyses aimed at understanding labor market segmentation and wage determination by gender could thus also improve our understanding of the underlying causes of household underinvestment in female education. Alternatively, or in addition, there may be a deep-rooted cultural bias as suggested by the disempowered position of women in Ethiopian society generally. Measures to strengthen women's legal rights and expand their economic opportunities, as suggested in Chapter 1, may help to improve the standing of women and to gradually erode this bias. Finally, action research should also be pursued whereby parents are encouraged to send their daughters to school for example through attendance fees or through greater involvement of the communities.

## CHAPTER 11. STRENGTHENING PEOPLE'S AGENCY—CONCLUDING REMARKS

11.1 Part III of the study explored the determinants of non-monetary dimensions of well-being and focused in particular on three key human development outcomes (malnutrition, health and mortality, and education). Improving human development outcomes is indeed important in and of itself to enhance people's well-being, and it is also critical both to empower people—allowing them to make effective choices in life—and to engender economic growth and reduce consumption poverty. Not only will improvements in nutritional status, health and educational outcomes among the poor unlock their human potential and stimulate economic growth, these improvements will also help break the vicious poverty cycles which keep individuals and families in conditions of chronic poverty and economic destitution across generations. We review the key policy implications regarding appropriate strategies to enhance human development outcomes emerging from the analysis, and comment briefly on the need for other interventions, in particular the need to enhance access to information and to strengthen people's opportunity structure, necessary to further foster empowerment of citizens in general and women in particular.

**11.2 The spread of HIV/AIDS, but also continued high malaria incidence, must be reversed if Ethiopia's aspirations for economic growth and poverty alleviation are to be met.** Ethiopia's HIV/AIDS epidemic is generalized, having spread far beyond the original high-risk subpopulations. Prevalence among women attending ante-natal clinics is five percent or more, and approximately 1.5 million Ethiopians are living with the virus. Unabated progression of the epidemic will undermine current and future development efforts. Malaria is one of the leading causes of both hospital stays and outpatient visits in Ethiopia, representing a huge burden on the country's strained health system. HIV/AIDS and malaria account for 6.2 and 4.5 percent of child deaths respectively. Controlling malaria will facilitate access to cultivable land, thus alleviating the intense land pressure that characterizes Ethiopian agriculture and providing opportunities to the rapidly emerging landless class. Immediate and concerted efforts to halt the spread of both diseases and to provide effective treatment for those infected are a necessary condition for other development and poverty reduction interventions to bear any fruit. In doing so, it will be critical to rapidly build an accurate data base (for example through a National Biological Survey) to enable close monitoring of the evolution of the incidence of HIV/AIDS incidence as well as a flexible response to the changing manifestation of the disease. Successful implementation of the multi-sectoral HIV/AIDS strategy also requires continued support from the highest political levels, and the placement of the program under the direction of the Prime Minister's Office, as is currently the case, is thus warranted.

**11.3 Enhancing female adult education should receive the highest priority given its key role in improving human development outcomes and consumption poverty reduction, as well as women's empowerment.** The estimated large beneficial effect of female adult education on human development outcomes and poverty is probably one of the most robust empirical relationships ever established in the human development literature. This underscores the urgent need to better understand the strong bias against investment in female

education which continues to persist in rural Ethiopia, and to perform action research by evaluating programs to promote girls' enrollment. Girls in rural areas were estimated to be 11 percentage points less likely than boys to be enrolled in primary school and eight percentage points less likely to complete primary school once enrolled. Moreover, women's education was the major differentiating factor in women's attitude towards wife beating. While 88 percent of all women with no education found it justified to receive a beating by their husbands either for burning the food, arguing with him, going out without telling him, neglecting the children, or refusing sexual relations, this reduced to 83 percent for women with primary education and 57 percent among women with secondary and higher education. Continued investment in expanding school access in rural areas will be critical to enhance primary enrollment.

**11.4 The substantial negative impact of harvest failure on human development outcomes highlights the need to strengthen people's ability to cope with shocks.** The empirical results for both child malnutrition and school enrollment clearly indicate that households' efforts to cope with harvest failure come at the expense of their children's human capital development. In the case of schooling girls are especially at a disadvantage in the face of shocks, while the nutritional status of boys tends to suffer more than that of girls. Given the permanent damage malnutrition-induced growth retardation and interruption of schooling impose on future earnings and development, farmers' risk management strategies must be strengthened. This could be done either by helping them to mitigate the effects of shocks (e.g. through irrigation, pest and plant disease management) or by increasing their capacity to cope with shocks ex post (e.g. through better targeting of food aid in response to shocks, development weather index based crop insurance schemes, strengthening the existing informal insurance schemes, or through productive safety nets and contingent transfer programs such as food/cash for work or for education).

**11.5 Increasing awareness about the long term detrimental effects of early childhood malnutrition on future economic growth is necessary.** A comprehensive and coherent multi-sectoral nutrition policy will need to be developed, with the institutional responsibilities of the various ministries and mechanisms for coordination of their actions and interventions in the field of nutrition clearly delineated. Given the critical importance of early childhood malnutrition for economic growth, this agenda should be of great concern to the Ministry of Finance and Development.

**11.6 Maternal education and especially health and nutritional knowledge play a critical and timely role in reducing child malnutrition and child mortality.** The empirical evidence on the determinants of child stunting suggests that child growth monitoring and maternal nutritional education programs could play an important complementary role to other development actions such as promotion of food security, income growth, and more generally female and male adult education, which are already underway. Other direct nutrition interventions such as micronutrient supplements, promotion of exclusive breast-feeding, and appropriate complementary feeding have also proven to be very cost effective as indicated by the Copenhagen Consensus.<sup>309</sup> Moreover, while it will take a considerable amount of time

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<sup>309</sup> Initiative by The Economist whereby a group of Nobel Prize winners were asked to evaluate and rank different development initiatives according to their cost effectiveness.

before the other development actions substantially affect pre-school child growth faltering and child mortality, child growth monitoring and nutritional education programs as well as complementary feeding and micronutrient supplementation could take effect immediately, as illustrated by the successful ongoing Vitamin A supplementation program. The most promising interventions to reach the MDG of reducing child mortality by two-thirds by 2015 from the 1990 level are enhancing maternal education and increasing access to safe drinking water. Given that 24 percent of under-five child deaths are attributed to diarrhea, maternal health knowledge and behavioral change will be equally critical.

**11.7 There is a clear need for a multi-sectoral approach to improve people's human capabilities, and its institutional implications warrant further attention.** The empirical analysis clearly indicates that irrespective of the particular human development outcome (be it malnutrition, mortality or education), important opportunities for improving these outcomes are to be found outside the particular sectoral realm.

**11.8 A better understanding of the existence of synergies between and the appropriate sequencing of interventions is needed to inform a multi-sectoral approach toward improving human capabilities.** While the empirical analysis presented in Part III properly identifies the effect of each individual intervention on a particular human development outcome, it is likely that there also exist synergies in the implementation of different interventions. Could, for example, income and maternal nutritional knowledge be considered complements, or do they rather substitute for one another? In the former case, an integrated approach is more effective to address child malnutrition, or alternatively, if one of the determinants is extremely low relative to the other, a sequenced approach would be called for. However, in the latter case, imparting maternal nutritional knowledge might suffice irrespective of the poverty status of the household, and there is no particular gain from an integrated approach. In the case of child stunting there is evidence that income and community nutritional knowledge act as substitutes, suggesting that there may be substantial gains from imparting nutritional knowledge, a relatively easy to implement and low cost intervention, even if people remain very poor. Yet, further investigation of the interactions between poverty and nutritional knowledge is necessary. There may also be a threshold below or above which determinants begin to act as complements. The existence of synergies also has important implications for the equity-efficiency trade-off, as substantial efficiency gains may be derived from focusing a package of interventions on some areas, which could come at the expense of intervening in others.

**11.9 Access to information is critical to enhance people's capability to aspire and expand their choice.** Wide dissemination of radios and mass civic education programs provide a cost effective and commanding medium to do so, especially when the majority of the population is illiterate and physically isolated. Radio programs are major dialogue initiators, often empowering individuals and fostering societal change. This is exemplified by the deeply disturbing story of Woineshet, a 13-year old rape victim in southern Ethiopia whose father's decision to bring her case to court was prompted by his exposure while working in Addis Ababa to radio announcements and bus ads urging the prosecution of rape cases. Enhancing people's access to information will not only require increasing people's

access to radios but also providing an enabling legal framework fostering open debate and supporting citizens' rights to information.

**11.10 In addition to enhancing people's human capabilities and their access to (and production of) information, i.e. their agency, people's opportunity structure should also be strengthened to foster empowerment of citizens in general and women (and pastoralists) in particular.** To further facilitate the ongoing transition from traditional norms to national legal frameworks discussed in Chapter 2, actions should focus on continued support to existing programs of decentralization and support to the development of independent civil society. Particularly crucial to foster empowerment through these programs would be: (1) a continuous emphasis on capacity building at the woreda and kebele level to ensure effective use of block grants for poverty reducing purposes; (2) the enhancement of the interface between kebele and woreda councils, and between citizens and both of these organizational entities; (3) the increased involvement of citizens in the formulation of kebele plans, budgeting and monitoring; and (4) establishing functional mechanisms of accountability, including annual performance appraisals.

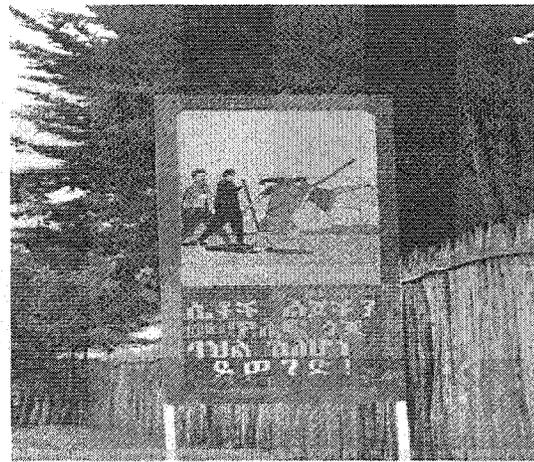
**11.11 To improve the position of women in Ethiopian society actions are recommended in the legal, social and economic spheres:**

- Further support is required to hone and deepen government strategies supporting equal legal protection of women. This includes: (1) better aligning the penal codes and application of existing laws to make them consonant with the word and spirit of Article 25 of the constitution and the National Policy on Women; (2) providing training on gender sensitization to judges, lawyers and other members of the legal profession; (3) establishing a watchdog to track changes in the law and its application; and (4) supporting legal advocacy groups and providing legal aid, women's advisory centers and shelters for abused women.
- The entrenched social norms and practices that discriminate against women in society in general and the home in particular should be addressed. The billboard actions against gender based violence undertaken by the Gurage Women and Teacher's Association are encouraging signs of civic engagement in this context (see Picture 11.1). This includes: (1) ensuring that gender issues are appropriately addressed in all development interventions and government programs both in policy and practice; (2) organizing training events for women parliamentarians and other champions of women's issues on communication skills, assertiveness, computer literacy, gender budgeting, planning, monitoring and evaluation for women MPs; and (3) continuing the focus on girls' education and promoting the inclusion of gender sensitivity programs in education curricula.
- Finally, women's participation in the formal economy should be increased by: (1) providing incentives to businesses to hire women; (2) providing business management training and follow-up support to women; and (3) continuing the expansion of credit availability to female entrepreneurs.

**Picture 11.1: Billboards against gender based violence by the Gurage Women's and Teachers' Association.**



“Stop violence against women!”  
“Prepared by Cheha Woreda Women  
and Teacher’s Association”



“Abduction of girls is bad practice.  
It should be stopped!”



## APPENDICES

### Appendix 1: Ethiopia's Action Plan to Strengthen SDPRP Monitoring and Evaluation

#### A.1 Background

The Government of Ethiopia established a Welfare Monitoring System (WMS) in 1996 to monitor the effect of economic policy on social outcomes. Key institutions are the Welfare Monitoring Unit in MoFED, the Central Statistical Authority and several ministries.

The Welfare Monitoring Unit (WMU), which is part of the Economic Policy and Planning Department in the Ministry of Finance and Economic Development (MoFED) is entrusted with the coordination of the monitoring and evaluation system. The WMU is responsible for compiling and analyzing data collected by other institutions in order to provide performance reports on SDPRP implementation and for commissioning of relevant research and the dissemination of the findings. The Economic Planning and Policy Department is responsible for drafting the SDPRP Annual Progress Report, which lays out the annual progress made in the implementation of the SDPRP and the poverty and welfare changes associated with SDPRP policies and programs. The WMU is responsible for ensuring that the relevant data are collected for monitoring purposes. As part of the plans to strengthen the monitoring and evaluation of the SDPRP, the Welfare Monitoring Unit is absorbing new responsibilities to spearhead the national agenda for monitoring and evaluation across government and in collaboration with a number of non-governmental actors (academic, civil and international). The increased responsibility will be matched by an increase in its technical and financial capacity (see section on Institutional Capacity).

The Central Statistical Authority (CSA) is the main data collection authority in Ethiopia. For the last fifteen years, it has carried out a complex program of surveys and censuses, including the population and agricultural censuses, the Household Income Consumption and Expenditure Survey (HICES), the Welfare Monitoring Survey (WMS), the Health and Nutrition Survey and the Labor Force Survey. It has recently completed its second Medium Term National Statistical Program (MTNSP) (2003-2008) and is currently in the middle of a process of institutional strengthening.

Alongside the CSA, several ministries collect socioeconomic data, mainly from administrative sources, relevant for the monitoring of the SDPRP implementation. Several line ministries, especially those with articulated sector programs, run their own monitoring systems. The sectors whose information systems are most relevant for the monitoring of the SDPRP are education, health and HIV/AIDS, water, roads, agriculture, food security and vulnerability, public sector management and capacity building, private sector development, and macroeconomic and finance. The level of development of sector-specific information systems differ significantly from sector to sector. As a result, some sectors are able to deliver facility-level data (e.g. education), while others can only make data available by region (e.g. health).

The monitoring and evaluation action plan has been developed as part of the preparation of the Poverty Reduction Support Credit (PRSC) of the World Bank, in collaboration with other donors, to support the implementation and monitoring of the SDPRP. A strong monitoring and evaluation system will deliver accurate and timely information on the achievement of the agreed set of prior actions and targets that will trigger the release of annual PRSC budget support funds by donors.

## **A.2 Objective**

The objective of the monitoring and evaluation system is to provide the government with reliable mechanisms to measure the efficiency of government and the effectiveness of public policies in achieving the objectives stated in its SDPRP.

## **A.3 Design**

The M&E system for the SDPRP takes into account the multi-sectoral approach to achieving national growth and poverty reduction objectives, as well as the newly implemented decentralized structure of intergovernmental responsibilities. It is designed to:

- a) Monitor input and process indicators across levels of government (e.g. public expenditure, adoption of reforms) as a measure of implementation;
- b) Monitor output indicators (e.g. education, health, infrastructure) at various levels of aggregation (household, woreda, national) as a measure of institutional efficiency;
- c) Monitor developmental outcomes and final objectives to track overall progress;
- d) Relate performance to indicators of reform processes for decentralization, capacity building and civil service reform to provide information on the effectiveness of the reform process in improving outcomes;
- e) Evaluate impact to determine the effectiveness of key government policies and programs in reaching desired objectives.

## **A.4 Components**

### ***Results framework and reporting mechanisms***

The SDPRP has a results framework matrix, which forms the basis for intergovernmental agreements of major outputs and outcomes to be achieved, and for the design of the M&E system. However the quality of the SDPRP matrix will need to be strengthened in the following areas:

- a) Strengthen the analytical linkages between government policies and programs, allocated inputs, expected outputs, and desired developmental outcomes needed to achieve the overall objectives of the government program;
- b) Improve the definition of indicators including baseline values and medium-term targets;
- c) Specify sources of data and responsibility for monitoring.

The current SDPRP reporting mechanisms are weak. The government plans to strengthen reporting on SDPRP progress, and regularize dialogue with donors. Specifically:

- a) Strengthen the structure and content of the SDPRP Annual Progress Report, ensuring close linkages with results-based monitoring framework;
- b) Establish regular consultative processes with donors and civil society, including a series of monitoring and evaluation workshops. An initial workshop held on May 21, 2004 brought together a cross section of government agencies (WMU, CSA and sector ministries) responsible for monitoring and evaluation implementation with several non-governmental stakeholders for the government to present its monitoring and evaluation strategy and obtain overall endorsement and feedback on key areas of implementation. Follow up events will provide a venue for consultation and in-depth discussion on key implementation challenges.

### ***Improve data quality and availability***

The government proposal for “Strengthening data collection, analysis and dissemination on poverty monitoring and the Millennium Development Goals”, which has received funding support from the Development Assistance Group (DAG), develops a comprehensive strategy to improve the quality of poverty data and analysis and enhance their use and dissemination. The proposal focuses on the activities by the Central Statistical Authority and the Welfare Monitoring Unit that will (a) create the necessary qualitative and quantitative evidence on welfare outcomes at low levels of aggregation, and (b) enhance the broad and fast dissemination and usage of data to all stakeholders.

**Central Statistical Authority.** The CSA proposes to create the necessary data on welfare outcomes, via new household surveys conducted at low levels of aggregation (including the Household Income and Consumption Expenditure Survey for 2003/04, bi-annual Core Welfare Indicators Questionnaire surveys), and a more effective organization of the available data in the form of a Socio-Economic Database. The CSA would also improve usage of data collected by the CSA via the development of a far reaching dissemination strategy.

*The Ethiopian Socioeconomic Database.* The aim of the database would be to ensure the availability of all quantitative evidence relevant to poverty monitoring and evaluation in an integrated manner. The CSA will develop an integrated electronic database of all available survey data and other data, and all relevant documentation in a user-friendly and relevant way, both for internal purposes within the CSA and other government departments, as well as for all other stakeholders.

**Welfare Monitoring Unit.** To ensure the availability of the necessary evidence from quantitative and qualitative sources on poverty and welfare outcomes and inputs, the WMU would: (1) coordinate the collection of participatory and qualitative data on poverty via a participatory poverty assessment (PPA); (2) construct a poverty map of Ethiopia, including poverty estimates at the woreda level, using advanced techniques exploiting the census and HICES data; and (3) establish an Integrated Administrative Management Information System,

combining administrative, budgetary and socio-economic data to monitor progress in SDPRP implementation and other purposes.

*Integrated Administrative Management Information System.* The aim of an integrated MIS is to collect and organize *all* relevant data, including administrative data, budgetary data and all relevant socio-economic data, in a user-friendly way for policy planning and monitoring, at levels of disaggregation relevant for decentralized policy making. The availability of an integrated data management system will facilitate timely and opportune delivery and processing of information by the WMU for tracking progress in the implementation of the SDPRP.

The integrated data management system will include administrative information from all relevant sectors at the woreda, regional and national levels to afford the government with vertical and horizontal monitoring capacity, strengthen its ability to identify problem areas and low performers, and improve its capability to affect success.

The design of the overall system and installation in MoFED is being financed under the DAG proposal. The Bank support, via its Institutional Development Fund grant, will attend to the institutional development in key sector ministries including education, health, HIV/AIDS, water, roads, agriculture, food security, public sector reform and capacity building, private sector, and macroeconomic and budget sectors to:

- a) Determine indicators for each sector MIS required for SDPRP monitoring;
- b) Design and implement modules of the I-MIS for each sector;
- c) Design reporting mechanisms from local to central government;
- d) Design action plans for addressing capacity building requirements to improve data flows from local governments (woreda) to central ministries.

#### ***Developing capacity to implement the SDPRP medium-term research agenda***

Poor analysis of effectiveness of public policy was identified in the government action plan as one of the reasons why efforts on the data collection and monitoring do not translate in better and more results-based decision making. As part of its harmonization strategy, the government decided to develop a medium-term research agenda in consultation with interested partners and with the support of the Ethiopian research community. The objective of the agenda is to establish the effectiveness of policies in priority areas to deliver expected results and provide early feedback to redress policy in case of failure. It will include policy analysis and impact evaluation studies geared towards validating the effectiveness of key government policies and programs in reaching desired objectives.

The Bank, through an IDF grant, will support the strengthening of MoFED's capacity for monitoring and evaluation analysis through technical assistance and training on methods and tools for monitoring and evaluation. Impact analysis of alternative policies and programs will focus on key SDPRP areas including agriculture, water, and decentralization. The capacity building efforts will take place in close collaboration with international and national researchers in government, research institutes, and universities to benefit from world class

expertise. Partnerships with Ethiopian universities and research institutes will be established to enable staff of the MoFED to benefit from analytical expertise and to strengthen links between data generation, policy analysis, and policy formulation.

The following activities will be required:

- a) Design and implement mechanisms for consultation and feedback with the research community. Develop roster of analysts and researchers, and website;
- b) Develop medium-term research agenda through consultative process with research and donor communities;
- c) Build analytical capacity in MoFED, through training and technical assistance, and fund priority evaluation analysis;
- d) Undertake analysis of key SDPRP policies.

This is expected to help the government improve its analysis of the effectiveness of policies and programs in delivering results, feed this information into the budget process to strengthen the overall effectiveness of public spending, and improve the prospects for attaining MDG targets.

#### ***Strengthen the environment for performance-based decision making***

International experience shows that it is very difficult to operationalize the incorporation of monitoring and evaluation results in the planning and budgeting processes. For this reason, the government will pay special attention to developing clear mechanisms to link planning, budgeting and monitoring and evaluation processes. Activities will include:

- a) identify key ministries and organizations that are or will be involved in monitoring performance, their function and interaction;
- b) develop and implement training plan on monitoring and evaluation tools and best practices;
- c) develop mechanisms to strongly link planning and budgeting processes to monitoring and evaluation results;
- d) Design and implement mechanisms to widely disseminate monitoring and evaluation results to program managers, policy-makers, communities and other civil society organizations.

#### ***Participatory monitoring***

The government has not been very receptive to the implementation of a policy for open access to public information. As an interim measure, the government drafted a policy for data access which addresses the immediate concerns regarding access to primary data sources—required to enhance policy analysis and improve data quality through producer/user linkages.

On the participatory monitoring side, civil society made some progress to reorganize under the recently established umbrella group called Poverty Action Network (PAN). The network has brought together a range of civil society organizations and narrowed down some areas

where these organizations think they can contribute to monitoring implementation of the SDPRP, namely, expenditure tracking and monitoring the quality of public service delivery. The government is moving consciously in its relations with civil society, waiting for PAN to demonstrate its ability to deliver.

***Strengthen institutional capacity***

Strengthening SDPRP monitoring and evaluation will require the Welfare Monitoring Unit playing a large and critical role in managing and spearheading the monitoring and evaluation agenda of the government, one that cannot be accomplished without a very significant strengthening of its capacity. New responsibilities include: managing the integrated data management system; leading the implementation of government wide monitoring and evaluation action plan across levels and sectors of government, ensure monitoring and evaluation standards, and support monitoring and evaluation needs assessment and capacity building; heading the SDPRP annual review process, coordinating the sector reviews, and drafting the SDPRP Annual Progress Report; coordinating the national research agenda; liaising with non-governmental institutions; developing protocols for horizontal (sector to sector) sharing of knowledge and information within the government; and liaising with other organizations (academic, international and non governmental) to strengthen the ability of the government to leverage outside resources.

The government has already approved the expansion of WMU staff, and outside resources have already been allocated to expand technical capacity and the quality of human resources.

## Appendix 2: Supplementary Figures

Figure A.1.1: Ethiopia- Percent of Total Territory Exposed to Malaria

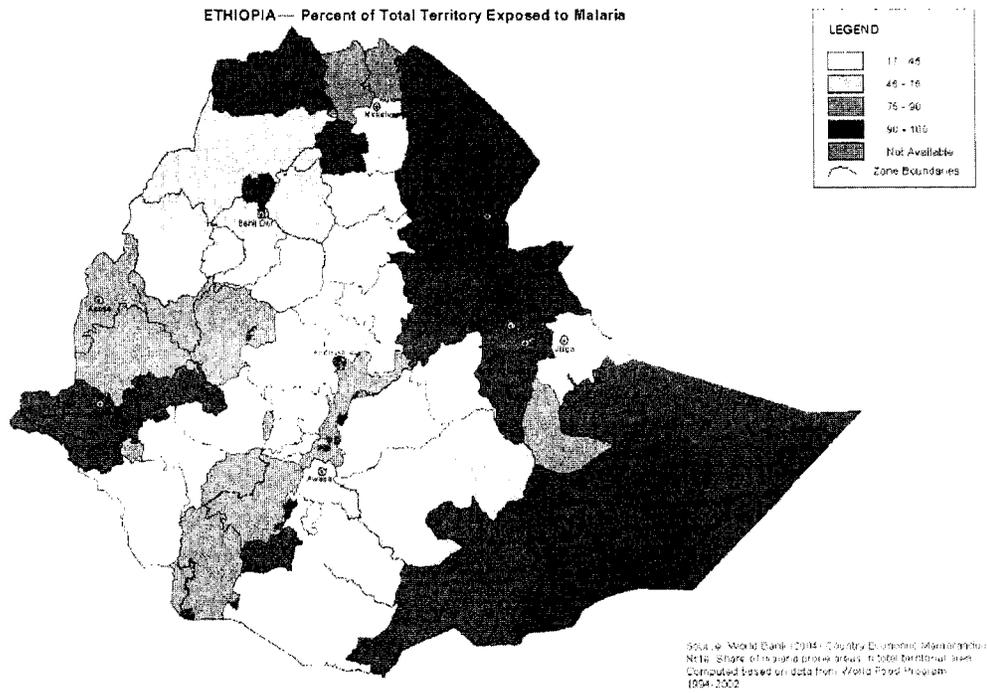


Figure A.1.2: Ethiopia—Percent of population vulnerable to malaria.

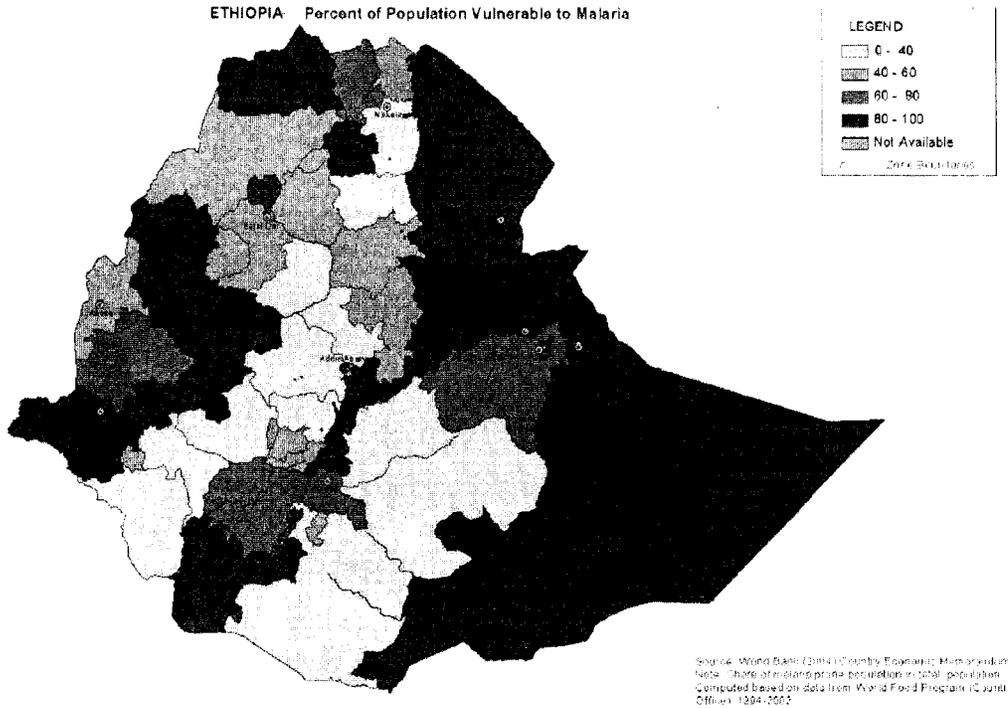
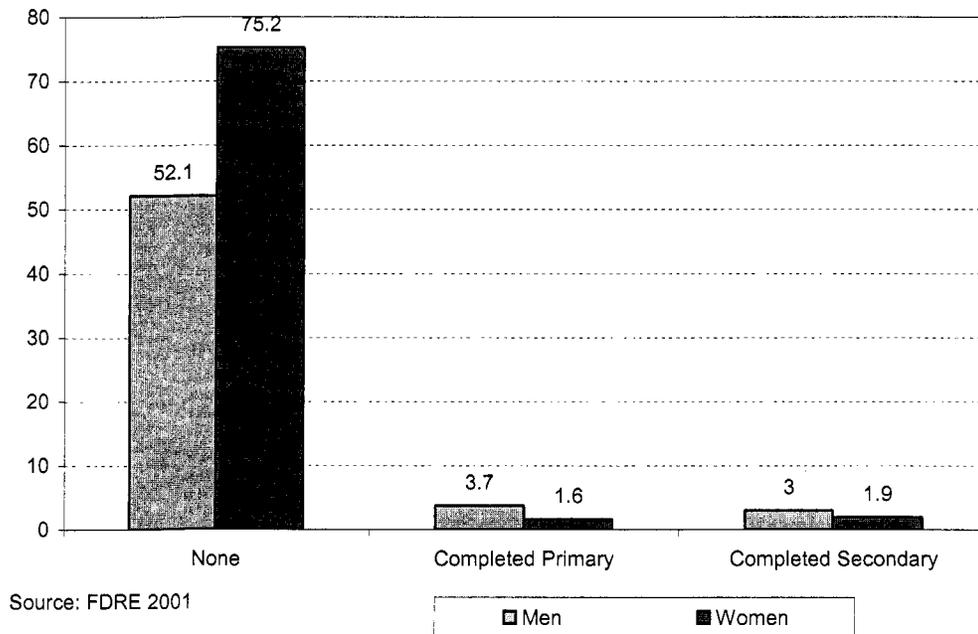
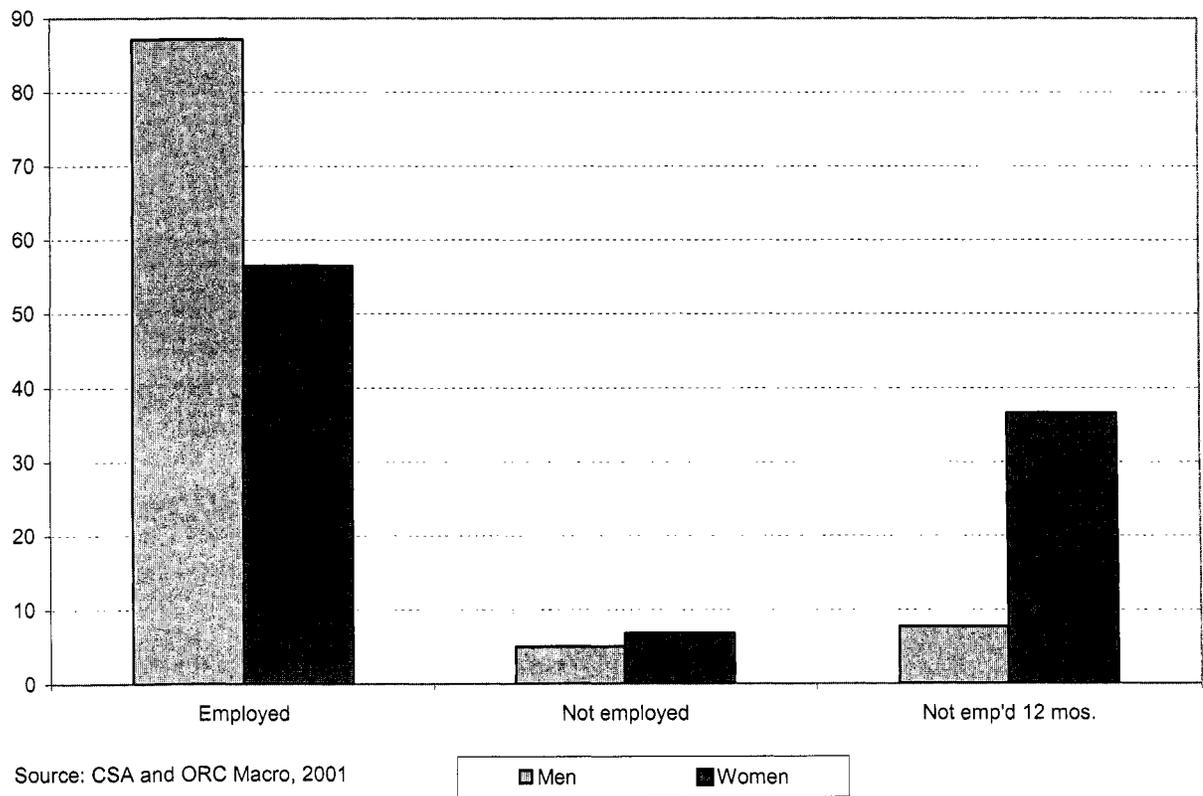


Figure A.2.1: Educational attainment by gender (%).



**Figure A.2.2: Employment status by gender.**



### Appendix 3: Supplementary Tables

Table A.1.1: Ethiopia, Price indices in 1999 (at 1995/96 constant prices)

	Months and prices			
	Jul-99	Jan-00	Feb-00	Average price
<b>Addis Ababa</b>				
General	108.7	102.8	105	106
Food	112.6	100.7	103.5	107
Non-food	104.8	105.3	106.7	105
<b>Rural areas</b>				
General	115.5	107.3	108.6	112
Food	123.2	105.6	108.7	115
Non-food	104.6	109.7	108.5	107
<b>Urban areas</b>				
General	119	115.5	115.7	117
Food	125.8	111.8	114.1	119
Non-food	110.5	120.1	117.1	115

**Table A.1.2: Ethiopia: Poverty lines per reporting area, 1995-1999**

Reporting area		1995			1999		
		Food poverty line	Lower poverty line	Upper poverty line	Food poverty line	Lower poverty line	Upper poverty line
11	Rural Tigray	712.83	920.50	1143.99	749.08	895.67	983.72
12	Rural Afar	599.37	838.07	851.43	688.37	864.51	903.63
13	Rural North & South Gondar	661.32	796.49	896.60	760.17	889.86	948.36
14	Rural East, West Gojam & Agawi	526.67	711.44	822.64	661.21	772.79	865.78
15	Rural North Wollo, Oromiya Zone	693.51	831.56	899.13	736.14	861.47	904.65
16	Rural South Wollo, Oromiya Zone & North Shewa	619.56	760.76	898.83	704.30	878.44	979.80
17	Rural East & West Wellega	590.04	765.55	934.02	649.93	803.89	891.99
18	Rural Illubabor & Jimma	608.82	763.00	985.24	631.21	738.42	875.12
19	Rural North & West Shewa	556.41	720.52	1002.85	694.39	874.20	992.21
21	Urban Mekele	915.55	1291.68	2023.42	1063.99	1434.36	2722.41
22	Urban Bahir Dar	818.75	1092.67	1275.97	885.72	1201.45	1687.94
23	Urban Gonder	877.66	1184.94	1437.76	1007.63	1301.67	1973.40
24	Urban Dessie	917.98	1189.76	1593.67	1009.36	1266.79	1589.97
25	Urban Jimma	716.07	943.65	1219.71	918.85	1286.37	1801.49
26	Urban Debre Zeit	767.83	1030.28	1450.46	967.09	1306.37	2203.72
27	Urban Nazareth	862.75	1146.80	1509.08	1014.03	1428.30	2221.89
28	Urban Harar	963.75	1182.43	1572.17	1127.41	1459.38	2077.50
29	Urban Addis Ababa	937.33	1226.02	1548.75	998.57	1297.72	1845.75
110	Rural East Shewa, Arsi, Bale & Borena	648.67	818.04	1051.55	625.00	774.40	951.17
111	Rural East & West Hararghe	619.41	733.73	901.76	547.20	620.68	668.67
112	Rural Somalie	483.29	558.52	679.81	663.95	818.98	927.30
113	Rural Benishangul-Gumuz	747.19	938.02	1082.79	624.54	791.00	887.52
114	Rural Yem, Keficho, Maji, Shekicho & Bench	654.37	837.80	963.53	547.24	677.56	756.12
115	Rural North & South Omo, Derashe & Konso	373.06	479.72	624.96	562.35	699.12	754.29
116	Rural Hadiya, Kambata & Gurage	701.32	895.26	1013.57	591.57	716.85	867.77
117	Rural Sidama, Gedeo, Burji & Amaro	888.27	1159.48	1338.70	581.40	700.13	854.65
118	Rural Gambela	908.14	1129.46	1301.06	628.24	811.67	897.03
119	Rural Harari	751.21	879.10	1201.83	696.55	872.47	994.30
120	Rural Addis Ababa	904.73	1126.75	1363.09	880.51	1120.01	1438.87
121	Rural Dire Dawa	739.45	880.02	1173.87	688.49	800.35	876.88
210	Urban Dire Dawa	1135.49	1446.12	1828.44	1143.09	1361.39	1570.33
211	Other Urban Centers	691.89	927.41	1180.11	890.50	1192.97	1793.96

**Table A.1.3: Ethiopia, Growth in consumption by expenditure decile, 1995-1999**

Expenditure Decile	National		Rural		Urban		Growth rates of consumption		
	1995	1999	1995	1999	1995	1999	National	Rural	Urban
1	617.85	623.45	622.46	625.11	594.06	613.06	1.01	1.00	1.03
2	848.65	868.52	845.07	872.13	878.88	844.39	1.02	1.03	0.96
3	1013.60	1023.15	1003.20	1022.50	1104.04	1028.30	1.01	1.02	0.93
4	1171.17	1175.88	1152.63	1172.91	1315.24	1194.32	1.00	1.02	0.91
5	1328.80	1332.98	1303.37	1327.24	1537.32	1377.76	1.00	1.02	0.90
6	1507.89	1510.58	1471.28	1500.63	1782.35	1593.39	1.00	1.02	0.89
7	1713.51	1715.73	1665.45	1698.37	2088.66	1879.13	1.00	1.02	0.90
8	1984.38	1968.59	1912.50	1937.19	2511.20	2332.84	0.99	1.01	0.93
9	2400.74	2391.27	2283.28	2315.92	3181.47	3059.03	1.00	1.01	0.96
10	4090.46	4026.65	3736.71	3672.82	5580.36	5978.02	0.98	0.98	1.07

**Table A.1.4: Ethiopia: Reporting adult equivalent total food consumption and share of food, 1995-1999**

Reporting area	Real Household expenditures per adult equivalent		Real Per adult equivalent food expenditures		Share of food expenditures in total expenditures		
	1995	1999	1995	1999	1995	1999	
11	Rural Tigray	1412.78	1409.92	740.47	894.51	0.70	0.80
12	Rural Afar	2038.56	1770.12	833.41	726.34	0.66	0.75
13	Rural North & South Gondar	1263.97	1629.24	665.56	904.11	0.76	0.79
14	Rural East, West Gojam & Agawi	1493.43	1937.76	570.54	873.57	0.70	0.78
15	Rural North Wollo, Wag Hamra	1211.14	1430.13	703.94	831.44	0.79	0.80
16	Rural South Wollo, Oromiya Zone & North Shewa	1483.28	1501.79	671.47	795.06	0.72	0.77
17	Rural East & West Wellega	1732.88	1809.68	641.84	885.70	0.67	0.74
18	Rural Illubabor & Jimma	1893.37	1501.42	701.77	794.64	0.68	0.78
19	Rural North & West Shewa	1965.05	1928.80	716.47	837.64	0.64	0.71
110	Rural East Shewa, Arsi, Bale & Borena	1664.43	1599.80	744.07	781.02	0.68	0.70
111	Rural East & West Hararghe	2087.75	1631.33	1026.72	912.32	0.76	0.80
112	Rural Somalie	2597.24	2313.29	924.58	902.57	0.71	0.75
113	Rural Benishangul – Gumuz	1296.66	1346.97	725.63	752.30	0.72	0.70
114	Rural Yem, Keficho, Maji, Shekicho & Bench	1492.85	1514.92	695.81	757.75	0.69	0.72
115	Rural North and South Omo, Derashe & Konso	1708.02	2058.95	444.55	658.72	0.69	0.77
116	Rural Hadiya, Kambata & Gurage	1319.93	1197.25	660.18	653.52	0.69	0.74
117	Rural Sidama, Gedeo, Burji & Amaro	1257.75	1106.91	748.98	826.24	0.67	0.76
118	Rural Gambela	1464.31	1021.63	994.46	735.92	0.73	0.71
119	Rural Harari	2615.70	1901.38	1553.51	1191.26	0.74	0.75
120	Rural Addis Ababa	1543.28	1520.95	923.32	976.38	0.68	0.65
121	Rural Dire Dawa	1595.91	1573.94	1023.01	1071.50	0.82	0.82
21	Urban Mekele	1761.01	1983.25	906.77	1003.24	0.56	0.58
22	Urban Bahir Dar	1568.59	2266.89	833.15	1002.36	0.66	0.55
23	Urban Gonder	1512.21	2308.48	850.36	1132.86	0.65	0.60
24	Urban Dessie	1098.15	1595.56	661.82	975.99	0.66	0.64
25	Urban Jimma	1913.42	1771.96	819.49	727.89	0.60	0.57
26	Urban Debre Zeit	1597.68	1953.89	719.13	805.32	0.62	0.55
27	Urban Nazareth	1666.41	1806.38	882.09	794.53	0.61	0.53
28	Urban Harar	1853.16	1780.16	1210.92	1127.74	0.70	0.63
29	Urban Addis Ababa	2036.89	2030.22	1180.94	1024.04	0.63	0.59
210	Urban Dire Dawa	1386.88	1417.28	1111.43	1239.90	0.70	0.74
211	Other Urban Centers	2151.30	2003.75	989.38	831.79	0.64	0.60

**Table A.2.1: Prevalence of female circumcision**

<b>Background Characteristics</b>	<b>Percentage of women circumcised</b>	<b>Percentage who support practice</b>	<b>Number</b>
<b>Age</b>			
15-19	70.7	53.4	3,710
20-24	78.3	57.0	2,860
25-29	81.4	58.5	2,585
30-34	86.1	65.2	1,841
35-39	83.6	63.6	1,716
40-44	85.8	66.3	1,392
45-49	86.8	66.7	1,264
<b>Residence</b>			
Urban	79.8	31.0	2,791
Rural	79.9	66.1	12,576
<b>Region</b>			
Tigray	35.7	25.3	969
Affar	98.6	76.5	178
Amhara	79.7	60.3	3,820
Oromiya	89.8	69.6	5,937
Somali	99.7	77.3	175
Benishangul-Gumuz	73.7	53.8	160
SNNP	73.5	59.8	3,285
Gambela	42.9	26.8	40
Harari	94.3	51.3	41
Addis Ababa	79.8	16.2	684
Dire Dawa	95.1	45.5	79
<b>Education</b>			
No education	80.4	67.0	11,551
Primary	78.4	48.5	2,425
Secondary and higher	78.2	18.6	1,391
<b>Employment</b>			
Not employed	79.5	59.1	5,630
Employed for cash	84.4	56.1	3,852
Employed not for cash	77.3	62.7	5,885
<b>Total</b>	<b>79.9</b>	<b>59.7</b>	<b>15,367</b>

**Table A.2.2: Elements of regional and local government**

	Kebele:	Woreda/Municipality	Region
Assembly	<ul style="list-style-type: none"> <li>All residents make up the kebele association.</li> <li>Association members meet annually – in an assembly.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	
Council	<ul style="list-style-type: none"> <li>Composed at each level – kebele, woreda and region - of all about 100 elected representatives. A greater number of women and young people council members are found in the kebeles, than at woreda and regional level.</li> <li>Councils meet between monthly and quarterly.</li> <li>Council members elect and appoint cabinet officials are elected every five years.</li> </ul>		
Cabinet (Also referred to as 'executive committee')	<ul style="list-style-type: none"> <li>Cabinet members are government employees.</li> <li>Cabinets are composed of councilors.</li> <li>Chairpersons have full-time posts, and other cabinet posts tend to be part-time.</li> <li>Responsible for preparing kebele plans (with sector offices), and submitting these to the woreda.</li> <li>Responsible for ensuring collection of land and income taxes, and organizing in-kind contributions to development activities.</li> <li>Appoints judges to the "social courts," charged with resolving local disputes.</li> </ul>	<ul style="list-style-type: none"> <li>Cabinets are composed of elected (councilors) and co-opted members (from ministry offices). Co-opted members commonly include members of the administration, judiciary and security. The chairperson/chief executive is often the woreda or region administrator.</li> <li>Most cabinets have between 7 to 10 members, mostly full-time.</li> <li>Cabinets (through committees with sector offices' support) prepare budgets and plans for approval by council.</li> <li>At the woreda level, set and collect local taxes, maintain rural tracks, water points, and administrative infrastructure, administer schools and health services, and manage agricultural development.</li> </ul>	
Sector departments	<ul style="list-style-type: none"> <li>Civil servants commonly found are development agents and health post</li> </ul>	<ul style="list-style-type: none"> <li>All ministries have woreda and regional offices.</li> </ul>	

Source: World Bank Country Office in Ethiopia 2002; INTRAC 2004a

**Table A.2.3: Focus group rankings of top five most important institutions in people's lives, rural sites (Dessie Zuria Woreda, Amhara Region)**

<i>Institution/Focus Group</i>	<i>Site A</i>	<i>Site B</i>	<i>Site C</i>
<b>Farmers</b>			
Church/Mosque	1	2	3
Idir	2	-	-
Peasant Association (Kebele)	3	4	4
Training Center	4	-	-
Health Clinic	5	-	5
Neighbors/relatives	-	1	-
Kire	-	3	-
Market	-	-	1
Work	-	-	2
<b>Widowed Women (elderly)</b>			
Forest	1	4	-
Market	2	-	5
Idir	3	-	1
Hospital	4	-	-
Peasant Association (Kebele)	5	3	-
Kire	-	1	-
Mosque	-	2	2
Sheiks	-	-	3
Dubarti (Praying)	-	-	4
<b>Youth</b>			
Dua (Praying)	1	5	-
Traditional Medicine	2	-	-
Health Clinic	3	4	3
Peasant Association (Kebele)	4	1	4
Police Station	5	3	-
Kire	-	2	-
Idir	-	-	1
Mosque	-	-	2
Tsebel (holy water)	-	-	5

*Source: Rahmato and Kidanu 1999*

**Table A.2.4: Focus group rankings of top five most important institutions in people's lives, urban sites**

<i>Institution/Focus Group</i>	<i>Aada Liben Woreda, Kebele 11, Oromiya Region</i>	<i>Dessie Zuria Woreda, Kebele 11, Amhara Region</i>	<i>Addis Ababa, Kebele 23</i>
<b>Unemployed</b>			
Kebele	1	3	-
Police Station	2	5	4
Courts	3	-	-
Church/Mosque	4	2	2
Idir	5	1	-
Tsiwa (religious gathering)	-	4	-
Health Services	-	-	1
Tsebel (Place near church for washing with holy water)	-	-	3
Neighbors	-	-	5
<b>Housewives</b>			
Idir	1	3	1
Kebele Administration	2	5	-
Tsebel	3	-	4
Church	4	2	3
Mahiber	5	-	-
Neighbors/relatives	-	1	-
Hospital	-	4	-
Elderly	-	-	5
<b>Youth</b>			
Kebele	1	2	-
Church	2	1	-
Hospital	3	-	4
Municipality	4	-	-
Market	5	-	2
Relatives	-	3	-
Government forest	-	-	1
Grain Mill	-	-	3
Idir	-	-	5

*Source: Rahmato and Kidanu 1999*

**Table A.4.1: Estimated effects of radio ownership across location 1995-1999<sup>1), 2)</sup>**

	<i>RURAL</i>		<i>URBAN</i>	
<b>Private endowments</b>				
<b>Human Capital/Demographics</b>				
Size of household	-0.0984	-47.15	-0.1057	-44.61
Dependency ratio	-0.0113	-2.9	-0.0528	-9.29
Ratio of Females in house	0.1529	8.85	0.2381	10.46
Female head of house	0.0022	0.23	-0.0905	-7.93
Age	-0.0052	-3.95	-0.0215	-11.32
Age squared	0.0000	2.89	0.0002	8.91
Grade obtained by adult males	0.0183	11.65	0.0086	6.46
Grade obtained by adult females	0.0153	6.54	0.0183	12.32
No of adults completed post secondary	0.1925	3.76	0.1538	12.64
<b>Physical capital</b>				
Own plough	0.0905	9.91	0.1337	6.04
Own farm animal	0.0592	6.47	0.0644	3.97
Own transport animal	0.1199	14.44	0.0126	0.53
Own bicycle	0.1374	2.7	0.1056	3.75
Own radio	0.1747	14.89	0.2065	17.54
Own tv <sup>3</sup>	-0.3342	-2.55	0.3531	20.45
EA mean radio ownership	0.3992	7.91	0.1315	3.8
No toilet in household	-0.0845	-5.97	-0.1500	-11.97
<b>Livelihoods</b>				
Obtain some income from coffee (=1)	0.0332	3.35	-0.0471	-2.54
Obtain some income from chat (=1)	0.0852	5.27	0.1159	2.91
Share in income from agriculture	0.0428	1.77	0.0445	1.57
Share of income from wages	0.0538	1.59	-0.0303	-2.17
Share of income from other sources	-0.5420	-15.9	-0.0127	-0.61
Number of livelihood strategies engaged in	-0.0815	-10.13	-0.0558	-6.35
<b>Public endowments</b>				
Electricity as source of household energy	0.0650	1.74	0.0964	5.98
Distance to food market (km)	-0.0004	-0.55	0.0113	4.18
Distance to water (km)	-0.0024	-4.03	-0.0087	-2.64
Distance to Health (km)	0.0017	2.93	-0.0026	-1.35
Distance to transport services (km)	-0.0016	-6	0.0008	1.26
<b>Year (=1 if year==1999)</b>	0.0737	8.06	-0.1190	-10.55
<b>Constant</b>	7.6870	179.02	8.2644	163.89
<b>Number of Observations</b>		14984		12097
<b>R-squared</b>		0.4599		0.43

<sup>1)</sup> In this model, we pool the observations for both the 1995 and 1999 samples. Pooled woreda Fixed Effect Model, similar to model in Table 4.10, column 1, but with radio and TV ownership disaggregated and inclusion of enumeration area-level average ownership of radios to capture externality effects.

<sup>2)</sup> Coefficients on woreda dummies not included.

<sup>3)</sup> The negative sign on the returns to TV in rural areas is likely due to an outlier. There were only 20 households with TV in rural areas.

**Table A.4.2: Estimated effects of radio ownership across location in 1999, with additional controls for wealth effect 1999<sup>1), 2)</sup>**

<b>Log of per adult equivalent expenditures</b>	<b>Rural</b>		<b>Urban</b>	
	<b>Coef.</b>	<b>t</b>	<b>Coef.</b>	<b>t</b>
<b>Private endowments</b>				
<b>Human Capital/Demographics</b>				
Size of household	-0.1046	-37.74	-0.1342	-43.62
Dependency ratio	-0.0180	-3.59	-0.0322	-4.48
Ratio of females in house	0.1601	7.41	0.1697	6.1
Female head of house	0.0092	0.78	-0.1110	-7.68
Age of household head	0.0000	0.03	-0.0130	-5.51
Age Squared	0.0000	-1.14	0.0001	3.54
Grade obtained by adult males	0.0149	7.78	0.0103	6.24
Grade obtained by adult females	0.0134	4.62	0.0141	7.97
No of adults completed post secondary <sup>2)</sup>	0.2621	4.58	0.1299	9.89
<b>Physical capital</b>				
Own plough	0.0680	6.05	0.0858	3.18
Own Cattle or Sheep	0.0443	3.39	0.0353	2.16
Own transport animal	0.1188	11.5	0.0944	3.31
Wall dummy (1 if stone/brick wall)	0.0266	1.01	0.1355	5.79
Roof dummy (1 if corrugated iron)	0.1291	9.32	0.0431	1.75
Number of Rooms	0.0242	3.56	0.0659	14.39
Own bike	0.2076	3.13	0.1368	4.26
Own radio	0.1632	11.76	0.1429	9.81
Own TV	-0.0323	-0.04	0.2918	14.66
Ea level radio	0.4065	6.47	0.0986	2.14
No toilet in household	-0.0847	-5.03	-0.1359	-8.49
<b>Livelihoods</b>				
Obtain some income from coffee (1=yes)	0.0417	3.03	-0.0150	-0.55
Obtain some income from chat (1=yes)	0.0875	4.26	-0.0963	-1.52
Share in income from agriculture	0.0183	0.49	0.0530	1.33
Share of income from wages	-0.0323	-0.65	-0.0545	-3.05
Share of income from other sources	-0.5993	-13.42	-0.0452	-1.97
Number of livelihood strategies engaged in	-0.0898	-9.8	-0.0382	-3.51
<b>Public endowments</b>				
Electricity as source of household energy	-0.0011	-0.02	0.1510	7.23
Distance to food market (km)	-0.0023	-1.77	0.0027	0.96
Distance to water (km)	0.0052	2.46	-0.0048	-1.31
Distance to Health (km)	0.0031	3.78	-0.0026	-1.19
Distance to transport services (km)	0.0001	0.33	0.0042	2.61
Constant	7.7045	132.44	7.7737	116.66
Number of observations	8091		7664	
R-squared	0.5258		0.4834	

<sup>1)</sup> In this model, we add additional controls for household wealth such as the material used for the wall and roof of the house. This information was only available for 1999. A woreda Fixed Effect Model is used (similar to model in Table 4.10, column 1, but with radio and TV ownership disaggregated and inclusion of enumeration area-level average ownership of radios to capture externality effects and dummy variables for the quality of roof and walls of the house.

<sup>2)</sup> Coefficients on woreda dummies not included.

**Table A.6.1: Profile of food aid distribution across market position**

Market Position	Degree of food aid receipts <sup>1)</sup>	# of hhs per food aid receipts	% of hhs per food aid receipts	Net Sales (Birr)	Mean grain receipts (Kgs)	Average consecutive years of food aid receipts
Net Buyers	No Food Aid	1,903	82	-552.03	0.00	1.52
	Some Food Aid	262	11	1189.43	34.47	1.80
	Significant Food Aid	161	7	1891.78	144.99	2.39
Autarkic	No Food Aid	244	80	0.00	0.00	1.20
	Some Food Aid	35	11	0.00	32.84	1.98
	Significant Food Aid	27	9	0.00	185.68	2.57
Net Sellers	No Food Aid	1,289	89	534.06	0.00	1.39
	Some Food Aid	113	8	317.89	33.41	1.87
	Significant Food Aid	53	4	697.50	144.24	2.41

<sup>1)</sup> These categories for food aid receipts were defined as follows: For all households with positive food aid, the mean food aid amount was the cut-off such that households more than the mean were classified as “Significant Food Aid” recipients and those getting positive amounts less than the mean as “Some Food Aid” recipients.

**Table A.8.1: Estimated child, household and community determinants of child height for age (pooled sample)**

Height for age z-scores (children 3-60 months)	Without prices (1)	Short & long run price effects (2)	Short run price effects <sup>1)</sup> (3)	Woreda fixed effects <sup>2)</sup> (4)
<b>Child characteristics</b>				
Sex (1=male)	-0.124 (5.30)	-0.124 (5.36)	-0.124 (5.35)	-0.118 (5.34)
child age (months)	-0.049 (13.97)	-0.048 (13.84)	-0.048 (13.85)	-0.049 (14.50)
child age squared	0.001 (13.03)	0.001 (12.92)	0.001 (12.94)	0.001 (13.64)
child is twin (1=yes)	-0.372 (2.10)	-0.382 (2.12)	-0.387 (2.15)	-0.383 (2.29)
<b>Household characteristics</b>				
Number of adult males (16-65 years old)	0.038 (1.80)	0.040 (1.96)	0.041 (1.97)	0.055 (2.83)
Number of adult females (16-65 years old)	0.042 (1.78)	0.039 (1.65)	0.035 (1.48)	0.034 (1.53)
Number of elderly (> 65 years old)	0.032 (0.66)	0.025 (0.54)	0.025 (0.54)	0.026 (0.57)
female headed household (1=yes)	0.012 (0.20)	0.003 (0.05)	0.003 (0.06)	0.045 (0.84)
highest grade completed by most educated female adult	0.031 (4.38)	0.033 (4.74)	0.034 (4.93)	0.030 (4.79)
post secondary education (1=yes) most educated fem. adult	0.230 (1.81)	0.208 (1.59)	0.221 (1.70)	0.214 (1.52)
info on female adult education (1=no; 0=yes)	0.139 (1.00)	0.158 (1.18)	0.154 (1.15)	0.163 (1.28)
Highest grade completed by most educated male adult	0.016 (3.15)	0.010 (2.02)	0.009 (1.83)	0.008 (1.6)
Post secondary education (1=yes) most educated male adult	0.246 (3.01)	0.268 (3.23)	0.276 (3.34)	0.327 (3.78)
info on male adult education (1=no; 0=yes)	0.153 (2.27)	0.142 (2.19)	0.142 (2.18)	0.127 (2.06)
Log real household expenditure per adult equivalent <sup>3)</sup>	0.179 (2.44)	0.164 (2.27)	0.161 (2.21)	0.193 (2.81)
<b>Community characteristics</b>				
<i>Sanitation, health, communication infrastructure</i>				
Non-self proportion hhs/cluster who drink water from own tap	0.209 (1.34)	0.297 (1.94)	0.393 (2.60)	0.295 (1.77)
Non-self proportion hhs/cluster with flush toilets	0.285 (1.19)	0.308 (1.28)	0.320 (1.35)	0.242 (1.00)
Distance to nearest health center (≤5km) (spline)	-0.001 (0.07)	-0.001 (0.06)	0.001 (0.08)	0.013 (1.13)
Distance to nearest health center (>5km)	0.003	0.003	0.001	-0.013

Height for age z-scores (children 3-60 months)	Without prices	Short & long run price effects	Short run price effects <sup>1)</sup>	Woreda fixed effects <sup>2)</sup>
	(1)	(2)	(3)	(4)
(spline)	(0.22)	(0.29)	(0.14)	(1.07)
Non-self proportion hhs/cluster who own radio	0.246 (2.24)	-0.007 (0.07)	-0.068 (0.62)	-0.109 (0.92)
Non-self proportion hhs/cluster who own TV	0.181 (0.73)	0.281 (1.12)	0.192 (0.76)	0.296 (1.19)
<i>Food and fuel prices</i>				
maize		0.284 (1.94)	0.316 (1.92)	
Teff		-0.436 (5.27)	-0.262 (2.56)	
Sorghum		0.074 (1.06)	-0.083 (0.61)	
Oil		0.018 (0.98)	0.036 (1.73)	
Beef		0.037 (2.91)	-0.015 (0.95)	
Sheep		0.000 (0.31)	0.001 (1.12)	
Goat		-0.004 (1.25)	-0.002 (0.50)	
Unpasteurized milk		0.069 (1.50)	0.102 (2.01)	
Sugar		-0.012 (0.35)	-0.046 (1.04)	
Kerosene		-0.128 (2.15)	-0.071 (0.97)	
Charcoal		-0.269 (3.79)	-0.106 (1.25)	
<i>Geographical location and time</i>				
rural (1=yes)	-0.019 (0.27)	-0.065 (0.64)	-0.190 (1.45)	-0.200 (2.27)
enset producing zones (1=yes)		0.399 (7.44)	0.135 (1.16)	
Year 1996 (1=yes)	-0.450 (13.01)	-0.354 (5.38)	-0.467 (5.97)	-0.458 (14.40)
Year 1997 (1=yes)	-0.497 (11.47)	-0.351 (4.97)	-0.408 (4.79)	-0.502 (13.21)
<b>Constant</b>	-2.887 (5.34)	-2.407 (4.52)	-2.051 (3.33)	-4.042 (7.26)
Observations	45751	45751	45751	45751
R-squared	0.04	0.06	0.06	0.11

Absolute value of t-statistics in parentheses.

<sup>1)</sup> Regional dummies are not shown.

<sup>2)</sup> Woreda dummies are not shown.

<sup>3)</sup> Predicted; household assets and land ownership are the identifying instruments.

Source: Christiaensen and Alderman 2004

**Table A.8.2: Child malnutrition alleviating potential of different policy interventions**

Prevalence of child stunting (%)	Original observations					Predicted observations				
	after intervention					after intervention				
	base	Direct effect	% change	total effect	% change	base	direct effect	% change	total effect	% change
<b>Pooled sample (model 2, table 3)</b>										
<i>Income and formal schooling</i>										
1) annual per adult equivalent income growth of 2.5 % for 15 yrs	63.2	61.6	-3	-	-	88.2	84.9	-4	-	-
2) at least one female adult/household educated up to primary level	63.2	59.1	-6	58.7	-7	88.2	78.0	-12	77.3	-12
3) at least one male adult/household educated up to primary level	63.2	61.8	-2	61.7	-2	88.2	86.1	-2	85.6	-3
4) joint intervention (1) & (2)	63.2	57.5	-9	-	-	88.2	73.3	-17	-	-
<i>Cereal prices</i>										
5) cereal price increase by 25 %	63.2	65.1	3	-	-	88.2	91.7	4	-	-
6) cereal price increase by 25 % (model3,table3)	63.2	64.0	1	-	-	87.3	89.8	3	-	-
<i>Nutritional knowledge</i>										
7) increase in proportion of right judgments by 25 % points	54	52.3	-3	-	-	59.7	55.7	-7	-	-
8) increase in proportion of right judgments by 50 % points	54	51.2	-5	-	-	59.7	52.4	-12	-	-
9) joint intervention (4) & (7)	54	46.4	-14	-	-	59.7	41.0	-31	-	-

Source: Christiaensen and Alderman 2004

**Table A.9.1: Diarrhea incidence and care-seeking**

	Poorest Quintile	Richest Quintile	Below poverty line	Above poverty line	Average
<b>Prevalence of diarrhea children &lt; 5 years</b>					
National average	25.4	19.3	24.1	21.0	22.6
<b>Regional variation</b>					
Tigray	18.3	13.2	18.3	17.2	17.7
Afar	23.1	19.5	16.2	16.4	16.3
Amhara	16.5	14.8	19.2	18.0	18.8
Oromiya	27.3	24.2	26.0	24.6	25.4
Somali	11.5	25.5	20.1	18.2	19.3
Benishangul-Gumuz	32.1	22.9	30.3	22.2	26.9
SNNP	29.4	27.3	30.4	28.4	29.6
Gambela	30.1	25.8	27.9	25.5	26.8
Harari	27.9	20.0	25.8	22.9	23.6
Addis Ababa		12.5		12.8	12.8
Dire Dawa	27.7	17.0	32.1	19.2	21.3
No treatment sought	79.1	56.8	79.8	67.2	74.2
<b>Treatment sought</b>					
<b>Public Sector</b>					
Hospital	0.7	9.8	0.8	4.8	2.6
Health Center	2.6	9.3	2.4	6.2	4.1
Health Post	0.4	0.3	0.3	1.0	0.7
Community Health Worker	0.0	0.0	0.1	0.0	0.1
Other Public Sector including Health Station	7.7	9.1	7.0	8.7	7.8
<b>Private Sector</b>					
Private Doctor/Hospital	0.9	5.3	0.8	3.1	1.9
Pharmacy/shop	4.2	6.0	4.9	5.7	5.3
Other Private Sector	4.6	3.5	3.7	3.2	3.5
<b>Treatment given</b>					
ORS	7.8	33.2	8.5	19.72	13.1
RHF at home	1.4	9.4	3.131	9.082	5.5
Home remedy/others	7.8	3.9	6.69	7.997	7.2
Others (Injection/pills/syrup)	21.2	18.0	20.28	18.38	19.5
None of the above	61.9	35.5	61.4	44.82	54.7
<b>Knowledge of ORS</b>					
Never heard of ORS	39.6	13.1	42.3	21.7	33.5
Used ORS	2.5	9.3	3.0	6.1	4.3
Heard of ORS	57.9	77.6	54.7	72.3	62.2

Source: World Bank 2004b

**Table A.9.2: Burden of HIV/AIDS in African countries<sup>1)</sup>**

	Number of People Living with HIV/AIDS	Adults prevalence, 15 to 49 years	Orphans (0-14 years old)	AIDS deaths, 2001
South Africa	5,000,000	20.1	660,000	360,000
Nigeria	3,500,000	5.8	1,000,000	170,000
Kenya	2,500,000	15.0	890,000	190,000
Zimbabwe	2,300,000	33.7	780,000	200,000
Ethiopia	2,100,000	6.4	990,000	160,000
Tanzania	1,500,000	7.8	810,000	140,000
DRC	1,300,000	4.9	930,000	120,000
Zambia	1,200,000	21.5	570,000	120,000
Mozambique	1,100,000	13.0	420,000	60,000
Cameroon	920,000	11.8	210,000	53,000
China	850,000	0.1	76,000	30,000
Malawi	850,000	15.0	470,000	80,000
Cote d'Ivoire	770,000	9.7	420,000	75,000
Sub-Saharan Africa	28,500,000	9.0	11,000,000	2,200,000

<sup>1)</sup> More recent figures estimate the number of people living with HIV/AIDS in Ethiopia at 1,500,000 (Federal Democratic Republic of Ethiopia, 2004)

Source: World Bank 2004b

**Table A.9.3: Summary statistics of variables included in the child mortality regression (rural specification)**

Variable	Number Observations	Mean	Std. Dev.	Min	Max
Under 5 Child Mortality Rate	5915	0.22	0.42	0	1
Females	5915	0.48	0.50	0	1
Female Headed Household	5915	0.15	0.36	0	1
Mother's Age	5915	33.73	6.87	18	49
Mother's Age Squared	5915	1185.04	480.92	324	2401
Mother's Primary School Completion	5915	0.0826712	0.28	0	1
Mother's Height	5877	1567.37	65.98	465	1867
Mother's Weight	5881	485.23	65.30	295	1574
Mother's BMI	5871	1972.81	230.35	1295	4226
Wealth Quintile 3	5915	0.33	0.47	0	1
Wealth Quintile 4	5915	0.12	0.33	0	1
Wealth Quintile 5	5915	0.11	0.31	0	1
No Water Access	5773	0.3824701	0.49	0	1
Piped Water	5763	0.06	0.23	0	1
Open Water	5773	0.4432704	0.50	0	1
Covered Water	5773	0.1158843	0.32	0	1
No Sanitation	5772	0.9052322	0.29	0	1
Ethnicity: Orthodox	5915	0.3967878	0.49	0	1
Ethnicity: Muslim	5915	0.4104818	0.49	0	1
Peri-Urban	5910	0.0267343	0.16	0	1
Tigray	5915	0.1159763	0.32	0	1
Affar	5915	0.09	0.29	0	1
Amhara	5915	0.1565511	0.36	0	1
Oromiya	5915	0.1952663	0.40	0	1
Benishangul	5915	0.0772612	0.27	0	1
SEP	5915	0.20	0.40	0	1
Gambela	5915	0.0385461	0.19	0	1
Harari	5915	0.04	0.20	0	1
Dire Dawa	5915	0.0226543	0.15	0	1

**Table A.10.1: Sample statistics for education regressions—rural and urban regressions**

Variable	Urban		Rural	
	Female	Male	Female	Male
Currently enrolled	0.82	0.85	0.24	0.34
Child age 8	0.12	0.12	0.15	0.15
Child age 9	0.12	0.12	0.13	0.13
Child age 10	0.14	0.14	0.14	0.13
Child age 11	0.10	0.10	0.09	0.10
Child age 12	0.15	0.16	0.14	0.15
Child age 13	0.13	0.12	0.10	0.10
Child age 14	0.14	0.13	0.10	0.11
Female headed household	0.38	0.35	0.19	0.18
Age of household head	44.4	44.8	45.8	46.1
Single head of household	0.21	0.20	0.10	0.09
Years of schooling: household head	4.45	4.19	0.73	0.69
Years of schooling: other adult	4.06	3.80	0.39	0.35
Log of per capita household expenditures	7.16	7.09	6.82	6.79
			0.23	0.24
EA - Average male literacy	0.77	0.77	0.33	0.33
EA - Average female literacy	0.52	0.53	0.09	0.09
Distance primary school 1-2 km	0.42	0.40	0.27	0.26
Distance primary school 3-4 km	0.05	0.05	0.25	0.26
Distance primary school 5-6 km	0.01	0.01	0.16	0.16
Distance primary school 7-12 km	0.00	0.00	0.11	0.11
Distance primary school > 13 km	0.00	0.00	0.02	0.03
Distance secondary school	2.49	2.57	23.54	23.58
Distance food market	1.31	1.22	6.83	6.80
Distance health clinic	1.42	1.45	8.89	9.07
Distance post office	2.81	2.88	24.30	24.27
Number of schools per capita	0.26	0.27	0.25	0.25
Population density	126.65	129.57	123.58	125.24
Student-teacher ratio	59.01	59.32	60.31	60.65
Percent female teachers	29.00	28.72	26.46	26.22
Percent teachers with certification	0.91	0.91	0.89	0.89
Tigray	0.13	0.12	0.07	0.07
Amhara	0.29	0.29	0.22	0.22
Oromiya	0.39	0.38	0.32	0.32
Benishangul	0.04	0.04	0.05	0.05
SNNPR	0.11	0.12	0.31	0.31
Year 2000	0.59	0.60	0.67	0.67

**Table A.10.2: Education outcome regression results, rural and urban.<sup>1) 2)</sup>**

Independent Variables	Probability child of primary school age (7-14) is currently enrolled in school <sup>3)</sup>		Probability of completing 5th grade for children aged 12 to 14 <sup>4)</sup>	
	Probability Current Enrolled Rural (1)	Probability Current Enrolled Urban (2)	Probability Complete Grade 5 Rural (3)	Probability Complete Grade 5 Urban (4)
Dummy: Child age 8	0.11 (5.87)**	0.077 (4.61)**		
Dummy: Child age 9	0.229 (11.58)**	0.12 (7.71)**		
Dummy: Child age 10	0.309 (15.38)**	0.144 (9.48)**		
Dummy: Child age 11	0.304 (14.08)**	0.133 (8.25)**		
Dummy: Child age 12	0.333 (16.75)**	0.148 (9.86)**		
Dummy: Child age 13	0.342 (15.94)**	0.119 (7.34)**	0.011 -0.87	0.095 (3.80)**
Dummy: Child age 14	0.355 (16.44)**	0.125 (7.84)**	0.008 -0.62	0.215 (8.76)**
Female child	-0.116 (14.21)**	-0.043 (4.06)**	-0.075 (7.05)**	-0.098 (4.78)**
Female-headed household	0.004 -0.21	0.014 -0.78	0.007 -0.27	-0.075 (2.18)*
Age household head	-0.001 -1.79	0.001 (2.80)**	0 -0.2	0.005 (4.91)**
Single household head	-0.046 -1.79	-0.003 -0.11	-0.016 -0.48	0.037 -0.86
Schooling of household head	0.011 (4.92)**	0.008 (5.66)**	-0.004 -1.21	0.008 (2.98)**
Schooling of non-head adult	0.011 (3.38)**	0.004 (2.28)*	0.005 -1.03	0.012 (4.20)**
Log of HH per capita expenditures	0.056 (6.12)**	0.025 (2.30)*	-0.002 -0.17	-0.001 -0.07
Rain-fall shock at plot level	-0.042 (2.96)**		-0.029 -1.58	
EA-level average literacy rate of males	0.098 (3.67)**	0.155 (3.41)**	0.062 (1.7)^	0.138 -1.54
EA-level average literacy rate of females	0.443 (9.67)**	0.202 (4.51)**	0.154 (2.21)*	0.106 -1.23
Primary school is within 2 km	-0.035 (3.00)**	-0.02 -1.74	-0.01 -0.61	-0.008 -0.35
Primary school is within 3-4 km	-0.054 (4.60)**	-0.025 -0.97	0.019 -1.11	-0.141 (2.96)**
Primary school is within 5-6 km	-0.098 (7.57)**	-0.019 -0.33	-0.003 -0.16	-0.193 (2.02)*

Independent Variables	Probability child of primary school age (7-14) is currently enrolled in school <sup>3)</sup>		Probability of completing 5th grade for children aged 12 to 14 <sup>4)</sup>	
	Probability Current Enrolled Rural (1)	Probability Current Enrolled Urban (2)	Probability Complete Grade 5 Rural (3)	Probability Complete Grade 5 Urban (4)
Primary school is within 7-12 km	-0.149 (10.49)**		-0.026 -1.33	0 (.)
Primary school is more than 13 km away	-0.176 (6.89)**	-0.035 -0.21	-0.035 -1.07	-0.352 -1.76
Distance to secondary school	-0.001 (2.05)*	-0.001 -1.18	-0.001 -1.49	-0.005 (2.62)**
Distance to food market	0.001 -1.07	0.001 -0.49	0.001 -0.62	0.004 -1.62
Distance to health clinic	-0.001 -1.39	-0.003 -1.13	0 -0.34	-0.002 -0.32
Distance to post-office	0 -0.72	0 -0.36	0 -0.92	0.001 -0.81
Number of schools in the area	0.509 (12.55)**	0.099 -1.38	0.162 (2.61)**	0.154 -1.1
Population density	0 -0.83	0 (2.45)*	0 -1.04	0 -1.4
Student-teacher ratio	0.001 (5.53)**	-0.002 (4.65)**	0 -0.09	0 -0.16
Fraction of female teachers	0 -0.15	0.005 (5.13)**	-0.002 (2.62)**	0.001 -0.79
Fractions of teachers with certificates	0.03 -0.74	0.151 -1.71	-0.026 -0.46	0.011 -0.06
Tigray	0.067 -1.62	0.07 -1.07	0.038 -0.63	0.261 -1.76
Amhara	0.089 (2.24)*	0.115 (1.96)*	0.027 -0.45	0.211 -1.4
Oromiya	0.053 -1.4	0.091 -1.15	0.072 -1.21	0.262 -1.72
Benishangul	0.032 -0.89	0.082 -1.69	0.053 -0.93	0.072 -0.63
SNPR	0.067 -1.76	0.115 -1.95	0.057 -0.98	0.159 -1.14
Year 2000 Dummy	0.144 (15.33)**	0.089 (5.65)**	0.11 (8.73)**	0.046 -1.55
Constant			0.07 -0.56	-0.397 -1.46
Number of Observations	11763	4979	4171	2135

<sup>1)</sup> Coefficients are reported as marginal probabilities.

<sup>2)</sup> ^ significant at 10 percent; \* significant at 5 percent; \*\* significant at 1 percent.

<sup>3)</sup> Absolute value of z statistics in parentheses.

<sup>4)</sup> Robust t statistics in parentheses.

**Table A.10.3: Education enrollment regressions—rural and urban in Ethiopia.**<sup>1) 2)</sup>

Variable	Rural		Urban	
	Girls	Boys	Girls	Boys
Child age 8	0.114 (4.59)***	0.103 (3.68)***	0.07 (2.88)***	0.08 (4.09)***
Child age 9	0.214 (7.94)***	0.24 (8.35)***	0.115 (5.05)***	0.116 (6.43)***
Child age 10	0.282 (10.25)***	0.323 (11.22)***	0.155 (7.16)***	0.122 (6.78)***
Child age 11	0.249 (8.41)***	0.352 (11.47)***	0.15 (6.58)***	0.11 (5.75)***
Child age 12	0.258 (9.49)***	0.38 (13.57)***	0.148 (6.87)***	0.13 (7.27)***
Child age 13	0.252 (8.59)***	0.408 (13.68)***	0.103 (4.34)***	0.121 (6.39)***
Child age 14	0.294 (9.86)***	0.391 (12.90)***	0.113 (4.88)***	0.118 (6.21)***
Female head of household	0.015 -0.59	0.015 -0.52	-0.017 -0.72	0.041 (1.83)*
Age of head of household	0 -0.57	-0.001 (1.76)*	0.002 (2.19)**	0.001 -1.51
Single head of household	-0.006 -0.2	-0.087 (2.37)**	0.022 -0.75	-0.053 -1.54
Schooling of household head	0.016 (5.88)***	0.004 -1.14	0.008 (4.17)***	0.008 (4.55)***
Other adult schooling	0.012 (3.08)***	0.006 -1.18	0.002 -0.76	0.007 (3.33)***
Log of per capita household expenditures	0.051 (4.40)***	0.065 (4.71)***	-0.007 -0.46	0.041 (2.97)***
Rain damage	-0.053 (2.87)***	-0.02 -0.94		
EA- Average male adult literacy rate	0.055 (1.65)*	0.17 (4.21)***	0.045 -0.7	0.206 (3.61)***
EA- Average female adult literacy rate	0.454 (8.26)***	0.374 (5.41)***	0.24 (3.71)***	0.149 (2.67)***
Distance Primary School 1-2 km	-0.037 (2.68)***	-0.033 (1.82)*	-0.022 -1.39	-0.018 -1.24
Distance Primary School 3-4 km	-0.067 (4.80)***	-0.046 (2.54)**	-0.057 -1.51	-0.007 -0.22
Distance Primary School 5-6 km	-0.104 (6.86)***	-0.093 (4.55)***	-0.071 -0.88	0.034 -0.48
Distance Primary School 7-12 km	-0.122 (7.07)***	-0.177 (7.75)***		
Distance Primary School > 13 km	-0.16 (4.56)***	-0.179 (4.43)***	-0.131 -0.6	0.064 -0.43
Distance to secondary school	0 -1.17	-0.001 -1.32	-0.002 -1.41	-0.001 -0.4

Variable	Rural		Urban	
	Girls	Boys	Girls	Boys
Distance to food market	0.003 (2.45)**	-0.001 -0.43	0.002 -0.72	0 -0.05
Distance to health clinic	-0.002 (2.58)***	0 -0.18	0 -0.04	-0.007 (1.90)*
Distance to post office	-0.001 (1.70)*	0 -0.32	-0.001 -0.41	0 -0.28
Number of schools per capita	0.363 (7.07)***	0.706 (10.42)***	0.179 (1.69)*	0.044 -0.5
Population density	0 (2.02)**	0 -1.27	0 -0.43	0 (2.76)***
Student-teacher ratio	0.001 (4.23)***	0.001 (3.59)***	-0.001 (2.75)***	-0.002 (3.79)***
Percent female teachers	0 -0.1	0 -0.61	0.005 (3.79)***	0.004 (3.78)***
Percent teachers with certification	0.022 -0.43	0.106 (1.66)*	0.098 -0.83	0.125 -1.18
Tigray	0.09 (1.69)*	0.081 -1.29	0.132 (1.69)*	0.003 -0.03
Amhara	0.105 (2.08)**	0.118 (1.91)*	0.166 (2.36)**	0.064 -0.8
Oromiya	-0.022 -0.5	0.176 (2.93)***	0.184 -1.62	0.029 -0.3
Benishangul	-0.065 (1.79)*	0.212 (3.41)***	0.104 -1.52	0.071 -1.23
SNPR	-0.001 -0.02	0.189 (3.07)***	0.149 (1.87)*	0.085 -1.15
Harari	0.038 -0.71	0.272 (3.85)***	0.126 -1.64	-0.028 -0.3
Year 2000 dummy	0.14 (11.76)***	0.157 (11.08)***	0.103 (4.70)***	0.069 (3.41)***
Number of Observations	5808	6299	2739	2629

<sup>1)</sup> All Coefficients are reported as marginal probabilities.

<sup>2)</sup> \* significant at 10 percent; \*\* significant at 5 percent; \*\*\* significant at 1 percent; robust z statistics are in parentheses.

**Table A.10.4: Primary school completion regression—rural and urban in Ethiopia.<sup>1)2)</sup>**

Variable	Rural		Urban	
	Girls	Boys	Girls	Boys
Child age 13	-0.002	0.028	0.147	0.252
	-0.14	-1.44	(5.25)***	(8.69)***
Child age 14	0.01	0.009	0.287	0.355
	-0.62	-0.47	(10.84)***	(12.39)***
Female head of household	-0.014	0.021	-0.019	-0.015
	-0.51	-0.57	-0.66	-0.44
Age of head of household	0	0	0.003	0.002
	-0.04	-0.27	(3.83)***	(2.04)**
Single head of household	0.003	-0.041	-0.034	0.06
	-0.08	-0.95	-0.93	-1.39
Schooling of household head	-0.001	-0.007	0.004	0.009
	-0.34	-1.38	-1.63	(3.43)***
Other adult schooling	0.003	0.007	0.003	0.004
	-0.55	-1.29	-1.31	-1.57
Log of per capita household expenditures	0.002	-0.006	-0.037	0.002
	-0.12	-0.34	(2.23)**	-0.09
Rain damage	-0.02	-0.041		
	-0.89	-1.47		
EA- Average male adult literacy rate	0.057	0.07	0.062	0.203
	-1.39	-1.33	-0.78	(2.37)**
EA- Average female adult literacy rate	0.126	0.113	0.069	-0.014
	(1.91)*	-1.31	-0.91	-0.17
Distance Primary School 1-2 km	-0.013	-0.017	-0.048	0.01
	-0.72	-0.73	(2.55)**	-0.48
Distance Primary School 3-4 km	-0.006	0.033	-0.078	-0.038
	-0.31	-1.39	(1.92)*	-0.8
Distance Primary School 5-6 km	-0.016	0	-0.007	0.049
	-0.76	0	-0.07	-0.38
Distance Primary School 7-12 km	-0.023	-0.042		
	-0.95	-1.35		
Distance Primary School > 13 km	-0.06	-0.045	0.039	
	-1.11	-0.74	-0.16	
Distance to secondary school	-0.001	0	0	0.002
	(2.30)**	-0.13	-0.21	-0.81
Distance to food market	0.003	-0.001	-0.007	0
	(2.05)**	-0.63	-1.45	-0.02
Distance to health clinic	-0.001	0	0.003	-0.005
	-1.08	-0.06	-0.64	-0.75
Distance to post office	0	0	-0.001	0.002
	-0.68	-0.86	-0.51	-0.92
Number of schools per capita	0.063	0.199	0.173	0.28
	-1.03	(2.58)***	-1.22	(2.09)**
Population density	0	0	0	0
	-0.07	-0.99	-0.61	-1.33
Student-teacher ratio	0	0	0.001	-0.001
	-1.09	-0.31	-1.21	-0.86

Variable	Rural		Urban	
	Girls	Boys	Girls	Boys
Percent female teachers	-0.001 -0.69	-0.003 (2.80)***	-0.001 -0.73	0.003 (1.80)*
Percent teachers with certification	-0.094 -1.38	-0.009 -0.11	0.169 -1.19	-0.081 -0.53
Tigray	0.061 -0.81	0.037 -0.43	0.196 -1.23	0.221 -1.43
Amhara	0.03 -0.44	0.017 -0.22	0.223 -1.32	0.312 (2.00)**
Oromiya	0.047 -0.7	0.116 -1.43	0.236 -1.53	0.26 (1.75)*
Benishangul	0 0	0.121 -1.52	0.246 (1.93)*	0.174 -1.48
SNPR	0.022 -0.33	0.107 -1.3	0.164 -1.06	0.239 -1.64
Harari	-0.016 -0.26	0.174 (1.72)*	0.287 (1.90)*	0.111 -0.78
Year 2000 dummy	0.104 (6.87)***	0.115 (6.04)***	0.084 (3.27)***	0.043 -1.5
Number of Observations	2014	2290	2927	2731

<sup>1)</sup> All Coefficients are reported as marginal probabilities.

<sup>2)</sup> \* significant at 10 percent; \*\* significant at 5 percent; \*\*\* significant at 1 percent; robust z statistics are in parentheses.

#### **Appendix 4: The Theoretical, Empirical, and Historical Case for Agriculture Led Development**

The focus on agriculture as the engine of economic growth and poverty reduction is grounded, both theoretically and empirically, in a close examination of the linkages between the different livelihood systems (agriculture and non-agriculture) in rural economies.<sup>310</sup> Three types of linkages are usually identified: (1) production linkages, (2) consumption linkages, and (3) saving and investment linkages. Production linkages can be further classified as backward and forward linkages. Backward linkages follow from the increased demand for inputs, while forward linkages arise due to increased demand for processed products or other downstream activities, which stimulate the agro-processing industry.

To better identify the conditions and factors which enable large multiplier effects from raising agricultural income, we illustrate the different linkages in Figure (A4)1.<sup>311</sup> Exogenous changes in policies, technologies, institutions, markets, infrastructure or capital may induce changes in productivity and prices in rural economies (see left side of figure). To examine how these changes work their way through the system, it is important to distinguish between tradable and non-tradable goods and services, with tradables being defined as goods and services that can be imported and exported to and from the area.<sup>312</sup> Productivity increases in non-tradable activities often lead to lower prices as local demand does not increase sufficiently to absorb the additional supply.

If the concerned goods (e.g. staple foods)<sup>313</sup> or services make up a large share of the budget, this will increase consumers' real income (see left bottom of graph). A reduction in the price of tradables will yield similar results. A consumption linkage will then arise as the increased real incomes translate into increased demand for locally produced non-tradable goods and services, which in turn generates local employment opportunities and income. A virtuous circle is established, whereby the original gains in real consumer incomes (from price declines due to productivity gains) are multiplied through an expansion of the local economy.

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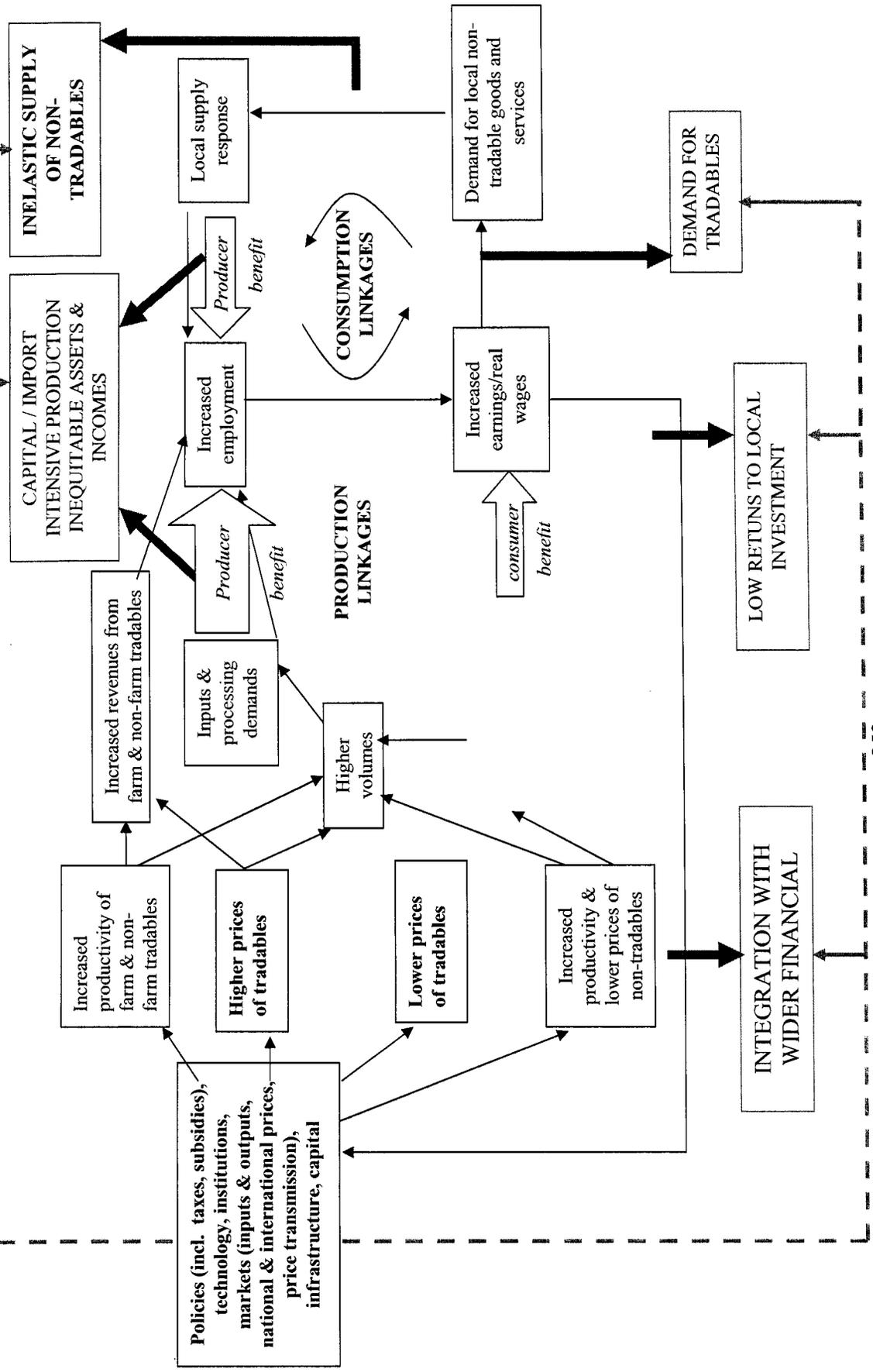
<sup>310</sup> Mellor, 1995; Adelman and Morris, 1973.

<sup>311</sup> The discussion relies heavily on Kydd et al., 2001.

<sup>312</sup> The tradability of goods and services depends on: (1) the size of the area (the larger the area, the larger the proportion of non-tradables); (2) its accessibility (the less accessible, the larger the proportion of non-tradables); and (3) the cost differential with the outside world. Together these factors determine the cost differential between areas or the spread between "import" and "export" parity prices. Note that while the terminology is borrowed from international trade it is equally applicable to intra-national trade.

<sup>313</sup> Given prohibitive transport and marketing costs, cereal markets in Ethiopia are in effect isolated from world markets. Moreover, teff, an indigenous grain which makes up an important part of the daily diet, is only produced in Ethiopia. High intra-regional marketing costs further inhibit intra-regional trade, with only 28 percent of total farm output marketed in 1996 (Gebremeskel et al., 1998). Of the cereals marketed, nearly one-third was sold directly from producers to consumers.

Figure (A4) 1: Farm / non-farm linkages and leakages in the rural economy



The size of the multiplier effect will critically depend on three key factors.<sup>314</sup> If the extra income is spent on tradables (e.g. radios and TVs) as opposed to locally produced non-tradables (e.g. non-agricultural goods and services such as housing improvements and locally provided services), local employment generation will be reduced. To the extent that increased income results in more demand for locally produced food it will help keep up food prices and strengthen the production linkages (see below). Nonetheless, reviewing the empirical evidence Bell and Hazell (1980) emphasize that the multiplier effect increases the greater people's *propensity to consume locally produced non-food goods and services*.

The multiplier effect is also reduced when local producers cannot sufficiently respond to the increased demand for non-tradables. This generates inflationary pressures and offsets the increase in real incomes. The consumer linkage effect presupposes that there is underutilized labor and other resources in the rural sector which can be mobilized. In addition to labor or capital constraints, *inelastic supply* may also follow from poor market development or high transaction costs. Finally, gains from increased demand for locally produced goods will also be reduced if *the capital or import content* of the production is high, or if they only provide returns to a limited group of people.

**The effects on producers of increases in non-tradable productivity are mixed.** Lower prices could potentially offset the gains from productivity if demand is inelastic. Lower prices for tradables (e.g. cash crops) have similar negative effects on producers of tradables. Higher prices and increased productivity in the production of tradables have positive effects on the income of their producers. The multiplier effects of the backward production linkages are often small. The increased demand for additional inputs (e.g. fertilizer and mechanical inputs) and marketing of additional outputs does not generate substantial employment, as these goods are typically tradable and imported from abroad, or capital intensive. Additional employment will only arise from the distribution and marketing of these goods, which is a labor intensive activity. In conclusion, while production linkages are generally considered to be weaker, consumption linkages are in fact found to be quite strong, especially in closed economy settings.<sup>315</sup>

Other linkages include potential savings and investment linkages, where increased real incomes stimulate savings and investment in capital. This could reduce household vulnerability and enhance the supply elasticity and productivity of local non-tradables. The strength of these linkages depends on the availability of and returns to local investment opportunities, and the extent to which the local financial markets are already integrated with the wider economy. Finally, growth in production of tradables may improve telecommunication and transport services, following the need to handle greater volumes. It may also lead to increased provision of external agricultural inputs (e.g. fertilizer, improved seeds) as well as economies of scope within the household where equipment used for production of tradables could also be used for the production of non-tradables.

Given a better understanding of the linkages between price changes and productivity increases in tradables and non-tradables following exogenous investments, policy and institutional

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<sup>314</sup> Kydd et al. (2001) speak of 'leakages.' Gabremadhin, 2004.

<sup>315</sup> Gabremadhin, 2004.

interventions, and the conditions under which these spawn the largest multiplier effects and have the greatest impact on poverty, we now turn to the relative roles of farm and non-farm production in this process. In rural areas, two broad sources of growth can be identified: (1) growth in the production of tradables (which increases local incomes directly), and (2) growth in production of non-tradables (which increases local incomes indirectly by lowering prices).<sup>316</sup>

**For growth in tradables to be effective in reducing poverty, it must raise earnings among a large part of the population.** This implies that production must be by the poor themselves (either as hired laborers or through self-employment), or be widespread with high labor content (so that the poor can benefit from the consumption linkage effects generated in the local economy). Apart from primary resource extraction (mining, forestry, fishery) it is hard to imagine many other non-farm activities which engender broad employment opportunities in economies such as Ethiopia's with limited communication infrastructure and linkages to urban or export markets. Opportunities for other non-farm employment typically only develop as links with urban areas deepen.<sup>317</sup> Moreover, the few non-farm employment opportunities available at this stage of development often have high entry barriers, limiting both the potential gains for the poor as well as the potential for widespread adoption and thus poverty reduction through consumption linkages.

**Expansion of the production of agricultural tradables (e.g. cash crops, tradable food crops, horticulture and livestock) offer much more potential, with direct gains from increased employment and income opportunities for the poor, as well as gains through backward and forward linkages** (e.g. employment opportunities in processing). The extent to which the poor can benefit from advances in productivity (and increased prices) in agricultural tradables depends on asset distribution, which is quite equal in Ethiopia, and their access to complementary inputs. Promoted technologies should be scale neutral and labor intensive (e.g. fertilizer, improved seeds). Nonetheless, while progress in cash crop production technologies may offer important opportunities for poverty reduction, greater opportunities for the poor are to be expected from consumption linkages resulting from productivity increases in non-tradable food production.

**Growth in non-tradables can engender significant poverty reduction through consumption linkages, if it concerns goods/services with a high average budget share.** Again, it is hard to imagine any other non-tradable which qualifies apart from farm products such as staple foods (cereals in Ethiopia). There will be important direct gains through decreased food prices for all net buyers and subsistence producers. However, the greatest benefits are to be expected from the consumption linkages through increased demand for and employment generation in the non-tradable non-farm sector (together with livestock and horticulture production). For the consumption linkage to result in sizeable multiplier effects, the income elasticity for non-food non-tradables must be large, and the local supply elastic and labor intensive. While net cereal sellers could potentially lose if demand is inelastic, it must be emphasized that the majority of the marketed surplus is usually produced by a

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<sup>316</sup> Migrant labor and remittances, not considered here, could be another source of growth for the local economy, with labor export in effect being a tradable.

<sup>317</sup> Bryceson, 1999; Reardon, et al., 1994.

minority of the farmers, who tend to be the larger and richer farmers.<sup>318</sup> The majority of households in rural Ethiopia are subsistence farmers and net food buyers. So are urban households. Food price decreases following technological change thus hold the promise of substantially increasing real incomes. Nonetheless, for this strategy to be sustainable food price declines have to be gradual, and large fluctuations must be avoided as they generate disincentive effects for net sellers to sustain the adoption of modern inputs, leading to fluctuations in output and prices which hurt the poor. This will require both a parallel increase in income and demand for food through growth in the non-food sector, reduction of transaction costs through better development of the market channels to cater to this increase in demand, and a better management of food aid.<sup>319</sup> We return to these issues in more depth below.

Over the past decade, the Asian economies have often been heralded as models of economic growth and poverty reduction. Close inspection shows that with the exception of Singapore and Hong Kong, all the successfully transforming countries of Asia experienced agricultural revolutions prior to industrialization.<sup>320</sup> These countries started from a primarily agrarian base with a stagnant and low productivity food sector, unstable food prices and heavy reliance on export crops, a situation much like that of Ethiopia today. While not sufficient, a technologically driven agricultural transformation proved necessary in these countries to generate structural transformation. Overall, agricultural growth multiplier effects in different parts of the world have been estimated to range from 1.5 to over two, implying that a US\$ 1 increase in agricultural income generates an additional US\$ 0.5 to 1 in income.<sup>321</sup>

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<sup>318</sup> Weber et al., 1988.

<sup>319</sup> The estimated amount of marketable surplus available for local food aid procurement was 530,000 MT, while the food aid needs of the chronically food deficit (a population of about five million people) was estimated at 557,204 MT. Yet by March 2002, only 236,374 MT had been locally procured due to insufficient financing (Gabremadhin, 2002).

<sup>320</sup> Rosegrant and Hazell, 2000.

<sup>321</sup> Reardon, 1998; Delgado et al., 1998.

## Appendix 5: Price Fluctuations, Substitution, and Market Activity Per Cereal

**Are households selling low and buying high?** Absent credit markets, liquidity constraints may force households to sell off their grains during the harvest season when prices are usually lower, and buy cereals later in the season when their stocks are depleted and cereal prices are likely higher. Depending on the degree of seasonal price fluctuations, net cereal sellers may thus turn into net cereal buyers. While the limited average volume of cereals sold by net buyers indicates that this is unlikely to change most people's net market position, it is nonetheless useful to explore this further, as it would provide some sense of the welfare diminishing effects of large intra-annual price fluctuations. Table (A5)1 presents the producer and retail price levels during the harvest, the post harvest and hunger season, while Table (A5)2 presents the sale and purchase transactions across net buyers and sellers in these three periods.

**Table (A5)1: Intra-annual cereal price fluctuation in 1995-96**

	Harvest season (Oct 95-Jan 96)		Post harvest season (Feb - May 96)		Hunger season (June-Sept 96)		Ratio retail price hunger season/producer price harvest season
	Producer	Retail	Producer	Retail	Producer	Retail	
Maize	0.85	0.98	0.84	1.00	1.00	1.11	1.31
Wheat	1.41	1.69	1.32	1.68	1.37	1.78	1.26
Teff	1.55	1.78	1.42	1.76	1.44	1.83	1.18
Barley	1.17	1.50	1.22	1.53	1.22	1.59	1.36
Sorghum	1.03	1.18	0.95	1.17	1.06	1.12	1.09
Millet	1.02	1.52	1.02	1.48	1.38	1.64	1.61
<b>Average</b>	<b>1.17</b>	<b>1.44</b>	<b>1.13</b>	<b>1.44</b>	<b>1.25</b>	<b>1.51</b>	<b>1.30</b>

*Source: Own calculations from CSA producer and retail market price series*

From Table (A5)1 it can be seen that in 1995-96 the ratio of the retail price during the hunger season and the producer price during the harvest season ranged between 1.09 for sorghum and 1.61 for millet, which is the least important cereal. The average ratio amounted to 1.30, about the ratio for maize and a bit larger than the ratio for teff, two much traded cereals. Harvest and post harvest prices were very similar on average, while hunger season prices were only five to 10 percent larger in 1995-96. Retail prices tended to be 20 to 25 percent higher than producer prices.

Table (A5)2 shows that the majority of the sales transactions among net buyers occur during the post harvest season (February-May), while purchases begin during the harvest season with their intensity increasing thereafter.<sup>322</sup> In other words, net buyers would stand to lose from large intra-annual price fluctuations. The majority of the purchase transactions among net sellers happen during the hunger season, while most of their sales transactions happen during the post harvest season.

In sum, given that (1) net buyers sell primarily during the post harvest season, while they buy especially during the hunger season, and (2) intra-annual price fluctuations were limited in

<sup>322</sup> Note that it only concerns the observed transactions up till July and that many households anticipated to buy cereals during August and September as well.

1995-1996 when compared to other years, **the percentage of net buyers observed in 1995-96 most likely represents a lower bound, compared to years characterized by larger intra-annual price fluctuations.**

**Table (A5)2: Incidence of cereal market transactions across net cereal buyers/sellers between October 1995 and September 1996**

Net buyer	Total # of transactions	Percentage of purchases			Total # of transactions	Percentage of sales		
		Oct 1995- Jan 1996	Feb -May 1996	June-July 1996		Oct 1995- Jan 1996	Feb- May 1996	June-July 1996
Crop								
maize	1693	29	37	35	1431	2	66	33
wheat	933	24	40	36	473	28	63	9
teff	558	19	47	34	340	2	87	11
barley	996	17	42	39	630	5	88	7
sorghum	1142	18	37	46	991	14	52	34
millet	163	16	60	25	45	0	7	93
average		21	44	36		9	61	31

Net seller	Total # of transactions	Percentage of purchase transactions			Total # of transactions	Percentage of sales transactions		
		Oct 1995- Jan 1996	Feb -May 1996	June-July 1996		Oct 1995- Jan 1996	Feb- May 1996	June-July 1996
Crop								
maize	643	4	34	62	692	26	59	13
wheat	368	1	4	94	368	12	52	35
teff	654	1	25	73	944	11	57	31
barley	377	0	15	84	391	20	51	29
sorghum	431	1	5	94	484	9	60	30
millet	87	0	95	5	125	16	65	20
average		1	30	69		16	57	26

Source: Own calculations from CSA Food Security Survey, 1996

**Are households selling high value grains to buy lower value ones?** Another component of market behavior that affects the valuation of net sales is the mix of crops that are being bought and sold. From Table (A5)3, we note for example that teff was the highest priced cereal, closely followed by wheat, while maize was the cheapest. Are households substituting more expensive cereals (wheat and teff) for cheaper ones? If this is an important phenomenon, one would expect households who sell a particular cereal (especially the more expensive cereals) to also buy a large quantity of other cereals. Table (A5)3 presents the number of purchase transactions for each cereal conditional on the household having sold a particular cereal.

**Table (A5)3: Number of cereal purchase transactions conditional on the sale of a cereal**

	Number of sale transactions <sup>1)</sup>	Percentage of households who buy a particular cereal given that they have sold					
		Maize	Wheat	Teff	Barley	Sorghum	Millet
Maize	900	32	41	37	34	26	19
Wheat	414	18	32	24	23	23	13
Teff	1040	17	16	16	17	17	13
Barley	470	23	23	26	28	23	33
Sorghum	648	17	20	23	23	27	17
Millet	140	5	2	3	4	4	7
Total	3612	112	134	129	129	120	102

<sup>1)</sup> Not weighted by population expansion factors.

Source: Own calculations from CSA Food Security Survey

**There is a significant amount of substitution between cereals, with households selling one cereal to buy back the same or a different one later.** About 30 percent of those who sell maize, wheat, barley or sorghum buy it back later, suggesting that large intra-annual price fluctuations would be harmful. However, this happened only in one to six cases among those selling teff, the most expensive but also the most sold cereal. Millet is least marketed and usually not sold to be bought back. Contrary to our hypothesis, it is maize, a less expensive cereal, which is mostly sold to buy back other cereals. Similarly, but less frequently, wheat, barley and sorghum are often sold to buy back other cereals. The most often bought cereals are wheat and teff, the more expensive cereals.

As indicated above, our basic finding of an important number of net cereal buyers is not affected by these findings, as they also hold when looking at quantities only. Table (A5)4 explores further the extent to which the different crops are traded and how their sales and purchases are concentrated across net buyers and sellers. Maize emerges as a much traded crop, with about 30 percent of all net buying rural households buying maize, and 20 to 30 percent selling maize depending on the season. Millet on the other hand is the least traded crop. Interestingly, only 10 to 14 percent (depending on the season) of all the net buying rural households buy teff, while 31 to 25 percent (depending on the season) of all net selling rural households sell teff. This suggests that teff is an important cash crop for most net selling households, that net buying rural households tend to meet more of their own demand for teff, and that teff is especially consumed in urban areas. This is consistent with the observed consumption patterns in rural and urban areas. Rural households spent on average 9.7, 6.9 and eight percent of their cereal purchases on maize, wheat and teff respectively, while in urban areas on average 1.6, 5.6 and 11.6 percent of cereal purchases were spent on maize, wheat and teff. Wheat on the other hand is more widely bought among net buying households, though its production is concentrated in the hands of fewer households.

**Table (A5)4: Crop level market participation characteristics by season**

Season	Grain Type	Net Buyer			Autarkic			Net Seller		
		Number	Market Participation %	Net Sales (Birr)	Number	Market Participation %	Net Sales (Birr)	Number	Market Participation %	Net Sales (Birr)
<b>Oct95- May96</b>	<b>Maize</b>	1,490	31.04	140.89	1049	22.91	-	688	22.60	259.41
	<b>Wheat</b>	916	19.08	166.07	547	11.95	-	362	11.89	363.75
	<b>Teff</b>	493	10.27	157.82	987	21.56	-	950	31.21	281.53
	<b>Barley</b>	765	15.94	147.67	882	19.27	-	372	12.22	263.64
	<b>Sorghum</b>	984	20.50	151.56	829	18.11	-	552	18.13	190.00
	<b>Millet</b>	152	3.17	121.02	284	6.20	-	120	3.94	152.09
<b>June 96- Sept 96</b>	<b>Maize</b>	1,270	30.79	172.83	1,613	22.63	-	344	29.45	125.59
	<b>Wheat</b>	726	17.60	410.19	989	13.87	-	110	9.42	166.17
	<b>Teff</b>	565	13.70	405.58	1,573	22.06	-	292	25.00	128.10
	<b>Barley</b>	546	13.24	221.31	1,328	18.63	-	145	12.41	170.12
	<b>Sorghum</b>	911	22.08	416.00	1,235	17.32	-	219	18.75	120.28
	<b>Millet</b>	107	2.59	121.15	391	5.48	-	58	4.97	139.01

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