

**Hunan Integrated Management of  
Agricultural Land Pollution Project  
Loaned by the World Bank**

**Social Assessment Report**

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## **Abstract**

### **Project summary**

The serious land heavy metal pollution in Hunan Province is the important reason for cadmium in rice exceeding the standard. In this context, in order to curb the heavy metal pollution in farming products producing areas, improve the farming products quality and safety, guarantee people' health, Hunan Provincial Agricultural Committee plans to use the World Bank' loan to implement the Hunan Integrated Management of Agricultural Land Pollution Project. The project will adopt whole area advance implementation method and select project areas to carry out intensive and integrated treatment. The project has 4 components: agricultural polluted soil management, sustainable soil management practice, environmental management and agricultural environmental monitoring, project monitoring, evaluation and management.

### **Social assessment objectives and process**

The objectives of social assessment are to identify main stakeholders and their needs, opportunities and risks of stakeholders brought by project, to work out the action plan to avoid or mitigate social risks, to improve project design and execution, to encourage the participation of individuals or groups who are most directly affected by the project.

In order to facilitate project design and execution, with the support and cooperation from relevant authorities, social assessment team carried out the social assessment survey in the first batch of project counties from Dec, 1<sup>st</sup> to 25<sup>th</sup>, 2017. The whole process adopted the participatory method. Information were collected by information disclosure, public consultation and etc. 12 project counties carried out the social assessment, including structural interview, group interview, participatory rating and sorting, matrix analysis of project impact, community resources survey, resources maps drawing and etc. 12 meetings were held and the participants were from county bureaus of agriculture, environmental protection, livestock husbandry, civil affairs, ethnic and religious affairs, human resources and social security, land resources, poverty alleviation office, women federation, dismantlement office and etc. 24 meetings were held and the participants were from township agricultural technology extension stations, township government, project village committee. 24 villager groups meetings were held(totaled 240 persons, of which 18 poor villagers or 30%),2 poor villagers meetings were held(totaled 144 persons), 24 women meetings were held(240 persons), intensive interviews 120 persons, of which 40 women or 33.3%, ethnic minorities 40 or 33.3%,

poor villagers 40 or 33.3%. In addition, according to the certain sampling proportion, 3 categories questionnaires surveys were carried out in 12 counties, 1,800 social assessment survey questionnaires were released in 12 project counties, the effective recovery questionnaires reached 1,540 or 85.6% of questionnaire reclaiming efficiency. For 8 project counties which have the need to plant alternative crops, 600 questionnaires with alternative crops were released, the effective recovery questionnaires reached 541 or 90.2% of questionnaire reclaiming efficiency. For 5 project counties resided by ethnic minorities, 500 questionnaires with ethnic minorities' identification were released, the effective recovery questionnaires reached 436 or 87.2% of questionnaire reclaiming efficiency.

### **Needs of major stakeholders**

The total managed area of agricultural land in 12 project counties reached 6,152.33 ha. Based on field survey, social assessment team identified the project major stakeholders and held consultations with them. Their needs can be summarized as follows;

Common needs: to develop agricultural production, to increase the opportunities of employment and entrepreneurship, enhance the ability to resist risks, to curb the heavy metal pollution in agricultural land, to improve farmers' living and farming conditions.

Needs of farmer households in the project areas. The total population in the project area is 0.2084 million, of which farming population 0.18699 million, accounting for 89.72% of the total. Their needs are:(1)to improve farming infrastructure, such as build or improve the irrigation canal, farming machinery road and etc.(2)to improve local ecological environment and farming products quality, to develop the ecological farming.(3)to join the farmers' cooperatives and reduce farming risks and costs.(4)to adjust farming structure and increase the proportion of cash crops and increase the income.(5)to reduce the risks of cost increase brought by the process of agricultural land heavy metal treatment.

Project areas have 107 farmers cooperatives, their needs:(1)to obtain financial support and reduce financing cost, to reduce the financial pressure of ecological farming development.(2)to improve the management of cooperatives and promote the local farming taking the development road of large scale production.(3)to establish the monitoring stations for heavy metal in soils and farming products, to improve the

farming products quality management level, and promote the local farming taking the development road of ecological farming.(4) to reduce the risks of farming products marketing and cost increase.

Needs of village committees in the project villages:(1)to establish and improve the farmers cooperatives and promote the upgrade of local industries.(2)to strengthen the trainings of local farmers' environmental awareness and farming skills, to improve the local farmers' environmental protection awareness and farming skills.(3)to formulate the reasonable compensation mechanism and reduce the risks of the decrease of farmers' income.

Needs of agricultural authorities:(1)to cooperate with stakeholders and complete the project.(2)to help farmer households to curb agricultural land heavy metal pollution, to develop farming production and improve farming products quality.(3)to explore the treatment skills and management models of local agricultural land heavy metal pollution through project execution.

Needs of other governmental authorities:(1)to improve the soil quality and local ecological environment, to enhance local environmental treatment and monitoring.(2)to promote the economic development of project area and project county, promote local agriculture taking the road of ecological development, and promote the rural revitalization program.(3)to drive economic and social development, to realize political stability, to promote the image of the government.(4)to improve the farming and living conditions of the poor, maintain social stability, and promote the harmonious development.

### **Poverty analysis**

4 counties of 12 project counties are poor counties at national level, 8 counties are poor counties at Hunan provincial level. 5,030 poor households or 25,251 persons are involved in the project. The average poverty incidence proportion is 12.12%.

The main income source of poor farmers is the traditional agriculture. The survey indicated that the main income source of 68.3% of poor households is cropping and livestock, income from cropping accounts for 66% of the mean value of specific gravity of household' income in poor households.

Poor households' supporting attitude towards the project is more consistent. The survey indicated that 84.6% of the poor households believed that the project is beneficial to the local economic and social development. Poor households' cognition towards the project showed a certain group difference. The cognition of poor

households in heavy pollution areas is lower than that in light pollution areas.

The important reasons for poor households in project areas are low quality of farming products, high medical expenditure and low degree of agricultural industrialization. Households became poor in the light of illness or physical disability, of which 63.77% households became poor in the light of illness, 14.85% households became poor in the light of physical disability. Poor households express the needs of improving farming products' quality, strengthening cropping skills training, increasing employment opportunities, strengthening development ability and providing cost compensation.

### **Social gender analysis**

The total population of 12 project counties is 7.2428 million, of which project areas 0.2084 million, women 0.1019 million, accounting for 48.86% of the total.

Majority of female inhabitants in villages received the junior high school education. Statistics indicated that: 35.8% of females received primary school education or lower, 52.8% of females received junior high school education, 11.3% of females received senior high school or special secondary school or vocational school education or higher. Majority of full time female farmers are middle aged and elderly women. Statistics indicated that: 4,571 females in the project areas are full time farmers, the average age is 47, the maximum age 89, the minimum age 16.

The majority of rural labors are women and middle aged or elderly. Project areas have 107 farmer cooperatives, female labors employed by cooperatives accounts for 55% of the total. The percentage of females' participation in cooperatives' management and decision making is low, the management of 107 cooperatives has 407 persons, of which 110 females, accounting for only 27.1% of the total. There is no females' participation in management in 21 cooperatives.

Women' needs towards the project: to increase the employment opportunities, to provide working protection measures such as heat stroke prevention measures at high temperature, weeding and mosquito repellent measures, measures to prevent the inhalation of lime from the lungs, to provide production skills training such as farming machinery operation, to combine the class room lectures and on the spot demonstration in training, to improve women' participation into the project.

### **Ethnic minorities analysis**

Ethnic minorities live in the project counties of Jishou, Huayuan, Baojing, Yongshun and Cili. The population in project villages totals 94,382 persons, of

which ethnic minorities 80,596, accounting for 85.39% of the total. Among ethnic minorities, Tujia 44,716 persons or 47.38% of the total, Miao 35,880 persons or 38.02% of the total.

The difference analysis of Tujia ethnic minority in project areas. The overall survey data indicated that: Tujia people's project cognition, needs, agronomy and etc have no obvious difference comparing with these of Han nationality. According to the population proportion, 38 villages inhabited by Tujia ethnic minority can be classified into 3 categories, villages with 30% or below of Tujia population, villages with 30% to 50% of Tujia population, villages with 50% or above of Tujia population. According to the ethnic minority definition applied by the World Bank, all categories of project villages were identified through interviews and etc. Conclusions: Local people don't believe their selves are unique cultural group. Their social customs and habits are almost as same as Han nationality. Tujia enjoy the Spring Festival, Lantern Festival, the Dragon Boat Festival and other traditional festivals as Han nationality do, they also enjoy the Sheba, the 8th day of the 4th lunar month, and other local festivals. Tujia people believe that there are no difference in language, planting habits and social customs compared with Han nationality. Language and words: In project areas, Tujia minority lives with Han nationality for thousands of years and they started to use Chinese long long ago. Religious and belief: Tujia minority believes in Taoism, worship the ancestors. Tujia minority believes in many gods, its religious belief includes natural worship, soil, rock, mountain, river, water and etc are all icons. Almost all Tujia households enshrine ancestral shrines in the shrines of the house. The main festivals are Dragon Boat racing and 6<sup>th</sup> of the 6<sup>th</sup> lunar month. Tujia minority pays great attention to the traditional festivals, especially the Spring Festival. Social customs and habits: Before Tujia girls get married, they have the tradition of crying marriage. If they don't cry, they will be discriminated against and laughed at. Now such crying marriage is gradually desalinated. Farming, the main crop is paddy rice. Tujia minority transplants seedlings, harvests and trashes in the busy season, they will help those households without enough labors, and the host household needs to provide food and drink only. This custom of helping each other follows thousands of years.

The population of Miao ethnic minority in project villages totals 35,880 or 38.12% of the total. The overall survey data indicated that: Miao people's project cognition, needs, agronomy and etc have no obvious difference comparing with these of Han nationality. According to the population proportion, 24 villages inhabited by Miao

ethnic minority can be classified into 2 categories, villages with 50% or below of Miao population, villages with 50% or above of Miao population. According to the ethnic minority definition applied by the World Bank, all categories of villages were identified through interviews and etc. Conclusions: Local people don't believe their selves are unique cultural group. Their social customs and habits are almost as same as Han nationality. They enjoy the Spring Festival, Lantern Festival, the Dragon Boat Festival and other traditional festivals as Han nationality do, they also enjoy the Gannianchang, the 3<sup>rd</sup> day of the 3<sup>rd</sup> lunar month, the 8th day of the 4th lunar month, the 6th day of the 6th lunar month, the 7th day of the 7th lunar month and other local festivals. Local people show that there is no difference in language, planting habits and social customs compared with Han nationality. Miao ethnic minority in the project areas don't have its unique cultural characteristics, habits and customs which are recognized by other peoples. There is little difference in culture, economy, society and politic organizations of Miao minority in project areas compared with the majority Han people. There is no obvious difference in folk belief, sacrificial activities, totem, worship of Miao minority in project areas compared with main stream society. There management model of villages resided by Miao minority is consistent with that of most villages in China, namely adopting the combination of township governance and village self rule. Miao minority uses the local dialect in daily communication and uses Chinese characters in daily life. The land in the project areas is owned by the collective, and the management model adopts household contract responsibility system.

By detailed survey and analysis, it was believed that the Miao people and Tujia people in project areas have the high degree of integration comparing with the mainstream of Han nationality, the definition of ethnic minority and its policy adopted by the World Bank are not applicable, it is unnecessary to formulate the ethnic minority development plan.

### **Social impact and risks**

Social assessment team believed that the positive impact of the project can be shown as follows:

Positive impact in short term:(1)to improve the stakeholders awareness of producing safe products through project propaganda.(2)to improve the farmer households skills of producing safe products through project training.(3)to reach a consensus on agricultural land heavy metal pollution control though the public participation.(4)to create farming conditions through infrastructure development.(5)to

provide technical support to farming products management through environmental management and farming environmental monitoring.(6)to improve farmers ability to resist risks and farming products competitiveness through fostering farmers cooperatives.

Positive impact in middle and long term:(1)The ecological benefit is significant. The project will curb the agricultural land heavy metal pollution in certain degree through pollution source control, dynamic monitoring, soil remediation and other measures, which will be beneficial to improve the ecological environment.(2)The economic benefit is considerable. The project will raise the sale price of farming products, reduce the farming cost, improve the land use efficiency and raise the added value of farming products. It will be beneficial to improve the farming and living conditions of farmers.(3)The social benefit is obvious. The project will encourage the migrant workers to return to their hometown, create more employment opportunities for women, help the poor to cast off poverty, and facilitate the formulation of agricultural land pollution management model.

It is estimated that the project will generate an increase of annual income of 44.835 million Yuan to farmers in 12 project counties, provide 12,000 labor posts, of which 7,000 labor posts for women. The project will also help 5,030 poor farmer households with archiving cards to cast off poverty.

Social assessment team believed that the social risks of the project can be shown as follows:

Social risk of growing the alternative crops. The total curbing area of 12 project counties will be 6,152.33 ha., of which heavy pollution area 408.46 ha., accounting for 6.64% of the total. In the planned curbing area, 5,743.87 ha will adopt VIP management and manure application or planting green manure. 408.46 ha will plant alternative crops, of which 126.63 ha of flowering tree, shrub and etc, 112.48 ha of corn, rape and sorghum, 76.44 ha of citrus, pear, grape, Dragon fruit and etc, 16.24 ha of mugwort, 76.67 ha of lotus. The project will improve the old existing irrigation canal. The necessary irrigation and farming measures will be in project scope, and it will not change the nature of the project. Therefore, social assessment concluded that according to the policy of the World Bank, land acquisition or house demolition will not be involved in project execution, involuntary policy of the World Bank is not applicable and it is unnecessary to formulate a resettlement action plan. The possible social risks of growing the alternative crops in the heavy pollution project areas are: (1)Some

farmers will not cooperate. Growing the alternative crops will need to change the planting habits and technology. PMOs and project teams have conducted detailed survey and analysis, but in fact, a few farmers may not cooperate. (2) Management issue of the delivery of the subsidy of growing the alternative crops, the agreement is made regarding the subsidy standard, but some farmers are concerned about the transparency of the subsidy delivery. (3) Labors. Due to the fact that most strong labors already work outside as workers, most villages have not enough labors. Growing the alternative crops of flowers and trees need more labors, the project execution may lack labors.

Economic risks. Economic risks will have 3 aspects: (1) the social risk brought by maintaining the original cropping habit while carrying out the land remediation. The first category is the marketing risk. The project will grow low cadmium content rice varieties, the rice quality will be affected in some degree, it might generate the impact to the original marketing channel and method. The second category is the risk that the food quality will not reach completely. During the land remediation, the quality of some food will not reach completely, it will probably affect the marketing price of these food. The third risk is the decrease of yield. The cultivation of low cadmium varieties might increase the risk of rice blast, which will reduce the yield. Survey statistics indicated that the biggest concern of farmers will be the actual income decrease (74.3%) in the short term, followed by the increase of amount of labor (40.1%) and the marketing risk of growing low cadmium content rice varieties (31.6%). (2) The social risk brought by growing alternative crops. The first category is the cost and earning risk of growing alternative crops. The second category is the marketing risk. If growing fruits, vegetables and cotton, new marketing channels will be established, which might bring the marketing risk. The third category is the management risk. Growing alternative crops will not only raise new requirement to crops technical management but also the need to establish the fair, transparent and regulated management procedures in the project villages. (3) The social risk brought by the cropping system adjustment. The farming model adjustment might require the increase of labor input, the net earning will decrease if the reasonable compensation unavailable. Survey statistics indicated that the biggest concern of farmers to grow alternative crops will be the actual annual income decrease (65.40%), followed by unable to market the alternative crops (42.30%).

Risk of public sentiment will have 4 categories. The first category is the misattribution risk. The existing pollution can be attributable to many factors. Before the start of bringing other pollution sources under control and carry out the project of

agricultural land pollution remediation, local residents might blame heavy metal pollution for all problems and raise relevant claims. The second category is to exaggerate the risk of heavy metal pollution. It will be easy to label all farming products of heavy metal content exceeding standard in project areas in the background that the project is dominated by the government. The third category is the risk of residents' environmental awareness. With regarding to their roles played in environmental pollution and protection, stakeholders group has the position deviation, they don't think that they should be responsible for the pollution of surrounding environment, nor they are one of the main bodies of environmental treatment.

### **Project suggestions and the action plan**

In order to ensure the smooth execution of the project, it should adopt the following supporting policies.

**(一) to enhance the training of project participation willingness of farmers, establish the whole process participation mechanism, defuse the social risks of growing the alternative crops in heavy pollution areas.**

In order to defuse the social risks of growing the alternative crops, it is suggested to enhance the training of project participation willingness of farmers, improve the farmers' consciousness of ecology and health, formulate the whole process participation mechanism, farmers will be guaranteed to effectively participate into the process of the selection of the alternative crops, formulation of subsidy plan and the project impact monitoring. The selection of alternative crops should fully respect to farmers' wishes, some locally successful crops can be considered as a reference to make the decision.

**(二) to formulate the basic compensation package and foster the farmers cooperatives, defuse the economic risk in agricultural land pollution treatment.**

After the consultation with local agricultural authorities and farmers, the project plans to formulate the basic compensation package, which is subject to adjustment according to the local conditions. Based on the technical methods, the compensation plan has 2 categories: one category is the compensation plan for rice of cadmium content exceeding the standard, mainly to compensate the profit loss of farming products which don't meet the standards. The compensation standard plans to be 20% of the local governmental purchase price. Another category is to compensate farmers who grow alternative crops. Growing alternative crops might result in the income decrease, according to the expectation of residents, the compensation standard plans to

be 6,000 Yuan per ha. With regarding to the huge input activity of growing alternative crops, such as growing flowering trees, project areas will be encouraged to explore the financial models of farmer households guarantee each other + cadre guarantee, and company +base +credit cooperative +farmer household. The project will foster the cooperatives in the areas without cooperatives, the project will strengthen the management capacity of existing cooperative by providing trainings in the areas with cooperatives. The project will try to foster 1 cooperative in each administrative village.

**(三) To strengthen the propaganda training and public sentiment guidance, and defuse the risk of public sentiment in project execution**

With regarding to the control measures of potential risk of public sentiment: Firstly, data obtained by monitoring at project start and execution stage should be kept in confidential in some degree. Secondly, the project should strengthen the propaganda and improve the environmental protection awareness of residents. Finally, the project should formulate the scientific and reasonable participation principles. Concrete measures are: to propaganda the food safety knowledge to the public and help them to realize that necessary measures can effectively reduce the heavy metal pollution, to adopt the relevant propaganda measures, to correctly guide the public sentiment and prevent the incorrect relaying an erroneous message, to pay attention to the wording in each stage of the project and try to avoid labeling, language expression should be popular and easy to understand, the propaganda manual and participation plan should be designed according to local linguistic and cultural habits.

With regarding to the above-mentioned conclusions and measures, it is suggested to carry out the following social action plan:(1)to establish the agricultural land treatment association and ensure the deep participation and extensive consultation of farmers households in project execution.(2)to formulate the subsidy plan and ensure the increase of farmers households' income , to avoid or minimize the negative impact to farmer households brought by the project.(3)to formulate the action measures and the budget.(4)to establish the project complaint and grievance mechanism and promote the extensive participation of the residents.

# 1. Introduction

## 1.1 Project brief introduction

### 1.1.1 Project background

Hunan is known for its nonferrous metals; of 160 mineral reserves found in the world, 140 varieties are found in Hunan. And tungsten, antimony, bismuth, zinc, lead and tin reserves range top in the country. The exploitation history is as long as 2,700 years. This brings abundant mineral resources to Hunan, but simultaneously it also brings severe heavy metal pollution in local regions. The severe heavy metal pollution of land is the main cause of overproof cadmium of rice. Under this background, Agriculture Commission of Hunan Province plans to make advantage of loans from the World Bank to implement “Hunan Integrated Management of Agricultural Land Pollution Project” in order to treat heavy metal pollution of agricultural producing areas, improve quality safety of agricultural products and guarantee life and health of people.

### 1.1.2 Project overview

By declaration of counties and districts and with overall consideration to main agricultural producing areas, heavy metal pollution degree and type of soil, social factors, ecological environmental protection, pollution treatment basis and demonstration, 15 counties and districts ranking 1-15 are preliminarily selected as the project counties by way of expert consulting. The total land area of the Demonstration Area is 9286.81 hectares, all of which are cultivated lands (accounting for 1.76% of the total cultivated land area of the project candidate counties), and the total area of paddy field is 9286.81 hectares. Main pollution sources of each project county in the Demonstration Area are the heavy metal pollution caused by mining and metallurgy enterprises (including the pollution to irrigation water) and agricultural inputs (mainly including the straw and organic fertilizer).

In order to guarantee the smooth implementation of the project, 3 counties (districts), namely, Yongxing County, Hengyang County and Yongding District in Hunan Province with controllable risks and better foundations are preliminarily selected as the first batch of project counties (the social assessment report has been submitted); and social assessment are performed to the second batch of project counties (districts) such as Zhongfang County, Jishou City, Huayuan County, Baojing County,

Yongshun County, Cili County, Anhua County, Qiyang County, Lengshuitan District, Linwu County, Yizhang County and Hengnan County in Hunan Province on the basis of the social assessment experience of the first batch of project counties. Considering the difficulty of comprehensive implementation of the project, Yongding District, Hengyang County and Yongxing County are regarded as the pre-implementation counties to conduct project activities in the first year with a construction period of 6 years, and implementation schedules of the remaining 12 counties will be subsequently prepared according to the conditions such as dense monitoring and so on of each county, and the construction period is 5 years.

In Hunan Integrated Management of Agricultural Land Pollution Project, the construction mode of whole-area promotion will be adopted. The selected demonstration areas will go through centralized and comprehensive treatment. The main contents of the project cover four aspects: sustainable management of farmland pollution, agricultural environment monitoring and management, project capacity construction and project management and assessment.

#### (1) Sustainable management of farmland pollution

Dense monitoring (the monitoring point density is 30-50 mu in the mountainous area and 50-100 mu in the continuous flat area) should be conducted to the selected Demonstration Area as per the monitoring scheme requirements, and risk level assessment shall be performed and comprehensive risk control measures shall be determined according to the monitoring data. In the light of the effective data analysis of rice, agriculture endogenous and exogenous sources, agricultural production management and so on in the Demonstration Area, specific risk management measures, mainly including engineering measures, agronomic measures, pest and disease integrated management and other measures, etc. should be taken. Different control measures will be taken according to the risk degrees, the risk control area in the Demonstration Area is estimated to be 5,978 hectares, and the measures include:

Engineering measures: 12 project counties will totally construct or transform and construct or transform a total of 173.9km channel, 193 detritus chambers, 49.35km tractor roads, 720m ecological intercepting ditch, 2 water retaining dams, 11 small desilting ponds, 3 electric pumping stations, 2 reservoirs, and 1 pumping well.

Agronomic measures: the combined measures such as high accumulative rice variety control, optimized field water management (waterflooding irrigation), soil

acidification conditioning (pH value), applying organic fertilizer, applying soil passivation agent, planting structure adjustment, removing straws from the field, and the like, the governance area of 12 counties in the second stage is 6,152.33 hectares).

Pest and disease integrated management: demonstrate the pest and disease integrated management in Hengyang County, adopt the mode of raising duck in paddy fields, promote agricultural cleaner production, encourage farmers to increase to apply the organic fertilizer, reduce the use of fertilizers, scientifically apply pesticides, promote professional unified prevention and control and green prevention and control of crop diseases and pests, and popularize the efficient, low toxic and low residual pesticides and the modern plant protection machinery.

Other measures: including variety screening, contaminated rice control, brand building of agricultural products, publicity and promotion and so on. Variety screening: each project county shall conduct the study on the rice safety production-appropriate technology based on the list of acute low-cadmium accumulative rice varieties recommended in Hunan Province, reasonably select the rice varieties in the demonstration area, confirm the cadmium accumulation index in the rice varieties mainly recommended in the area, and control the rice variety with high cadmium accumulation risks to enter into the Demonstration Area when the rice variety BCF index is higher than the level-VI risk. Control of contaminated rice: the contaminated rice will be purchased by special enterprises and used as grains and feeds for industrial uses, and the purchasing enterprises will be subsidized.

Please ask the competent agricultural supervision agency to organize the personnel in villages and towns to supervise the implementation of the project agronomic measures (application of lime, organic fertilizer, passivator, waterflooding irrigation and removing straws from the field, etc.).

The total population of 12 Demonstration Areas and counties is 7,244,800, wherein, 208,400 are in the Demonstration Area, 101,900 are women, accounting for 48.86% of the population in the Demonstration Area; the population of ethnic minorities is 94,382, accounting for 45.29% of the total population of the demonstration area; the population of poor people is 25,251, and the poverty rate is 12.12%. The implementation of the project can provide safe food and reduce the risk of diseases among local residents, create more opportunities for employment and capacity enhancement for local residents, especially for women and poor families, and thereby helping to increase the income of local residents.

## (2) Agricultural environment monitoring and management

Establish the agricultural environment monitoring and early warning system. Investigate content of pollutants in agricultural products in the demonstration area; monitor input/output balance of farmland pollutants. Make related local rules and regulations and technical draft standard for control & prevention of farmland pollution and recovery. Provide technical support for control of pollution emission for enterprises discharging heavy metal which severely affects pollution sources.

## (3) Project capacity construction

In this project, the government officials and technical personnel will be organized for study and training to improve project management capacity. Organize local benefited farmers and major planting farmers for training to enhance their recognition of severity of pollution of farmland and agricultural products on health as well as their soil management skills capability for sustainable utilization. Organize implementation of a series of subject studies to support project implementation and optimization of technical measures. Moreover, formulate the soil environment protection action plan.

## (4) Project management and assessment

The project management system is established to collect information and data of farmland environmental quality variation in project implementation process. Establish the integrated management evaluation system of farmland pollution; monitor and evaluate project implementation results. Refine the project achievements. Purchase office equipment needed by the project management organization as well as costs incurred by daily management, purchase, financial management and project supervision.

### 1.1.3 Distribution characteristics of project candidate counties

The 14 candidate counties of the Hunan Integrated Management of Agricultural Land Pollution Project with World Bank Loan embody the “one line and two areas” distribution characteristics. One line, namely, the 3 counties in the Xiangjiang River Basin, including Anhua County, Hengyang County and Hengnan County; two areas, namely, 7 counties (cities and districts) in the western Hunan area, including Jishou City, Yongshun County, Baojing County, Huayuan County, Yongding District, Cili County and Zhongfang County; and 4 counties (cities and districts) in the southern Hunan area, including Yizhang County, Linwu County, Lengshuitan District and

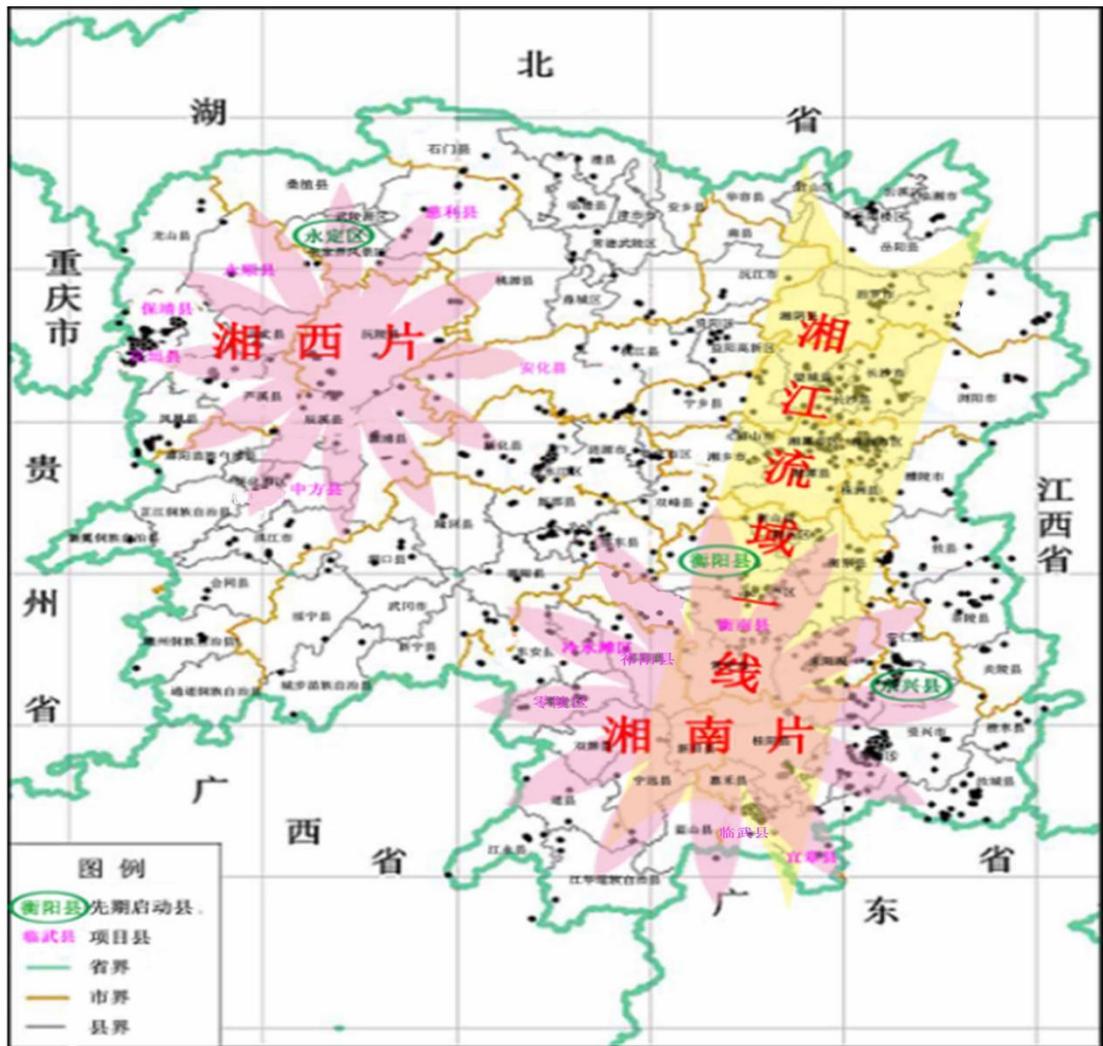


Figure 1-1 Distribution of 15 Candidate Counties for Hunan Integrated Management of Agricultural Land Pollution Project

## 1.2 Project social assessment

### 1.2.1 Purpose and contents of social assessment

The emphasis of social impact assessment in this project is to determine positive and negative local social development goals by project construction so as to fully recognize potential benefits and risks of the project and take rational measures to avoid and remove social risks and social conflicts likely to cause failure of the project to the largest degree, and to increase social benefit of project investment.

The social impact assessment in this project mainly covers:

(1) Collect social and economic development information of project affected regions. Such information consists of community population, economic development, social culture and political system affected by this project as well as traditional occupancy of land resources of local residents and natural resources they rely on for survival.

(2) Determine critical stakeholders of the project, including directly or indirectly benefited groups or organizations and directly and indirectly affected groups or organizations suffering losses.

(3) Have a full consultation with stakeholders in this project. In each phase of project preparation and implementation, carry out free and full consultation with affected population in advance; and establish the complaint channel and procedure for disadvantaged groups.

(4) Social impact and risk analysis: Assess positive and negative influence of the project mainly from the macro-perspective.

In project construction period, local farmland irrigation facilities and travel roads may be affected to some degree in project implementation period. The social impact assessment will focus on analysis of possible social risks brought by the project, in particular, pay close attention to potential unfavorable influence on ethnic minorities, old people, the disabled, poverty people, single parent family and other disadvantaged groups as well as farmers with requisition of land.

(6) Analyze and strive for support of the local community for project construction. After diagnosing benefit conflicts likely to occur in project construction process, further understand the willingness and attitude of such stakeholders. Strive for enough support of local communities and residents for the project by participation and consultation of social assessment.

(7) Collect suggestions of local communities to project planning and implementation. The World Bank loan project shall guarantee that ethnic minorities can benefit from the project fairly in planning. The project owner shall take measures to prevent unfavorable influence on ethnic minority communities. To realize the goals of

social impact assessment, the social impact assessment team in the process collects opinions and suggestions of local affected population and communities. They also discuss with sample population in the demonstration area with the social impact assessment so that the conclusions and measures of social impact assessment will be proper. To prevent social conflicts and relieve negative impact on local residents and communities, the social impact assessment team also provides the proper countermeasures to the project planner.

(8) Formulate mitigation measures. On the basis of full public participation, the social impact assessment team will also formulate targeted mitigation measures and conduct follow-up monitoring according to the project impact characteristics.

### **1.2.2 Main methods for social assessment**

The participatory social assessment method is used in the entire social assessment process. Information disclosure and public consultation are used for information collection. In the 12 project counties, the participatory evaluation method and tool are used for social assessment including structural interview, group interview, participatory scoring and ranking, matrix analysis of project impact, social resource survey and resource map drawing so that different interest groups and different types of farmers in the villages may participate in the project voluntarily, fairly and actively. The assessment team selects different survey sites and carries out 12 symposiums involved by county level cadres from related competent departments including Agricultural Bureau, Environmental Protection Bureau, Bureau of Animal Husbandry, Poverty Relief Office, the Women's Federation, Bureau of Civil Affairs, Bureau of Nationality Religions, Bureau of Human Resources and Social Security, Land and Resources Bureau, Demolition and Relocation Office, etc. They held 24 county cadre symposiums attended by technician at agricultural stations, main leaders as well as project village committee director in the project villages and towns; 24 symposiums with villager groups (240 persons in total, 18 impoverished persons, accounting for 30.0%), 2 symposiums with impoverished residents (144 persons in total), and 24 woman symposiums (240 persons in total). Have in-depth interview with 120 villagers (40 women, accounting for 33.3%; 40 ethnic minorities, 33.3%; 40 impoverished residents, 33.3%). In addition, three types of questionnaire surveys are performed in 12

project counties according to a certain sampling proportion; 1800 social assessment questionnaires are distributed in 12 project counties, 1540 of which are effectively recovered, and the questionnaire recovery rate is 85.6%; 600 questionnaires are distributed in 8 counties to be restructured, 541 of which are effectively recovered, and the questionnaire recovery rate is 90.2%; 500 ethnic identification questionnaire are distributed in 5 project counties inhabited by ethnic minorities, 436 of which are effectively recovered, and the questionnaire recovery rate is 87.2%.

(I) literature review and statistical data use

(1) Collect city annals, county annals and other literature stating local conditions and customs of the demonstration area, in particular, statistical data of social and economic conditions of ethnic minority regions in the demonstration area.

(2) Collect statistical yearbook of social and economic conditions of the demonstration area, bulletin of national economy and social development of each county in each year as well as literature provided by the county Statistical Bureau, Poverty Relief Office, the Women's Federation and the Disabled Persons Federation.

(3) Collect social development regulations and policies of the demonstration area, including important national level social development laws, policies as well as some important local regulations and policies made by Hunan Province.

(II) Questionnaire survey

In the key surveying communities and project affected areas, the assessment team carries out questionnaire survey of main stakeholders. The sample of questionnaire survey consists of different main stakeholder groups; special attention has been paid to women, ethnic minorities, poverty households and other disadvantaged groups.

The cluster sampling mode is adopted in questionnaire survey. Distribution is made in the equal distribution principle. It is planned to survey 150 questionnaires in each project county. Select 2 project towns in each project county; select 1 village in each project town; hand out 75 questionnaires in each village. The questionnaire survey targets are mainly part-time or full-time farmers. And the surveying targets are selected based on standards of the World Bank. Meanwhile, the questionnaire survey is also conducted in the Demonstration Area involved in crop restructuring (8 of 12 counties are involved in crop restructuring.) and the minority living area, and the sample distribution is shown in Table 1.

Table 1: Sample distribution

Cities	Social assessment questionnaires	Crop restructuring questionnaires	Ethnic minority questionnaires
Zhongfang County	150	75	
Jishou City	150		100
Huayuan County	150	75	100
Baojing County	150		100
Yongshun County	150	75	100
Cili County	150	75	100
Anhua County	150	75	
Qiyang County	150		
Lengshuitan County	150	75	
Linwu County	150	75	
Yizhang County	150	75	
Hengnan County	150		
Total	1800	600	500

### (III) Symposiums (group interviews and meetings)

symposiums mainly consist of (1) county cadre symposiums: in each sample project county, the assessment team holds symposiums with the project owner and related government departments respectively. The attendees of social assessment cadre symposiums are government leaders, Forestry Bureau, Finance Bureau, Development and Reform Bureau, Agricultural Bureau, Water Conservancy Bureau, Environmental Protection Bureau, the Women's Federation, Nationality Religion Bureau and Culture Bureau. (3) Village cadre symposiums: in each sample project towns, the assessment team holds symposiums attended by town cadres, director of agro technical station and village cadres. (2) Villager symposiums: respectively hold village/community villager symposiums in each key surveying community with main stakeholder groups. The attendees hereof involve direct and indirect affected residents, in particular, poverty households, ethnic minorities and women representative.

### (IV) In-depth interview

In the key surveying project affected area, the assessment team carries out in-depth interview. The selected targets consist of some proportion of women, ethnic minorities

and poverty households. Among which the low income household, moderate income households and high income households account for a proper proportion respectively.

## 2. Basic Social-Economic Status Analysis of Project Counties

### 2.1 Social-economic status analysis of Hunan Province

#### 2.1.1 Social and economic status

The social and economic status of Hunan Province is characteristic of:

**First, the economic aggregate ranks at national top level.** In 2017, Hunan realizes gross regional production of 3,459.06 billion Yuan, with a year-on-year growth of 8%. wherein, the added value of the primary industry was 36.9 billion Yuan with an increase of 3.6%; the added value of the secondary industry was 1,414.55 billion Yuan with an increase of 6.7%; and the added value of the tertiary industry was 1,675.51 billion Yuan with an increase of 10.3%. According to the resident population calculation, per capita GDP was 50,563 Yuan, with an increase of 7.4%. The contribution rate of primary industry, secondary industry and tertiary industry to economic growth is 4.9%, 37.0% and 58.1%.

**Second, rice output ranks top national wide.** In 2017, the cultivation area of grain was 4.8624 million ha, with an decrease of 28.2 thousand ha than last year. Of which early rice area 1.3831 million ha, with an decrease of 37.4 thousand ha, middle rice 1.2331 million ha, with an increase of 23.9 thousand ha, late rice 1.4326 million ha, with an decrease of 26.2 thousand ha. The output of grain was 29.84 million ton, with an increase of 1% than last year. Of which summer grain 0.615 million ton, with an increase of 12.6%, early rice 8.085 million ton, with an decrease of 3.1%, fall grain 21.14 million ton, with an increase of 2.4%. The annual newly increased effective irrigation area for farmland is 21,000 ha. The new increased water irrigation area is 11,000 ha. The started water conservancy works are 91,000 and the input fund is RMB 36.8 billion. 1.22 billion m<sup>3</sup> earth-rock water conservancy works have been completed, 12,417 km rural road have been improved. Hunan with its 3.1% cultivated land provides 5.4% grain. It ranks the 8<sup>th</sup> among 13 main grain producing provinces. The rice output accounts for 12.8% of the national output, ranking 1<sup>st</sup>, and making special important contribution to national food security.

**Third, poverty-stricken population exceeds 2.17 million.** The poverty status in Hunan Province displays two features: One is that the total quantity of poorer people is large. By 2017, the poor population with archived cards in Hunan Province has decreased from 7 million to 2.16 million in the end of 2017, but they are all poorer people. The second is that poverty people concentrate in Wuling Mountain regions and

Luoxiao Mountain regions. The data of Hunan poverty relief information network show that: there are 6,923 poverty villages in Hunan Province, which exist in almost each city and state but mainly concentrate in the western region of Hunan.

**Fourth, outflow population is large.** Hunan is the province with large outflow population. By September 30, 2015, the total population of the whole province is up to 73.26 million and the floating population is 15.18 million, accounting for 21% of the total. The trans-provincial outflow population is 10.33 million, the trans-provincial inflow population is 0.44 million and intra-province floating population is 4.4 million.

**Fifth, farmland is severely polluted by heavy metal.** In 2014, Ministry of Environmental Protection of China and Department of Homeland Security jointly released *Survey Communiqué of National Soil Pollution Status*. 16.1% soil pollution is out of limit nationally, of which 19.4% cultivated land is out of limit and grain safety is facing severe challenges. Seen from pollution distribution, soil pollution in South China is more severe than that in North China. Soil pollution problem in Yangtze River delta, Pearl River Delta and Northeast China old industrial base is prominent. The overproof heavy metal of soil in Southwest and Mid-South Regions is severe. The distribution of 4 inorganic pollutants, including cadmium, mercury, arsenic and lead, increases gradually from the northwest to the southeast and from the northeast to the southwest. The mineral poisoned and heavy metal polluted land area in Hunan Province is up to 28,000 ha, accounting for 13% of total area of the whole province. Of 14 cities and states in Hunan, 8 are in Xiangjiang River Basin. The production and living water of more than 40 million people is polluted.

### **2.1.2 Heavy metal pollution status in Hunan Province**

1) **Compositions of heavy metal industries:** there are many enterprises involving heavy metal in Hunan, enterprises involving heavy metal in Hunan are as many as 1,450. The industries involving heavy metal pollution (as per the number of enterprise) are: non-ferrous metal metallurgy and rolling industry, non-ferrous metal mining and separation industry, chemical raw material and chemical product manufacturing industry, ferrous metal metallurgy and rolling industry, metal product industry, coal mining and separation by washing industry, leather, fur, feather (down feather) and their products industry, general equipment manufacturing industry, electric machinery and equipment manufacturing industry, transport equipment manufacturing industry, non-metal ores mining and separation industry, non-metal ores product

manufacturing industry, communication equipment, computer and other electronic equipment manufacturing industry, ferrous metal mining and separation industry, special equipment manufacturing industry, waste resources and materials recycling and processing industry, wood processing and wood, bamboo, vine, palm and straw product industry, pharmaceutical industry, rubber product industry, instrument meter and culture, office machinery manufacturing industry, power and thermal power production and supply industry, printing industry and recording media duplication, art ware and other manufacturing industries.

2) **Distribution of industries involving heavy metal:** industries involving heavy metal in Hunan Province are mainly distributed in non-ferrous metal metallurgy and rolling industry, non-ferrous metal mining and separation industry, chemical raw material and chemical product manufacturing industry (sulfuric acid production mainly), ferrous metal metallurgy and rolling industry (electrolytic manganese, iron and steel industry mainly) and metal product industry (electroplate industry mainly). See their proportion in Fig. 2-1. The total enterprise quantity of the five industries above accounts for 86.43% of total enterprises involved in heavy metal in the whole province.

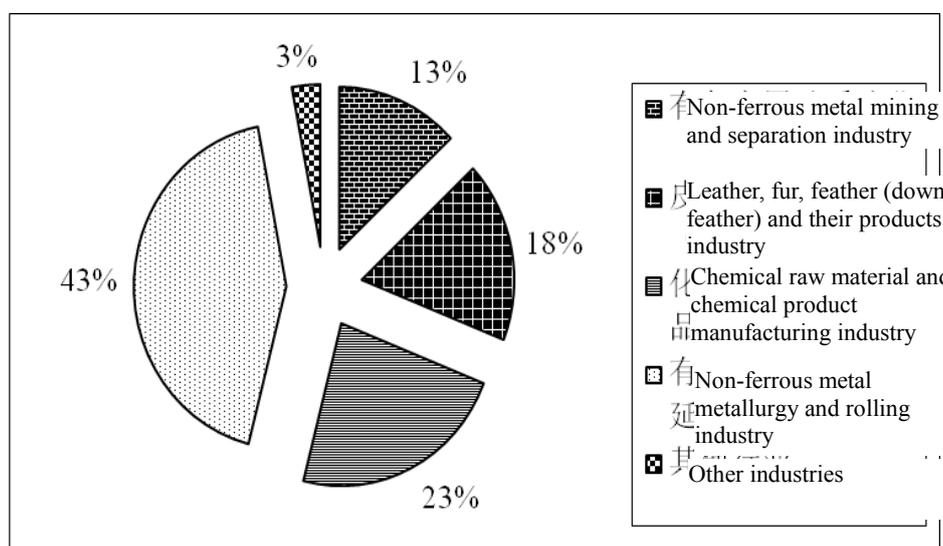


Figure 2-1 Distribution of Industries involved in Heavy Metal Pollution in Hunan Province (2007)

3) **Regional distribution of enterprises involving heavy metal:** the non-ferrous metal metallurgy and rolling industry is mainly distributed in Chenzhou, Loudi and Hengyang, accounting for 33%, 17% and 12% respectively in the whole province. The metal mining and separation industry is mainly distributed in Chenzhou and Xiangxi autonomous prefecture, accounting for 47% and 20% respectively of the whole

province. The chemical raw material and chemical product manufacturing industry is mainly distributed in Hengyang, Changsha and Xiangtan, accounting for 20%, 17% and 13% respectively of the whole province. Seen from Fig. 2-2, heavy metal pollution enterprises and heavy metal pollution in Hunan province mainly concentrate in Xiangjiang River Basin, South Hunan and West Hunan. Non-ferrous metal mining, separation and metallurgy are concentrating in other regions such as Anhua County and Taojiang County in Yiyang City, Hanshou County and Shimen County in Changde City, which leads to severe heavy metal pollution.

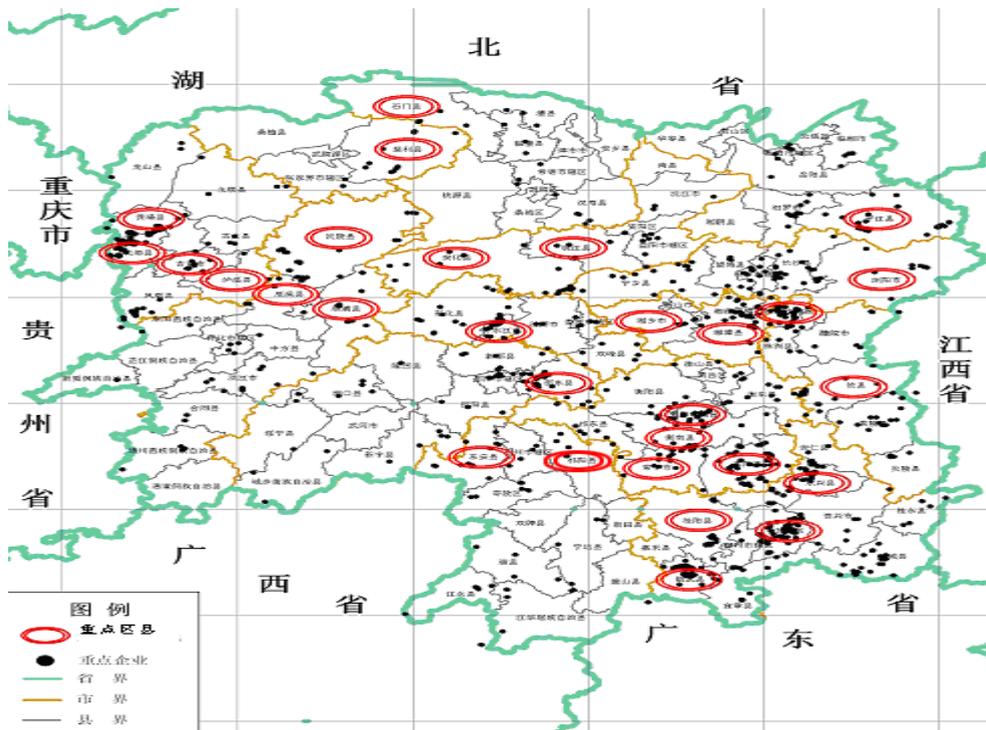


Figure 2-2 Distribution of Enterprises involved in Heavy Metal Pollution and Key Districts/Counties in Hunan Province

## 2.2 Social-economic status analysis of project counties

### 2.2.1 Social-economic status analysis of Zhongfang County

#### (1) County overview

In 2016, the county's GDP reached 10.026 billion Yuan with an increase of 8.1% over the previous year, wherein, the added value of the primary industry was 1.313 billion Yuan with an increase of 3.6%; the added value of the secondary industry was 5.788 billion Yuan with an increase of 8.4%; and the added value of the tertiary industry was 2.925 billion Yuan with an increase of 9.5%, and the contribution rates of the

primary, secondary and tertiary industries to economic growth were 13.1%, 57.7% and 29.2%, respectively. Based on the calculation by permanent population, the per capita GDP of the county reached 41,091 Yuan in 2016 with an increase of 8.8% over the previous year.

By the end of 2016, the total registered population of the county was 292,300, among which, 93,500 were permanent residents, 260,400 were agricultural population, 74,000 were peasant households, and the population sex ratio was 53:47 (male to female). There were 244,000 permanent residents, including 87,200 urban residents and 156,800 rural residents, and the county's urbanization rate was 35.74%.

The cultivated land area of Zhongfang County is 19595.73 hectares, including 13356.38 hectares of paddy field and 6239.35 hectares of dry soil, and widely distributed in all villages and towns, especially in Luyang Town, Zhongfang Town, Tongwan Town, Tiepo Town, Tongmu Town and Huaqiao Town. Zhongfang County is a typical mountainous agricultural county, has always put priority on agriculture since its establishment, and initially formed an agricultural product base with seven advantages of high-quality super rice, high-quality aquatic products, fine livestock and poultry, high-quality fruits and vegetables, medicinal herbs, oil tea and industrial raw material forests.

Zhongfang County has mainly grain crops of rice, corn, sweet potato, potato, soybean, and so on, is based on rice planting, and is a high-quality rice base construction county in Hunan Province. Zhongfang County was awarded as the honorary titles of "Advanced demonstration base of 'Planting Three to Produce Four' High-yielding Project on Super Hybrid Rice in Hunan Province", "Quality Safety County of Agricultural Products in Hunan Province", "The Province's Grain Production Excellent County" and so on in 2016, the perennial rice planting area of the county is about 12,824 hectares, and the planting system is mainly based on the double cropping system in main forms of rice-green fertilizer, rice-rape, rice-vegetable, and the like.

Due to unavailability of rice monitoring data, Zhongfang County only has the rice monitoring data (110 monitoring points) of Luyang Town, Xinjian Town, Tongwan Town and Tongmu Town in 2016 and the dense monitoring data (79 monitoring points) in 2017, and the results show that part of rice has heavy metal risks in 5 risk factors of cadmium, arsenic, mercury, lead and chromium, and the main risk factor is cadmium, followed by arsenic.

## (2) Demonstration area overview

Zhongfang County totally selects 4 demonstration areas:

Basic situations of Luyang Demonstration Area. Luyang Town is an economic and cultural center in the northeast of Zhongfang County and is 13 kilometers away from the center of Huaihua City. The Luyang Demonstration Area covers 5 villages including Luxi Village, Heping Village, Xiaping Village, Qiaoshang Village and Wuli Village, has an area of 315 hectares and a population of 22,230. Since the farmland is polluted by the heavy metals caused by “three wastes” of enterprises involving heavy metal pollution such as the historical silicon factory, cement plant and so on, the rice and soil test results exceed the standards.

Basic situations of Xinjian Demonstration Area. Xinjian Town is located in the east of Zhongfang County, borders with Yangcun Township of Hecheng District and the Huangyan Tourist Resort and is 25 kilometers away from Huaihua City. The Xinjian Demonstration Area involves Xinjian Village, Heihetian Village and Huangjin Village, and has an area of 125 hectares and a population of 7,394. Since the farmland is polluted by the heavy metal caused by wastewater irrigation, the rice and soil test results exceed the standards, and the pollution sources have been effectively controlled. The main pollution type of cultivated land is cadmium pollution, there is a small amount of unpolluted farmland, and the cadmium content is 0.3-0.6 mg/kg.

Basic situations of Tongwan Demonstration Area. Tongwan Town is located on both sides of Yuanjiang River in the eastern half of Zhongfang County and is the economic and cultural center in the eastern of Zhongfang County. The Tongwan Demonstration Area covers Zhuyuantou Village and has an area of 60 hectares and a population of 1,126. Since the farmland is polluted by the heavy metal caused by wastewater irrigation, the rice and soil test results exceed the standards, and the pollution sources have been effectively controlled. The main pollution type of cultivated land is cadmium pollution, there is a small amount of non-polluting farmland.

Basic situations of Tongmu Demonstration Area. Tongmu Town is located in the southernmost part of Zhongfang County, adjacent to Zhijiang Town and Hongjiang Town, and 35 kilometers away from Huaihua City. The Tongmu Demonstration Area covers Fengpo Village and has an area of 60 hectares and a population of 3,464. Since the farmland is polluted by the heavy metal caused by “three wastes” of enterprises involving heavy metal pollution such as mining and so on, and wastewater irrigation,

the rice, sediment and soil test results exceed the standards, and the pollution sources have been effectively controlled. The main pollution type of cultivated land is cadmium pollution, there is a small amount of unpolluted farmland.

According to the survey data, the average household income of farmers in the Demonstration Area of Zhongfang County was 40,688 Yuan in 2017, among which the average non-agricultural income was 26,930 Yuan and the average agricultural income was 13,353 Yuan.

(3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The farmland pollution risk in Zhongfang County mainly comes from the soil pollution and the farmland exogenous pollution. Therefore, except that the risk management measures such as soil conditioning, pollution remediation and so on are purposefully taken; the farmland heavy metal pollution monitoring , varieties and production management and etc should also be strengthened.

Table 2-1 Heavy Metal Pollution Risks and Technical Measures to be Taken in Zhongfang County Demonstration Area

Risk type				area(ha.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	133.36	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standards.
medium low	medium low	high	medium low	217.1	optimize field water management(appropriate irrigation), apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, remove straws from the field, manage and control rice which exceeds the standards.
high	medium low	high	medium low	179.17	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards, grow alternative crops if pollution serious.
high	medium low	medium low	medium low	20.77	control varieties with high accumulation, optimize field water management, conduct soil acidification conditioning, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.
high	high	high	No risk	9.6	grow alternative crop of corn.

## 2.2.2 Social-economic status analysis of Yongshun County

### (1) County overview

The county's economic development has lagged, and the county is an industrial-

weak and financially-poor county in Xiangxi Autonomous Prefecture. In 2015, the county's GDP reached 5.74 billion Yuan, and the total fiscal revenue was 470 million Yuan; the total agricultural output value was 2.62 billion Yuan, the per capita disposable income of urban residents was 16,880 Yuan, and the net income of farmers was 5,579 Yuan.

In 2015, the total population of the county was 544,700, among which the rural population was 497,300 and the ethnic minority population was 500,000, accounting for 91.3% and 91.8% of the total population respectively. The total number of households in the county was 107,000, the agricultural population was 446,000, and the rural labor forces were 310,000.

The total land area in Yongshun County was 381,170 hectares, among which the agricultural land area was 356,520 hectares, accounting for 93.53% of the total land area; the construction land area was 18,730 hectares, accounting for 4.91% of the total land area; and the area of other land was 5,920 hectares, accounting for 1.55% of the total land area.

In 2015, the sowing area of crops in the county was 76,500 hectares, the sowing area of grain crops was 44,320 hectares, and the high standard farmland area was 5,400 hectares. The total grain output was 212,600 tons, including 123,100 tons of rice, 36,000 tons of corns, 8,900 tons of sweet potatoes, 38,500 tons of potatoes, and 3,900 tons of soybeans. The county has won the title of "Provincial Food Production Model County" for five consecutive years. As Yongshun County is a mountainous area, rice planting is generally single cropping rice, and the main cropping system is "rice-rape" and "rice-idle".

According to the detection results of farmland soil heavy metal pollution in Yongshun County, there are different degrees of heavy metal pollution in some farmland soil in the county, and the main pollution risk element is cadmium. The area of farmland at a slight risk of heavy metal cadmium pollution is 20,505 hectares, accounting for 51.77% of the county's farmland area; the area of farmland at a moderate risk of heavy metal cadmium pollution is 11939.7 hectares, accounting for 30.14% of the county's farmland area; the area of farmland at a median risk of heavy metal cadmium pollution is 1791.7 hectares, accounting for 4.52% of the county's farmland area; and the area of farmland at high risk of heavy metal cadmium pollution is 2388.7

hectares, accounting for 6.03% of the county's farmland area. Heavy metal cadmium pollution exists in farmland soil of Yongshun County.

## (2) Demonstration area overview

Yongshun County totally selects 1 demonstration area:

Wanping Demonstration Area is located in Wanping Town (in the north of Yongshun County) and covers 4 administrative villages (neighborhood committees) such as Xinglong Neighborhood Committee, Longzhai Village, Shangping Village and Bieliping Village, the project covers an area of 257 hectares, main crops in the village where the project locates include rice, oilseed rapes, corns and potato; 9 farmers' specialized cooperatives are totally developed in 4 villages, and the population of the demonstration area is 9,623. Since the farmland is polluted by the heavy metal caused by "three wastes" of enterprises involving heavy metal pollution, the rice and sediment test samples exceed the standards, and the pollution sources have been effectively controlled. The main farmland pollution type is cadmium pollution, and there is still a small amount of unpolluted farmland.

According to the survey data, the average household income of farmers was 31,822 Yuan in Yongshun County Demonstration Area in 2017, among which the average non-agricultural income was 24,321 Yuan and the average agricultural income was 9,233 Yuan.

## (3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The rice cadmium pollution in Yongshun County Demonstration Area is generally at high risk, while there is no risk of arsenic pollution; the soil cadmium pollution is at medium risk, while there is no risk of the soil arsenic pollution; although there are few relevant enterprises in the county. The farmland heavy metal pollution monitoring, varieties and production management should be strengthened; and the heavy metal balance in farmland should be controlled to curb the worsening trend of farmland pollution.

Table 2-2 Heavy Metal Pollution Risks and Technical Measures to be Taken in  
Yongshun County Demonstration Area

Risk type				area(ha.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	183.76	crops varieties and cultivation management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, manage and control rice which exceeds the standards.
high	medium low	medium low	medium low	73.24	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards, control and manage farmland pollution sources, adjust models of cultivation management(including high risks varieties control).

### 2.2.3 Social-economic status analysis of Qiyang County

#### (1) County overview

In 2016, the county's regional GDP reached 26.359 billion Yuan with an increase of 9.1% over the previous year, among which the added value of the primary industry was 4.880 billion Yuan with an increase of 3.3%; the added value of the secondary industry was 9.452 billion Yuan with an increase of 7.3%; and the added value of the tertiary industry was 12.027 billion Yuan with an increase of 13.4%, and the county's per capita regional GDP was 29,998 Yuan with a year-on-year growth of 9.3%.

At the end of 2016, Qiyang County had a permanent resident population of 877,500, including 395,100 urban residents and 482,400 rural residents; and the female population was 426,200 accounting for 48.56% of the total population, and no ethnic minorities lived in the county.

The annual grain planting area was 108,940 hectares, including 84,620 hectares of rice, 22,880 hectares of oil, 490 hectares of cottons, and 30,090 hectares of vegetables, and the total annual grain output was 645,500 tons.

Rice is the main grain crop in the county and has a planting area of 80,626 hectares, the cropping system includes the triple cropping system, the double cropping and the single cropping system, the grain crop area for the triple cropping system is 21,720 hectares, and the main forms are rice-rice-rape and rice-rice-vegetables; the grain

crop area for the double cropping system is 60,250 hectares, and the main form is rice – rice; and the grain crop area for the single cropping system is 2,030 hectares, and the main form is rice – idle and rice - vegetables.

In 2012 and 2017, a total of 464 farmland soil monitoring samples and dense monitoring samples were collected in Qiyang County. Some farmland soil in the county has heavy metal pollution to different degrees, and the main pollution risk elements were cadmium, arsenic and mercury in the form of compound pollution.

## (2) Demonstration area overview

Qiyang County totally selects 2 demonstration areas:

Xiaojia Demonstration Area is located in the central and southern hinterland of Qiyang County in Hunan Province, 35 kilometers away from the county town. The demonstration area covers Niutouwan Village, Niuling Village, Wangjiaping Village and Jinxing Village. The project area has 48 beneficiary villager groups, 1,682 beneficiary farmer households, 6,835 beneficiaries. 4 villages has 14 big farmers and 3 cooperatives. The project area has an area of 426.93 hectares. The Xiaojia demonstration area mainly plants rice and adopts the cropping system of single cropping rice + ratoon rice. Besides farmers' own consumption, most rice are sold to the local processing enterprises. The farmland is affected by historical ni-mo ore mining, thereby causing heavy metal pollution. And the farmland soil is mainly polluted by cadmium and is mainly at a low or medium risk.

Baishui Demonstration Area is located in the middle of the county, 28 kilometers away from the county town. It is contiguous with Jinbaotang on the east, Babaozhen and Xiaojiazhen on the south, Dazhongqiao on the west, Guanyintanzhen on the northern west, Xiangjiang river in the north which is also contiguous with Panshizhen. The demonstration area has an area of 142.01 hectares. The project area has 34 beneficiary villager groups, 1,243 beneficiary farmer households, 2,956 beneficiaries. 2 villages has 8 big farmers and 4 cooperatives. The project area has rice cultivation area of 73.5 hectares. The demonstration area mainly plants rice and adopts the cropping system of single cropping. Besides farmers' own consumption, most rice are sold to the local processing enterprises.

According to the survey data, the average household income of farmers in the

Qiyang County Demonstration Area was 38,984 Yuan in 2017, among which the average non-agricultural income was 19,126 Yuan and the average agricultural income was 18,857 Yuan.

(3) Heavy metal pollution risks and technical countermeasures in the demonstration area

The farmland pollution risk characteristic in Qiyang County belongs to the typical soil pollution and leads to part of agricultural products to exceed the standards, and the main control countermeasures include agronomic management and soil restoration, and other auxiliary control measures. Please refer to Table 2-3 in detail.

Table 2-3 Heavy Metal Pollution Risks and Technical Measures to be Taken in Qiyang County Demonstration Area

Risk type				area(ha.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	303.44	crops varieties and cultivation management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, manage and control rice which exceeds the standards.
high	medium low	medium low	medium low	265.51	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards, control and manage farmland pollution sources, adjust models of cultivation management(including high risks varieties control).

#### 2.2.4 Social-economic status analysis of Linwu County

(1) County overview

In 2016, the county's GDP was 13.997 billion Yuan with a year-on-year growth of 8.1%. According to the permanent resident population, the per capita GDP was 37,522 Yuan with an increase of 14.5% over the previous year, among which the added value of the primary industry was 1.316 billion Yuan with a year-on-year growth of 0.9%; the added value of the secondary industry was 7.266 billion Yuan with a year-on-year growth of 6.3%; and the added value of the tertiary industry was 5.412 billion Yuan with an increase of 12.1%, and the economic structure was further optimized.

The county has jurisdiction over 9 towns and 4 townships (including 1 nationality township) and has a total population of 394,600. By the end of 2016, the county had a

permanent resident population of 346,200, a rural population of 191,200, an urban population of 155,000, and an urbanization rate of 44.76%.

Rice is the main grain crop in the county and has a planting area of 15,390 hectares, the cropping system includes the double cropping and single cropping system, the grain crop area for the double cropping system is 5,270 hectares and accounts for 34.24% of the paddy field area, and the main forms are oilseed rape – rice, vegetables - rice, watermelon - rice, corns – rice, and so on; the grain crop area for the single cropping system is 10,120 hectares and accounts for 65.76% of the paddy field area, and the main form is rice – idle.

There were 685 monitoring points for agricultural products in total in Linwu County in 2013 and 2017. By analyzing the data, in 5 risk factors such as cadmium, arsenic, mercury, lead and chromium, part of rice in Linwu County has the risk of heavy metal pollution, and its risk factors are cadmium and arsenic, and other factors have no risk.

## (2) Demonstration area overview

Linwu County totally selects 2 demonstration areas:

Wushui Town Demonstration Area is located in the southeast suburb of Linwu County, covers Chengtou Village, and has an area of 68.8 hectares and a population of 2,385. The Demonstration Area mainly plants rice and adopts the single-season cropping system. Rice in the Wushui Town Demonstration Area has the risk of heavy metal pollution, and its risk factors are cadmium and arsenic.

Nanqiang Town Demonstration Area is located in the southeast of Linwu County, covers Wenxi Village, Tiantou Village and Liantang Village, and has an area of 187.4 hectares and a population of 5,035. The demonstration area mainly plants rice and adopts the one-season cropping system. Rice in the Nanqiang Town Demonstration Area has the risk of heavy metal pollution, and its risk factor is arsenic.

According to the survey data, the average household income of farmers in Linwu County Demonstration Area was 26,211 Yuan in 2017, among which the average non-agricultural income was 19,896 Yuan and the average agricultural income was 3,058 Yuan.

(3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The farmland pollution risk in Linwu County mainly comes from the soil pollution and the farmland exogenous pollution. Therefore, except that the risk management measures such as soil conditioning, pollution remediation and so on are purposefully taken; the farmland heavy metal pollution monitoring should also be strengthened, varieties and production management affecting farmland pollution should be clarified; and the heavy metal balance in farmland should be controlled to curb the worsening trend of farmland pollution.

Table 2-4 Heavy Metal Pollution Risks and Technical Measures to be Taken in Linwu County Demonstration Area

Risk type				area(ha.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	187.4	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standards.
medium low	medium low	high	medium low	76.73	optimize field water management(appropriate irrigation), apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, remove straws from the field, manage and control rice which exceeds the standards.
high	medium low	high	medium low	51.11	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards, grow alternative crops if pollution serious.
high	medium low	medium low	medium low	54.3	control varieties with high accumulation, optimize field water management, conduct soil acidification conditioning, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.
medium low	medium low	high	high	153.71	optimize field water management, apply the cadmium and arsenic synchronous passivator, remove straws from the field, grow alternative crops if pollution serious.

### 2.2.5 Social-economic status analysis of Lengshuitan District

In 2016, the GDP of the whole district reached 24.179 billion Yuan with a year-on-year growth of 9.3%, wherein, the added value of the primary industry was 3.512 billion Yuan with an increase of 3.4%; the added value of the secondary industry was 8.928 billion Yuan with an increase of 7.5%; and the added value of the tertiary industry was 11.739 billion Yuan with an increase of 12.8%. According to the permanent resident

population, the per capita GDP was 45,093 Yuan with an increase of 9.0%.

In 2016, the total registered population of the district was 559,900 with a total of 198,000 households including 289,100 males and 270,800 females. The birth rate of the whole district was 14.7‰ with a year-on-year growth of 1.6‰; the mortality rate was 4.9‰, with a year-on-year growth of 0.8‰; and the natural growth rate was 9.8‰. By the end of the year, there were 543,200 permanent residents and a total of 193,300 households, including 364,800 urban residents and 178,400 rural residents, and the urbanization rate was 67.2%. In 2014, the total permanent population of the district was 1.1252 million (about 291,600 households), including 408,800 urban residents and 716,400 rural residents.

The total output value (current price) of agriculture, forestry, animal husbandry and fishery in the whole district reached 6.329 billion Yuan with an increase of 3.5%, and the added value of agriculture, forestry, animal husbandry and fishery was 3.546 billion Yuan with an increase of 3.5%. The total area of crops was 100,200 hectares with an increase of 1.2%, of which the sowing area of grain crops was 56,700 hectares with a decrease of 0.6%, the total grain output reached 366,900 tons with a year-on-year decline of 1.5%, wherein, the cereal output was 354,400 tons with a decrease of 1.5%.

Rice is the main grain crop in Lengshuitan District and has a planting area of 28,393 hectares, the cropping system includes the double cropping and the single cropping system, the area for the double cropping system is 8,980 hectares and accounts for 31.63% of the paddy field area, and the main forms are rice – rice, oilseed rape – rice, and so on; the area for the single cropping system is 19,413 hectares and accounts for 68.37% of the paddy field area, and the main form is rice – idle. Rice planting varieties include Xiangzaoxian 45, Xiangwanxian 13, Huanghuazhan, and the like.

A total of 2938 farmland soil monitoring samples and dense monitoring samples were collected in Lengshuitan District in 2016. Some farmland soil in the district existed different degrees of heavy metal pollution, and the main pollution risk element was cadmium, followed by arsenic and mercury.

## (2) Demonstration area overview

Lengshuitan District totally selects 4 demonstration areas:

Xianghuaba Village Demonstration Area is located in the east of Lengshuitan District and the main planting system in the Demonstration Area is rice - green manure. The demonstration area has an area of 173.33 hectares and a population of 2,317. The farmland is polluted by irrigation water sources due to heavy metal pollution caused by “three wastes” of historical enterprises involving heavy metal pollution, which has been effectively treated. The variety enrichment coefficient of rice commonly used by farmers is low, the rice cadmium pollution is at medium risk and the arsenic pollution is at low risk, and the cadmium pollution in farmland soil is at low risk.

Shixijiang Village Demonstration Area is located in the middle and north of Lengshuitan District and adopts the main cultivated-land planting system of single cropping rice, and the irrigation water is originated from Lanjiang River. The Demonstration Area has an area of 186.66 hectares and a population of 2,367. The farmland is polluted by irrigation water sources due to heavy metal pollution caused by “three wastes” of historical enterprises involving heavy metal pollution, and there still may be the problems of dry and wet sedimentation, agricultural inputs and so on. The cadmium pollution in farmland soil is at high risk, the variety enrichment coefficient of rice commonly used by farmers is low, and the rice cadmium pollution is at high risk.

Lishan Village Demonstration Area is located in the middle and north of Lengshuitan District, adopts the main planting system of single cropping rice, and has an area of 175.66 hectares and a population of 2,549. The farmland is polluted by irrigation water sources due to heavy metal pollution caused by “three wastes” of historical enterprises involving heavy metal pollution. The variety enrichment coefficient of rice commonly used by farmers is low, and the rice arsenic pollution is at low risk.

Qishan Village Demonstration Area is located in the east of Lengshuitan District, adopts the main planting system of rice – rape, and has an area of 100 hectares and a population of 2,494. The farmland is polluted by irrigation water sources due to heavy metal pollution caused by “three wastes” of historical enterprises involving heavy metal pollution. The variety enrichment coefficient of rice commonly used by farmers is low, and the rice arsenic pollution is at low risk.

According to the survey data, the average household income of farmers in Lengshuitan District Demonstration Area was 46,159 Yuan in 2017, among which the

average non-agricultural income was 22,597 Yuan and the average agricultural income was 20,160 Yuan.

(3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The overall average risk level of rice cadmium pollution in Lengshuitan District is at high risk; the overall average risk of rice arsenic pollution is at low risk; the soil cadmium pollution level is at high risk; the soil arsenic pollution level has no risk, and the cadmium content in the farmland exogenous straw exceeds the standards. There may be a low risk of atmospheric sedimentation (according to the emissions of exhaust gases containing heavy metal in all cities of Hunan Province, the risk is initially determined as the low risk), and the risk should be supplement for monitoring after approval and before implementation of the project; the irrigation water does not exceed the standards, and the rice production management is at low risk. It is preliminarily determined that the farmland pollution risk characteristic in Lengshuitan District belongs to the typical soil pollution and leads to part of agricultural products to exceed the standards, and the main control countermeasures include agronomic management and soil restoration, and other auxiliary control measures.

Table 2-5 Heavy metal pollution risks and countermeasures to be taken in the Lengshuitan Demonstration Area

Risk type				area(h a.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	416.9 4	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standards.
high	medium low	high	medium low	186.6 6	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.
high	medium low	medium low	medium low	32	control varieties with high accumulation, optimize field water management, conduct soil acidification conditioning, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.

### 2.2.6 Social-economic status analysis of Jishou City

(1) County overview

In 2016, the regional GDP of Jishou City was 13633.86 million Yuan with an

increase of 10.2% over the previous year. Among them, the added value of the primary industry was 711.13 million Yuan with an increase of 3.3%; the added value of the secondary industry was 4099.76 million Yuan with an increase of 13.6%; the added value of the tertiary industry was 8822.97 Yuan with an increase of 9.1%. Among the GDP, the structure rate of the three industries was 5.2:30.1:64.7, and the operating income of the service industry above the scale reached 2245.79 million Yuan with an increase of 9.92% over the previous year. According to the permanent resident population, the per capita regional GDP was 42,009 Yuan with an increase of 2,645 Yuan and 5.9% over the previous year.

In 2016, the registered population of Jishou City was 307,500 with an increase of 1.25% over the previous year, and the permanent resident population was 336,500 with an increase of 7.64%. The urban population of Jishou City was 254,000, and the urbanization rate was 75.5% with an increase of 2.24%.

In 2016, the agricultural output of Jishou City was 888.58 million Yuan with an increase of 3.1%, and the grain planting area of Jishou City was 9,670 hectares with a decrease of 1.1% over the previous year. Rice is the main grain crop in the city and has a planting area of 9,858 hectares, the cropping system includes the double cropping and the single cropping system, the area for the double cropping system is 4,278 hectares and accounts for 43.40% of the paddy field area, and the main forms are rice-rape, rice-vegetables; the area for the single cropping system is 5,580 hectares and accounts for 56.60% of the paddy field area, and the main form is rice – idle. Rice planting varieties include Xiangmi 5431, Y Liangyou 1998, Liangyou 584, Chaoyou 2000, and the like.

The monitoring data results of soil agricultural products show that, in 5 risk factors such as cadmium, arsenic, mercury, lead and chromium, the rice in Jishou City has the risk of heavy metal pollution, and its main risk factor is cadmium.

## (2) Demonstration area overview

Jishou City totally selects 3 demonstration areas:

Qianzhou Demonstration Area is located in downtown of Jishou City, covers Guanhou Village and Ximenkou Village, and has an area of 132.22 hectares and a population of 5,214. The farmland is polluted by the heavy metal caused by “three wastes” of historical metallurgical enterprises involving heavy metal pollution, the rice

test samples exceed the standards, and the pollution sources have been effectively controlled. The main farmland rice pollution type is cadmium and arsenic compound pollution, and some farmlands are pollution-free.

Shuangtang Demonstration Area is located in the southwest of Jishou City, covers Zhoujiazhai Village, Shuangtang Sub-district and Daba Village, and has an area of 49.66 hectares and a population of 2,208. In the demonstration area, the rice-rape planting system is adopted. The farmland is polluted by the heavy metal caused by “three wastes” of historical enterprises involving heavy metal pollution, the rice test samples exceed the standards, and the pollution sources have been effectively controlled. The main farmland rice pollution type is cadmium and arsenic compound pollution, both of which are mildly polluted, and some farmlands are pollution-free.

Aizhai Demonstration Area is located in the west gate of capital of Xiangxi Autonomous Prefecture, Jishou City, covers Daxing Village, Xiaoxing Village, Xingfu Village, Paixiong Village, Jinye Village and Yangmeng Village, has an area of 265.62 hectares and a population of 6,137, and adopts the rice-rape planting system. The farmland is polluted by the heavy metal caused by “three wastes” of historical enterprises involving heavy metal pollution, the rice and sediment test samples exceed the standards, and the municipal environmental protection bureau will further take countermeasures for pollution sources in the area. The main cultivated-land pollution type is cadmium and arsenic compound pollution, both of which are mildly polluted.

According to the survey data, the average household income of households in Jishou City Demonstration Area was 47,670 Yuan in 2017, among which the average non-agricultural income was 37,400 Yuan and the average agricultural income was 9,644 Yuan.

(3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The heavy metal cadmium in soil and rice exceeds the standards in three demonstration areas of Jishou City, and the arsenic in soil and rice slightly exceeds the standards, and other heavy metals does not exceed the standards. Therefore, Jishou City will take the heavy metal cadmium and arsenic as the main index of soil risk assessment, conduct a comprehensive assessment of soil pollution risks, farmland pollution source risks and farmland management risks, determine different types of risks according to

different risk levels, combine with other heavy metal pollution characteristics, and pertinently put forward the corresponding control measures.

Table 2-6 Heavy Metal Pollution Risks and Technical Measures to be Taken in Jishou City Demonstration Area

Risk type				area(ha.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	291.88	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standards.
high	medium low	medium low	medium low	155.62	control varieties with high accumulation, optimize field water management, conduct soil acidification conditioning, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.

### 2.2.7 Social-economic status analysis of Huayuan County

#### (1) County overview

Huayuan County is located in the central part of Xiangxi Tujia and Miao Autonomous Prefecture, with a total land area of 1109.35 square kilometers and a total of 24712.21 hectares of cultivated land (including 11900.47 hectares of paddy field and 12811.74 hectares of dry land). In 2016, the total output value in this county reached 5.95841 billion Yuan, the total output value of agriculture, forestry, animal husbandry and fishery was 1.208364 billion Yuan, and the per capita disposable income of rural residents was 7,055 Yuan. Huayuan County is a typically “old, small, marginal, poor and mountainous” area with multiple reservoirs. It is a key county and poor county designated by the state in national poverty alleviation and development and regional development in Wuling Mountain area.

The county has a total area of 1108.69 square kilometers and has 12 townships and towns, 217 villages and 24 communities (neighborhood committees), with a total population of 314,700, including agricultural population of 266,600 belong to and rural laborers of 143,000.

In addition to grain crops, in this county, annual cash crops and fruits are also produced in agricultural production, among which grain crops mainly include rice, corn, sweet potato, soybean, etc., annual cash crops mainly include rape, peanuts, vegetables, flue-cured tobacco, sweet wormwood, etc. and fruits mainly include citrus, pears, kiwi

fruit, etc. Rice, rape, vegetables and other crops are staple crops. Main planting systems are rice, rape-rice, rice-fertilizer, rice-vegetable and so on. The planting area of crops in 2016 was 34.89 thousand hectares, including 19.83 thousand hectares of grain crops, 9.5 thousand hectares of rice, 5.51 thousand hectares of vegetables, 2.1 thousand hectares of soybeans, and 8 thousand hectares of Chinese medicinal herbs. The total grain output for across the year was 90276.45 tons, with 56116.45 tons of rice.

The area of farmland that does not exceed the standard in this county is 1483.3 hectares, accounting for 6.0 % of the total farmland area; 8,542.6 hectares of farmland (34.8 %) was slightly polluted. 3,983.2 hectares of farmland (16.2 %) was lightly polluted. 3461.3 hectares of farmland (14.1 %) was moderately polluted, and 7087.3 hectares of farmland (28.9%) was heavily polluted.

## (2) Demonstration area overview

There are 4 demonstration areas selected in Huayuan County:

Huayuan Town Demonstration Area is located in Huayuan Town in the north of the county border. The demonstration area includes Tianping Village, Zhuchao Village, Ganggang Village and Dao'er Village. The total area of farmland in the demonstration area is 143 hectares, and the main crop planted is rice. The total population of the demonstration area is 4468. Farmland is polluted by heavy metals caused by smelting and "three wastes" from other enterprises involving in heavy metal pollution. The heavy metal content of rice and soil test samples exceeds the standard but pollution sources have been effectively controlled. The main farmland pollution type is the compound pollution of cadmium, arsenic, mercury, and cadmium pollution is the most serious.

Longtan Town Demonstration Area is located in Longtan Town, northwest of the county, and it is inhabited by Miao people. The town is rich in lead, zinc and sulfur deposits. The demonstration area includes Longmen Village, Shuangping Village and Jinrong Village, with a total area of 149 hectares and rice as the main planting crop. The total population of the demonstration area is 4618. The main farmland pollution type is the compound pollution of cadmium, arsenic, mercury, and cadmium pollution is the most serious. The content of cadmium varies greatly. Farmland is polluted by heavy metals caused by smelting and "three wastes" from other enterprises involving in heavy metal pollution. The heavy metal content in rice and soil test samples exceeds the standard but pollution sources have been effectively controlled.

Malichang Town Demonstration Area is located in Malichang Town in the middle of the county. It is mainly inhabited by Miao people, who make up more than 90 % of the total population. The total area of farmland in the demonstration area is 61 hectares, with rice as the main planting crop. The population of the demonstration area is 2767. Farmland is polluted by heavy metals caused by “three wastes” from smelting and other enterprises involving in heavy metal pollution. The heavy metal content in rice and soil test samples exceeds the standard but the pollution sources have been effectively controlled. The main farmland pollution type is the compound pollution of cadmium, arsenic, mercury, and cadmium pollution is the most serious.

Mao’er Township Demonstration Area is located in Mao’er Township to the west of the county, including Mao’er Village. The demonstration area is 56 hectares, and rice is the main planting crop. The population is 1,980. The main farmland pollution type is the compound pollution of cadmium, arsenic, mercury and lead, cadmium pollution is the most serious. The content of cadmium varies greatly. Farmland is polluted by heavy metals caused by “three wastes” from smelting and other enterprises involving in heavy metal pollution. The heavy metal content in rice and soil test samples exceeds the standard but the pollution sources have been effectively controlled.

Survey data shows that the average income of peasant households in the Huayuan County Demonstration Area in 2017 was 29,393 Yuan, of which the average non-agricultural income was 22,694 Yuan and the average agricultural income was 4,611 Yuan.

(3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The risk characteristics of farmland pollution in Huayuan County belong to typical soil pollution and can lead to some agricultural products exceeding the standard. Agronomic management and soil restoration measures are mainly adopted with assistance of other control measures.

Table 2-7 Heavy Metal Pollution Risk and Technical Measures to be Taken in Huayuan County

Risk type				area(h a.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		

medium low	medium low	medium low	medium low	48.8	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standards.
medium low	medium low	high	medium low	99.79	optimize field water management(appropriate irrigation), apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, remove straws from the field, manage and control rice which exceeds the standards.
high	medium low	high	medium low	69.54	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards, grow alternative crops if pollution serious.
high	medium low	medium low	medium low	190.87	control varieties with high accumulation, optimize field water management, conduct soil acidification conditioning, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.

## 2.2.8 Social-economic status analysis of Hengnan County

### (1) County overview

In 2016, Hengnan County had a permanent population of 971,400, of which 380,400 were urban residents and 591,000 were rural population. The urbanization rate reached 39.2 %, including 512,600 men and 458,800 women.

In 2016, the total output value of Hengnan County achieved 31.569 billion Yuan, with an year-on-year of 7.7 %. Among them, the added value of the primary industry was 7.153 billion Yuan with an increase of 3.3 %; the added value of the secondary industry was 13.604 billion Yuan with an increase of 7.4 %; and added value of the tertiary industry was 10.812 billion Yuan with an increase of 11.1 %.

Hengnan County ranks first in the province in comprehensive production capacity of grain, oil, cotton, tobacco and live pigs. The sown area of perennial grain crops is 106,300 hectares, producing 690,000 tons of grain. Rice is the main grain crop in the county, with a planting area of 97,333 hectares. The planting systems include triple cropping system, double cropping system and single cropping system. The area of triple cropping system is 4964 hectares, accounting for 5.1 % of the planting area. The main patterns are rice-rice-fertilizer, rice-rice-rape, and rice-rice-vegetable. The double cropping area is 87307.7 hectares, accounting for 89.7 % of the paddy field area. The main patterns are rice-rice, rape-rice, vegetable-rice, tobacco-rice, watermelon-rice, corn-rice, etc. The single cropping area is 5061.3 hectares, accounting for 5.2 % of rice. The main pattern is rice-idle. The rice varieties mainly include Xiangzaoxian Rice 45,

Xiangwanxian Rice 13, Huanghuazhan and other varieties.

In Hengnan County, 572 sites were sampled for farmland soil monitoring and dense monitoring in 2013, 2016 and 2017. Heavy metal pollution exists in some farmland soils in the county. Cadmium is the main risk element of pollution, followed by arsenic, and some of them exist in the form of compound pollution.

## (2) Demonstration area overview

There are 8 demonstration areas selected in Hengnan County:

Qishan Demonstration Area is located in the northwest of Hengnan County. The demonstration area includes Qishan Village, with an area of 68.7 hectares. The population of the demonstration area is 2,680. The demonstration area adopts a rice-rape planting system. The pollution source may be the high background value of heavy metals in the soil caused by the parent material of the soil, coupled with the unreasonable application of cadmium-containing phosphate fertilizer for many years, but it has been effectively controlled. There are different levels of heavy metal pollution in farmland soil, and the risk factor is mainly cadmium. The enrichment coefficient of common rice varieties used by farmers is not high, and there is a low risk of cadmium pollution in rice.

Quanhu Town Demonstration Area is located in the west of Hengnan County. The demonstration area covers Qitang Village with an area of 97.7 hectares and a population of 1090. The demonstration area adopts rice-idle, rice-rape and rice-vegetable planting systems. The risk of arsenic pollution in Quanhu Demonstration Area comes from production management. Besides agricultural management and soil remediation measures, it is necessary to further clarify the influence of dry and wet sedimentation, varieties and production management. The enrichment coefficient of common rice varieties used by farmers is not high, and there is a low risk of in rice. Cadmium pollution is the main type of farmland soil pollution, with medium or high risk as risk degree. Farmland is polluted by heavy metals caused by “three wastes” from other enterprises involving in heavy metal pollution. At the same time, there may be the problem of over application of agricultural fertilizers.

Lijiang Town Demonstration Area is located in the south of Hengnan County. The demonstration area covers Jiepai Village, with an area of 105.3 hectares and a

population of 3059. The demonstration area adopts a rice-rape planting system. The risk of arsenic pollution in Lijiang Demonstration Area mainly comes from production management. Besides agricultural management and soil remediation measures, it is necessary to further clarify the influence of dry and wet sedimentation, varieties and production management. The pollution of industrial and mining enterprises caused by the polluted Xiangjiang River water source has been gradually improved. The main pollution type in farmland soil is cadmium, and the risk of which is mainly high or medium. The enrichment coefficient risk of common rice varieties used by farmers is high and the soil cadmium pollution is at high risk but arsenic pollution is at medium risk.

Xiangyang Town Demonstration Area is located in the east of Hengnan County. The demonstration area covers Suhu Village and Zhushan Village. The demonstration area covers 152.3 hectares and the population is 3456. The demonstration area adopts rice-idle, rice-rape and rice-vegetable planting systems. In the upper reaches of the river, the main pollution source is heavy metal pollution caused by the “three wastes” from enterprises involved in heavy metal pollution in past but it has been effectively controlled. Cadmium pollution is the main type of pollution in farmland soil, and its risk is mainly medium or high. The enrichment coefficient of common rice varieties used by farmers is not high, and there is a low risk of cadmium and arsenic pollution in rice.

Xiantang Town Demonstration Area is located in the northeast of Hengnan County. The demonstration area covers Changtang Village, with an area of 72.1 hectares and a population of 2886. The planting systems in the demonstration area are rice-rape and rice-idle. Farmland is polluted by heavy metals caused by the “three wastes” from enterprises involved in heavy metal pollution in history. The enrichment coefficient of common rice varieties used by farmers is not high, and there is a low risk of cadmium and arsenic in rice. Cadmium and arsenic pollution are the main types of farmland soil pollution. Cadmium is mainly at high risk or medium risk, and arsenic is mainly at medium risk or low risk.

Huaqiao Town is located in the east of Hengnan County. The demonstration area covers Maiyuan Village and Liushun Village. The demonstration area covers 152.5 hectares and the population of the demonstration area is 3456. Farmland is polluted by

heavy metals caused by the “three wastes” from enterprises involved in heavy metal pollution in history. The enrichment coefficient of common rice varieties used by farmers is not high, and there is a low risk of arsenic pollution in rice. Cadmium and arsenic pollution are the main types of farmland soil pollution. Risk of cadmium pollution is mainly medium or low, and so does the arsenic pollution.

Chashi Town Demonstration Area is located in the southeast of Hengnan County. The demonstration area covers Lianhua Village, with an area of 98.3 hectares and a population of 2438. The planting systems in the demonstration area are rice-rape and rice-idle. The risk of cadmium and arsenic pollution in Chashi Town Demonstration Area is mainly caused by the contaminated rice caused by soil pollution, as well as the exogenous and production management of farmland. The pollution source is mainly from industrial and mining enterprises in the upper stream brought by the water source, Leishui River. The enrichment coefficient of rice varieties used by farmers is high. The cadmium pollution risk in rice is extremely high and that of arsenic pollution is low. Cadmium and arsenic pollution are the main types of pollution in farmland soil. The risk of cadmium pollution is extremely high or high and so does the arsenic pollution risk.

Jiangkou Town Demonstration Area is located in the southeast of Hengnan County. The Demonstration area covers Sanping Village, with an area of 81 hectares and a population of 2438. The demonstration area adopts rice-rape and rice-vegetable planting systems. The risk of arsenic pollution in Jiangkou Town may come from atmospheric sedimentation. The main pollution sources are waste water and waste residue from basalt quarries, carry-over pollution in past and Leishui reverse irrigation caused by extraordinary floods, which leads pollution of the plough layer. Cadmium pollution is the main type of farmland soil pollution, and cadmium pollution risk is mainly high or medium. The enrichment coefficient of rice commonly used by farmers is not high and the pollution risk of rice is low.

Survey data shows that in 2017, the average income per household in Hengnan County Demonstration Area was 29,160 Yuan, wherein the average non-agricultural income was 20,056 Yuan and the average agricultural income 5,342 Yuan.

(3) Risk of heavy metal pollution in Hengnan County and technical measures to be Taken

The risk of farmland pollution in Hengnan County mainly comes from soil pollution and exogenous farmland pollution, which leads to the excessive cadmium and arsenic content in rice in low pollution risk soil. Therefore, except adopting targeted risk management measures, such as soil conditioning and pollution remediation to ensure the quality and safety of agricultural products, it also should strengthen the monitoring of heavy metal pollution in farmland, varieties and production management, and control the balance of heavy metal in farmland so as to curb the worsening of farmland pollution.

Table 2-8 Heavy Metal Pollution Risks and Technical Measures to be Taken in  
Hengnan County Demonstration Area

Risk type				area(ha.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	58.64	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standard.
high	medium low	high	medium low	99.79	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.
high	medium low	medium low	medium low	69.54	control varieties with high accumulation, optimize field water management, conduct soil acidification conditioning, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.
high	medium low	high	high	190.87	crops varieties and cultivation management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment, remove straws from the field.
medium low	medium low	high	medium low	48.8	crops varieties and cultivation management, optimize field water management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment.
medium low	high	high	medium low	99.79	crops varieties and cultivation management, optimize field water management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment.
medium low	high	medium low	medium low	69.54	crops varieties and cultivation management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment.
medium low	medium low	medium low	high	190.87	apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, remove straws from the field, control and manage farmland sediment.

## 2.2.9 Social-economic status analysis of Baojing County

### (1) County overview

In 2015, the county's resident population was 313,924 (87780 households), including non-agricultural population of 42969 and agricultural population of 270955. Among them, 149,726 were women, accounting for 47.7 % of the total population. The minority population was 248,785, accounting for 79.25 % of the total population, including 174226 Tujia people and 72622 Miao people.

In 2015, the gross value of production in the county was 4.058 billion Yuan, of which the added value of the primary industry was 609 million Yuan with an increase of 3.9 %. The added value of the secondary industry was 1.559 billion Yuan, with an increase of 13.5 %. The added value of the tertiary industry was 1.889 billion Yuan, with an increase of 13.5 %. The added value of the primary industry accounted for 18.4 % of the GDP, the added value of the secondary industry accounted for 35.1 %, and the added value of the tertiary industry accounted for 46.6 %. The contribution rates of the primary, secondary and tertiary industries to economic growth were 11.8 %, 34.6 % and 53.6 % respectively. Calculated by the resident population, GDP per capita was 7,587 Yuan with an increase of 3.4 %.

The sown area of grain crops is 18,750 hectares, producing 88,772 tons of grain, with 5,170 hectares of rape, 6,515 tons of rapeseed, 4,511 hectares of tea leaves, 302 tons of output and 770 hectares of aquaculture water. The main grain crop in the county is rice, with a planting area of 9,000 hectares. The planting system is single cropping system, with three main patterns: rice-idle, rice-rape, and rice-vegetable. Rice varieties include Jingliangyouhuazhan, Taiyou 390, Y Liangyou 3399, Xiangyou 6203, etc.

In 2011 and 2012, 397 samples were collected for monitoring and testing of soil agricultural products, covering an area of 39,600 mu of paddy fields. Among the five risk factors of cadmium, arsenic, mercury, lead and chromium, PH value and soil cation exchange capacity were measured at the same time. The results of the testing data showed that there was a risk of heavy metal pollution in some paddy fields in Baojing County. The risk factor was cadmium and the heavy metal contents of 286 samples exceeded the standard. The over-standard area was 28,500 mu, with cadmium exceeding the standard as the main form, and an over-standard rate of 72.04 %.

## (2) Demonstration area overview

There are 5 demonstration areas selected in Baojing County:

Yanjing Demonstration Area is located in Fuxing Town, 18 kilometers away from the county, covering 4 villages in Fuxing Town, namely Yanjing Village, Ganxi Village, Datuo Village and Mawang Village. The demonstration area is 144 hectares. The population of the demonstration area is 6514. The demonstration area adopts a rice-idle planting system. Farmland is polluted by heavy metals brought about by lead, zinc and iron private mining and the “three wastes” from smelting enterprises involved in heavy metal pollution. The heavy metal content in rice and sediment samples exceeds the standard. But the pollution source has been effectively controlled. Cadmium pollution is the main type of farmland pollution. In addition, few farmlands are pollution-free.

Xiaba Demonstration Area is located in Purong Town, 22 kilometers away from the county, including Xiaba Village and Zebi Village in Purong Town, with an area of 63.34 hectares. The population of the demonstration area is 3454. The demonstration area adopts a rice- idle planting system. Farmland is polluted by heavy metals brought by private mining sites of lead and zinc mines. The heavy metal content in rice and sediment samples exceeds the standard, but pollution sources have been effectively controlled. Cadmium pollution is the main type of pollution of cultivated lands, while a small part of cultivated land is pollution-free.

Nadong Demonstration Area is located in Qianling Town, Baojing County. Qianling Town is the economic, political and cultural center of Baojing County. It is about 5km away from the county and covers two villages, Nadong Village and Heping Village. The demonstration area is 40.67 hectares with a population of 3555. The demonstration area adopts a rice-idle planting system. Heavy metal pollution is caused by mercury and lead mining in farmland, and the heavy metal content in rice and sediment samples exceeds the standard. Up to now, pollution sources have been effectively controlled. Cadmium pollution is the main type of cultivated land pollution.

Zhongba Demonstration Area is located in Shuitianhe Town, 27 kilometers away from the county, and covers two villages, Zhongba Village and Shuitian Village in Shuitian Town. The demonstration area is 48.33 hectares with a population of 2979. The demonstration area adopts a rice-idle planting system. Due to heavy metal pollution caused by mercury and vanadium mining in farmland, heavy metal content in rice and sediment samples have exceeded the standard. Up to now,, pollution sources in the region have been effectively controlled. Cadmium pollution is the main type of

cultivated land pollution.

Hangsha Demonstration Area is located in Lyudongshan Town, Baojing County, about 71 kilometers away from the county. It covers two villages, Hangsha Village and Hangji Village in Ludongshan Town. The demonstration area is 74.33 hectares with a population of 4090. The demonstration area adopts a rice-fallow planting system. Farmland is polluted by heavy metals brought about by vanadium mining and smelting, and heavy metal content in rice and sediment samples exceeds the standard. The county environmental protection department has taken effective measures to control pollution sources in the region, mainly by shutting down and banning them. Cadmium pollution is the main pollution type of cultivated land, while a small part of cultivated land is pollution-free.

Survey data shows that in 2017, the average income of households in Baojing County Demonstration Area was 46,720 Yuan, of which the average income of non-agricultural households was 29,631 Yuan and the average income of agricultural households was 8,455 Yuan.

(3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The farmland pollution risk in Baojing County mainly comes from soil pollution and farmland exogenous pollution, resulting in excessive cadmium content (low risk) in rice due to soils with high pollution risk. Therefore, targeted risk management measures such as soil conditioning and pollution remediation should be taken. In addition, monitoring of heavy metal pollution in farmland should also be strengthened in varieties and production management, regulate and control the heavy metal balance in farmland to curb the worsening farmland pollution.

Table 2-9 Heavy Metal Pollution Risks and Technical Measures to be Taken in Baojing County Demonstration Area

Risk type				area(ha.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	153.4	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standards.

high	medium low	medium low	medium low	60	control varieties with high accumulation, optimize field water management, conduct soil acidification conditioning, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.
medium low	medium low	high	medium low	157.27	crops varieties and cultivation management, optimize field water management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment.

## 2.2.10 Social-economic status analysis of Anhua County

### (1) County overview

At the end of 2016, the total number of households in Anhua County was 309,000, with a total population of 1.08 million and a permanent population of 910,000, of which 260,000 were resident in cities and towns, with an urbanization rate of 28.53 %. The natural population growth rate was 5.98%. There were 26 ethnic groups, including Han, Tujia, Miao and Mongolian peoples living in Anhua County.

In 2016, the gross regional production reached 19.63 billion Yuan, with an increase of 7.6 % on a year-on-year basis. Among them, the added value of the primary industry was 4.47 billion Yuan, with an increase of 3.5 %. The added value of the secondary industry was 7.23 billion Yuan, with an increase of 6.3 %. The added value of the tertiary industry was 7.93 billion Yuan, with an increase of 11.3 %. The ratio of tertiary industries was 22.8: 36.8: 40.4; the proportion of primary industries decreased by 0.2 percentage points; the proportion of secondary industries decreased by 0.4 percentage points, and the proportion of tertiary industries increased by 0.6 percentage points. The contribution rates of the primary, secondary and tertiary industries to the economic growth were 10.6 %, 30.3 % and 59.1 % respectively, pulling GDP growth by 0.8 %, 2.3 % and 4.5 % respectively.

The total output value of agriculture, forestry, animal husbandry and fishery was 7.26 billion Yuan in the whole year. The sown area of grain was 65,800 hectares and the total grain output was 238,000 tons. Rice is the main grain crop of the county, with a planting area of 27,700 hectares. The planting system includes double cropping system and single cropping system; the double cropping area is 18,000 hectares,

accounting for 64.9 % of the paddy field area. The main planting patterns are rice-rape, rice-corn, rice-cabbage and rice-watermelon etc. The single cropping area is 6,000 hectares, accounting for 21.66 % of the paddy field area with rice-idle as its main pattern. Main rice varieties include Longliangyouhuazhan Rice, Y Liangyou 488, Y Liangyou 2108, Huanghuazhan Rice, etc.

The monitoring data of soil agricultural products in 2015 and 2017 shows that among the five risk factors of cadmium, arsenic, mercury, lead and chromium, some rice in Anhua County have the risk of heavy metal pollution, and the risk factor is cadmium.

## (2) Demonstration area overview

There are 5 demonstration areas selected in Anhua County.

Kuixi Town Demonstration Area is located in the west of Anhua County. The demonstration area covers 2 villages, Kuixi Village and Muliu Village, with an area of 3000 mu. The population is 2210. The planting system in the demonstration area is rice-rape. Heavy metal pollution caused by the “three wastes” of from enterprises involved in heavy metal pollution in history has led to the pollution of irrigation water sources on farmland but has now been effectively controlled. There are different levels of heavy metal pollution in farmland soil, and the risk factor is mainly cadmium.

Dongping Town Demonstration Area includes Zhongdi Village with an area of 1200 mu. The demonstration area has a population of 1325. The staple crops are rice, rape and corn. Heavy metal pollution caused by the “three wastes” of from enterprises involved in heavy metal pollution in history has led to the pollution of irrigation water sources on farmland but has now been effectively controlled. The enrichment coefficient of common rice varieties used by farmers is high, and cadmium content in rice exceeds the standard.

Jiangnan Town Demonstration Area includes Bianjiang Village, with an area of 1100 mu. The population is 860. Rice and corn are staple crops in the demonstration area. Farmland is polluted by heavy metals caused by the “three wastes” from enterprises involved in heavy metal pollution in past and the pollution comes from irrigation water sources. Pollution possibilities of dry and wet sedimentation, agricultural inputs and others may also exist. The enrichment coefficient of common

rice varieties used by farmers is high and rice pollution risk is medium. Cadmium pollution is the main type of farmland soil pollution and it is mainly low-risk or medium-risk.

Changtang Town Demonstration Area includes Hezhen Village, with an area of 1280 mu. The population is 1,300. The demonstration area is dominated by rice. It is planned to replace rice with grape and orange. Farmland is polluted by heavy metals caused by the “three wastes” from enterprises involved in heavy metal pollution in history and the pollution comes from irrigation water sources. Pollution possibilities of dry and wet sedimentation, agricultural inputs and others may also exist. The enrichment coefficient of common rice varieties planted by farmers is high and rice pollution risk is medium.

Qingtangpu Town Demonstration Area includes Yushui Village, with an area of 1310 mu. The population of the Demonstration Area is 1100. Rice and corn are staple crops in the demonstration area. Farmland is polluted by heavy metals caused by the “three wastes” from enterprises involved in heavy metal pollution in past. The pollution comes from irrigation water sources, and there are also possibilities of dry and wet sedimentation, agricultural inputs and other pollutions. The enrichment coefficient of common rice varieties planted by farmers is high and rice pollution risk is medium. Cadmium pollution is the main type of farmland soil pollution, and its risk is mainly low or medium.

Survey data shows that in 2017, the average income of households in Anhua County Demonstration Area was 39,485 Yuan, of which the average income of non-agricultural households was 30,416 Yuan and the average income of agricultural households was 11,651 Yuan.

(3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The risk characteristics of farmland pollution in Anhua County belong to typical soil pollution and it leads to the heavy metal content in some agricultural products exceeding the standard. Agricultural management and soil remediation measures are mainly adopted to assist other control measures.

Table 2-10 Heavy Metal Pollution Risks and Technical Measures to be Taken in

## Anhua County Demonstration Area

Risk type				area(h a.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
high	medium low	high	medium low	401.09	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards, grow alternative crops if pollution serious.
medium low	medium low	high	medium low	124.9	crops varieties and cultivation management, optimize field water management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment.

### 2.2.11 Social-economic status analysis of Yizhang County

#### (1) County overview

In 2016, the county's total permanent resident population was 624,700, including 146,200 in towns and 478,500 in villages. Among them, the population of women was 294,100, accounting for 47 % of the total population, and the minority population was 15,000, accounting for 2.4 % of the total population.

In 2016, the total output value in the county was 14.718 billion Yuan, of which the added value of the primary industry was 1.708 billion Yuan, with an increase of 2.8 %. The added value of the secondary industry was 6.764 billion Yuan, with an increase of 12.3 %. The added value of the tertiary industry was 6.246 billion Yuan, with an increase of 13.8 %. The contribution rates of the primary, secondary and tertiary industries to economic growth were 11.61 %, 45.95 % and 42.44 % respectively. Calculated by the resident population, GDP per capita was 23,560 Yuan, with an increase of 7.5 %.

Yizhang County has gradually formed advantageous industries such as high-quality rice, navel orange, live pigs, poultry, tea leaves, waxberry, vegetables, seedlings and flowers, fast-growing and high-yielding forests, hybrid corn and the like in adjusting the agricultural industrial structure. The county's grain area is stable at 750,000 hectares, with a total grain output of over 303,000 tons.

In Yizhang County, there were 1549 sampling sites in 2012 and 2015 for farmland

soil monitoring and dense monitoring. Some farmland soils in the county had different degrees of heavy metal pollution, with cadmium as the main pollution risk element, followed by arsenic, and the compound cadmium and arsenic heavy metal pollution existed in some land.

## (2) Demonstration area overview

A total of 3 demonstration areas are selected in Yizhang County:

Meitian Town Demonstration Area is located in the southwest of the county. The demonstration area covers two villages, Meitian Village and Huangshi Village, with an area of 150.47 hectares with a population of 5926. The staple crop in the demonstration area is single cropping rice. Farmland is polluted by heavy metals brought about by the "three wastes" of from enterprises involved in heavy metal pollution in past, resulting in farmland pollution by irrigation water sources but effective governance has been achieved. However, due to its location factors, there may still be dry and wet deposition and other problems. The main type of farmland soil pollution is the compound cadmium and arsenic pollution. In principle, the cadmium pollution risk is extremely high, while that of arsenic is low. Low cadmium pollution risk and extremely high cadmium pollution risk in rice exist. In some lands the arsenic pollution is at low risk. The enrichment coefficient of common rice varieties used by farmers is low risky and single cadmium or arsenic pollution in rice exists.

Wuling Town Demonstration Area covers three villages, namely, Raotian Village, Taipingli Village and Dengjiawan Village. The demonstration area is 264.46 hectares and the population is 7810. The staple crop is single cropping rice. Farmland is polluted by heavy metals caused by the "three wastes" from enterprises involved in heavy metal pollution in history. The enrichment coefficient of common rice varieties used by farmers is at low risk or medium risk. The contents of cadmium and arsenic in rice exceed the standard. The compound pollution of cadmium and arsenic is the main type of farmland soil pollution, and single cadmium pollution or single arsenic pollution exists in few lands. The main pollution risk is low or none. Most of rice is contaminated by cadmium and arsenic, while few are contaminated by cadmium or arsenic.

Yiliu Town is located in the middle of the county. The demonstration area includes Shijie Village. The demonstration area is 63.33 hectares with a population of 1650. The planting system of of demonstration area is dominated by double cropping rice.

Farmland is polluted by heavy metals brought about by the “three wastes” from enterprises involved in heavy metal pollution in past, resulting in farmland pollution caused by irrigation water sources but effective governance has been achieved. The compound pollution of cadmium and arsenic is the main type of farmland soil pollution, cadmium pollution risk is extremely high and arsenic pollution is at low risk. The pollution of rice is single cadmium pollution, with an extremely high risk.

Survey data shows that in 2017, the average income of households in Yizhang County Demonstration Area was 31,169 Yuan, of which the average non-agricultural income was 21,293 Yuan and the average agricultural income was 7,701 Yuan.

(3) Heavy metal pollution risks and technical measures to be taken in the demonstration area

The risk of farmland pollution in Yizhang County mainly comes from soil pollution and exogenous pollution of farmlands, which leads to the excessive cadmium and arsenic content in rice. Therefore, the targeted risk management measures, such as soil conditioning and pollution remediation should be taken and monitoring of heavy metal pollution in farmland should also be strengthened to clarify the risk degrees affecting farmland pollution such as dry and wet sedimentation, varieties and production management to regulate and control the heavy metal balance in farmland so as to curb the worsening of farmland pollution.

Table 2-11 Heavy Metal Pollution Risks and Technical Measures to be Taken in the Demonstration Area

Risk type				area(ha.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	90	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standards.
high	medium low	high	high	155.59	crops varieties and cultivation management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment, remove straws from the field, grow alternative

					crops if pollution serious.
medium low	medium low	high	medium low	214.67	crops varieties and cultivation management, optimize field water management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment.
high	high	high	high	18	Grow corn.

## 2.2.12 Social-economic status analysis of Cili County

### (1) County overview

At the end of 2016, the total number of households in Cili County was 245,771, with a total household registration population of 705792. The resident population at the end of the year was 613,900, and the urban population was 268,100, with an urbanization rate of 43.7 %. Cili County is a multi-ethnic county. Since ancient times, 17 ethnic groups such as Han, Tujia, Bai, Hui and Miao peoples have been living here. Among them, the minority population dominated by Tujia people, accounts for 61 % of the total population.

In 2016, the gross domestic product Cili County was 16.70809 billion Yuan, with an increase of 8.1 % over the previous year, wherein: the added value of the primary industry was 2.7179 billion Yuan, with an increase of 3.6 %; The added value of the secondary industry was 5.16692 billion Yuan, with an increase of 6.2 %. Among them, the added value of industry was 4.4872 billion Yuan, with an increase of 6.7 % on a year-on-year basis. The added value of the tertiary industry was 8.8232 billion Yuan, with an increase of 10.8 %. The per capita GDP of the county was 27,301 Yuan (calculated by permanent resident population), which is about 4110 USD at the average exchange rate in 2016. The adjustment of economic structure has been steadily progressing. The proportion of the added value of the primary, secondary and tertiary industries in the county's GDP has been optimized from 17.0: 32.4: 50.6 last year to 16.3: 30.9: 52.8. The overall well-to-do level in 2016 was 87.9 %, an increase of 2.8 percentage points over the previous year.

In 2016, the cultivated land area of the county was 654,000 mu, and the cultivated area of grains was 923,700 mu. The total grain output reached 295,700 tons, up 1.6 %

on a year-on-year basis. Rice is the main grain crop in the county, with a planting area of 247500 hectares. Planting systems include single cropping system and double cropping system. Main forms include rice-vegetable, rice-fertilizer, rice-rape, rice-idle, etc.

Based on the data analysis of dense monitoring of agricultural products in Cili County in 2016, results show that among the five risk factors of cadmium, arsenic, mercury, lead and chromium, some paddy grains in Cili County are at risk of heavy metal pollution, and the risk factors are cadmium, arsenic and mercury.

## (2) Demonstration area overview

A total of 5 demonstration areas are selected in Cili County:

Dongyueguan Town is located in the northeast of Cili County. The demonstration area covers 3 villages, namely, Yangfengping Village, Liangqiao Village and Sanyuanqiao Village. The area of the project is 209.71 hectares, and the population is 13815. Planting systems are rice-rape and rice-vegetables. The farmland was affected by the sewage irrigation of Zhuangta Reservoir, causing heavy metal pollution. The source of pollution, Zhuangta Coal Mine, has been shut down, and the water quality of Zhuangta Reservoir has reached the standard after testing. The enrichment coefficient of common rice varieties used by farmers is not high and the risk of rice is low. The heavy metal pollution degree in farmland soil varies, and the main risk factor is cadmium.

Yangliupu Township is located in the northeast of Cili County. The demonstration area covers two villages, Huayue Village and Siqiao Village, with an area of 155.73 hectares and a population of 7602. Planting systems in the demonstration area is rice-rape and rice-vegetables. The heavy metal pollution of farmland was caused due to the sewage irrigation from Zhuangta Reservoir. The source of pollution, Zhuangta Coal Mine, has been shut down, and after testing, the water quality of Zhuangta Reservoir has reached the standard. The enrichment coefficient of common rice varieties used by farmers is low and the pollution risk of rice is low. There are different levels of heavy metal pollution in farmland soil, and the main risk factor is cadmium.

Tongjinpu Town is located in the north-central part of Cili County. The Demonstration Area covers a total of four villages, including Ruanhu Village, Pingshan

Village, Chenping Village and Xingyue Village, with an area of 262.13 hectares and a population of 12,630. Planting systems in the demonstration area is rice-rape and rice-vegetable. The heavy metal pollution of farmland was caused due to the sewage irrigation from Zhuangta Reservoir. The source of pollution, Zhuangta Coal Mine, has been shut down, and after testing, the water quality of Zhuangta Reservoir has reached the standard. The enrichment coefficient of common rice varieties used by farmers is low and the pollution risk of rice is low. There are different levels of heavy metal pollution in farmland soil, and the main risk factor is cadmium.

Gaoqiao Town is located 53 kilometers south of Cili County. The demonstration area covers Xianfeng village, with an area of 90 hectares and a population of 2004. Planting systems in the demonstration area are rice-rape and rice-vegetable. Farmland is affected by nickel-molybdenum mining in the past, which leads to heavy metal pollution in farmland. The enrichment coefficient of common rice varieties used by farmers is high and heavy metal pollution risk in rice is medium. Cadmium pollution is the main type of farmland soil pollution, mainly with low risk or medium risk.

Sanhekou Town is located in the northwest of Cili County. The demonstration area covers Linkuang Village and Guotai Neighborhood Committee, with an area of 97.85 hectares and a population of 4623. The planting systems in the demonstration area are rice-rape and rice-vegetables. Cadmium and arsenic pollution are the main types of farmland soil pollution, cadmium pollution risk is mainly low or none and arsenic pollution risk is high and extremely high. The enrichment coefficient of common rice varieties used by farmers is high, and the heavy content of rice exceeds the standard. The organic matter content of farmland soil is medium to high level.

Survey data shows that in 2017, the average income per household in Cili County Demonstration Area was 21,536 Yuan, wherein the average non-agricultural income was 15,710 Yuan and the average agricultural income was 3,398 Yuan.

### (3) Heavy metal pollution degree in demonstration area

The farmland pollution risk in Cili County mainly comes from soil pollution, Therefore, in addition to targeted measures such as soil conditioning and pollution remediation, risk management measures should also be strengthened to monitor heavy metal pollution in rice and farmland so as to resist the risk of farmland pollution expanding.

Table 2-12 Risk of Heavy Metal Pollution Control in Farmland and Technical Measures to be Taken in Cili County Demonstration Area

Risk type				area(h a.)	Countermeasures
rice cadmium	rice arsenic	soil cadmium	soil arsenic		
medium low	medium low	medium low	medium low	521.74	optimize field water management, conduct soil acidification conditioning, manage and control rice which exceeds the standards.
high	medium low	high	medium low	35.83	control varieties with high accumulation, optimize field water management, apply lime, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards, grow alternative crops if pollution serious.
high	medium low	medium low	medium low	37.15	control varieties with high accumulation, optimize field water management, conduct soil acidification conditioning, apply commercial organic fertilizer, apply soil passivator, remove straws from the field, manage and control rice which exceeds the standards.
medium low	medium low	high	medium low	140.63	crops varieties and cultivation management, optimize field water management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment.
medium low	high	high	medium low	18.17	Crops varieties and cultivation management, optimize field water management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment, grow alternative crops if pollution serious.
medium low	high	medium low	medium low	61.8	crops varieties and cultivation management, apply commercial organic fertilizer, apply the cadmium and arsenic synchronous passivator, control and manage farmland sediment.

## 2.3 Analysis of Farmland Cultivation in Demonstration Area

### 2.3.1 Farmland Conditions in Demonstration Area

The total land area of 12 project counties is 2572252 hectares, of which the land area of the demonstration area is 6152.33 hectares, accounting for 0.24 %. The total area of cultivated lands is 400188 hectares, of which 6152.33 hectares is within the demonstration area, accounting for 1.54 %. The paddy field covers an area of 278371

hectares, of which 6152.33 hectares is within the demonstration area, accounting for 2.21 %. Zhongfang County, Yizhang County and other 8 demonstration areas have 408.46 hectares which plan to grow alternative crops, as shown in Table 2-13.

Table 2-13 Farmland Conditions in Demonstration Area

Project county	Land situation (hectare)						Areas plan to grow alternative crops in the Demonstration Area
	Total land area		Agricultural acreage		Including: paddy field area		
	Project county	Demonstration Area	Project County	Demonstration Area	Project County	Demonstration Area	
Jishou City	107833	447.5	11760	447.5	7400	447.5	
Yongshun County	381065	257	39830	257	29998	257	57.88
Baojing County	175460	370.67	20496	370.67	14506	370.67	
Huayuan County	110870	409	24558	409	9533	409	47.50
Cili County	348000	815.32	38080	815.32	24140	815.32	61.80
Zhongfang County	147900	560	22200	560	13334	560	68.61
Anhua County	495000	525.99	43231	525.99	25590	525.99	40.00
Hengnan County	262111	827.84	65760	827.84	57670	827.84	
Lengshuitan District	121816	635.6	32160	635.6	18680	635.6	11.0
Qiyang County	253800	568.95	51193	568.95	44340	568.95	
Linwu County	137524	256.2	20047	256.2	12600	256.2	65.00
Yizhang County	30873	478.26	30873	478.26	20580	478.26	56.67
Total	2572252	6152.33	400188	6152.33	278371	6152.33	408.46

### 2.3.2 Cost Benefit of Farmland Cultivation in Demonstration Area

The main crop in demonstration area is rice. The planting systems include “rice+idle”, “rice+ratoon rice” and “rice+rape”. The costs and benefits of each region are basically the same. Please refer to Table 2-14 for details. Therefore, there is no need to explain for each demonstration area. The survey data shows that firstly, the net income of rice planting is relatively low on the whole, while the net incomes of flower and other economic crop planting are relatively high. Secondly, the cost of rice planting

is relatively low, and the costs of flower and other economic crop planting are relatively high.

Table 2-14 Cost and Benefit of Farmland Cultivation in Demonstration Area (per Hectare)

Planting system	Cost (unit: Yuan)	Income (unit: Yuan)	Net income (unit: Yuan)
“Rise + fallow”	19050	28125	9075
“Rice + ratoon rice”	20550	31125	10575
“Rice + oilseed rape”	22050	35625	13575
Flower / seedling / fruit seedling, etc.	129000	500000	371000
Replant citrus, pears, pitaya, etc. (five years)	38250	135000	96750

### 2.3.3 Mode of Farmland Management

According to the survey data of sample villages in the project county, farmland management in the demonstration area can basically be divided into four modes:

The first one is the retail business model, under which decisions on production, investment, management and sales of farmland are made by retail households in a decentralized manner, with the yield and income belong to farmers. In such model, land use efficiency is relatively low and main crop is single cropping rice.

The second one is the decentralized management model of farmers’ cooperatives. Under this model, part of the decision-making power of farmland management is unified by cooperatives, but farmland management and yield benefits are all owned by members.

The third mode is the centralized management mode of farmers’ cooperatives. Under this model, all decision-making power of farmland management belongs to cooperatives, and farmers only have the right to share out bonus according to their shares.

The fourth model is the farmers’ cooperative plus company management model. Under this model, the cooperative is mainly responsible for land circulation. After land circulation, a farm lease contract is signed with the agricultural company, while the income of farmers main comes from rent.

### 2.3.4 Brief Summary

According to the survey data of sample villages in the project county, the farmland cultivation in the Demonstration Area has the following characteristics:

First, rice is the main crop. The demonstration area is mainly planted with rice, and some areas are also planted with rape, corn and other crops.

Secondly, retail cultivation dominates the area. Although in Qiyang, Hengnan and other places within the demonstration area are dominated by large households or rural

cooperatives, but other demonstration areas are dominated by retail cultivation.

Thirdly, the utilization rate of farmland is low. The planting system in the demonstration area dominated by retail farmers is mainly for single cropping rice, while the utilization rate of farmland in areas with good land circulation is higher. Some areas have double cropping rice planting system, while others adopt rice - rape or rice + vegetable planting system.

Fourthly, light cadmium pollution is the main type of pollution in farmland. All farmland is polluted to varied degrees, except Yizhang, Linwu and other places. The pollution in other places is mainly light and main type of pollution is cadmium pollution in rice.

Fifthly, farmland pollution mainly comes from mining and production management and is affected by the indiscriminate mining of mineral resources and the direct discharge of waste water or waste gas from some small local workshops or factories in past. In addition, the application of chemical fertilizers in production management has also posed a certain impact.

### **3. Analysis of the stakeholder groups and requirements of the project**

#### **3.1 The definition of stakeholder groups of the project**

According to the World Bank aid targets, all directly or indirectly benefited or damaged individuals and organizations in the affected area of the project are both stakeholder groups of the project. According to the feasibility study report, the farmland pollution in the demonstration area is controlled through agro technology improvement, land restoration, establishing monitoring stations, supporting rural cooperative organizations and other measures. The main stakeholders involved include five categories:

(1) Farmers in the demonstration areas. Farmers in the demonstration areas are the main groups directly benefited or damaged of the project, the farmland heavy metal pollution control will have an impact on the land use, agro technology measures and so on.

(2) Farmer cooperatives and related enterprises. Farmer cooperatives in the demonstration area are also the main groups directly benefited or damaged, the farmland heavy metal pollution control will have different degrees of impact on the management and farming modes.

(3) Village committees of the project villages. The village committees of the project villages are the main groups of the farmland pollution control.

(4) Relevant government departments. The farmland pollution control involves agriculture, environmental protection, the national religious bureau and other relevant departments.

(5) Vulnerable group. Mainly refer to ethnic minorities, women and poor households.

This part focuses on analyzing the appeals and expectations of the farmers, farmer cooperatives, village committees in the demonstration area and relevant government departments for the project. The analysis of vulnerable groups will be divided into the ethnic minority analysis, gender analysis and poverty analysis in the following chapters.

#### **3.2 Analysis of stakeholder groups' cognition**

##### **3.2.1 Awareness and cognition situations of stakeholders**

**First, a considerable part of the residents have been aware of the farmland suffering the heavy metal pollution.** Although the residents in the demonstration area can not accurately know about the specific values of heavy metal pollution, a

considerable part of them have realized the farmland suffers the heavy metal pollution. The survey data shows that 35.5% of the residents believe that the farmland heavy metal pollution in the demonstration area is very serious; 38.3% of the residents believe the pollution is more serious; 18.0% believe the pollution is general; 6.1% believe the pollution is not very serious; only 2.0% think there is no pollution; as shown in Table 3-1.

**Table 3-1 Pollution Conditions of Farmland Heavy Metals (such as Cadmium, Nickel, Arsenic, etc.) in the Demonstration Areas**

		Frequency	Percentage	Effective percentage	Accumulated percentage
<b>Effective</b>	<b>Very serious</b>	526	34.2	35.5	35.5
	<b>Relatively serious</b>	567	36.8	38.3	73.8
	<b>General</b>	267	17.3	18.0	91.8
	<b>Not very serious</b>	91	5.9	6.1	98.0
	<b>No pollution</b>	30	1.9	2.0	100.0
	<b>Total</b>	1481	96.2	100.0	
<b>Lack</b>		59	3.8		
<b>Total</b>		1540	100.0		

Severely polluted demonstration areas are featured by a stronger awareness of residents. Farmlands in Zhongfang County, Huayuan County, Yizhang County, Cili County, Yongshun County, Linwu County and Anhua County are severely polluted, and average assessment value of residents on pollution is above 4 points (very severe=5 points; relatively severe=4 points; general=3 points; not severe=2 points; no pollution=1 point; the higher the score is, the more severe the pollution is); please refer to Table 3-2.

**Table 3-2 Assessment of residents in project counties on heavy metal pollution (cadmium, nickel and arsenic, etc.) in farmlands of Demonstration Areas**

Project county	Effective sample size	Minimum value	Maximum value	Average value	Standard deviation
Zhongfang County	120	2	5	4.08	0.60
Jishou City	120	1	5	3.15	1.22
Huayuan County	114	2	5	4.45	0.58
Baojing County	139	2	5	3.96	0.67
Yongshun County	160	2	5	4.18	0.94
Cili County	162	3	5	4.69	0.48
Anhua County	120	2	5	4.74	0.64
Qiyang County	106	1	5	3.77	0.92
Lengshuitan District	117	1	5	3.47	1.06
Linwu County	125	2	5	4.03	1.03
Yizhang County	125	2	5	4.13	0.91
Hengnan County	128	1	5	3.81	1.10

A fair proportion of residents have been aware of heavy metal pollution in farmlands for a long time. As shown in the survey, 41.9% residents believe that pollution has lasted for more than 10 years. In the process of field survey, heavy metal pollution in farmlands in some areas has experienced for a relatively long time, especially in the region where local mines were extensively exploited by utilizing small workshops in the history.

**Table 3-3 Duration of the Farmland Heavy Metal Pollution Conditions in the Demonstration Area**

		Frequency	Percentage	Effective percentage	Accumulated percentage
<b>Effective</b>	One to two years	63	4.1	4.3	4.3
	Three to five years	177	11.5	12.1	16.4
	Five to ten years	281	18.3	19.2	35.6
	Over ten years	615	39.9	41.9	77.5
	Unclear	330	21.4	22.5	100.0
	Total	1467	95.3	100.0	
<b>Lack</b>		73	4.7		
Total		1540	100.0		

Second, the residents have a certain understanding of “the farmland pollution control project in Hunan province”, and they know about it mainly through the government’s propaganda. The survey data shows that the residents have a certain understanding of this project: 38.5% of the residents “know a little” about this project, 20.8% of the residents “know more”, 4.4% of the residents “know a lot”. There are also 24.9% of the residents “not knowing very much” and 11.3% “know nothing”, seeing Table 3-4. They know about it mainly through the government’s propaganda, the survey shows that 62% of the residents know about it through the government’s propaganda, 12.9% think they know about it through the project company, 7% through the press, 6.3% through the folk means, and 11.8% through other ways. The survey of residents’ awareness is made by questionnaires before the villagers’ congress, forums and interviews, mainly investigating the publicity of government departments and project units. After the social assessment finished the relevant survey participated in, the residents know basically about this project.

**Table 3-4 Do you know about the “Agricultural Product Quality Improvement**

### Project”?

		Frequency	Percentage	Effective percentage	Accumulated percentage
Effective	Know nothing	167	10.9	11.3	11.3
	Not know very much	369	24.0	24.9	36.2
	Know a little	571	37.1	38.5	74.8
	Know more	308	20.0	20.8	95.6
	Know a lot	65	4.2	4.4	100.0
	Total	1480	96.1	100.0	
Lack		60	3.9		
Total		1540	100.0		

There are some differences in the understanding of the project among different groups. The research group assigns 1 point, 2 points, 3 points, 4 points and 5 points respectively to “know nothing”, “not know very much”, “know a little”, “know more”, “know a lot”. According to survey data, average understanding level of men is 2.83, which is slightly higher than the average understanding level of the project of women, 2.78; the understanding level of poverty-stricken households is higher than that of non poverty-stricken households, as shown in Table 3-5. This shows that, fruitful results have been achieved in the public participation of the social assessment and other units in project preparation stage, such as effective improvement of awareness of poverty-stricken households, in terms of literal expression and involvement empowerment. However, special demands of women should be more satisfied.

Table 3-5 Group difference analysis on understanding of “Safety and Quality Improvement Project for Producing Area of Agricultural Product”

Variable		Minimum value	Maximum value	Average value	Standard deviation
Sex	Male	1	5	2.83	1.04
	Female	1	5	2.78	0.96
Poverty-stricken household or not	Yes	1	5	2.92	1.10
	No	1	5	2.81	0.97

**Third, a fair proportion of residents have been aware of the adverse effect caused by heavy metal pollution.** According to survey data: heavy metal pollution in farmlands has caused significant adverse effect in terms of the health, income and food security of local residents, etc. 82.78% respondents see significant impact of farmland pollution on the health of local people; 73.36% respondents see significant impact of farmland pollution on the output of local agricultural products; 82.92% respondents see

significant impact of farmland pollution on the quality of local agricultural products; 80.63% respondents see significant impact of farmland pollution on the selling price of local agricultural products. Please refer to Table 3-6.

**Table 3-6 Impact of heavy metal pollution in farmlands on local production**

	Very great	Relatively great	General	Relatively small	No impact	Total
Impact of farmland pollution on the health of local residents	52.6%	30.2%	12.8%	3.5%	1.0%	100.0%
Impact of farmland pollution on the output of local agricultural products	44.7%	28.7%	19.3%	4.9%	2.4%	100.0%
Impact of farmland pollution on the quality of local agricultural products	49.1%	33.9%	13.2%	2.4%	1.5%	100.0%
Impact of farmland pollution on the selling price of local agricultural products	48.7%	31.9%	14.8%	3.2%	1.3%	100.0%

Adverse effect on the production of local residents in areas with severe heavy metal pollution in farmlands is more significant. The research group assigns 5 points, 4 points, 3 points, 2 points and 1 point respectively to “very great”, “relatively great”, “general”, “relatively small” and “no impact”. According to survey data: average assessment value of residents in heavily polluted areas on the impact of heavy metal pollution in farmlands on the health of local residents, output, quality and selling price of local agricultural products is higher than that in lightly polluted areas. Please refer to Table 3-7. Average assessment value on the impact of heavy metal pollution in farmlands on the health of local residents is the highest one. This suggests that farmland pollution has caused relatively significant adverse effect on the income and health of local rural residents, in particular residents in heavily polluted areas.

**Table 3-7 Assessment on the impact of heavy metal pollution in farmlands on local production in different areas**

		Minimum value	Maximum value	Average value	Standard deviation
a. Impact of farmland pollution on the health of local people	Heavily polluted region	1	5	4.38	0.77
	Lightly polluted region	1	5	4.20	1.02
b. Impact of farmland pollution on the output of local agricultural products	Heavily polluted region	1	5	4.20	0.90
	Lightly polluted region	1	5	3.94	1.15
c. Impact of farmland pollution on the quality of local agricultural products	Heavily polluted region	1	5	4.37	0.78
	Lightly polluted region	1	5	4.14	0.99
d. Impact of farmland	Heavily polluted region	1	5	4.33	0.81

pollution on the selling price of local agricultural products	Lightly polluted region	1	5	4.11	1.02
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### 3.2.2 Analysis of stakeholders' participation willingness

“Agricultural Product Quality Improvement Project in Hunan Province” which is implemented by the World Bank loan involves the farming technology, farmland use and the construction of public facilities. According to the local survey, the willingness of the residents participating in the survey is very high, mainly showing in:

First, over ninety percent residents in demonstration areas are willing to change crop varieties and improve cultivation mode according to the project. Residents in demonstration areas mainly plant rice. In order to effectively control farmland pollution, however, 91.67% residents are willing to (including very willing and relatively willing) change farmland planting pattern according to governance demand of the project. 95.42% residents are willing to adjust planted rice varieties according to governance demand of the project. 93.40% residents are willing to spray lime and adopt leaf inhibitor and control agent (Si) according to governance demand of the project. 96.68% residents are willing to irrigate with clean water in farmland according to governance demand of the project. 95.36% residents are willing to apply organic fertilizer or plant green manure and not to apply chemical fertilizer any more according to governance demand of the project. Please refer to Table 3-8 for details. Second, after appropriate subsidies provided by government, about ninety percent residents in demonstration areas are willing to conduct land transfer. According to survey, 92.41% residents are willing to conduct land transfer and contiguous development in a systematic way. In the process of land transfer, residents are willing to adopt Shares + Cooperation or renting. Third, more than eighty percent residents support the construction of public facilities in Demonstration Areas. According to survey, 94.69% residents are willing to make appropriate transformation and upgrading to the irrigation infrastructure of local farmland; 95.66 % residents are willing to build new heavy metal contaminated straw treatment facilities in heavy metal contaminated area of farmland. Fourth, more than ninety residents are willing to participate in project construction and relevant technical training in demonstration areas. According to survey, 93.0% residents are willing to participate in project construction and 93.9% in agro-technical training in Demonstration Areas. Fifth, in heavily and moderately polluted areas, 93.25% residents

are willing to replant other crops according to demand of the project.

From the survey data, we can draw the following conclusions: (1) The local farmers give a higher recognition degree to the ways of improving the agricultural product quality; (2) the local farmers are more willing to the large-scale construction through the land transfer; (3) local farmers have the higher willingness of participating in relevant technical training.

**Table 3-8 Participation Willingness of Residents**

	Very willing	Relatively willing	General	A little unwilling	Very unwilling	Total
As required by the project, adjust farmland planting pattern	70.70	20.97	6.28	1.82	0.23	100.00
As required by the project, adjust planted rice varieties	70.38	25.04	3.99	0.44	0.15	100.00
As required by the project, spray lime and adopt leaf inhibitor and control agent (Si) in farmland	68.69	24.70	5.49	0.74	0.37	100.00
As required by the project, irrigate with clean water in farmland	77.75	18.94	3.10	0.07	0.15	100.00
As required by the project, apply organic fertilizer or plant green manure and not apply chemical fertilizer any more	72.26	23.11	3.53	0.74	0.37	100.00
As required by the project, make appropriate transformation and upgrading to the irrigation infrastructure of local farmland	77.32	19.22	3.09	0.15	0.22	100.00
As required by the project, build new heavy metal contaminated straw treatment facilities in heavy metal contaminated area of farmland	71.17	23.53	4.50	0.52	0.29	100.00
As required by the project, build new or reconstruct tractor roads and other measures	78.94	16.72	3.46	0.74	0.15	100.00
As required by the project, conduct land transfer and contiguous development in a systematic way	68.06	24.36	5.92	1.14	0.53	100.00
As required by the project, replant other crops	65.48	27.77	5.44	0.94	0.38	100.00

### 3.3 Analysis of the demands of stakeholder groups

The demands of main stakeholder groups in the demonstration area include:

**I. Control the farmland heavy metal pollution and improve the living standards of residents.** Through the visit and survey of the project villages, we know that the farmland heavy metal pollution has caused different degrees of influence on the farmers' income, the quality and quantity of agricultural products as well as the farmer's health. The farmland heavy metal pollution has become a key factor that restricts the income of farmers and the upgrading of agricultural industry. Therefore, the major stakeholder groups of the project village require urgently controlling the farmland heavy metal pollution, to improve the levels of the residents' life and income

**II. Improve agricultural infrastructure and develop the production.** Through the visit and survey of the project villages, the social assessment team knows that there exist generally the problems of irrigation canals which have been in disrepair for long years, and a lack of pollution monitoring facilities of farmland and agricultural products

in the project villages. The lack of additional measures needed by agricultural development lead to the low level of industrial development. Therefore, the main stakeholder groups in the project village think it is urgently required to improve the agricultural infrastructure and develop agricultural production.

**III. Establish the farmers' cooperatives and improve the ability of resisting the market risk and self-development.** Through the visit and survey of the project villages, the social assessment team knows there exist generally the conditions that the cooperatives' development degree is low and their operation is poor, and some of the project villages have not yet established the cooperatives by far. When the farmers develop related industries, they lack funds, technology and the guide of related organizations, the industrial development is disperse and lack the scale, the yield of products is low, the market information is short, and the competitiveness of products is low in the demonstration area. The farmers believe generally that the cooperatives play a special role in their industrial development, and they hope, through the development of cooperatives, to improve the degree of organization and develop regional advantages, leading them to promote their development and prosperity.

**IV. Create the opportunities of employment and entrepreneurship in the places of local and close to farmers' homes, to promote the return of migrant workers.** Through the visit and survey of the project villages, the social assessment team knows that there all exist a lot of migrant workers in the project villages. The main reasons why the farmers go out for work are that the traditional industry is difficult to support their families, which causes there are mainly the elderly and children left in the villages. Therefore, the elderly and children left in the villages as well as migrant workers hope urgently that the project of farmland heavy metal pollution control can promote the scales of the local agricultural development, to create the opportunities of employment and entrepreneurship in the places of local and close to the farmers' homes for migrant workers.

Different stakeholders have different demands for the project, analyzing specifically various types of main stakeholders' requirements is conducive to identifying the major social issues of the project, to avoid the potential social risks of the project and promote the smooth implementation of the project. The social assessment team implements the project information publicity, propaganda, public participation and other activities for the stakeholder groups in the area affected by the

project, and analyzes the requirements of the main stakeholders, mainly includes five aspects as follows:

(1) Farmers in the demonstration areas

The farmers in the demonstration area are the groups affected directly by the project and also the main groups benefiting from the project. The attitudes and behaviors of the farmers in the demonstration area have a direct effect on the progress of the project, so the satisfaction condition of the needs of the farmers in the demonstration area is one of the criteria to achieve evaluating the project objectives.

The farmers in the demonstration area are eager to develop the local agricultural production and control the farmland heavy metal pollution. Because the agricultural development in the project villages is restricted by information, technology and fund, they hope, through establishing the cooperatives, to make the agricultural development develop in the direction of the ecological agriculture. Through the visit and survey of the farmers in the project villages, we know that the requirements of the farmers in the demonstration area include: (1) Improve the agricultural production infrastructure, such as repairing or constructing new irrigation channels, tractor road and other facilities; (2) Improve the local ecological environment, improve the quality of agricultural products and develop the ecological agriculture; (3) Participate in farmer cooperatives and reduce the risk and cost of production; (4) Adjust the industrial structures, increase appropriately the proportion of economic crops and improve the income level; (5) Reduce the cost increase risk that the farmland heavy metal control process brings to the farmers.

(2) Farmer cooperatives in the demonstration area

The existing farmer cooperative organization in the demonstration area can be divided into three types of the rice farmer cooperative organization, the fruit/vegetable, etc. cooperative organization, and the agricultural machinery cooperative organization. The social assessment group interviews with the persons in charge of three types of farmers' cooperative organizations of the sample villages.

The rice farmers' professional cooperatives in the demonstration areas hope to reduce the risk of heavy metal exceeding criterion in the products, enhance the value of agricultural products and promote industrial upgrading through the farmland heavy metal pollution control. Through the visit and survey of the farmers in the project villages, we know that the requirements of the rice farmers' professional cooperative in

the demonstration area include: (1) Obtain financial support, reduce financing costs and ease the capital pressure of developing the ecological agriculture. (2) Enhance the management level of the cooperative organizations and promote the large-scale development of local agriculture. (3) Establish heavy metal monitoring stations of soil and agricultural products, improve the quality management level of agricultural products, and promote the local agriculture to develop in the direction of ecological agriculture. (4) Reduce the risks of agricultural product sales and cost increase.

The fruit/vegetable, etc. farmers' cooperative organization in the demonstration areas hopes, through the implementation of the project, to provide an opportunity for their creating agricultural product brands. Through the interviews and survey of the farmers in the project villages, we know that the requirements of the rice farmers' professional cooperative in the demonstration area include: (1) Expand the planting scale and create brand products; (2) Establish soil monitoring stations and improve the management level of product quality; (3) Reduce the label effects that the heavy metal pollution control may bring the agricultural products.

#### (3) Project village committee

The project village committee is the grassroots and direct management, coordination and executive institution of the project; the organization and management ability of project village committee directly affect the project execution. The project village committee hopes to execute governance to the heavy metal pollution of farmland, improve the ecological environment and thus upgrade the residents' production and living level. According to the interview with and investigation of project village residents, we can draw the following conclusion: The rural cooperative of paddy in the demonstration area has specific demands: (1) Establish and improve the professional rural cooperative and promote upgrading of local industries; (2) Enhance the environmental consciousness of local farmers and training of planting technologies and thus upgrade the environmental protection consciousness and technical level; (3) Formulate reasonable compensation mechanism and thus reduce the income risks of rural residents.

#### (4) Agricultural bureau

Due to numerous project types and large quantity, the project is involved in numerous institutions and staffs; the project suffers from arduous organization, management and coordination tasks. In order to execute the project smoothly, the project county has established a project leadership team; the agricultural bureau at

county level has established a project execution, organization and management institution composed of numerous departments—it is responsible for executing the project. Besides, it has formulated specific management systems and measures, fulfilled the preliminary preparation in high quality and laid a solid organization and system assurance for formal execution of the project.

The agricultural bureau at county level serves as the main responsible body for the normal operation of whole project stage; it not only fulfills the contract rights and obligations in the identity of owner, but also coordinates and settles the economic, technical, financial and environmental matters related to the project. In the project execution and subsequent supervision and management, the agricultural bureau at county level is the closest stakeholder. Therefore, the agricultural bureau at county level hopes: (1) Cooperate with the stakeholders and fulfill the project in a smooth and successful manner; (2) Assist the demonstration area farmers to execute governance to the heavy metal pollution in the farmland, develop the agricultural production and thus upgrade the quality of agricultural products; (3) Execute the project of World Bank and explore into the governance technologies and management model of local farmland pollution.

#### (5) Other governmental departments

Other governmental departments include the environmental protection bureau, animal husbandry bureau, poverty relief office, women's association, civil affairs bureau, religious bureau, human defense and social insurance bureau, national land bureau and demolition office as well as town departments and offices of the demonstration area. On one hand, it plays an instructive, supportive and service role to the development of rural cooperative and industry in the demonstration area; on the other hand, the development quality of rural cooperative and industry in the demonstration area directly affects the political performance of governmental and other related departments and elevation in the farmers' income and adjustment to agricultural structure and can upgrade the local environmental governance and surveillance level; Therefore, the government and related departments hope: (1) Improve the soil quality and local ecology and upgrade the local environmental governance and surveillance level; (2) Promote the economic development of whole project county and demonstration area and promote the ecological development path of the agriculture; (3) Mobilize the social and economic development and realize political stability and upgrade the governmental image; (4) Improve the production and living conditions of

poverty-stricken people, level up the living standard of poverty-stricken population, maintain the social stability and promote harmonious development.

## 4. Poverty Analysis in Demonstration Areas

### 4.1 Analysis of poverty situation in the demonstration area

#### 4.1.1 Analysis of general poverty situation in the demonstration area

On the list of national counties and cities in poverty alleviation issued by the Leading Group Office of Poverty Alleviation and Development of the State Council in 2017, 20 counties and cities in Hunan Province were included in national poverty-stricken counties. Among 12 counties and cities in demonstration areas, 4 counties and cities are classified as national poverty-stricken counties. Among the list of 51 poverty-stricken counties and cities published by Poverty Alleviation and Development Office of Hunan Province in 2017, 8 counties and cities are located in demonstration areas. According to survey data, first, poverty stricken population in demonstration areas is relatively large; there are 5,030 poverty-stricken households with a poverty stricken population of 25,251 in demonstration areas where farmland governance is planned to be conducted in 12 counties and cities, average poverty rate is 12.12% as shown in Table 4-1; second, farmland pollution has affected poverty alleviation of poverty-stricken households to a certain extent. According to survey data: In project counties with a higher poverty rate, including Huayuan County (40.48%), Baojing County (33.28%), Cili County (28.18%), Yongshun County (12.68%), residents have a higher awareness of pollution level. To this end, farmland pollution has affected poverty alleviation of poverty-stricken households to a certain extent.

Table 4-1 Overall poverty status of 12 counties and cities

	National poverty-stricken counties	Provincial poverty-stricken counties	Poverty-stricken households in Demonstration Area (unit: household)	Poverty stricken population in Demonstration Area (unit: person)	Poverty rate in Demonstration Area (poverty stricken population/population in Demonstration Area)	Self awareness of pollution level*
Jishou City		√	126	691	5.08%	3.15
Yongshun County	√	√	219	1243	12.68%	4.18
Baojing County	√	√	1535	8254	33.28%	3.96
Huayuan County	√	√	837	4857	40.48%	4.45
Cili County		√	1280	5946	28.18%	4.69
Zhongfan County		√	158	760	2.67%	4.08
Anhua County	√	√	149	756	2.85%	4.74

Hengnan County			229	770	3.06%	3.81
Lengshuitan District			43	187	1.28%	3.47
Linwu County			66	264	1.61%	4.03
Qiyang County			234	1019	4.45%	3.77
Yizhang County		√	154	504	2.02%	4.13
Total	4	8	5030	25251	10.51%	

\*Values of self awareness of pollution level: very severe = 5 points; relatively severe = 4 points; general = 3 points; not severe = 2 points; no pollution = 1 point; the higher the score is, the more severe the pollution is.

#### 4.1.2 Living model of poverty-stricken households

In the demonstration area, the poverty-stricken households are featured by self-sufficient agricultural economy, which is mainly demonstrated in the following aspects:

**I. It adopts traditional agricultural industry as the main income source.** The living model of poverty-stricken households is rather single. Compared with ordinary farmers, the poverty-stricken households largely depend on the traditional planting industry. According to the interview data, we can conclude: The income source of farmers is diversified, including income of planting and animal husbandry industries, working income or remuneration, business income, investment, rent and governmental subsidy. According to the questionnaire result, 68.3% of poverty-stricken households mainly depend on the planting and animal husbandry industries. The income of poverty-stricken households from farmland accounts for 66.0% of the family income in average. It reveals that income of minority groups and poverty-stricken households is greatly affected by the agriculture.

Poverty-stricken households with main income source of working as migrant workers account for a certain proportion but not a large proportion in the general income of poverty-stricken households.

**II. It focuses on the traditional agriculture and agricultural business model.** According to the interview and symposium, we can conclude: On one hand, the planting structure of poverty-stricken households focuses on the grain. The poverty-stricken households still depend on the traditional agriculture; the planting industry focusing on grain is the fundamental industry for poverty-stricken households to earn a basic living; very few economic products are planted. According to survey data: 82.01% poverty-stricken households plant rice in farmlands; 10.73% poverty-stricken households plant corn in farmlands and only 7.13% poverty-stricken households plant tea and other

economic crops in farmlands, as shown in Table 4-2. On the other hand, the farmland business of poverty-stricken households focuses on the traditional production model. The poverty-stricken households seldom adopt modernized machinery technology; the rural cooperative does not participate in large range.

Table 4-2 Crops planted by poverty-stricken households

Crops planted	Times (unit: household)	Percentage
Rice	4125	82.01%
Corn	540	10.73%
Oilseed rape	6	0.12%
Tea and other economic crops	359	7.13%
Total	5030	100.00%

#### 4.1.3 Analysis of causes of poverty

According to the interview and symposium with poverty-stricken households, we can conclude: There are three types of causes of the poverty of poverty-stricken households in the demonstration area:

I. The agricultural products suffer from poor quality. Quite a number of poverty-stricken households reflect that agricultural products suffer from poor quality for two major reasons: 1. The agricultural technologies are inadequate and poverty-stricken households input a little in the technological studying. According to survey data: 23.11% poverty-stricken households fall into poverty due to lack of technology; poverty-stricken households in minority areas have stronger demand for technologies, as shown in Table 4-3. 2, Land pollution. In particular the quality and public praise of moderately and heavily polluted agricultural product will affect the price of agricultural products and thus bring down the income of poverty-stricken households.

II. The agricultural industrialization is not very high. The poverty-stricken households are restricted to the information, technology and fund and most of them focus on the traditional agricultural planting and business; they fail to participate in the rural cooperative or plant economic products. According to survey: 38.42% poverty-stricken households fall into poverty due to lack of capital, and 6.79% poverty-stricken households fall into poverty due to lack of labor. Shortage of capital and labor has also affected participation of poverty-stricken households in rural cooperatives. Due to non-participation in rural cooperatives, cost of planting per hectare of poverty-stricken households is generally 30% higher than that of rural cooperatives. Minority areas still implement small-scale peasant economy, dominated by scattered individual planters;

therefore, capital demand is lower than that of other areas. In other areas, in particular the areas where there are many large-scale planters and lands are relatively concentrated, local poverty-stricken households are eagerly seeking to improve the added value of local agricultural products through World Bank project; to this end, capital demand of local poverty-stricken households is higher than that of minority areas.

III. The household suffers from high medical expenditure. The pollution against farmland has direct and indirect impact on the income of poverty-stricken households. The direct impact includes the farmland pollution impact on production volume and price of agricultural products; the indirect impact affects the farmer's health and increases the medical expenditure. According to survey data: 63.77% poverty-stricken households fall into poverty due to diseases and 14.85% poverty-stricken households fall into poverty due to disability. Long-term consumption of food with excessive heavy metal content has inevitably increased disease risks of poverty-stricken households. In heavily polluted areas, local residents said that land pollution brings about a higher risk to health. In a demonstration area, local villagers said that basically each resident who has lived in the village for a long time will suffer from lithiasis. In addition, among children born in the village in the recent years, children with mental disabilities are in extremely high numbers. Proportion of poverty caused by diseases in heavy pollution areas is higher than that of other demonstration areas. Previous survey data show that areas such as Huayuan County, Baojing County, Cili County and Yongshun County, are also areas with a high heavy metal pollution level. This demonstrates once again that heavy metal pollution increases the probability of residents to suffer from disease and further increases the probability of residents to fall into poverty.

Table 4-3 Analysis of causes for poverty of poverty-stricken households

Main cause for poverty	Times (unit: household)	Valid percentage	Different areas	
			Heavy Pollution Demonstration Areas	Medium and Low pollution Demonstration Areas
Lacking of technology	726	23.11%	26.22%	20.00%

<b>Lacking of labor</b>	213	6.79%	7.69%	5.89%
<b>Lacking of capital</b>	1206	38.42%	34.97%	41.87%
<b>Poverty caused by diseases</b>	2002	63.77%	78.67%	48.87%
<b>Poverty caused by disability</b>	466	14.85%	12.24%	17.46%
<b>Poverty caused by education</b>	416	13.26%	8.92%	17.60%
<b>Total</b>	5030	100%	26.22%	20.00%

## 4.2 Analysis of knowledge and demand of poverty-stricken group in the demonstration area

### 4.2.1 Analysis of cognition

The poverty-stricken group has rather well understanding of and support to the project, mainly in the following aspects:

**I. Quite a number of poverty-stricken households have a certain understanding of the “Agricultural Product Quality Improvement Project”.** The investigation data reveals: “32.4% of poverty-stricken households have a little knowledge of the project; 22.8% of poverty-stricken households have rather good knowledge of the project; 7.9% of poverty-stricken households have very good knowledge of the project”. Please refer to Table 4-4 in detail. They mainly know about the project through governmental propaganda (54.5%) and project unit (21.8%).

**Table 4-4 Knowledge of “Agricultural Product Quality Improvement Project” by Poverty-stricken Households**

		Frequency	Percentage	Effectiveness percentage	Accumulative percentage
<b>Effective</b>	Not know at all	40	9.4	9.6	9.6
	Not know very well	114	26.9	27.3	36.9
	Know a little	135	31.8	32.4	69.3
	Rather know	95	22.4	22.8	92.1
	Know very well	33	7.8	7.9	100
	Total	417	98.3	100	
<b>Lack</b>		7	1.7		
<b>Total</b>		424	100		

Certain group differences are also reflected in the understanding of poverty-stricken households of “Safety and Quality Improvement Project for Producing Area of Agricultural Products”. In poverty stricken population, understanding level of the project of women (average value 3.02) is higher than that of men (average value 2.88); understanding level of the project of poverty-stricken households in heavily polluted areas (average value 2.83) is lower than that of poverty-stricken households in lightly

polluted areas. Please refer to Table 4-5.

According to survey data: poverty-stricken households have had a certain understanding of the project; but propaganda work aiming at the men in poverty stricken population needs to be further deepened.

**Table 4-5 Understanding level of different groups of “Safety and Quality Improvement Project for Producing Area of Agricultural Products”**

Variable		Minimum value	Maximum value	Average value	Standard deviation
<b>Sex</b>	Male	1	5	2.88	1.113
	Female	1	5	3.02	1.019
<b>Pollution level</b>	Severe	1	5	2.83	1.103
	Light	1	5	3.05	1.073

**II. Most of the poverty-stricken households support the project.** According to the investigation result, 84.6% of poverty-stricken households maintain that “Agricultural Product Quality Improvement Project” is beneficial to the local social and economic development. Therefore, the poverty-stricken households support the project unanimously. The investigation reveals: 79.0% of poverty-stricken household support the project very much; 19.8% of poverty-stricken households support the project quite well; and 1.2% of poverty-stricken households have an ordinary attitude. Please refer to Table 4-6 in details.

**Table 4-6 Attitudes of Poverty-stricken Households to the local “Agricultural Product Quality Improvement Project”**

		Frequency	Percentage	Valid percentage	Cumulative percentage
<b>Effective</b>	Very supportive	327	77.1	79.0	79.0
	Relatively supportive	82	19.3	19.8	98.8
	General	5	1.2	1.2	100.0
	Not too supportive	None	None	None	
	Strongly opposed	None	None	None	
	Total	414	97.6	100	
<b>Total</b>	System	10	2.4		
		424	100		

#### 4.2.2 Analysis of needs

The poverty-stricken households in the demonstration area refer to the group of key concern in the World Bank project. They mainly have the following needs:

**1. Enhancing the quality of agricultural products.** According to the visit and investigation of project village, the social assessment team has come to know about that poverty-stricken households in the demonstration area hope to execute governance to

serious farmland pollution by heavy metal, to improve the quality of local agricultural products and to reduce the health risks.

**2. Strengthening the training of planting technologies.** The poverty-stricken households in the demonstration area lack agricultural technologies. According to the visit and investigation of project village, the social assessment team has come to know about that poverty-stricken households hope to enhance the production skills, optimize farming technologies and adjust the industrial structure.

**3. Increasing the employment opportunities for poverty-stricken households.** The poverty-stricken households in the demonstration area can not work in non-local areas due to patients in their families or disease. According to the visit and investigation of project village, the social assessment team has come to know about that poverty-stricken households hope to have more employment opportunities through project execution and increase the income.

**4. Enhancing the development capabilities.** The poverty-stricken households in the demonstration area suffer from poor risk resistance capability and inadequate assets. According to the visit and investigation of project village, the social assessment team has come to know about that poverty-stricken households hope to (1) participate in the rural cooperative and enhance the risk resistance capability; (2) obtain the support of preferential loans; (3) participate in the decision making of project.

**5. Providing cost subsidy.** The agricultural industry of demonstration area is the main income source of poverty-stricken households. They are worried that project may increase the planting cost and reduce income for a short period of time. According to the visit and investigation of project village, the social assessment team has come to know about that poverty-stricken households hope to formulate reasonable cost compensation plan and thus avoid reduction of income.

## **5. Analysis of Social Gender in the Demonstration Area**

### **5.1 Analysis of women development status quo in the demonstration area**

#### **5.1.1 General development status of women in the project county**

General situation of women in Chenzhou City (Yizhang County and Linwu County). In 2016, illiteracy rate among young and middle-aged women was 0.17%; among prime working-age population, average years of education of women is 10.74 years. In 2016, number of women employed throughout the society in Chenzhou City was 1.5167 million, accounting for 45% of total employment, increasing by 1.7% on a year-on-year basis; number of women employed in urban units is 359,200, accounting for 37.3% of total employment in urban units, which is 2.7% higher than the provincial proportion, 34.6%.

General situation of women in Yongzhou City (Qiyang County and Lengshuitan District). By the end of 2015, number of employed persons in Yongzhou City was 3.47 million, including 1.56 million women, accounting for 44.9% of employed persons in the city, increasing by 1.2% compared with 2010. Over the last five years, registered urban unemployment rate in Yongzhou City has been controlled at about 4%. Transfer of rural female labor force increased from 595,000 to 604,000. A total of 1.018 billion Yuan of small start-up guarantee loans for women was issued, benefiting 15,900 women.

General situation of women in Hengyang City (Hengnan County). In 2016, number of employed persons throughout the society in Hengyang City was 4.7902 million, including 2.1481 million women, accounting for 44.8%; number of employed persons in urban units was 535,000, including 173,000, accounting for 32.3%. In 2016, number of persons granted with basic living allowance for city residents in the city was 81,800, including 29,700 women, decreasing by 10,700 persons (26.5%) compared to the previous year; number of persons granted with basic living allowance for rural residents was 154,800, including 50,800 women, decreasing by 36,200 persons (41.61%) compared to the previous year. Illiteracy rate among young and middle-aged women was 0.27%, decreasing by 0.11% on a year-on-year basis.

General situation of women in Huaihua City (Zhongfang County). In 2015, number of employed persons in the city was 3.065 million, including 1.203 million women, accounting for 39.2% of the total number of employed persons, increasing by

68,000 persons and 27,000 persons respectively compared to 2011; 997,000 employed persons in urban units, including 396,000 women, increasing by 128,000 persons and 70,000 persons respectively compared to 2011. Women account for 39.7% of the total number of employed persons in urban units. Through years of efforts to eliminate illiteracy, literacy rate among young and middle-aged women in Huaihua City reached 99.9%, and literacy rate of adult women reached 91.6%.

General situation of women in Xiangxi Tujia and Miao Autonomous Prefecture (Jishou City, Huayuan County, Baojing County and Yongshun County). According to *Main Data Bulletin of the Sixth National Population Census of Xiangxi Tujia and Miao Autonomous Prefecture*, among the permanent resident population in the Prefecture, there were 1,307,078 men, accounting for 51.3% and 1,240,755 women, accounting for 48.7%. Gross rate of sex (take women as 100, ratio of men to women) decreased from 108.23 in the fifth national population census in 2000 to 105.32.

General situation of women in Zhangjiajie (Cili County). in 2016, number of employed persons in the city was 960,000, including 465,000 women, increasing by 3,000 persons compared to the previous year; there were 112,000 employed persons in urban units, including 51,000 women, increasing by 2,000 persons compared to the previous year. Number of urban workers participating in basic medical insurance in the city was 133,000, including 55,000 women, accounting for 41.4%.

General situation of women in Yiyang City (Anhua). In 2015, Yiyang City had a permanent resident population of 4.4102 million, including 2.1409 million women, accounting for 48.54%. Among prime working age population, average years of education of women was 11 years, increasing by 1 year compared 2010. Illiteracy rate among young and middle-aged women was 0.

12 project districts and counties have a total population of 7.2448 million, including a population of 208,400 in Demonstration Areas, 101,900 women, accounting for 48.86% of the population in Demonstration Areas, as shown in Table 5-1.

Table 5-1 Distribution of women in Demonstration Areas

	Population of project county (10,000 persons)	Population of Demonstration Area (10,000 persons)	Women's population in Demonstration Area(10,000 persons)	Proportion of women's population in Demonstration Area(%)
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Jishou City	30.10	<b>1.36</b>	<b>0.66</b>	48.31%
Yongshun County	54.47	<b>0.96</b>	0.46	47.96%
Baojing County	31.26	<b>2.06</b>	1.18	57.36%
Huayuan County	30.89	<b>1.19</b>	0.58	48.83%
Cili County	70.90	<b>4.07</b>	2.00	49.19%
Zhongfang County	28.40	<b>3.42</b>	1.48	43.16%
Anhua County	103.16	<b>0.68</b>	0.32	47.25%
Hengnan County	113.4	<b>2.15</b>	1.03	47.83%
Lengshuitan District	53.56	<b>0.97</b>	0.55	56.16%
Qiyang County	108.00	<b>0.98</b>	0.47	47.99%
Linwu County	37.34	<b>1.47</b>	0.81	55.24%
Yizhang County	63.00	<b>1.54</b>	0.65	42.40%
Total	724.48	<b>20.84</b>	<b>10.19</b>	48.86%

### 5.1.2 Development status of permanent female residents in the demonstration area

The investigation data of sample village reveals:

**1. The permanent female resident in the villages mainly have junior high school diploma.** The investigation data reveals: 35.8% of the female have junior high school diploma; 52.8% of them have primary school and below primary school diploma; 11.3% have senior high school/technical secondary school/vocational school and higher diploma.

**2. Most of permanent female resident are engaged in labor with income.** The investigation data reveals: 68.7% of them are engaged in labor with income; 31.3% are engaged in labor without income. In the labor with income, 87.6% are engaged in agriculture, 8.0% are working to earn living, 2.7% are engaged in industrial and business industry and 1.8% of them are engaged in other fields.

**Third, farming women are mainly middle and old aged women.** According to survey data: average age of farming women in demonstration areas is 47 years old, and the maximum age is 89 years old while the minimum age is 16 years old. Women engaging in farmland cultivation under 30 years old account for 8.9%, women at 31-40 years old account for 15.6%; women at 41-50 years old account for 35.6%; women at 51-60 years old account for 30.1%; women above 60 years old account for 9.8%. According to survey data: in Demonstration Areas, women in farmland cultivation are mainly middle and old aged women.

**Table 5-2 Age status of women in farmland cultivation in Demonstration Areas**

		Time	Percentage	Valid percentage	Cumulative percentage
Valid	Under 30 years old	404	8.8	8.9	8.9
	31-40 years old	705	15.4	15.6	24.5
	41-50 years old	1614	35.3	35.6	60.1
	51-60 years old	1366	29.9	30.1	90.2
	Above 60 years old	442	9.7	9.8	100.0
	Total	4531	99.1	100.0	
Missing	System	40	0.9		
Total		4571	100.0		

## 5.2 Analysis of women’s participation methods of agricultural activities in the demonstration area

According to the interview and symposium with local women, the women mainly participate in the agricultural activities in two methods:

**(1) The women are the main labor force of agricultural work.** The women and middle and old-aged people are the main labor force of agricultural work. In the project village, the labor is mainly distributed in two models: 1. Cultivation modes relying on left-behind women. In the case, the left-behind female have to do farming work since their household labor migrates out to make living. Please refer to Table 5-3 in detail. 2. Joint management model by men and women: The men and women in the household participate in the farming and management together. Please refer to Table 5-4 in detail. According to the feedback of investigation, the labor is mainly in the form of women and old men in the contemporary rural farming. It is compatible with the existing population feature: “993861 troops” (99-old men; 38-women; 61-children).

**Table 5-3 Agricultural Schedule and Work Distribution in Demonstration Areas**

Month	Agricultural activities and work distribution	Month	Agricultural activities and work distribution
January	Farming at home (women)	February	1. Plant vegetables (women) 2. Plant beans (women)
March	1. Plant seedling (women) 2. Manage farmland (women)	April	1. Harvest rape (women) 2. Prepare for farming (women)
May	1. Insert seedling (women) 2. Spray chemical fertilizer (women)	June	1. Spray pesticide (women) 2. Manage farmland (women)
July	1. Spray pesticide (women) 2. Remove grass (women)	August	Harvest sesame (women)
September	Harvest paddy (women)	October	1. Plant rape (women) 2. Manage farmland (women)

<b>Novem ber</b>	1. Remove grass (women) 2. Spray pesticide (women)	<b>Decem ber</b>	Manage farmland (women)
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Remark: The month is defined according to the Chinese lunar calendar.

**Table 5-4 Agricultural Schedule and Work Distribution in Demonstration Areas**

<b>Month</b>	<b>Agricultural activities and work distribution</b>	<b>Month</b>	<b>Agricultural activities and work distribution</b>
<b>January</b>	Manage farmland (men+ women)	<b>Februa ry</b>	Plant rape (men + women)
<b>March</b>	1. Plant early season rice (men+ women) 2. Spray fertilizer (men+ women)	<b>April</b>	Seedling transplanting(men + women)
<b>May</b>	1. Harvest (me + women) 2. Spray pesticide (men+ women) 3. Manage farmland (men+ women)	<b>June</b>	1. Seedling transplanting (men+ women) 2. Spray pesticide (men + women) 3. Manage farmland (men + women)
<b>July</b>	1. Harvest early season rice (men + women) 2. Insert late rice (men+ women) 3. Manage farmland (men+ women)	<b>August</b>	1. Harvest (men + women) 2. Spray pesticide (men + women) 3. Manage farmland (men + women)
<b>Septem ber</b>	1. Plant rape (men+women) 2. Spray pesticide (men+ women)	<b>Octobe r</b>	Harvest late rice (men + women)
<b>Novemb er</b>	Harvest late rice (men + women)	<b>Decem ber</b>	Plant rape (men + women)

Remark: The month is defined according to the Chinese lunar calendar.

**(2) The women constitute the main part of rural cooperative.** According to survey data: among farming women, 548 women are employees in rural cooperatives for farmland cultivation. There are a total of 107 rural cooperatives in demonstration areas and women take up about 55% of total employees in the rural cooperatives. There are a total of 406 management personnel in 107 rural cooperatives in demonstration areas, including 110 women, accounting for 27.1%. There is no woman in the management of 21 rural cooperatives. According to interview data, wage is 50-100 per day. According to survey data, women constitute the main part of rural cooperatives, but the proportion of women participating in the management decision-making and management of rural cooperatives is low.

### **5.3 Analysis of project cognition and need of women group in the demonstration area**

#### **5.3.1 Analysis of cognition**

The women group has a well understanding of and support to the project. They are mainly demonstrated in the following aspects:

#### **1. Some women have a certain understanding of the project mainly through**

**government.** The investigation reveals: 43.2% of women in total have a little knowledge of the project; 17.8% have rather good knowledge of the project; 3.1% know the project very well. 25.7% do not know much about the project; 10.2% even do not know the project. The women know about the project mainly through governmental propaganda (56.1%).

**2. Most of women support the project.** The investigation reveals: 97.1% of total women believe the project is beneficial to the local social and economic development. Therefore, the women support the project. The investigation reveals: 77.5% of total women support the project very much; 18.2% of total women support the project well; 3.5% of total women have an ordinary attitude to the project; only 0.8% of total women do not support it.

### **5.3.2 Analysis of need**

The women mainly have the following needs:

**1. Creating employment opportunities.** On one hand, the project is expected to increase the land use rate; on the other hand, it is expected to promote the development of agricultural product processing enterprises and create more employment opportunities for local farming households. According to the visit and investigation of project village, the social evaluation team has come to know that local women hope to have more employment opportunities and boost the economic income.

**2. Providing labor protection.** According to the visit and investigation of project village, the social assessment team has come to know that local women in demonstration areas hope to be provided with sunstroke prevention, grass removing and mosquito-proof measures and anti-septic mask to prevent lime from inhaling into the lungs.

**3. Improving production skills.** According to the visit and investigation of project village, the social assessment team has come to know that above 90% of the women deem it necessary to receive professional technical training; the rural women are rather interested in the planting technologies, but also hope to receive production skill training such as agricultural machinery; the women like to receive technical training in the form of classes and on-site demonstration.

**IV. Improving participation ability.** According to the visit and investigation of project village, women constitute the main part of rural cooperatives, but their

participation in management decision-making of farmlands is low. Women in demonstration areas hope to improve their participation ability, to promote farmland cultivation decisions to be beneficial to women protection.

#### **5.4 Social gender action plan in various construction phases**

##### **5.4.1 Promotion of women's participation in the project**

According to the on-site investigation and observation, the women in the demonstration area constitute the main force of household labor and agricultural production and have rather little participation in the village matters-it does not have much difference between different ethnic groups. In order to promote the development of women and safeguard fair benefits in the project, efforts are made to enhance the women's participation in various project stages. Suggestions: In the governance of farmland pollution, establishment of rural cooperative society and selection of industrial development, special attention is paid to the demand and idea of women in the demonstration area; at least one woman is designated in the leadership team of farmland pollution governance. At least 30% of total women participate in the meeting of farmland pollution governance convened by the local residents. At least 30% of total women participate in the training programs organized in the project construction.

##### **5.4.2 Improving women's cognition of rural cooperative and project**

The survey result reveals that the men and women have rather poor knowledge of the farmland pollution project; in the farmland pollution governance and industrial development, the women fail to participate as actively as men. In order to enable women to participate in the industrial development of rural cooperative society, we put forward the following suggestions:

1. In the course of project construction, maintain the information disclosure and organize propaganda and training; enable at least 30% of women to participate in the training with considering the convenience of women in the selection of training time and venue and use local language as much as possible.

2. Give full play to the strengths of women's federation in the information propaganda and training; cooperate and coordinate with the women's federation and launch the information propaganda and training.

## **6. Analysis of Ethnic Minority in Demonstration Areas**

### **6.1 Overview**

#### **6.1.1 Status of ethnic minority population in Xiangxi Autonomous Prefecture**

According to the sixth nationwide population census in 2010, among the permanent resident population in Xiangxi Tujia and Miao Autonomous Prefecture, ethnic minority was 1,967,096, accounting for 77.21%; population of Tujia people was 1,089,301, accounting for 42.75%; population of Miao people was 863,141, accounting for 33.88%.

Jishou City Demonstration Area is a city inhabited by ethnic minority people. Ethnic minority population is 225,200, accounting for 77.3% of the total population, including 121,000 Miao people and 101,200 Tujia people.

In the population of 217,697 in Huayuan County Demonstration Area, there are 164,974 Miao people, accounting for 75.78%; 42,296 Han people, accounting for 19.42%; 10,427 Tujia people, accounting for 4.77%; 64 other minority people, accounting for 0.03%.

Baojing County Demonstration Area has a total population of 207,337 (excluding entire mitigation households), accounting for 79.73% of total population. There are 19 ethnic groups in total, including Han, with a population of 52,687, accounting for 20.77% of total population, and 18 ethnic minorities. Tujia is the ethnic minority with the largest population, 148,292, accounting for 57.03%, followed by Miao, with a population of 57,468, accounting for 22.10%.

Yongshun County Demonstration Area has a total population of 538,200, including 281,000 males, 257,200 females. In the total population, there are 496,000 minority people, including 429,500 Tujia people and 63,400 Miao people.

#### **6.1.2 Status of ethnic minority population in Zhangjiajie**

Zhangjiajie has a total population of 1.7091 million, consisting of 33 ethnic minorities, mainly including Tujia, Bai and Miao. Ethnic minority population is 1.1525 million, accounting for 77.19% of the total population. Main ethnic minorities are Tujia and Bai. Population of Tujia is 1.0156 million, accounting for 59.4% of the total population while population of Bai is 112,100, accounting for 6.6% of the total population. 8 Tujia townships and 7 Bai townships have been already established.

Cili County is a multi-ethnic group county with a total population of 709,000. Since ancient times, 17 ethnic groups, including Han, Tujia, Bai, Hui and Miao, have

been living here. Ethnic minority population dominated by Tujia accounts for 61% of total population.

## 6.2 Customs and culture of ethnic minority dominated in the demonstration area

Different ethnic minorities in the demonstration area apply the same language and characters and marry each other; they live harmoniously and no conflicts are witnessed. The cultures between various ethnic groups integrate with each other and no estrangement is discovered.

Jishou City, Huayuan County, Baojing County, Yongshun County and Cili County are inhabited by ethnic minorities. There are a total of 62 project villages in these project counties. Total population of project villages is 94,382. including a total population of minorities of 80,596, accounting for 85.39%. Among minorities, total population of Tujia people is 44,716, accounting for 47.38%; total population of Miao people is 35,880, accounting for 38.02%. Distribution of minorities in each project village is as shown in Table 6-1. Ethnic minorities in project villages are mainly Tujia and Miao.

Table 6-1 Distribution of ethnic minority population in project villages

Village	Population	Household	Han		Miao		Tujia	
			Quantities	Proportion %	Quantities	Proportion %	Quantities	Proportion %
Jinye Village	1450	358		0.00%	1450	100.00%		0.00%
Paixiong Village	963	243	16	1.66%	935	97.09%	12	1.25%
Xingfu Village	1530	285	20	1.31%	1501	98.10%	9	0.59%
Yangmeng Village	1062	250		0.00%	1000	94.16%	62	5.84%
Xiaoxing Village	801	181		0.00%	801	100.00%		0.00%
Guanhou Village	2234	585	40	1.79%	2194	98.21%		0.00%
Ximenji Village	2705	756	398	14.71%	875	32.35%	1432	52.94%
Daba Area	1473	568		0.00%	43	2.92%	1430	97.08%
Daxing Village	1065	250	15	1.41%	1032	96.90%	18	1.69%
Er Village	1560	290		0.00%	1560	100.00%		0.00%
Ganggang Village	956	21	16	1.67%	940	98.33%		0.00%
Gevu Village	1228	228		0.00%	1228	100.00%		0.00%
Jinrong Village	1034	212		0.00%	1034	100.00%		0.00%
Laotianping Village	1090	239		0.00%	1090	100.00%		0.00%
Longmen Village	1472	365	61	4.14%	1411	95.86%		0.00%

<u>Mao'er Village</u>	1924	421	4	0.21%	1920	99.79%		0.00%
<u>Shuangpin g Village</u>	2044	442		0.00%	2044	100.00%		0.00%
<u>Wanggao Village</u>	1329	286		0.00%	1329	100.00%		0.00%
<u>Zhuchao Village</u>	903	220		0.00%	903	100.00%		0.00%
<u>Hangsha Village</u>	2228	486	12	0.54%	2216	99.46%		0.00%
<u>Ganxi Village</u>	1752	418	802	45.78%	270	15.41%	680	38.81%
<u>Mawang Village</u>	1150	327	250	21.74%	700	60.87%	200	17.39%
<u>Yanjing Village</u>	1722	437	801	46.52%	438	25.44%	483	28.05%
<u>Hangji Village</u>	2058	448		0.00%	2058	100.00%		0.00%
<u>Hangsha Village</u>	2228	580		0.00%	2228	100.00%		0.00%
<u>Xiaba Village</u>	2462	635		0.00%		0.00%	2462	100.00%
<u>Zebi Village</u>	1017	245		0.00%		0.00%	1017	100.00%
<u>Heping Village</u>	1938	475	528	27.24%	210	10.84%	1200	61.92%
<u>Nadong Village</u>	841	205	216	25.68%	30	3.57%	595	70.75%
<u>Shuitian Village</u>	2602	757	20	0.77%	2400	92.24%	182	6.99%
<u>Zhongba Village</u>	2040	275		0.00%	2040	100.00%		0.00%
<u>Beiliping Village</u>	1832	472		0.00%		0.00%	1832	100.00%
<u>Longzhai Village</u>	3358	758		0.00%		0.00%	3358	100.00%
<u>Shangping Village</u>	1238	315	20	1.62%		0.00%	1218	98.38%
<u>Xinglong Neighborhood Committee</u>	3195	687	81	2.54%		0.00%	3114	97.46%
<u>Dongvuan Village</u>	1982	560	502	25.33%		0.00%	1480	74.67%
<u>Douxi Village</u>	906	462	206	22.74%		0.00%	700	77.26%
<u>Yangfengping Village</u>	1592	420	430	27.01%		0.00%	1162	72.99%
<u>Taiwan Village</u>	1262	362	462	36.61%		0.00%	800	63.39%
<u>Liangqiao Village</u>	1609	480	209	12.99%		0.00%	1400	87.01%
<u>Dongshi Village</u>	1286	386	826	64.23%		0.00%	460	35.77%
<u>Sanvanqiao Village</u>	1321	385	398	30.13%		0.00%	923	69.87%
<u>Guangming Village</u>	725	202	650	89.66%		0.00%	75	10.34%
<u>Chenjiathe Village</u>	545	170	510	93.58%		0.00%	35	6.42%
<u>Siping Village</u>	742	192	675	90.97%		0.00%	67	9.03%
<u>Linkuang Village</u>	1538	510	600	39.01%		0.00%	938	60.99%

<b>Guotaiqiao Village</b>	979	297	324	33.09%		0.00%	655	66.91%
<b>Pingxi Village</b>	1088	325	380	34.93%		0.00%	708	65.07%
<b>Chenping Village</b>	1340	354		0.00%		0.00%	1340	100.00%
<b>Erwutai Village</b>	1357	447	57	4.20%		0.00%	1300	95.80%
<b>Kuihuatai Village</b>	1650	488		0.00%		0.00%	1650	100.00%
<b>Miaoshan Village</b>	1630	518		0.00%		0.00%	1630	100.00%
<b>Qianbugang Village</b>	1245	345		0.00%		0.00%	1245	100.00%
<b>Cuanhu Village</b>	1465	425		0.00%		0.00%	1465	100.00%
<b>Xingyue Village</b>	1620	426	20	1.23%		0.00%	1600	98.77%
<b>Zhaoping Village</b>	1233	321	27	2.19%		0.00%	1206	97.81%
<b>Pingshan Village</b>	1078	285		0.00%		0.00%	1078	100.00%
<b>Chaxi Village</b>	850	225	509	59.88%		0.00%	341	40.12%
<b>Kangzhuang Village</b>	1445	420	593	41.04%		0.00%	852	58.96%
<b>Siqiao Village</b>	1162	372	483	41.57%		0.00%	679	58.43%
<b>Huayue Village</b>	2096	564	1296	61.83%		0.00%	800	38.17%
<b>Longyue Village</b>	1012	278	802	79.25%		0.00%	210	20.75%
<b>Saizhuang Village</b>	1140	345	527	46.23%		0.00%	613	53.77%
<b>Total</b>	94382	24284	13786		35880		44716	

### 6.2.1 Customs and culture of Tujia Nationality in the demonstration area

According to the research of famous scholar, Mr. Pan Guangdan, Tujia is the offspring of ancient Ba people. At the end of Shang Dynasty, Ba people joined the war against Kingdom Zhou and was honored the title of Bazi Kingdom due to war merit. During the Spring and Autumn and the Warring States Periods, Ba people mingled with blood with Chu Kingdom in the east side; under the threatening of Chu Kingdom, Ba Kingdom retreated to the southwest area. Currently, Tujia is mainly distributed in Hunan, Hubei, Guizhou and Chongqing at the center of Wuling Mountain and Qingjiang River reaches. In October 1956, the State Council confirmed Tujia as a single nationality formally.

#### (1) Characteristics of Tujia in project villages

According to the proportion of Tujia in the population of demonstration areas, 38 villages inhabited by Tujia are divided into three categories: project villages where population of Tujia people accounts for less than 30% of population of demonstration

areas; project villages where population of Tujia people accounts for 30% - 50% of population of demonstration areas; project villages where population of Tujia people accounts for 50% and above of population of demonstration areas. According to the definition of minorities of the World Bank, various categories of project villages are identified through interview and other methods. Please refer to Table 6-2.

**Table 6-2 Characteristics of Tujia in project villages**

	<b>Project village</b>	<b>Whether residents identify themselves as a part of a unique minority cultural groups</b>	<b>Whether residents are collectively attached to residential areas or ancestral domains with unique geographical features</b>	<b>Whether there is traditional culture, economy, society or political system that is different from mainstream society and culture</b>	<b>Whether there is a minority language that is different from the official language in the nation or local region</b>
Project villages where population of Tujia people accounts for less than 30% of population of demonstration areas	Mawang Village and Yanjing Village in Baojing County; Longyue Village in Cili County	No. Local residents do not identify themselves as a unique cultural group. And their customs and habits are the same as Han.	No.	No. Local residents see no difference with Han in terms of language, planting habit, customs and habit.	No. Language used in daily life is local dialect, and characters used are Chinese characters
Project villages where population of Tujia people accounts for 30% - 50% of population of demonstration areas	Dongshi Village, Huayue Village and Chaxi Village in Cili County; Ganxi Village in Baojing County	No. Local residents do not identify themselves as a unique cultural group. Their customs and habits are substantially consistent with Han. In addition to Spring Festival, Lantern Festival and Dragon Boat Festival and other traditional festivals, there are “Sheba” and “the 8 <sup>th</sup> of the Fourth Lunar Month” festivals	No	No. Local residents see no difference with Han in terms of language, planting habit, customs and habit.	No. Language used in daily life is local dialect, and characters used are Chinese characters

<p>project villages where population of Tujia people accounts for 50% and above of population of demonstration areas</p>	<p>Ximenji Village in Jishou City, Yangsaizhuang Village, Siqiao Village, Kangzhuang Village, Linkuang Village, Pingxi Village, and Guotaiqiao Village in Cili County; Qianling Town, Heping Village, Taiyan Village, Sanyanqiao Village, Yangfengping Village, Dongyuan Village, Douxi Village, Liangqiao Village, Erwutai Village, Zhaoping Village, Xingyue Village, Chenping Village, Kuihuatai Village, Miaoshan Village, Qianbugang Village, Cuanhu Villge and Pingshan Village in Bajing County; Xinglong Neighborhood Committee, Shangping Village, Beiliping Village and Longzhai Village in Yongshun County; Xiaba Village, Zebi Village and Nadong Village in Baojing County</p>	<p>No. Local residents do not identify themselves as a unique cultural group. Their customs and habits are substantially consistent with Han. In addition to Spring Festival, Lantern Festival and Dragon Boat Festival and other traditional festivals as Han, there are “Sheba” and ”the 8<sup>th</sup> of the Fourth Lunar Month” festivals, and “no sweeping, no clothing airing, no soup and no water carrying during spring festival” and “pregnant women shall not use a knife and shall not eat chicken and pork liver” and other taboos.</p>	<p>No</p>	<p>No. Local residents see no difference with Han in terms of language, planting habit, customs and habit.</p>	<p>No. Language used in daily life is local dialect, and characters used are Chinese characters</p>
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## (2) Customs and culture of Tujia Nationality in project villages

Language and character: Tujia in the demonstration area started to use Chinese and Chinese characters at a very early stage.

Social management mode: The village management mode is compatible with that of most rural areas in China: that is to say, it integrates the county administration and village governance. The county administration refers to Level I county administration (including town administration)-it is known as the grass root rural government established according to law; the village governance refers to the village committee-it is the grass root self-autonomous organization in the village. The village committee constructs and manages the village under the instruction of county administration.

Religious belief: In the demonstration area, Tujia believes in Taoism and pays tribute to the ancestors. They worship numerous Gods; the religious belief includes nature, land, rock, mountain, river and water. Until now, almost every household has a shrine in the lobby to worship ancestral tablets. The festivals of Tujia mainly include the dragon boat festival and “June 6<sup>th</sup>”. They attach great importance to the traditional festivals, especially in the Spring Festival.

Local customs: Before marriage of women in Tujia, they tend to “cry out”; otherwise, they will be discriminated and laughed at. Currently, the “cry-out” custom

has become out of date.

Production methods: Rice is mainly planted. In the busy season, the local residents plant seedling; people help those households short of labor; the host only provides food and drink. The mutual assistance custom has been inherited over thousands of years.

The overall survey data indicated that: Tujia people' project cognition, needs, agronomy and so on have no obvious difference comparing with these of Han nationality.

#### 6.2.2 Customs and culture of Miao in Demonstration Areas

Miao is an ancient nation, scattered around the world. Miao people are mainly distributed in Guizhou Province, Hunan Province, Hubei Province, Yunnan Province, Guangxi Province and Hainan Province and other provinces and districts in China as well as Laos, Vietnam, Thailand and other countries and regions in Southeast Asia. According to historical documents and word of mouth materials, ancestors of the Miao first lived in the middle and lower reaches of the Yellow River and their ancestor was Chiyou. "Sanmiao" era migrated to the Jiangnan Plain and then mitigated to the south and the west in a large scale due to wars and other reasons, to mountainous areas of Southwest China and the Yunnan-Guizhou Plateau. After the Ming Dynasty and the Qing Dynasty, some Miao people migrated to countries in Southeast Asia and then mitigated all the way to Europe and America over in modern times. Miao had their own language. Miao Language has been included in Miao Language Branch of Miao-Yao Group of Sino-Tibetan Family, consisting of three major dialects in western Hunan, eastern Guizhou and Sichuan, Guizhou and Yunnan. Due to long-term interaction between Miao and Han, some Miao people are also proficient in Mandarin Chinese and are able to use Mandarin Chinese.

##### (1) Characteristics of Miao in project villages

According to the proportion of Miao in the population of demonstration areas, 24 villages inhabited by Miao are divided into two categories: project villages where population of Miao people accounts for less than 50% of population of demonstration areas; project villages where population of Miao people accounts for 50% and above of population of demonstration areas. According to the definition of ethnic minority developed by the World Bank, various categories of project villages are identified through interview and other methods. Please refer to Table 6-2.

Table 6-3 Characteristics of Miao in project villages

	<b>Project village</b>	<b>Whether residents identify themselves as a part of a unique minority cultural groups</b>	<b>Whether residents are collectively attached to residential areas or ancestral domains with unique geographical features</b>	<b>Whether there is traditional culture, economy, society or political system that is different from mainstream society and culture</b>	<b>Whether there is a minority language that is different from the official language in the nation or local region</b>
Project villages where population of Miao people accounts for less than 50% of population of demonstration areas	Ganxi Village and Yanjing Village in Baojing County	No. Local residents do not identify themselves as a unique cultural group. And their customs and habits are the same as Han.	No.	No. Local residents see no difference with Han in terms of language, planting habit, customs and habit.	No. Language used in daily life is local dialect, and characters used are Chinese characters
Project villages where population of Miao people accounts for 50% and above of population of demonstration areas	Zhongba Village in Yongshun County; Mawang Village, Shuitian Village, Hangsha Village, Zhuchao Village, Hangji Village and Hangsha Village in Baojing County; Longmen Village, Daxing Village, Gangang Village, Mao'er Village, Er Village, Geyu Village, Jinrong Village, Laotianping Village, Shuangping Village and Wanggao Village in Huayuan County; Yangmeng Village, Paixiong Village, Xingfu Village, Guanhou Village, Jinye Village and Xiaoxing Village in Jishou	No. Local residents do not identify themselves as a unique cultural group. Their customs and habits are substantially consistent with Han. In addition to Spring Festival, Lantern Festival and Dragon Boat Festival and other traditional festivals as Han, there are “going to the last fair before spring festival”, “the 3rd day of the Third Lunar Month”, “the 8th day of the Fourth Lunar Month”, “the 6 <sup>th</sup> day of the Sixth Lunar Month” and “the 7 <sup>th</sup> day of the Seventh Lunar Month” and other local ethnic festivals	No.	No. Local residents see no difference with Han in terms of language, planting habit, customs and habit.	No. Language used in daily life is local dialect, and characters used are Chinese characters

(2) Customs and culture of Miao in project villages

Language and characters: daily communication among Miao people in demonstration areas is mainly in local dialect; characters used in daily life and communication is Chinese characters.

Religious belief: religious belief of Miao in Demonstration Areas is dominated by Taoism and Ancestor Worship. Miao in Demonstration Areas mainly celebrates traditional Chinese festivals (Spring Festival, Dragon Boat Festival, Mid-Autumn

Festival and Tomb-Sweeping Day ).

Social management mode: management mode of villages inhabited by Miao in demonstration areas is substantially consistent with that of most rural areas in China, i.e. the combination of township government and village governance. Township government refers to township level regime (including township regime), and is the most grass-roots level government set up by the nation in rural areas according to law; village governance refer to village committee, the most grass-roots level self-governing mass organization in rural areas. Villages are mainly constructed and governed by village committee under the guidance of township government.

Customs and habits: Miao in Demonstration Areas has various kinds of folk recreational activities, such as “going to the last fair before spring festival”, “the 3rd day of the Third Lunar Month”, “the 8th day of the Fourth Lunar Month”, “the 6th day of the Sixth Lunar Month” and “the 7th day of the Seventh Lunar Month” and other local ethnic festivals. Main foods of Miao are mainly rice, corn, beans and potatoes, especially rice and corn.

Production mode: dominated by rice cultivation, without unique production mode.

The overall survey data indicated that: Miao people’ project cognition, needs, agronomy and etc have no obvious difference comparing with these of Han nationality.

### **6.3 Identification of ethnic minority in the demonstration area**

#### **6.3.1 Identification basis**

“Ethnic minority” refers to the minority group in general term: unique and weak social and culture group. The World Bank defines the ethnic minority as follows:

- (1) It is self-appraised as one member of ethnic minority cultural cluster with unique features; the appraisal is agreed by others.
- (2) The cluster is attached with the residential area or inherited area with unique geological features and attached with natural resources herein.
- (3) It enjoys the traditional social, cultural, economic or political system different from the mainstream society and culture.
- (4) It is possessed of the ethnic minority language different from the national or regional official language.

#### **6.3.2 Identification methods**

On-site investigation: It aims to know about the population structure, racial constitution, economic structure, ethnic minority village identification and living

customs of ethnic minority in each project village.

Document collection and documentary search: It aims to collect the annual statistics yearbook, statement, municipal annal and county annal reflecting population, ethnic group, culture and customs in the demonstration area and know about the features of ethnic minority in the demonstration area and production and living differences from Han people.

Interview with well-informed sources: It aims to conduct interview with well-informed sources, such as responsible persons for the racial and religious belief bureau, know about the ethnic minority type, population, racial features and distribution in the demonstration area and know about the related projects under construction in the demonstration area (they can promote the development of ethnic minorities).

### **6.3.3 Screening of ethnic minority**

According to the identification basis, the social assessment team screened Tujia and Miao in 62 project villages and drew the following conclusion:

In project villages, Tujia has a population of 44,716, accounting for 47.38% of the total population. Tujia in the demonstration area does not have its unique or other recognized cultural features, living customs or local customs; the social, economic, cultural and political organization has no difference from that of mainstream races; the religious, sacrificing and totem worship activities do not have obvious difference from the mainstream society. Tujia uses the same language and Chinese characters as demonstration area. The Tujia people are well integrated with the mainstream society. It does not fit the World Bank definition of IP term and not applicable to the IP policy of the World Bank.

In project villages, Miao has a population of 35,880, accounting for 38.02% of the total population. Miao in the demonstration area does not have its unique or other recognized cultural features, living customs or local customs; the social, economic, cultural and political organization has no difference from that of mainstream races; the religious, sacrificing and totem worship activities do not have obvious difference from the mainstream society. Miao uses the local dialect for daily communication, but the Chinese characters is used for daily life in demonstration area. The land of Miao is owned by the collective; the contract responsibility system based on the household with remuneration linked to output is adopted. These Miao people are well integrated with the mainstream society. It does not fit the World Bank definition of IP term and not applicable to the IP policy of the World Bank.



## 7. Social Impact and Risk Analysis of the Project

### 7.1 Analysis of social impact of the project

#### 7.1.1 Positive impact

Within a short period of time, the project is expected to bring the following positive impact:

**1. Launching project propaganda to enhance stakeholders' awareness of producing safe products.** The investigation and research discover the following problem: Stakeholders in the slightly polluted area are not fully aware of causes of heavy metal pollution in the farmland and possible negative effect. The project propaganda and training are organized to improve the stakeholder's **awareness** of governance urgency.

**2. Organizing project training to improve farmer's skills of producing safe products.** The investigation and research discover the following problem: Heavy metal pollution of agricultural products is associated with the farmer's agricultural skills. The agricultural skills and technologies are optimized to reduce heavy metal pollution against the agricultural products. Therefore, the project aims to organize training program for the farmers and thus upgrade the safe product production skills.

**3. Encouraging the public to participate in the project and reaching a common consensus in the governance of heavy metal pollution of farmland.** The investigation and research discover the following problem: The stakeholders have certain disputes over the governance necessity and methods. The project encourages the public to participate in the project and reach common consensus in the governance of heavy metal pollution of farmland.

**4. Improving the infrastructure construction to create favorable conditions for agricultural production.** The investigation and research discover the following problem: The farmers are eager to improve the backward infrastructure facilities such as irrigation facilities. Every time social evaluation team reached a project village, the local residents reflect poor infrastructure facilities, especially road and water; the rural infrastructure facilities in the demonstration area suffer from inadequate input and lack effective investment and management which seriously hinder the agricultural production and sustainable development in rural area. The project aims to implement clean water irrigation, channel modification and machinery farming road maintenance projects and create favorable conditions for agricultural production.

**5. Executing environmental management and agricultural environment surveillance to provide technical support for agricultural product quality management.** The investigation and research discover the following problem: Agricultural products and soil surveillance facilities are inadequate in the demonstration area; therefore, the governmental department and farmers are not fully aware of the degree of heavy metal polluted agricultural products. The project aims to execute environmental management and agricultural environment surveillance so as to provide technical support for the quality management of agricultural products.

**6. Establishing rural cooperative to improve farmer's risk resistance capability and product competitiveness.** The long-term backward and poverty-stricken status of the demonstration area renders numerous farmers constantly know about the situation: Distributed pattern will make them live by sales of elementary agricultural products; the products suffer from low added value, low production efficiency and market connection difficulty. The farmers have to sell agricultural products through local or non-local buyers; the products ultimately reach the companies; the farmers can only get the price of elementary agricultural products; the added value of products is produced after deep processing. Therefore, the farmers become aware of and are eager to cooperate with rural cooperative and large households, enhance the market competitiveness, and lengthen the industrial chain so as to increase the product price. The project aims to establish rural cooperative and thus improve the risk resistance capability and product competitiveness.

**7. Generating considerable economic benefits.** The investigation and research discover the following problem: The heavy metal pollution governance of farmland has affected the agricultural production and farmer's income to a certain degree. The project governance measures can yield considerable economic benefits mainly in the following four aspects: (1) Raise the sales price of agricultural products. The project adopts related measures to produce eligible agricultural products and thus raise the price of agricultural products. For instance, some slightly polluted areas in Hengyang have made test of VIP governance measures; Cadmium content in the paddy and grain is controlled effectively and paddy and grain price can be increased from 250 Yuan/kg to 320 Yuan/kg. (2) Reduce the cost of agricultural production. The rural cooperative organization is supported and cultivated to reduce agricultural capital cost by about 30%. (3) Improve the land use efficiency. The land use efficiency is rather high in the rural cooperative. The rural cooperative is established to improve the land use efficiency. (4)

Upgrade the added value of agricultural products. The project team cultivates the rural cooperative and establishes surveillance facilities, provides organization and technical support for the agricultural industrialized development and brings benefits to upgrade the added value of agricultural products. Through a series of measures, 12 demonstration areas are expected to achieve a growth of income of 44.835 million Yuan per year.

**8. The project yields obvious social benefits.** The investigation and research discover the following problem: Numerous people go to non-local areas for working; the poverty-stricken households focus on the traditional agricultural business and planting model and are plunged into the poverty circulation; the heavy metal pollution governance of farmland lacks related experience. The project is able to effectively settle the said problems; produce obvious social benefits, mainly in the following aspects: 1) Bring benefits to the backflow of migrant workers. The project creates employment opportunities and working posts for migrant workers; in particular, it creates more employment opportunities for women. It is expected that there is the increase of 12,000 posts in total for laborers in 12 demonstration areas. 2) Bring benefits to poverty relief and wealth accumulation. The poverty-stricken households are mainly restricted to the information, technology and fund which lead to poverty circulation. The project team offers support to the poverty-stricken households in the respect of information, technology and fund and brings benefits to poverty relief for 5,030 registered and filed poverty-stricken households. 3) Bring benefits to the formation of farmland pollution governance model. Currently, the farmland pollution governance lacks related experience and model. The project is able to explore into effective and practical technical and management model in the demonstration area and produce a demonstration effect for the heavy metal pollution governance in other areas.

According to survey data: the highest positive impact assessment made by residents in project villages on the project is guarantee to quality safety of agricultural products (88.30%), followed by improvement of rural infrastructure (63.60%), improvement of income of local residents (51.50%), improvement of awareness of residents to control farmland pollution governance (48.10%), effective governance and reasonable utilization of polluted farmlands (45.70%), facilitation of scale operation and creation of rural brands (43.30%) and increase of employment opportunities for local rural residents (33.50%). Please refer to Table 7-1. According to survey results: first, the purpose of the project is consistent with the expectation of rural residents, i.e.

production of healthy and safe foods in polluted farmlands; second, the project has not only social benefits, such as effective governance of polluted farmlands, but also economic benefits, such as improving the income of local rural residents; third, the operation mode of creating rural brands of the project with the basic carrier of rural cooperatives is also widely recognized.

Table 7-1 Positive impact assessment of residents on “Farmland and Agricultural Product Quality Improvement Project”

	Response		Percentage of number of cases
	N	Percentage	
<b>Guarantee to quality safety of agricultural products</b>	1172	23.50%	88.30%
<b>Improvement of awareness of residents to control farmland pollution governance</b>	638	12.80%	48.10%
<b>Improvement of rural infrastructure</b>	844	16.90%	63.60%
<b>Effective governance and reasonable utilization of polluted farmlands</b>	606	12.10%	45.70%
<b>Facilitation of scale operation and creation of rural brands</b>	574	11.50%	43.30%
<b>Increase of employment opportunities for local rural residents</b>	445	8.90%	33.50%
<b>Improvement of income of local residents</b>	683	13.70%	51.50%
<b>Others</b>	27	0.50%	2.00%
	4989	100.00%	376.00%

### 7.1.2 Negative impact

(1) In the project execution, it is expected to shift the agricultural production structure; some land may change the planting model which will affect the income of some farmers for a short period of time.

(2) In the project construction, the dust, noise, rubbish and sludge’s temporary stacking will have interim negative impact on the cleanliness and tidiness of demonstration area and have a temporary and negative impact on the daily life and production of local residents in the demonstration area.

## 7.2 Analysis of social risks of the project

### 7.2.1 Analysis of social risks of growing alternative crops

Within existing demonstration areas: first, prohibited planting is not involved. Total governance scale in 12 project counties is 6,152.33 hectares, including 408.46 hectares of heavily polluted area ( $P_i > 5$ ), accounting for 6.64% of total area under control. “VIP” management and application of organic fertilizer or planting green

manure (F) and other measures are proposed to be taken in a total of 5,743.87 hectares of farmlands under control; crop restructuring is proposed to be implemented in a total area of 408.36 hectares, including 126.63 hectares for replanting flowers and seeding trees and fruit seedling, etc.; 112.48 hectares for replanting corn/rape/sorghum; 76.44 hectares for replanting oranges, pears, grapes and pitaya etc.; 16.24 hectares for replanting folium artemisiae argyi; 76.67 hectares for replanting lotus. Second, requisition of land is not involved. Requisition of land is not required for project activities and all civil engineering activities are implemented within villages. Facilities built will be used by villagers. A total of 173.9 km irrigation ditches, 193 detritus chambers, 49.35 km tractor roads, 720 m ecological intercepting ditches, 2 retaining dams, 11 small hilly ponds dredging, 3 electric pumping stations, 2 reservoirs and 1 motor-pumped well are proposed to be constructed or reconstructed in 12 project counties. Engineering measures in Demonstration Areas are divided into two categories: (1) reconstruction of irrigation ditches or drainage ditches. Reinforcement and remediation will be carried out based on existing ditch foundation. (2) use of newly built machinery or electric irrigation station and required land are within the scope of villages; the nature of collective ownership of villages will not be altered.

Table 7-2 Varieties and Scale(Ha) of Alternative Crops in Each Project County

	Flowers/seeding/fruit seeding, etc.	Oranges, pears, etc	Folium artemisiae argyi	Corn, oilseed rape, etc.	Lotus	Total
Zhongfang County	17.33	25.44	16.24	9.6		68.61
Huayuan County	47.5					47.5
Yizhang County					56.67	56.67
Cili County	61.8					61.8
Linwu County				45	20	65
Anhua County		40				40
Lengshuitan County		11				11
Yongshun County				57.88		57.88
	126.63	76.44	16.24	112.48	76.67	408.36

Land acquisition and house demolition is not involved in the implementation of the project. Involuntary policy of the World Bank will not be triggered. The possible social risks of growing the alternative crops in the heavy pollution project areas are:

(1)Farmers will not cooperate. Growing the alternative crops will need to change the planting habits and technology. PMOs and SA teams have conducted detailed survey and analysis, but in fact, a few farmers may not cooperate. (2)Management issue of the delivery of the subsidy of growing the alternative crops, the agreement is made regarding the subsidy standard, but some farmers are concerned about the transparency of the subsidy delivery. (3) Labors. Due to the fact that most strong labors already work outside as workers, most villages have not enough labors. Growing the alternative crops of flowers and trees need more labors, the project execution may lack labors.

### **7.2.2 Livelihood risks of farmers**

Changes in the farmland products will bring about certain risks. In the project execution, the farmland product changes include three types: reserve the original planting habits; change planting variety of farmland; adjust the farming system.

There are mainly four categories of social risks brought by reserving existing planting habits and implementing land remediation: first, marketing risk. In the project, rice is replanted to low-cadmium varieties, and thus quality of rice grain will be affected, which means that existing marketing channels and methods may be affected. There is a certain marketing risk for new varieties. Second, the risk of substandard food. In the process of governance, substandard grain crops will be excluded from food chain and can only be used as biofeeds. The price of grain crops as industrial raw materials, however, is 1/3 lower than the price as normal grain crops. Third, risk of reduction of output. Replanting low-cadmium varieties will increase the risk of rice blast and may further lead to reduction of output. According to survey data: the top concern for peasants is reduction of actual income of rural residents in short term (74.3%), followed by increase of agricultural production labor amount (40.1%) as well as marketing risk incurred by replanting varieties (31.6%). Please refer to Table 7-2.

Table 7-2 Negative impact potentially caused by Farmland Quality Improvement Project

	No (%)	Yes (%)	Effective sample size
<b>Reduction of actual income of rural residents in short term</b>	25.7	74.3	1540
<b>Increase of agricultural production labor amount</b>	59.9	40.1	1540
<b>Unmarketable replanted crop products</b>	68.4	31.6	1540
<b>Construction will destroy the original vegetation, resulting in water and soil loss</b>	84.2	15.8	1540
<b>Construction will cause road dust, vehicle exhaust, oil dripping and leaking and other environmental pollution</b>	81.1	18.9	1540
<b>Construction work noise will affect the rest of rural residents</b>	85.1	14.9	1540

There are also three categories of risks brought by crop restructuring: first, risk of cost benefit of replanted crops. Input cost of replanted crops is restricted by seeds, technologies and labor and other factors, with some uncertainty; revenues of replanted crops are affected by the market and other factors. To this end, there is a certain risk of cost benefit for replanted crops. Second, marketing risk. New marketing channels are required to be established for replanted fruit trees, vegetables and cotton. There is no government protective price acquisition system for fruit trees and vegetables. Lacking of government guarantee system will increase risks to the income of farmers. Third, management risk. Replanting will not only implement new requirements on technical management of replanted crops but also require project villages to establish fair, transparent and standardized management procedures. Fourth, there is a risk of low quality food at the beginning of land rehabilitation before the polluted land is fully restored. According to survey data: in the process of crop restructuring, the top concern for rural residents is reduction of actual income in the same year (65.40%), followed by unmarketable replanted crops (42.30%). Please refer to Table 7-3.

Table 7-3 Negative impact potentially caused by crop restructuring

	Response		Percentage of number of cases (%)
	Sample size	Percentage (%)	
<b>Reduction of actual income in the same year</b>	490	40.20	65.40
<b>Increase of agricultural production labor amount</b>	176	14.40	23.30
<b>Unmarketable replanted crops</b>	317	26.00	42.30
<b>Construction will destroy the original vegetation, resulting in water and soil loss</b>	155	12.70	20.70
<b>Increased household debt</b>	76	6.20	10.10
<b>Other</b>	6	0.50	0.80
	1220	100.00	162.60

Adjustment of farming system will cause the risk of reduction of net earnings. Change of planting model may increase input of labor. In case of no reasonable subsidy for input, net earnings will reduce.

**Table 7-4 Potential Social Risks of Change in Agricultural Technologies**

<b>Change in agricultural technology</b>	<b>Potential social risks</b>
<b>Maintain existing planting habits: Select and plant low-cadmium accumulative products based on the existing types (V), irrigate with clean water (I), spray lime (P), adopt leaf inhibitor and control agent (Si) and spray soil adjustment agent (bacteria).</b>	1. Reduce net profits 2. Market sales risk 3. Poor quality risk of agricultural products 4. Reduce production volume
<b>Change farmland planting system: Change to plant cotton, vegetable and fruit tree (grapefruit)</b>	1. Risk of cost benefit; 2. Marketing risk; 3. Management risk.
<b>Adjust farming system (planting model): Change to plant double-season rice in the “rice- rice-green fertilizer” model, change to plant one-season rice in the “rice-bean” model and change to plant one-season paddy in the “rice-rape” model</b>	1. Risk of reduction of net earnings

### **7.2.3 Risks of public opinions**

The demonstration area suffers from rather complex environmental pollution; apart from heavy metal pollution in the soil, some areas suffer from the industrial wastewater, waste gas and rural living pollution which will damage the health and daily life of local residents. The project is expected to lead to four types of public opinion risks: 1) Risk of ambiguous reason. In the investigation, the local residents reflect that pollution leads to agricultural failure and poor living water. They are caused by pollution in numerous aspects; farmland soil pollution governance is executed without other pollution governance which may mislead local residents to heavy metal pollution; they may claim for compensation. 2) Risk of exaggerating heavy metal pollution. The heavy metal pollution governance of farmland led by the governmental department may mislead local residents to heavy metal pollution to all the agricultural products in the demonstration area. Improper settlement may lead to cluster event. 3) Risk of local residents’ environmental protection awareness. The stakeholders have deviation in their role in the environmental pollution and protection; they do not think they should bear responsibilities for surrounding environmental pollution and do not deem them as one of the environmental governance bodies. Therefore, they require the government or certain organization to bear the soil improvement responsibilities; they mainly play the role of executor.



## **8. Public Participation and Information Disclosure of the Project**

The domestic and international development practice reveals: The participation of beneficial group is the primary condition of project success. We can conclude that the real meaning of “participation” refers to positive and active participation; the participant has decision making right. Therefore, “enable the beneficial group to participate in the project” aims to enable the farmers to participate in various procedures of project activities in a positive and effective manner—In the respect of project design, execution, management, surveillance and evaluation, they have the right of speech; their opinions can be adopted by the project management department and can affect the decision making.

### **8.1 Principle of public participation and information disclosure**

1) Maintaining the disclosure of project information. The project propaganda is penetrated in the whole project cycle. Efforts are made to establish a regular disclosure system of project information; regularly make an announcement to the project information closely associated with stakeholders in the public areas of community. Besides, the group meeting, representative meeting, slogan, TV show and broadcasting measures are adopted to notify stakeholders of project preparations.

2) Assisting main stakeholders to establish the consciousness of project main body. The evaluation team recommends to launch out the following training programs: a) organize participation training to the stakeholders and instruct them to positively think about community development, farmland heavy metal pollution and environmental protection; b) organize the training of environmental protection knowledge and instruct the stakeholders to think about impact of their living and production methods on the soil and think about protecting the soil; c) organize the training of project technologies and eliminate worries of stakeholders to the project.

3) Absorbing main stakeholders to participate in the project construction; first consider employing them as paid labor; permitting them to provide rear services for the construction project.

4) Concerning about the role of village community cadres and community strength in the project execution. The village community cadres participate in the project propaganda, training, mobilization, villager demand reflection, discovery of existing problems, coordination of contradictions and subsequent management. In the project execution, a certain subsidy is offered to the main cadres.

5) Launching out the village participation management model of village soil governance and protection and encourage the local residents to maintain the project effect sustainable.

6) Encouraging the weak tendency to participate in the project. In the project design, instructive stipulations are formulated for the weak tendency such as women and minority group. For instance, 50% of total women are required to participate in the training program (the standard can be properly graded in the minority group); various communities are required to absorb a certain ratio of poverty-stricken households to participate in the project and it is adopted as the project evaluation indicator. In order to listen to the voice of weak tendency, the village project team includes the representatives of women, minority group and poverty-stricken households. In view of rather low cultural level in the women and ethnic minority, various demonstration areas organize special training programs, select proper teaching contents, methods and language according to the actual demand and thus upgrade the training effect. As for the demonstration area distributed with ethnic minority, easy and special training program is organized according to their features and demand.

The assessment team has formulated the catalog for activity participation of project beneficiary in different project cycles such as farmland soil environmental governance. It includes the participation suggestions of the evaluation team.

## **8.2 Participation of stakeholders in the project preparation stage**

### **8.2.1 Basic participation methods**

In the project impact area, the social evaluation team has launched out a series of project propaganda activities and mobilized stakeholders to participate in the project decision making. The stakeholders participate in the project at three levels:

#### (1) Official symposium

The assessment team convenes the symposium for officials of project office at various levels and related governmental departments and knows about and collects:

- ① Execution and assessment result of local project
- ② Project risk analysis; countermeasures for how to reduce risks
- ③ Suggestions on how to upgrade project effect
- ④ Project problems
- ⑤ Expected impact of the project
- ⑥ Collection of document literature and annual statistical statements at province,

county and county level.

(2) Symposium of project farmers and rural cooperative society

The assessment team convened a symposium with the sub-project project owners, including the following contents:

① Background and process of project; knowledge of project execution status quo and assessment

② Project design

③ Existing problems

④ Suggestions on how to upgrade project effects and avoid risks

⑤ Collection of owner's filing documents

⑥ Selection of investigation point

(3) Consultation and participation of stakeholders

The assessment team launched out consultation and participation in the stakeholders. In the on-site work of each sub-project, the assessment team selected different survey points in order to cover the main stakeholder groups affected by the project. The assessment team launched out the unlimited preliminary participation among main stakeholder groups. The assessment team selected different survey points and convened 12 county cadre symposiums participated by the county agricultural bureau, environmental protection bureau, animal husbandry bureau, poverty alleviation office, women's federation, civil affairs bureau, civil and religious bureau, human resource and social security bureau, national land bureau and demolition office and other relevant government functional departments; and 24 village cadre symposiums participated by the agricultural station technicians and township main responsible persons and directors of project village committees in project townships; 24 village team symposiums (240 persons in total, including 18 poverty-stricken persons, accounting for 30.0%); 2 poverty-stricken household symposiums (144 persons in total); 24 women symposiums (240 persons in total); launched out in-depth interview with 120 villagers, including 40 females, accounting for 33.3%; 40 minority people, accounting for 33.3%; 40 poverty-stricken people, accounting for 33.3%. In addition, according to a certain sampling rate, three categories of questionnaire surveys have been implemented in 12 project counties: a total of 1,800 copies of social assessment questionnaires were distributed in 12 project counties, and 1,540 copies of effective questionnaires were recovered with a recovery rate of effective questionnaires 85.6%;

600 copies of crop restructuring questionnaires were distributed in demonstration areas in 8 project counties where crop restructuring is required, and 541 copies of effective questionnaires were recovered with a recovery rate of effective questionnaires 90.2%; 500 copies of minority identification questionnaires were distributed in 5 project counties inhabited by minorities, and 436 copies of effective questionnaires were recovered with a recovery rate of effective questionnaires 87.2%.

Some pictures of the site of public participation

a. Site of questionnaire survey of the project



b. Site of symposiums participated by villagers



c. Cadres symposiums



### 8.2.2 Participation contents and activities of information disclosure

The participation in the project preparation stage mainly aims to reach common consensus and design the appeal plan that can adequately reflect the demand of stakeholders. Please refer to Table 8-1 for the specific participation catalog.

Table 8-1 Participation Model of Main Stakeholders

Participati on activities	Contents	Activity methods	Participants
<b>Project propagand a</b>	①Publicize the importance and necessity of project execution; request for their opinions and suggestions. ②Transmit the following information concerned by the mainly affected groups in a timely manner: project execution date, venue, settlement plan.	Bulletin, propaganda brochure, public convergence, slogan and propaganda list	①All the members of village ②Project owner ③Project office
<b>Analysis of affected group</b>	①Confirm affected groups and basic living status ②Confirm the positive and negative impact of various groups	Representative meeting Women symposium Symposium of poverty-stricken households	① Village representative (including poverty-stricken household, ethnic minority and women) ② Village/village committee ③Project owner and project office
<b>Analysis of problems</b>	① Analyze the status quo and existing problems in the village/village farmland pollution; determine specific impact degree on the village development ② Assist the local residents to analyze association of farmland pollution with their own life	Representative meeting Women symposium Symposium of poverty-stricken households	
<b>Evaluation of indigenous knowledge</b>	Analyze specific contents of indigenous knowledge to alleviate farmland soil pollution	Representative meeting Women symposium Symposium of poverty-stricken households	
<b>Analysis of need</b>	Confirm needs of affected groups; analyze the gap between said needs and project design	Representative meeting Women symposium Symposium of poverty-stricken households	
<b>Feedback</b>	①Evaluate the project design plan and project contents ②Evaluate the project expectation and suggestions of stakeholders	Representative meeting Women symposium Symposium of poverty-stricken households	
<b>Training</b>	①Face with all the local residents and enhance training of national and local environmental indicators and environmental protection laws and stipulations.	①Representative meeting ②Bulletin, propaganda brochure, slogan and	

	②Launch out training on farmland pollution control. ③Propagandize impact of living methods on the surrounding environment; assist the local residents to know about their living impact on the surrounding environment.	propaganda list	④Agricultural bureau ⑤Village committee
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Public opinions and suggestions have been obtained through convening symposiums, case interview, issuing questionnaires. Information collected through various methods allows residents in demonstration areas to have a common understanding of the project and improve their public participation awareness and ecology awareness, and further improve social and economic benefits of the project. Please refer to Table 8-2.

Table 8-2 Summary of public participation in social impact

Time	Form of public participation	Place	Participants	Content	Feedback to public opinions
May-Jul. 2017	Symposiums	Each county agricultural bureau	Environmental protection bureau, animal husbandry bureau, poverty alleviation office, women's federation, civil affairs bureau, civil and religious bureau, human resource and social security bureau, national land bureau and demolition office and other relevant government functional departments	Understand the status of local agriculture and rural residents; consult the status of the project in local areas. Know about basic conditions of industrial and mining enterprises involving heavy metal; current status of safety of local agricultural products; listen to the opinions of relevant government department on the project. Especially in Demonstration Areas where crop restructuring is required, listen to the opinions of relevant department on crop restructuring.	Play an exemplary role in the development of local agriculture, rural revitalization and increase of farmers' income through good implementation effect.
May-Jul. 2017	Symposiums	Township government	Agricultural station technicians and township main responsible persons and directors of project village committees in project townships	Understand the status of local agriculture and rural residents; consult the economic and social benefits of the implementation of the project in local areas.	Bring about significant social and economic benefits through good implementation effect
May-Jul. 2017	Symposiums	Villages	Villagers, responsible persons of cooperatives, poverty-stricken households, women, minorities, etc.	Understand the impact of heavy metal pollution on the physical and mental health of villagers; villagers' awareness of the project; listen to the willingness and suggestions of local villagers on the implementation of the project. Obtain a detailed understanding of the ethnic culture, language, production mode and social management and other	Bring about significant social and economic benefits to villagers, in particular poverty-stricken households, women and other groups through good implementation

				aspects of minorities in Demonstration Areas inhabited by minorities.	effect
Aug. - Oct. 2017	Questionnaire survey	Project villages	Residents in project villages	Understand residents' awareness of and willingness to the implementation of the project; as well as potential social impact caused by the implementation of the project.	Bring about significant social and economic benefits through good implementation effect
Nov.-Dec. 2017	Interview	Project villages	Residents in project villages	Obtain an in-depth understanding of farming practices and gender division of labor in Demonstration Areas as well as potential impact caused by the implementation of the project.	Promote industrial upgrading, social participation and equality through good implementation effect.

### 8.3 Public participation in project execution stage

All the members of village, village committee, project owner, project office and village project management team are converged to participate in the project construction and surveillance in the form of village meeting, representative meeting and village project management team meeting.

Farmer households' participation in the project execution stage should be the whole process participation. (1) To participate into project execution. Farmer households should participate into the execution of project activities, such as the sampling of rice and soil, the cooperative setup, cooperative post arrangement, staff employment, salary arrangement, dividends in shares, training plan formulation and project execution. Appropriate proportion of minorities, poor households and women should be guaranteed. (2) To participate into project monitoring. The representatives of farmer households, village committees and cooperatives should be guaranteed to participate into the whole process of the project monitoring plan formulation, selection of monitoring indicators, sampling and its delivery in order to ensure the scientific and effective monitoring. Please refer to Table 8-2 in detail.

Table 8-2 Participation Outline of Main Stakeholders in Project Construction Stage

Participation activities	Contents	Activity methods	Participants
<b>Village project organization and management</b>	Confirm the team members, recommend and select responsible person, execute organization training, select and manage project construction staffs, safeguard the security of construction site, coordinate the relationship between	① Village meeting ② Village/representative meeting ③ Village project management team	① All the members of village ② Village committee ③ Project owner ④ Project office

<b>nt team</b>	various parties and reflect the opinions of local residents.	meeting (including poverty-stricken households, affected people, ethnic minority and women)	⑤Village project management team
<b>Project construction</b>	<ul style="list-style-type: none"> <li>①Confirm the establishment methods, social capital introduction methods and farmland soil governance methods of professional agricultural organization</li> <li>②Confirm working posts of project construction</li> <li>③Confirm the selection standard of construction staffs and must include ethnic minority, poverty-stricken household and women</li> <li>④Confirm the remuneration of construction staffs</li> <li>⑤Participate in the technical training and safety system training of construction staffs</li> <li>⑥Participate in the project construction</li> </ul>	<ul style="list-style-type: none"> <li>①Village meeting</li> <li>②Representative meeting</li> <li>③Participation in the project construction</li> </ul>	<ul style="list-style-type: none"> <li>①The construction staffs include the resettled groups, ethnic minority, women and poverty-stricken households</li> <li>②Project office</li> <li>③Project owner</li> <li>④Project construction institution</li> <li>⑤Village project management team</li> <li>⑥Social capital representative</li> </ul>
<b>Village/village project soil surveillance team</b>	<ul style="list-style-type: none"> <li>①Make regular surveillance of the soil</li> <li>②Make resuming surveillance to the i resettled group's living standard</li> <li>③Monitor resuming of natural environment upon completion of project</li> <li>④Make regular surveillance of agricultural products</li> </ul>	<ul style="list-style-type: none"> <li>①Village meeting</li> <li>②Village/representative meeting</li> <li>③Village project surveillance team (including poverty-stricken households, resettled groups, ethnic minority, and women)</li> </ul>	<ul style="list-style-type: none"> <li>①All the members of village</li> <li>②Village committee</li> <li>③Project owner</li> <li>④Project office</li> <li>⑤Village project surveillance team</li> </ul>
<b>Training</b>	Make surveillance and assessment of skill training	Training of village project surveillance team	<ul style="list-style-type: none"> <li>①Village project surveillance team</li> <li>②Project office</li> <li>③Project owner</li> </ul>
<b>Appeal to opinions</b>	Establish opinion feedback system of village members	<ul style="list-style-type: none"> <li>①Print out "table of project appeal opinions" and distribute to each village team; enable the local residents to raise their opinions in a timely manner.</li> <li>②Prepare complaint hotline in the provincial project office.</li> <li>③Designate village surveillance team to collect the farmers' opinions and suggestions at any time.</li> </ul>	<ul style="list-style-type: none"> <li>①Village project surveillance team</li> <li>②All the members of village</li> <li>③Project office and project owner</li> </ul>

## 8.4 Information disclosure of the project

The participation right of affected people shall be emphasized during stages of involuntary resettlement, policy-making, and plan preparation and implementation. The objects of public participation are classified into three types, i.e. government departments in each level, expert terms and affected village collective and population. Resettlement policy framework and social assessment shall be involved in public consultation and participation according to steps of public participation to ensure full participation of affected groups. All documents shall be announced according to policy

of the World Bank and relevant archives shall be filed or published in the newspaper for announcement according to domestic requirements.

Opportunities including social economic investigation and social impact assessment and investigation shall be utilized to extensively publicize and introduce resettlement policy of the Project by various means and solicit opinions from various kinds of affected population. After extensive public participation, consultation and communication, local governments, affected village collectives and affected population have already fully understood the potential influence, settlement policy and income recovery plan of the project.

The project management office in each level may adopt the following procedures and methods to encourage the affected population to participate in consultation:

(1) Publicize basic information of the Project and attract the affected population to actively participate in the Project.

Methods such as posting of announcement, radio and television, network media and investigation forum are adopted to introduce basic conditions of the Project to the affected groups and enable the affected population to have a relatively full concept and understanding of the Project. The main contents of information of the Project include: Objectives of farmland pollution prevention and administration; influence of farmland pollution administration project; project compensation standards, compensation amount and resettlement policy; affected people's opinion feedback and appeal channels.

(2) Convening of public consulting meeting

The project management office organizes affected people to attend consulting meeting on an irregular basis based on actual conditions of project land acquisition and demolition. At least 5 meetings shall be convened. The number of participants shall not be lower than 30% of total affected population. During each meeting, representatives of disadvantaged groups especially women and ethnic minorities shall be invited to attend the meeting. The number of disadvantaged groups including women and ethnic minorities attending the meeting shall not be lower than 30% of total number of participants. Also, the meeting shall be monitored by relevant external independent monitoring organization. Furthermore, project construction contents, progress and resettlement policy of the Project shall be publicized through TV, broadcasting, newspaper and network.

(3) Convening of hearing

As for issues about affected people include change to alternative crops and planting technologies, affected people's compensation expectations and difficulties facing them, the affected people may fully express their opinions. their feedback and suggestions may be collected through public hearing, group discussion and analysis by classification of issues and suggestions. Then, the discussion results will be made public.

(4) Disclosure of resettlement policy framework

PMO shall disclose the existing resettlement policy framework to the public in project areas. The general places used to disclose resettlement policy framework can be public activity places, villager activity rooms in the affected village committees, government public information website, etc.. The language used shall be easy to understand. The main contents of resettlement policy framework include principles and procedures of compensation, resettlement policies, entitlement framework of affected people, and grievance redress mechanism, etc.

(5) Announcement of monitoring results of agricultural products during project implementation period

The villager monitoring team monitors farmland products using agricultural product monitoring equipment and then announce the detection results. Detection of agricultural products is usually conducted once for single cropping rice and twice for double cropping rice respectively. The monitoring results of agricultural products may be announced in villages' information bars, places with centralized activities conducted by villagers, villager activity rooms in the affected village committees and government public information website. The language used shall be easy to understand without easy generation of ambiguity.

## **9. Conclusions and Recommendations**

### **9.1 Basic conclusions**

#### **Project Overview**

The serious land heavy metal pollution of Hunan Province is an important cause resulting in standard surpassing of cadmium in rice. Under this background, in order to administer heavy metal pollution in producing places of agricultural products, improve quality and safety of agricultural products and safeguard people's life health, Agriculture Commission of Hunan Province plans to utilize World Bank loan to implement "Hunan Integrated Management of Farmland Pollution Project" (the Project for short). Construction method of whole district advancing will be adopted for the Project. demonstration area will be selected to implement centralized and comprehensive administration. The main contents of the Project include four aspects, i.e. agricultural polluted soil management, sustainable soil management practice, environmental management and agricultural environment monitoring, and project monitoring, assessment and management.

#### **Purpose and Process of Social Assessment**

The purpose of social assessment lies in identifying main stakeholders and their demands as well as opportunities and risks brought by project construction and operation to stakeholders. Also, relevant action plan is formulated to avoid or ease social risks and help perfect project design and implementation so as to enable individuals and groups possibly under most direct influence of project activities to take part in project activities effectively.

In order to help project owners to design and implement the Project, the social assessment team launched social assessment and investigation over the first batch of project counties from December 1, 2017 to December 25, 2017, 2015 with the support and coordination of relevant departments. Participatory social assessment method is adopted during the whole social assessment process. Approaches such as information disclosure and public consultation were taken to collect information. Social assessment was carried out in 12 project counties and methods such as structure interview, group interview, participatory scoring and sorting, matrix analysis of project influence, survey of community resources and mapping of resource map were employed. Social assessment team convened 12 county cadre symposiums participated by the county agricultural bureau, environmental protection bureau, animal husbandry bureau,

poverty alleviation office, women's federation, civil affairs bureau, civil and religious bureau, human resource and social security bureau, national land bureau and demolition office and other relevant government functional departments; and 24 village cadre symposiums participated by the agricultural station technicians and township main responsible persons and directors of project village committees in project townships; 24 village team symposiums (240 persons in total, including 18 poverty-stricken persons, accounting for 30.0%); 2 poverty-stricken household symposiums (144 persons in total); 24 women symposiums (240 persons in total); launched out in-depth interview with 120 villagers, including 40 females, accounting for 33.3%; 40 minority people, accounting for 33.3%; 40 poverty-stricken people, accounting for 33.3%. In addition, according to a certain sampling rate, three categories of questionnaire surveys have been implemented in 12 project counties: a total of 1,800 copies of social assessment questionnaires were distributed in 12 project counties, and 1,540 copies of effective questionnaires were collected with a rate of effective questionnaires 85.6%; 600 copies of crop restructuring questionnaires were distributed in Demonstration Areas in 8 project counties where crop restructuring is required, and 541 copies of effective questionnaires were recovered with a recovery rate of effective questionnaires 90.2%; 500 copies of minority identification questionnaires were distributed in 5 project counties inhabited by minorities, and 436 copies of effective questionnaires were recovered with a recovery rate of effective questionnaires 87.2%.

### **Demands of Main Stakeholders**

Total area for polluted farmland management in 12 project counties is 6,152.33 hectares. Based on field survey, social assessment has identified main stakeholders of the project and carried out participation and consultation with main stakeholders. Demands of those stakeholders are as follows:

Common demands: Develop agricultural production, increase opportunities for employment and entrepreneurship, enhance risk resistance, administer heavy metal pollution of farmland and improve farmers' production and living standards.

Demands of rural residents in Demonstration Areas: total population involved in Demonstration Areas is 208,400, including an agricultural population of 186,990, accounting for 89.72% of the population of demonstration areas. The demands of farmer households in demonstration area include: (1) Improve agricultural production infrastructure, e.g. repair or new construction of irrigation channels, farm tracks, and

other relevant facilities: (2) Better local ecological environment, improve quality of agricultural products and develop ecological agriculture; (3) Participate in farmer cooperatives and lower production risks and cost; (4) Adjust industrial structure, increase the ratio of cash crops in a proper manner and improve income level; (5) Lower the risk of increase of cost brought to farmers during administration process of heavy metal of farmland.

There are 107 rural cooperatives in demonstration areas. Demands of specialized farmer cooperatives: (1) Acquire capital support, lower financing cost and lighten the capital stress for development of ecological agriculture; (2) Improve organization management level of cooperatives and facilitate local agriculture to adopt scaled development path; (3) Establish soil and agricultural product heavy metal monitoring stations, improve quality management level of agricultural products and promote the local agriculture to adopt the development path of ecological agriculture; (4) Lower risks of sales of agricultural products and increase of costs.

Demands of project village committees: (1) Establish and perfect farmers' professional cooperatives and promote local industrial upgrading; (2) Strengthen local farmers' environment awareness and planting technology training as well as their environmental protection awareness and technological level; (3) Formulate a reasonable compensation mechanism and lower residents' resentment.

Demands of agricultural departments: (1) Smoothly and successfully complete the Project through cooperation with stakeholders; (2) Help farmer households in the demonstration area control heavy metal pollution of farmland, develop agricultural production and improve quality of agricultural products; (3) Explore local farmland pollution control technologies and management models through improvements of the World Bank project.

Demands of other relevant departments of the government: (1) Improve soil quality and local ecological environment and improve administration and monitoring level of local environment; (2) Promote the economic development of project counties and Demonstration Areas; drive the ecological development path of agriculture and promote rural revitalization; (3) Drive economic and social development, realize political stability and improve government image; (4) Improve production and living conditions of poverty-stricken people, enhance the living standards of poverty-stricken population, safeguard social stability and promote harmonious development.

### **Poverty Analysis**

Among 12 counties and cities in demonstration areas, 4 counties are national poverty-stricken counties and 8 counties and cities have been included in the list of Hunan Province poverty-stricken counties. Demonstration areas in 12 counties and cities where farmland governance is proposed to be implemented involve 5,030 poverty-stricken households, with a poverty-stricken population of 25,251, and an average poverty rate of 12.12%.

Poverty-stricken residents mainly obtain their income from traditional agriculture. According to survey, 68.3% of poverty-stricken households mainly obtain their income from planting industry and breeding industry. Income from farmlands of poverty-stricken households accounts for 66.0% of household income on average.

Poverty-stricken households have relatively consistent supporting attitude towards the Project. The survey indicates that 84.6% of poverty-stricken households believe “Safety and Quality Improvement Project for Producing Area of Agricultural Products” benefits local economic and social development. Certain group differences are also reflected in the understanding of poverty-stricken households of “Safety and Quality Improvement Project for Producing Area of Agricultural Products”. In poverty stricken population, understanding level of women of the project is higher than that of men, understanding level of poverty-stricken households in heavily polluted areas of the project is lower than that of poverty-stricken households in lightly polluted areas.

Low quality of agricultural products, high medical expenditure and low degree of agricultural industrialization are the main reasons causing poverty. Poverty caused by diseases is the main factor. 63.77% poverty-stricken households fall into poverty due to diseases; 14.85% poverty-stricken households fall into poverty due to disability. Therefore, poverty-stricken households have proposed the demands for improvement of quality of agricultural products, strengthening of planting technical training, increase of employment opportunities of poverty-stricken households, enhancement of development capacity and provision of cost compensation.

### **Analysis of Gender**

12 project districts and counties have a total population of 7.2448 million, including a population of 208,400 in demonstration areas, 101,900 women, accounting for 48.86% of the population in Demonstration Areas.

Women permanently residing in the villages mainly have junior high school diploma. According to survey data: 35.8% of them have primary school and below

primary school diploma; 52.8% of them have junior high school diploma; 11.3% of them have senior high school/technical secondary school/vocational school and higher diploma. Farming women are mainly middle and old aged women. According to survey data: the full time farming women in demonstration areas is with an average age of 47 years old, and the maximum age is 89 years old while the minimum age is 16 years old.

The rural labor engaged in agriculture is mainly women and middle age and old aged people. There are a total of 107 rural cooperatives in demonstration areas and women take up about 55% of total employees in the rural cooperatives. The proportion of women participating in the decision-making and management of rural cooperatives is low. There are a total of 406 management personnel in 107 rural cooperatives in demonstration Areas, including 110 women, accounting for 27.1%. There is no woman in the management of 21 rural cooperatives.

Demands of women for the Project: Increase job opportunities, provide labor protection measures against high temperature, sunstroke, weeds and mosquitoes and preventing inhalation of lime to lungs, and provide training of production skills such as operation of agricultural machines. Classroom lecturing and site demonstration shall be combined for relevant training. Enhancing participation capability of women.

#### Analysis of Ethnic Minorities

Jishou City, Huayuan County, Baojing County, Yongshun County and Cili County are inhabited by ethnic minorities. Total population of project villages is 94,382, including a total ethnic minority population of 80,596, accounting for 85.39%. Among ethnic minorities, total population of Tujia people is 44,716, accounting for 47.38%; total population of Miao people is 35,880, accounting for 38.02%.

Analysis of differences of Tujia nationality in demonstration area: According to the proportion of Tujia in the population of Demonstration Areas, 38 villages inhabited by Tujia are divided into three categories: project villages where population of Tujia people accounts for less than 30% of population of demonstration areas; project villages where population of Tujia people accounts for 30% - 50% of population of demonstration areas; project villages where population of Tujia people accounts for 50% and above of population of demonstration areas. According to the definition of minorities of the World Bank, various categories of project villages are identified through interview and other methods. It is concluded: local residents do not identify themselves as a unique cultural group. Their customs and habits are substantially consistent with Han. In addition to Spring Festival, Lantern Festival and Dragon Boat

Festival and other traditional festivals as Han, there are “going to the last fair before spring festival”, “the 3rd day of the Third Lunar Month”, “the 8th day of the Fourth Lunar Month”, “the 6th day of the Sixth Lunar Month” and “the 7th day of the Seventh Lunar Month” and other local ethnic festival. Local residents see no difference with Han in terms of language, planting habit, customs and habits. Language: Since the Tujia nationality lives together with Han nationality in demonstration area for a long time, people with Tujia nationality have begun to use Chinese quite early; religious belief: The Tujia nationality in demonstration area mainly believes in Taoism and worships ancestors. The Tujia nationality believes in multiple gods and the religious beliefs include nature worship. Land, rock, mountain, river and water are all Tujia people’s worship objects. Almost all Tujia families consecrate their ancestors’ spirit tablets in the shrines of central rooms. The festivals of the Tujia nationality in demonstration area mainly include dragon-boat racing and “the 6th day of the Sixth Lunar Month”. The Tujia nationality pays great attention to traditional festivals especially the Spring Festival which is the most ceremonious. Local customs of the Tujia nationality include: Before marriage of women of Tujia nationality in the demonstration area, there is a custom of “crying marriage”. Before marriage, if a girl cannot practice this custom, she will be discriminated and ridiculed. However, currently, this custom has already been gradually faded. Mode of production: Rice planting is mainly adopted. During busy season, Tujia people harvest wheat, transplant seedlings and beat harvest rice. As for families lack of labor, others will initiatively help them and the hosts are only required to provide food and drink. This kind of custom featuring mutual help has become a custom through long time usage over the centuries.

Total population of Miao people in project villages is 35,880, accounting for 38.12%. According to the proportion of Miao in the population of demonstration areas, 24 villages inhabited by Miao are divided into two categories: project villages where population of Miao people accounts for less than 50% of population of demonstration areas; project villages where population of Miao people accounts for 50% and above of population of demonstration areas. According to the definition of minorities of the World Bank, various categories of project villages are identified through interview and other methods. Local residents do not identify themselves as a unique cultural group. Their customs and habits are substantially consistent with Han. In addition to Spring Festival, Lantern Festival and Dragon Boat Festival and other traditional festivals as Han, there are “going to the last fair before spring festival”, “the 3rd day of the Third

Lunar Month”, “the 8th day of the Fourth Lunar Month”, “the 6th day of the Sixth Lunar Month” and “the 7th day of the Seventh Lunar Month” and other local ethnic festivals. Local residents see no difference with Han in terms of language, planting habit, customs and habits. Miao in Demonstration Areas does not have its unique or other recognized cultural features, living customs or local customs; the social, economic, cultural and political organization has no difference from that of mainstream races; the religious, sacrificing and totem worship activities do not have obvious difference from the mainstream society. Management mode of villages inhabited by Miao in demonstration areas is substantially consistent with that of most rural areas in China, i.e. the combination of township government and village governance. Language used in daily communication of Miao in demonstration areas is local dialect, and characters used in daily life are Chinese characters. Lands of Miao in demonstration areas are owned by the collective; the management mode of contract responsibility system based on the household with remuneration linked to output is adopted.

By detailed survey and analysis, it was believed that the Miao people and Tujia people in project areas have the high degree of integration comparing with the mainstream of Han nationality, the definition of ethnic minority and its policy adopted by the World Bank are not applicable, it is unnecessary to formulate the ethnic minority development plan.

### **Social Impact and Risks**

The social assessment shows that the positive influence of integrated management of polluted farmland in Hunan Province is mainly reflected in the followings:

Positive impact within a short term is mainly reflected in: (1) Improve the work safety product awareness of stakeholders through project publicity; (2) Improve farmer households’ skills of work safety products through project training; (3) Reach a consensus on control of heavy metal pollution of farmland through public participation; (4) Create conditions for agricultural production through improvement of infrastructure; (5) Provide quality management of agricultural products with technical support through environmental management and monitoring of agricultural environment; (6) Improve risk resistance and product competitiveness of farmer households through cultivation of farmers’ professional collectives.

Medium and long-term positive impact is mainly reflected in: (1) Significant ecological benefits: The heavy metal pollution of farmland has been administered in the Project through adoption of measures including source control, dynamic monitoring

and soil repair to a certain extent, thus benefiting improvement of ecological environment; (2) Considerable economic benefits: The heavy metal pollution administration of farmland in the Project can realize improvement of selling prices of agricultural products, lowering of agricultural production cost, improvement of land utilization efficiency and improvement of added value of agricultural products, which benefits the improvement of farmers' production and living standards; (3) Obvious social benefits: The implementation of the Project benefits return of migrant workers. In particular, it creates relatively abundant jobs for women. It benefits poverty alleviation of poverty-stricken households and formulation of farmland pollution administration model.

In case of smooth implementation of the project, a total growth of income of 44.835 million Yuan/year is expected to be created for farmers in 12 demonstration areas. A total of 12,000 posts are expected to be increased, including almost 7,000 posts for women. 5,030 poverty-stricken households for who files were established are expected to achieve poverty alleviation.

The social assessment team thinks that the social risks of integrated management of polluted farmland in Hunan Province are mainly reflected in the followings:

Social risks of growing alternative crops: The total curbing area of 12 project counties will be 6,152.33 ha., of which heavy pollution area 408.46 ha., accounting for 6.64% of the total. "VIP" management and application of organic fertilizer or planting green manure (F) and other measures are proposed to be taken in a total of 5,743.87 hectares of farmlands under control; crop restructuring is proposed to be implemented in a total area of 408.46 hectares, including 126.63 hectares for replanting flowers and seeding trees and fruit seedling, etc.; 112.48 hectares for replanting corn/rape/sorghum; 76.44 hectares for replanting oranges, pears, grapes and pitayas etc.; 16.24 hectares for replanting folium artemisiae argyi; 76.67 hectares for replanting lotus. Project works are mainly reconstruction based on existing irrigation canals. Land acquisition or house demolition will not be involved in project execution, involuntary resettlement policy of the World Bank will not be triggered and it is unnecessary to formulate any resettlement action plan. If there is any newly emerged involuntary resettlement, the existing resettlement policy framework which was prepared at the project appraisal earlier will be applied to these 12 county subprojects. The possible social risks of growing the alternative crops in the heavy pollution project areas are: (1)Some farmers will not cooperate. Growing the alternative crops will need to change the planting habits and

technology. PMOs and SA teams have conducted detailed survey and analysis, but in fact, a few farmers may not cooperate. (2) Management issue of the delivery of the subsidy of growing the alternative crops, the agreement is made regarding the subsidy standard, but some farmers are concerned about the transparency of the subsidy delivery. (3) Labors. Due to the fact that most strong labors already work outside as workers, most villages have not enough labors. Growing the alternative crops of flowers and trees need more labors, the project execution may lack labors.

Economic risks: Economic risks are mainly reflected in three aspects: (1) Social risks resulting from land remediation due to preservation of original planting habits: The first category is risk of marketing. Rice is replanted to low-cadmium varieties, and thus quality of rice grain will be affected to some extent, which means that existing marketing channels and methods may be affected. The second category refers to risk of failure of food to reach standard. During the period of administration, some food may not completely reach the standard, which may influence food selling price. The third category is risk of output reduction. Replanting low-cadmium varieties will increase the risk of rice blast and may further lead to reduction of output. According to survey data: the top concern for peasants is reduction of actual income of rural residents in short term (74.3%), followed by increase of agricultural production labor amount (40.1%) as well as marketing risk incurred by replanting varieties (31.6%). (2) Social risks from farmland crop restructuring: The first category is the risk of cost and benefits of replanted crops. The second category is the risk brought by market sales. It is required to establish new sales channels for replanted fruit trees, vegetables and cotton, so as to result in sales risk. Third, management risk. Replanting will not only implement new requirements on technical management of replanted crops but also require project villages to establish fair, transparent and standardized management procedures. (3) Social risks from adjustment of cropping system: The change of planting model may increase labor input. If no reasonable subsidy is obtained from the project, farmer's net income will be lowered. According to survey data: in the process of crop restructuring, the top concern for rural residents is reduction of actual income in the same year (65.40%), followed by unmarketable replanted crops (42.30%)

Public opinion risks: Public opinion risks are mainly classified into four types: The first category is the risk of improper attribution. The existing pollution condition is resulted from multiple aspects. Administration of soil pollution of farmland before

launch of administration of other pollution may cause the local residents to attribute all problems to heavy metal pollution so as to put forward relevant claim appeals. The second category is the risk of exaggeration of heavy metal pollution. Government departments leading the launch of farmland heavy metal pollution administration in demonstration area can easily attach the label of heavy metal standard-surpassing in all agricultural products in demonstration area. The third category is the risk of resident's environmental protection awareness. The main stakeholder groups have different orientations in their roles played in environmental pollution and environmental protection. They neither think that they shall take responsibility for surrounding environmental pollution nor believe that they are one of subjects involved in environmental governance.

## **9.2 Recommendations**

In order to ensure the smooth execution of the project, it should adopt the following supporting policies.

**(一) to enhance the training of project participation willingness of farmers, establish the whole process of participation mechanism, minimize the social risks of growing alternative crops in heavily polluted farm land.**

In order to defuse the social risks of growing the alternative crops, it is suggested to enhance the training of project participation willingness of farmers, improve the farmers' consciousness of ecology and health, formulate the whole process participation mechanism, farmers will be guaranteed to effectively participate into the process of the selection of the alternative crops, formulation of subsidy plan and the project impact monitoring. The selection of alternative crops should fully respect to farmers' wishes, some locally successful crops can be considered as a reference to make the decision.

**(二)to formulate the subsidy plan and foster the farmers cooperatives, defuse the economic risk in agricultural land pollution treatment.**

After the consultation with local agricultural authorities and farmers, the project plans to formulate the subsidy plan, which is subject to adjustment according to the local conditions. Based on the technical methods, the compensation plan has 2 categories: one category is the compensation plan for rice of cadmium content exceeding the standard, mainly to compensate the profit loss of farming products which don't meet the standards. The compensation standard plans to be 20% of the local governmental purchase price. Another category is to compensate farmers who grow alternative crops.

Growing alternative crops might result in the income decrease, according to the expectation of residents, the compensation standard plans to be 6,000 Yuan per ha. With regarding to the huge input activity of growing alternative crops, such as growing flowering trees, project areas will be encouraged to explore the financial models of farmer households guarantee each other + cadre guarantee, and company +base +credit cooperative +farmer household. The project will foster the cooperatives in the areas without cooperatives, the project will strengthen the management capacity of existing cooperative by providing trainings in the areas with cooperatives. The project will try to foster 1 cooperative in each administrative village.

**(三) To strengthen the propaganda training and public sentiment guidance, and defuse the risk of public sentiment in project execution**

With regarding to the control measures of potential risk of public sentiment: Firstly, data obtained by monitoring at project start and execution stage should be kept in confidential in some degree. Secondly, the project should strengthen the propaganda and improve the environmental protection awareness of residents. Finally, the project should formulate the scientific and reasonable participation principles. Concrete measures are: to propaganda the food safety knowledge to the public and help them to realize that necessary measures can effectively reduce the heavy metal pollution, to adopt the relevant propaganda measures, to correctly guide the public sentiment and prevent the incorrect relaying an erroneous message, to pay attention to the wording in each stage of the project and try to avoid labeling, language expression should be popular and easy to understand, the propaganda manual and participation plan should be designed according to local linguistic and cultural habits.

With regarding to the above-mentioned conclusions and measures, it is suggested to carry out the following social action plan:(1)to establish the agricultural land treatment association and ensure the deep participation and extensive consultation of farmers households in project execution.(2)to formulate the compensation plan and ensure the increase of farmers households' income , to avoid or minimize the negative impact to farmer households brought by the project.(3)to formulate the action measures and the budget.(4)to establish the project complaint and grievance mechanism and promote the extensive participation of the residents in project sites.

## 10. Social Action Plan of the Project

### 10.1 Logical Framework

As for casual loop diagram involving problems existing in polluted villages of Hunan Province, causes of formation and social impact as well as functions of project activities, negative influence and consultation and discussion results of problems and countermeasures, the consulting experts adopt “Target-oriented Project Planning Method” to draft *Social Action Plan of Hunan Integrated Management of Farmland Pollution Project*.

**The long-term objectives of the Project in social terms are recommended as:** Realize effective administration of polluted farmland in demonstration areas of relevant counties and cities to enable farmer households especially poverty-stricken households and women to produce safe grains and increase income, get rid of poverty and diseases resulting from polluted farmland, shorten the gap between the rich and the poor among village groups and farmer households, increase agricultural risk resistance, orderly participate in rural cooperatives and develop high-efficiency and ecological agriculture.

The objectives during project planning stage are recommended as: Enable polluted farmland in each town, village group and farmer household in demonstration areas to produce safe grains.

**Outputs to obtain in order to realize objectives include:**

1. The polluted farmland regions have basically adopted effective farmland remediation technologies based on degree of pollution;
2. The administration cost of polluted farmland is reasonably apportioned and the farming benefits are significantly improved;
3. Monitoring equipment of polluted farmland has been basically established and effective monitoring is launched;
4. Poverty-stricken households, women and farmer households have equally participated in planning, implementation and management of the Project and fairly benefited from the Project.

**Project activities to launch in order to obtain results:**

As for administration and management of polluted farmland:

(1) Adopt remediation technologies in polluted farmland, including liming, flood irrigation, replanting of low-cadmium varieties, application of organic fertilizers, planting of green manure, spraying of leaf surface controlling agent, additional

application of soil conditioner and deep ploughing technology. These technologies involve cost subsidy though. Remediation technologies or replanting of low-cadmium varieties also involve benefit loss subsidy.

(2) Guide farmers to adjust planting structure and replant candy orange, grapefruit and cotton. The adjustment of planting structure involves productive subsidy and risk subsidy.

(3) Repair irrigation works and facilities allocated in field.

(4) Establish monitoring equipment of polluted farmland and agricultural products and cultivate relevant monitoring technical personnel.

(5) Establish long-term effective polluted farmland administration measures and develop relevant management organization.

Social participation of pollution administration:

(1) Offer training of concepts of social fairness, priority to poverty, etc. as well as participatory project planning, implementation, management, monitoring and evaluation approaches and methods to PMO, and leaders and personnel of relevant agencies;

(2) Offer training of concepts of equality, participation and democratic rights and implementation methods to cadres of project village groups and representatives of farmer households (including the appropriate proportion of poverty-stricken households and women);

(3) Establish rural cooperatives in project towns and village groups to ensure that farmer households participate in the planning, design, implementation, engineering quality supervision and acceptance of the Project in an equal manner;

(4) Establish farmland pollution administration interest appeal mechanism between agricultural management department and environment protection department and villages and rural cooperatives.

## **10.2 Consultation Framework**

The participation and consultation framework applicable for each party during implementation of the Project shall comprise several aspects, including organization structure, rules and regulations, actual operation and supervision management:

### **10.2.1 Organization Structure**

It is recommended to form farmland administration association as organization structure of this framework in the community level. The farmland administration

boundary in this demonstration area is basically consistent with the boundary of administrative village. Therefore, the farmland control association (hereinafter referred to as “the Association”) is recommended to be formed with administrative village as unit. It shall be classified into 4 levels, namely, farmland control association, villager representative assembly, village congress and villager group.

The villager groups shall carry out participation, consultation and management of project construction and polluted farmland administration within scope of each group. Farmer households, poverty-stricken households, other types of farmer households and women shall elect their own representatives respectively to exercise democratic rights such as participation, expression and supervision in the organization and operation of villager congress. The ratio of women in total number of participants shall not be lower than 30%.

Villager representative assembly or enlarged villager representative assembly is the consultation and deliberative organ responsible for formation, operation or village-level development of the Association. This organ is also responsible for discussing and nominating candidates of executive committee members, or village project management team and supervision team, forming schemes and reaching consensus on planning, implementation and management of articles of association and each rule of the Association as well as the Project in the village level as well as use and maintenance of the Project through discussion and consultation, and submitting the foregoing to villager congress or general villager assembly.

As the highest decision-making body, villager congress selects executive committee members of the Association and members of the supervision team, discusses and modifies articles of association, rules and project planning as well as other schemes submitted by the representative assembly, listens the annual work report, work plan of next year and farmland administration plan of executive committee of the Association or project management team as well as reports of the supervision team, and discusses, modifies and votes. Under the condition that overwhelming majority of farmer households in the whole village trust and authorization, the villager congress or enlarged villager congress may vicariously exercise the authorities of villager general meeting.

As the executing agency of farmland administration association, the project management team is responsible for organizing and implementing the Project, executing rules and regulations regarding farmland pollution management and project

maintenance, implementing polluted farmland administration measures, and coordinating with disputes and contradictions resulting from farmland pollution administration. The number of members of executive committee of the Association and project management team shall better not exceed 5 so as to reduce lost labor subsidy expense. Since the Project is community oriented (i.e. all villagers are required to participate in the Project and fairly benefit from the Project), the main leaders in village Party branch and village committee (the two village committees for short) responsible for the Project shall be allowed to directly enter the executive committee and project management team and host the work without election so as to avoid existence of two leading centers in one community; other members and supervision team shall be elected and appointed by villager congress or representative assembly or enlarged villager representative assembly. The members of supervision team shall have no direct relationship with members of executive committee and management team so as to make it convenient to give play to supervision function.

The responsibilities of the two village committees include: Analyze differences of communities and farmer households with the help of PMO, organize each representative to analyze farmland pollution control problems and countermeasures, and participate in planning and design of project contents at village level; mobilize and organize each villager group to elect members of enlarged villager representative assembly and prepare to establish and convene villager representative assembly, enlarged villager representative assembly, villager congress, and all villager assembly; after establishment of project management team, except main leaders responsible for the Project entering and hosting the work, the two village committees shall continuously support the work of the Association or the management team, coordinate with superior-subordinate and internal-external relationships and carry out necessary supervision instead of taking on the work of management team for replacement.

During consultation, discussion of official business, organization of implementation of the Project, operation and maintenance of the Project and mediation of disputes, the functions of family elders, social elites, senior Party members and veteran cadres shall be brought into play and the development and work implementation of the Association or project management and supervision organization shall be supported; also, young people shall be encouraged to take part in development of the Association as well as planning, implementation and management of the Project.

### **10.2.2 Rules and Regulations & Rules of Procedure**

The villager congress shall formulate articles of association or relevant terms in project management system to ensure the proportion of poverty-stricken village groups, poverty-stricken households and women in villager representatives.

Certain rules and procedures shall be formulated for consultation, discussion and decision-making of the Association or the Project, including group discussion, communication in assembly and reaching of consensus of groups such as poverty-stricken households and women so as to ensure that each poverty-stricken village group, poverty-stricken households and women may exercise democratic rights such as right to know, participation, expression, decision-making and supervision and make sure that they can participate in development of the Association as well as planning, implementation, management, monitoring and evaluation of the Project all the way.

### **10.2.3 Actual Operation**

Help village group cadres to determine residence distribution of poverty-stricken residents and differences between villager groups and farmer households; join hands with each representative especially representatives from poverty-stricken communities, poverty-stricken households and women representatives to discuss and analyze problems, causes and countermeasures in terms of administration of polluted farmland so as to realize the necessity of implementation and management of the Project; analyze negative influence of project contents as well as problems possibly taking place during implementation of the Project, and determine measures to avoid or lighten such negative influence; specifically plan and design project contents of each villager and formulate project implementation plan based on actual circumstances and conditions and people's demands and wishes.

Assist the formation of village groups, village representative assembly or enlarged villager representative assembly and ensure the implementation of relevant terms in articles of association of the Association and project rules regarding poverty-stricken village groups, poverty-stricken households and women representatives.

Help project management team and project village joint conference formulate rules and regulations involving agriculture management, engineering management and financial management of farmland pollution administration and prepare project maintenance plan. Special attention shall be paid to safeguarding of rights of ethnic minorities, poverty-stricken village groups, poverty-stricken households and women including equal participation, consultation and benefiting; solve possible water consumption contradictions and disputes of project management team or water

consumption household groups.

Strengthen the capacity building of leaders and relevant personnel of the Association or project management team and improve their awareness of social fairness and priority to poverty.

#### 10.2.4 Monitoring and Evaluation

A monitoring and evaluation mechanism shall be established in “Provincial Project Management Office”. This mechanism is to supervise and monitor execution of subsidy schemes of the Project and social benefits generated. The supervision and management are specifically implemented by Provincial Project Management Office. It is required to establish a top-to-bottom internal supervision mechanism. Consulting experts hired by Provincial Project Management Office shall check the implementation progress of project subsidy scheme, form a progress report and submit the report to the World Bank once every year. The supervision and assessment indexes of the Project include farmers’ income, jobs and farmer households’ skills. See Table 10-1 for details.

Table 10-1 Social Assessment Index System of the Project

Social impacts of the Project	Monitoring and evaluation indexes	Acquisition of indexes
◇ Increase of farmers’ income	Farmer households’ pure income per capita (before and after the Project)	Baseline survey
	Income of special groups per capita	
◇ Increase of jobs	Increase of number of agricultural technical personnel	Relevant statistics of government in each demonstration area Records of PMO
	Increase of jobs of special groups	
◇ Increase of farmer households’ production skills	Personnel participating in technical training	Records of PMO
	Sessions of agricultural technical training	
	Learning of skills of special groups	
	Frequency of participation in activities such as training and visit	Records of PMO and community
	Satisfaction degree assessment of project training	
◇ Promotion of establishment of farmers’ cooperative organizations and community democracy	Number of rural cooperative organizations in project villages	Statistics of county PMO
	Degree of satisfaction of benefited groups for project	Questionnaire Interview
	Villagers’ feedback of the Project	
◇ Capacity building of project management organization	Construction of agricultural product producing place heavy metal pollution of soil monitoring system	Record of PMO Symposium

### 10.3 Subsidy Scheme

#### (1) Source of compensation fund

All compensation funds covered by the compensation scheme shall be from the World Bank loan and government supporting funds of each project county. Specific amount of compensation funds shall be determined according to specific conditions of

different project counties, in particular the area of farmlands to be governed.

Each project county government shall guarantee compensations for rural residents to be in place in full amount and a timely fashion.

(2) Compensation standard and budget

Subsidy schemes are drafted through consultation with local rural residents. There are two types of subsidy schemes according to technical modes:

The first type is to eliminate the revenue risk of remediation technologies based on “VIP”. In order to effectively eliminate the benefit loss caused by substandard products using the subsidy scheme for remediation technologies based on “VIP”, it is recommended to develop risk subsidy scheme according to the standard of 20% of the governmental purchase price. Budget shall be made according to the case that 30% of the project farmland do not meet the standards.

The second type is the subsidy provided to affected people or village for crop restructuring. Crop restructuring subsidy is developed according to the expectation of local residents and opinions of provincial and county project offices. Crop restructuring subsidy will apply the standard as expected by local residents.. That is, the crop Restructuring subsidy determined by provincial and county project offices is 6,000 Yuan/hectare. Subsidy will be provided for annual crops for only one year. Subsidy will be provided for crops with two restructuring years and above till the production year. Based on the restructuring crop types and scales provided by project counties, according to the subsidy standard, subsidy of each project county can be estimated by the social assessment. See Table 10-2 for details.

Table 10-2 Crop Restructuring Estimated Subsidy Budget of Project Counties  
(unit: 10,000 Yuan)

	Flowers/seeding/fruit seeding, etc	Oranges, pears, etc	Folium artemisiae argyi	Corn, oilseed rape, etc.	Lotus	Total	Source of fund	Supervision organization
Zhongfang County	41.59	61.06	38.98	23.04	0.00	164.66	World Bank loan	Provincial and county project offices
Huayan County	114.00	0.00	0.00	0.00	0.00	114.00		
Yizhang County	0.00	0.00	0.00	0.00	136.01	136.01		
Cili County	148.32	0.00	0.00	0.00	0.00	148.32		
Linwu County	0.00	0.00	0.00	108.00	48.00	156.00		
Anhua County	0.00	26.40	0.00	0.00	0.00	26.40		
Lengshuitan County	0.00	0.00	0.00	138.91	0.00	138.91		
Yongshun County	0.00	0.00	0.00	96.00	0.00	96.00		
<b>Total</b>	<b>303.91</b>	<b>87.46</b>	<b>38.98</b>	<b>365.95</b>	<b>184.01</b>	<b>980.30</b>		

### (3) Subsidy organization

Prior to the implementation of the project, each project county shall establish a special compensation organization, with specially-assigned person to be responsible for issues relating to compensation. Compensation organizations include county compensation organization and village compensation organization. County

compensation organization shall be set up under the county project office, led by county project leaders, with 5 members; it could be an independent department or acted concurrently by main principal of county project office. Village compensation organization consists of 5 members, including village project principals, village leaders and villagers,.

Main responsibilities of county compensation organization: be responsible for the distribution of compensation funds and the execution of compensation schemes, etc.;

Main responsibilities of village compensation organization: be responsible for specific execution of compensation schemes and regular disclosure of compensation information.

#### (4) Compensation time

According to public participation result, rural residents generally choose compensation once a year in terms of compensation time. To this end, the compensation scheme is determined as compensation once a year. Compensation shall be subject to assessment result. Corresponding compensation can be made after the issuing of the assessment result of substandard, to be governed and the confirmation of farmland crop restructuring by project county.

#### (5) Applicability of compensation

Risk subsidy is only applicable to substandard farmlands verified by relevant department through test. Crop restructuring subsidy is only applicable to heavily polluted farmlands according to monitoring data. Subsidy will not be provided for moderately or lightly polluted farmlands.

#### (6) Compensation mode

According to public participation results, the principle of “subsidy will be provided for the person who plants” is adopted. Subsidy is provided in cash mainly. Specific operation is as follows: county project office will execute unified bank cards for each rural resident for who a subsidy will be provided; compensation fund required will be transferred into the bank account of each rural resident uniformly at the compensation time point each year.

#### (7) Compensation process

Process of the compensation scheme is:

Step 1: each county project office publishes compensation scheme and implementation details;

Step 2: Each project village provides compensation scheme and implementation

details and compiles statistics of specific data of light pollution, moderate pollution and heavy pollution respectively.

Step 3: Each county project office will, according to compensation data provided by each project village, report to provincial project office for approval. After approval, county project office will distribute compensation fund and implement specifically.

Step 4: Each county project office will transfer compensation fund into the compensation account of each rural resident.

#### (8) Compensation supervision

In order to guarantee compensation measures of the project to be implemented earnestly and compensation funds to be in place in full amount and a timely fashion, a supervision team shall be established during the period when compensation is required for the project. Main responsibilities of the supervision team are:

Supervise compensation funds to be in place in full amount and a timely fashion;

Supervise the openness, transparency and equality of compensation process;

Supervise compensation funds to be used for its specified purpose only.

Principle of three-three system is adopted for staff composition of compensation supervision team, i.e. 3 members of county project team (in principle consisting of director of county project office, leader in charge of project funds, finance bureau, leader in charge of auditing bureau), 3 members of village project team, 3 villagers' representatives.

### **10.4 Implementation of Study on Hunan Agricultural Environment Pollution Compensation Mechanisms**

In this subject, the issue of policy compensation mechanism for heavy metal and non-point source pollution in Hunan agricultural environment is mainly discussed, primarily aimed at providing Agricultural Commission of Hunan Province with advisory policy recommendations in terms of economic compensation and non economic compensation for tackling pollution in agricultural environment. Main research techniques are questionnaire survey and focus group interview. Objects for sampling survey are divided into 3 categories: first, 3 counties are selected from 15 project counties with heavy metal pollution determined by the World Bank as sample counties; second, 3 counties are selected from Changsha-Zhuzhou-Xiangtan Region with state intervention as sample counties; third, 3 counties are selected from other counties not subject to the intervention of the state and the World Bank as sample

counties. 3 natural villages subject to agricultural environment pollution are selected from each of the 9 selected sample counties as sample villages; 27 sample villages in total. In this case, it will help us implement comparative a study to compensation mechanisms for agricultural environment pollution. Main outcomes are: first, policy advisory report - *Study on Hunan Agricultural Environment Pollution Compensation Mechanisms*; second, development of ecological environment awareness and improvement of ecological environment protection capability of enterprises and farmers.

#### **10.5 To carry out the impact monitoring and evaluation of social action**

As for impact monitoring and evaluation, Provincial PMO entrusts an independent agency or society and migration consulting expert through public bidding to carry out the monitoring and evaluation of project subsidy scheme and social benefits of the whole project once a year until the planned objectives of the Project are fully realized. The independent agency or individuals can be academic agency, NGO or independent consulting company which shall have qualified and experienced staff though. Also, the work outlines of such agencies shall be accepted by the World Bank.

#### **10.6 Expenditure estimate**

According to “project activities to be implemented in order to obtain results” in logical framework in terms of society of project counties, the following table of expenditure estimates is listed. See Table 10-3 for details.

**Table 10-3 Table of expenditure estimates of development planning measures and actions in 12 counties**

Training objects and contents	Training method	Person-time/year(each county)	Training years(each county)	Total expenses in five years(unit: 10 thousand Yuan)	Total expenses of 12 counties(unit: 10 thousand Yuan)	Implementing organization	Supervising organization	Source of fund
Offer training of concepts of social fairness, priority to poverty, etc. as well as participatory project planning, implementation, management, monitoring and evaluation approaches and methods to PMO, and leaders and personnel of relevant agencies;	Participatory poverty relief, expert consulting and training	60	5	6	72	The third organization entrusted	Provincial and county project management offices	World Bank loan
Offer training of concepts of equality, participation and democratic rights and implementation methods to cadres of project village groups and representatives of farmer households (including sufficient poverty-stricken households and women);	Participatory poverty relief, expert consulting and training	300	5	30	360	The third organization entrusted	Provincial and county project management offices	
Establish rural cooperatives in project towns and village groups to ensure that farmer households participate in the whole process of the Project.	Expert consulting, pilot, site survey and training	300	5	30	360	The third organization entrusted	Provincial and county project management offices	
Guide farmers to adjust planting structure.	Technical training, and information and sales services	1500		22.5	270	The third organization entrusted	Provincial and county project management offices	
Establish long-term effective polluted farmland administration	Expert consulting, training, community	300	5	30	360	The third organization	Provincial and county	

measures and develop relevant management organization.	mobilization and cultivation organization					entrusted	project management offices
Establish farmland pollution administration interest appeal mechanism between agricultural administrative department and environment protection department and villages and rural cooperatives.	Expert consulting and establishment of relevant meeting and mechanism	30	5	3	36	The third organization entrusted	Provincial and county project management offices
<b>compensation mechanism of Hunan agricultural environmental pollution</b>	Expert consulting and field survey			2	24	The third organization entrusted	Provincial and county project management offices
results monitoring and evaluation of social action	field survey			7.5	90		
total				131.08	1572		

## 10.6 Grievance Redress Mechanism

During preparation and implementation of the Project, in order to timely get to know and solve the influence and problems caused by the Project to affected people, employees of affected enterprises and other stakeholders, varied and effective appeal and complaint channels shall be established in the Project. Such channels specifically include:

Stage 1: The affected people may express their dissatisfaction to the project owner, or village committees/community neighborhood committees, or town governments/sub-districts in form of oral appeal or written appeal. The said project owners, or village committees/community neighborhood committees, or town governments/sub-districts shall preserve a written record of oral complaint and give clear reply within two weeks.

Stage 2: If the affected people are still dissatisfied with the s decisions in stage 1, they may put forward appeals to relevant implementation and management agencies

such as county PMO after receiving the decisions and relevant agencies shall make decisions on handling of such matters within 2 weeks.

Stage 3: If the affected people are still dissatisfied with the decisions in stage 2, they may put forward appeals to provincial PMO after receiving the decisions. Relevant agency shall make decisions on handling of such matters within 2 weeks.

Stage 4: If the affected people are still dissatisfied with the decisions in stage 3, they may put forward appeals to competent administrative authorities level by level for arbitration according to the *Administrative Procedure Law of the People's Republic of China*.

Stage 5: If the affected people are still dissatisfied with the arbitration award, after receiving the arbitration award, they may appeal to the civil court according to the civil procedure law.

## **Appendix 1: Social Assessment Questionnaire of Hunan Integrated Management of Agricultural Land Pollution Project with World Bank Loan**

Dear friends,

Hello! In order to control the heavy metal pollution in agricultural product producing area, Agricultural Commission of Hunan Province intends to implement the “Hunan Integrated Management of Agricultural Land Pollution Project”. This survey will not involve personal identification information, so please answer them truthfully. Thank you for your support for the project! Please fill in the details on the line, draw “√” on the corresponding option.

Research Group on the Social Assessment of “Hunan Integrated Management of Agricultural Land Pollution Project”

January 2018

### **A. Basic Information**

**A1. Your gender:** ① Male ② Female

**A2. You are \_\_\_ years old. (Please fill in the specific figure on the line)**

**A3. Your education degree is:**

- ① Primary school and below ② Junior high school
- ③ Senior high school/technical secondary school/vocational school
- ④ University and above

**A4. Your marital status is:**

- ① Unmarried ② Married
- ③ Divorced ④ Remarried after divorce

**A5. Are your family a poverty-stricken family established the files?**

- ① Yes ② No

**A6. Are there any disabled people in your family?**

- ① Yes ② No

**A7. Your current professional status is:**

- ① Full-time worker ② Part-time farming ③ Full-time farming ④ Others

**A8. Your current identity is:**

- ① General retail ② Peasant entrepreneur ③ Professional investor ⑤ Others

**A9. In 2017, your average monthly income is\_\_Yuan ? (Please fill in the specific figure on the line)**

**A10. How many people are there in your family? \_\_\_\_\_Persons (Please fill in the specific figure on the line)**

**A11. In 2017, your total household income was\_\_Yuan; non-agricultural income was\_\_Yuan, agricultural income (including farmland rent) was\_\_Yuan; gross income (including cost) from paddy field planting was\_\_Yuan, and the cost was\_\_Yuan.**

**A12. In 2017, your total household expenditure last year was\_\_Yuan; agricultural expenditure was\_\_Yuan; living expenses was\_\_Yuan; medical expenditure was\_\_Yuan; education expenditure was\_\_Yuan; endowment expenditure was\_\_Yuan; other expenditures were**

Yuan.

**A13. Within the confines of your village, you think that your family economic status is:**

- ① Very good ② Good ③ General ④ Poor ⑤ Extremely poor

**A14. What is the main industry in your village (community)?**

- ① Mainly agriculture ② Mainly non-agriculture  
③ Agriculture and non-agriculture are basically equivalent ④ Unclear

## B. Awareness and Support Willingness

**B1. The farmland heavy metal (such as cadmium, nickel and arsenic etc) pollution situation in your location is:**

- ① Very serious ② Relatively serious ③ General ④ Not very serious ⑤ No pollution

**B2. The farmland heavy metal pollution situation in your location has lasted for:**

- ① 1-2 years ② 3-5 years ③ 5-10 years ④ Above 10 years ⑤ Unclear

**B3. The development trend of farmland heavy metal pollution phenomenon in your location is:**

- ① More and more serious ② Better and better ③ Maintain the status quo ④ Unclear

**B4. The impact of farmland heavy metal pollution on the local area is:**

a. The impact of farmland pollution on the health of local people	①Very great	② Relatively great	③General	④ Relatively small	⑤ No impact
b. The impact of farmland pollution on the yield of local agricultural products	①Very great	② Relatively great	③General	④ Relatively small	⑤ No impact
c. The impact of farmland pollution on the quality of local agricultural products	①Very great	② Relatively great	③General	④ Relatively small	⑤ No impact
d. The impact of farmland pollution on the selling price of local agricultural products	①Very great	② Relatively great	③General	④ Relatively small	⑤ No impact

**B5. Do you understand the “Integrated Management of Agricultural Land Pollution Project”?**

- ① Completely do not understand ② Not too understand ③ Understand a little  
④ Relatively understand ⑤ Very understand

**B6. Generally speaking, do you think the “Integrated Management of Agricultural Land Pollution Project” will be favorable to the development of local economy and society or not:**

- ① Very favorable ② Relatively favorable ③ General ④ Not too favorable ⑤ Very unfavorable

**B7. Generally speaking, your attitude to local implementation of the “Safety and Quality Improvement Project for Producing Area of Agricultural Products” is:**

- ① Very supportive    ② Relatively supportive    ③ General    ④ Not too supportive    ⑤ Strongly opposed

### **C. Participating Willingness and Expectations**

**C1. Your paddy fields are\_\_mu; paddy fields currently cultivated are\_\_mu; paddy fields rented out are\_\_mu; paddy fields rented in are\_\_mu?**

**C2. At present, crops planted in your farmland all year round are:**

- ① One-season paddy    ② Double cropping rice    ③ Rice+rape    ④ Rice+ tobacco    ⑤ Others  
(Please specify)

**C3. According to demand of the project, if you are required to adjust farmland planting pattern (e.g. Change “one-season paddy” to “rice+ rape”), are you willing to do so?**

- ① Very willing    ② Relatively willing    ③ General    ④ Not too willing    ⑤ Very unwilling

**C4. According to governance demand of the project, if you are required to adjust rice planting pattern, are you willing to do so?**

- ① Very willing    ② Relatively willing    ③ General    ④ Not too willing    ⑤ Very unwilling

**C5. According to governance demand of the project, if you are required to spray lime in the farmland and spray leaf surface controlling agent (Si), are you willing to do so?**

- ① Very willing    ② Relatively willing    ③ General    ④ Not too willing    ⑤ Very unwilling

**C6. According to governance demand of the project, if you are required to adopt irrigating with clean water in the farmland, are you willing to do so?**

- ① Very willing    ② Relatively willing    ③ General    ④ Not too willing    ⑤ Very unwilling

**C7. According to demand of the project, if you are required to apply organic fertilizer or plant green manure and not to apply chemical fertilizer any more, are you willing to do so?**

- ① Very willing    ② Relatively willing    ③ General    ④ Not too willing    ⑤ Very unwilling

**C8. According to demand of the project, if appropriate transformation and upgrading shall be made to the irrigation infrastructure of local farmland, are you willing to do so?**

- ① Very willing    ② Relatively willing    ③ General    ④ Not too willing    ⑤ Very unwilling

**C9. According to demand of the project, if heavy metal contaminated straw treatment facilities shall be newly built in heavy metal contaminated area of farmland, are you willing to do so?**

- ① Very willing    ② Relatively willing    ③ General    ④ Not too willing    ⑤ Very unwilling

**C10. According to demand of the project, if farm tracks shall be newly built or reconstruct, are you willing to do so?**

- ① Very willing    ② Relatively willing    ③ General    ④ Not too willing    ⑤ Very unwilling

**C11. If the project construction occupies the farmland, you think that the subsidy standard shall be\_\_Yuan/mu.**

**C12. According to demand of the project, if land transfer and contiguous development shall be conducted in a systematic way, are you willing to do so?**

① Very willing ② Relatively willing ③ General ④ Not too willing ⑤ Very unwilling

**C13. If land transfer shall be conducted, which of the following land transfer ways do you prefer to choose?**

① Renting (e.g..rent your farmland to project party, large grower or other agricultural operating entities, and you shall obtain rent)

② Buying shares (e.g. fix a price for operating right of your farmland to buy shares, set up a joint stock company, and you obtain profits according to shares.)

③ Shares + cooperation (Set up a cooperative by taking land operating right as shares, and you obtain income according to land minimum guarantee and benefit bonus)

④ Others (Please specify)

**C14. According to demand of the project, the project shall hire some farmers to participate in the construction of local project, are you willing to do so?**

① Very willing ② Relatively willing ③ General ④ Not too willing ⑤ Very unwilling

**C15. According to demand of the project, the project shall conduct technical training on participating farmers, are you willing to do so?**

① Very willing ② Relatively willing ③ General ④ Not too willing ⑤ Very unwilling

**C16. If you are willing to participate in, in your opinion, the technical training subsidy shall not be less than \_\_\_\_\_ Yuan/person/day. (Please fill in the specific figure on the line)**

## **D. Farmland Governance and Management**

**D1. Does your family participate in the rural cooperative currently?**

① Yes ② No

**D2. According to your knowledge, the villagers in the village have not joined the rural cooperatives due to (Multiple choices):**

① Insufficient funds ② Poor farming techniques ③ Excluded by cooperative members ④ Fields are just for the full stomach ⑤ Fear of being looked down on ⑥ Be not willing to risk ⑦ Insufficient labor force ⑧ Others (Indicating the method of formation)

**D3. According to your understanding, the benefits of rural cooperative members are (Multiple choices):**

① Cooperatives provide more preferential prices for production raw materials  
② Cooperatives uniformly sell agricultural products at higher prices than retail prices  
③ Cooperative members can enjoy preferential prices for using agricultural machines and agricultural implements  
④ Others

**D4. What the management organizations do you think that need to be established in the village to carry out the management of polluted farmland?**

① Farmland Treatment Society (selected by all farmers in the Demonstration Area, election project management team and supervision team)

- ② Member of project management team (responsible for project management operations)
- ③ Farmland Governance Committee (responsible for supervising project management team)
- ④ Project technical team (responsible for technical training and teaching)
- ⑤ Others

**D5. Which of the following persons do you think shall be included in your village's farmland governance committee of “Management Project of Polluted Farmland” (Multiple choices)?**

- ① Poverty-stricken households
- ② Village cadres
- ③ Women
- ④ Peasant households
- ⑤ Others

**D6. In the implementation process of the project, if your wishes and expectations are different from or conflict with the project, what approach do you hope to resolve the differences or disputes between them? (Multiple choices)**

- ① Reflecting to village cadres
- ② Reflecting to the local government or higher level government
- ③ Asking the project party to solve
- ④ Exiting and no longer cooperating with the project party
- ⑤ Finding a group of people to resolve problems by force
- ⑥ Others (Please specify on the line)

**D7. After the completion of the project, what positive impact do you think it will have on the local area? (Multiple choices)**

- ① Ensuring the quality and safety of agricultural products
- ② Increasing the awareness of residents in the treatment of farmland pollution
- ③ Improved rural infrastructure
- ④ Contaminated farmland is effectively managed and used rationally
- ⑤ Conducive to large-scale operations and creating rural brands
- ⑥ Increasing the employment opportunities of local farmers
- ⑦ Conducive to increasing the income of local farmers
- ⑧ Others(Please specify on the line)

**D8. Does the project construction pose the following negative effects on your production and life? (multiple choice)**

- ① Short-term reduction in real income of farmers
- ② Increasing in agricultural production labor
- ③ The sales of crop products that have been replanted could not go out
- ④ The construction has destroyed the original vegetation on the ground and caused soil erosion.
- ⑤ Construction has caused road dust, automobile exhaust, drip oil and other environmental pollution
- ⑥ Construction noise has affected farmers' rest
- ⑦ Others(Please specify on the line)

***The investigation is over. Thank you again for your participation and support! Wish you all the best!***

## **Appendix 2: Questionnaire of Hunan Integrated Management of Agricultural Land Pollution Project with World Bank Loan (Crop restructuring)**

Dear friends,

Hello! In order to control the heavy metal pollution in agricultural product producing area, Agricultural Commission of Hunan Province intends to implement the “Hunan Integrated Management of Agricultural Land Pollution Project”. This survey will not involve personal identification information, so please answer them truthfully. Thank you for your support for the project! Please fill in the details on the line, draw “√” on the corresponding option.

Research Group on the Social Assessment of “Hunan Integrated Management of Agricultural Land Pollution Project”

January 2018

### **A. Basic Information**

**A1. Your gender:**① Male      ② Female

**A2. You are \_\_\_\_\_ years old. (Please fill in the specific figure on the line)**

**A3. Are your family a poverty-stricken family established the files?**

① Yes      ② No

**A4. Are there any disabled people in your family?**

① Yes      ② No

**A5. Your nationality is:**

**A6. How many people are there in your family? \_\_\_\_\_ Persons (Please fill in the specific figure on the line)**

**A7. In 2017, your total household income was \_\_ten thousand Yuan; non-agricultural income was \_\_ten thousand Yuan, agricultural income(including farmland rent) was \_\_ten thousand Yuan; gross income (including cost) from paddy field planting was \_\_ten thousand Yuan, and the cost was \_\_ten thousand Yuan.**

### **B. Awareness and Support Willingness**

**B1. The farmland heavy metal (such as cadmium, nickel and arsenic etc) pollution situation in your location is:**

① Very serious      ② Relatively serious      ③ General      ④ Not very serious      ⑤ No pollution

**B2. The impact of farmland heavy metal pollution on the the health of local people:**

① Very great      ② Relatively great      ③ General      ④ Relatively small      ⑤ No impact

**B3. The impact of farmland heavy metal pollution on the yield of local agricultural products:**

① Very great      ② Relatively great      ③ General      ④ Relatively small      ⑤ No impact

**B4. The impact of heavy metal pollution of cultivated land on the selling price of local agricultural products:**

① Very great      ② Relatively great      ③ General      ④ Relatively small      ⑤ No impact

**B5. Do you understand the “Integrated Management of Agricultural Land Pollution Project”?**

- ① Completely do not understand ② Not too understand ③ Understand a little  
④ Relatively understand ⑤ Very understand

**B6. Generally speaking, your attitude to local implementation of the “Integrated Management of Agricultural Land Pollution Project” is:**

- ① Very supportive ② Relatively supportive ③ General ④ Not too supportive ⑤ Strongly opposed

### **C. Participating willingness and expectations**

**C1. Your paddy fields are \_\_mu; paddy fields currently cultivated are \_\_mu; paddy fields rented out are \_\_mu; paddy fields rented in are \_\_mu?**

**C2. The crops mainly planted in your paddy field currently are (Multiple choices)**

- ① One-season paddy ② Double cropping rice ③ Rice+ rape ④ Rice+ tobacco ⑤ Others (Please specify)

**C3. According to demand of the project, if you are required to replant other crops, are you willing to do so?**

- ① Very willing ② Relatively willing ③ General ④ Not too willing ⑤ Very unwilling

**C4. According to demand of the project, if you are required to replant other other crops, which crops are you willing to replant?**

- ① Candy oranges, navel oranges, plums, grapes and dragon fruit  
② Seedling, flower and mulberry ③ Folium artemisiae argyi ④ Sorghum, cotton and corn  
⑤ Lotus root, lotus leaf ⑥ Others

**C5. According to demand of the project, if you are required to replant other crops, what are you worried about?**

- ① Higher input costs for crop conversion ② Product sales of replanted crops ③ Technical requirements for replanting crops ④ Subsidy management for replanting crops

**C6. If land transfer shall be conducted, which of the following land transfer ways do you prefer to choose?**

- ① Renting ② Buying shares ③ Shares + cooperation ④ Others (Please specify)

**C7. If farm tracks or canals shall be newly built or reconstruct, your farmland is required to occupy, are you willing to do so? ① Willing ② Unwilling**

**C8. If farm tracks or canals are newly built or reconstruct, in your opinion, the subsidy standard to the occupied farmland shall not be \_\_mu/ Yuan.**

### **D. Replantation Management**

**D1. In your opinion, how much subsidies you receive to replant if your lands are required to be replanted the following cash crops:**

D1a. The proposed subsidy of candy orange, navel orange, plum, grape or pitaya is xxxx Yuan/mu for xxxx years.

D1b. The proposed subsidy of flowers, plants and seedlings or mulberry is xxxx Yuan/mu for

xxxx years.

D1c. The proposed subsidy of Chinese mugwort is xxxx Yuan/mu for xxxx years.

D1d. The proposed subsidy of sorghum, cotton or corn is xxxx Yuan/mu for xxxx years.

D1e. The proposed subsidy of lotus root or lotus leaf is xxxx Yuan/mu for xxxx years.

**D2. Which of the following ways do you think should be adopted in compensation period?**

- ① Once a year ② Once half a year ③ Once a quarter ④ One-time subsidy

**D3. Which institution do you think should implement the compensation?**

- ① Provincial PMO ② County PMO  
③ Village-level PMO ④ Special compensation management group

**D4. Which kind of supervision way do you think should be adopted during compensation?**

- ① Supervised by provincial PMO ② Supervised by County PMO ③ Supervised by Village project implementation group  
④ Supervised by special compensation supervision group ⑤ Supervised by specialized third party organizations ⑥ Cooperatively supervised by departments at all levels

**D5. Who do you think of should participate in the compensation supervision group:**

**(Multiple choices)**

- ① Leaders of World Bank project ② Members of provincial project group ③ Members of county project group  
④ Town cadres ⑤ Members of village project group ⑥ Villager ⑦ Others

**D6. What is the most concerned about during compensation?**

- ① Low compensation standard ② Low practical operability of compensation method ③ Withholding actions during compensation  
④ Insufficient transparency during compensation ⑥ Inconsistent policies ⑦ Imperfect compensation mechanism ③ Others

**D7. After the Project is completed, in your opinion, what positive influences it will have on the local (Can make multiple choices):**

- ① Ensure the quality and safety of agricultural products. ② Contaminated farmland can get effective governance and rational utilization.  
③ Increase the employment opportunities of local farmers. ④ Improve the agricultural production skills of local farmers.  
⑤ Increase the income of local farmers. ⑥ Others (Please specify on the line.)

**D8. Does the construction of the Project have the following negative impacts on your production and life? (Can make multiple choices):**

- ① Reduce the actual income of farmers. ② Increase the labor amount of agricultural production. ③ Replanted crop products cannot be sold out. ④ Construction will destroy the original vegetation, resulting in water and soil loss. ⑤ Increase family debt . ⑦ Others.

*Thank you for your support! This is the end of the questionnaire.*

### Appendix 3: Ethnic Minority Development

**1. Your nationality is:**

- ① Tujia ② Bai ③ Dong ④ Yao ⑤ Hui ⑥ Others

**2. Does your nationality have its own language?**

- ① Yes ② No

**2a. What is the language of your nationality?** Please specify.

**2b. Can you speak your own language?**

- ① Entirely ② A little ③ Absolutely not

**2c. The language you used to use in daily life is:**

- ① Chinese ② Your own language

**3. Does your nationality have characters?** ① Yes ② No

**3a. What is your own characters?** Please specify.

**3b. The character you used to use in daily life is:**

- ① Chinese character ② Your own character

**4. What is your national costume?** Please specify.

**4a. Do you wear national costume?**

- ① Often ② Occasionally ③ Only for ethnic customs and activities ④ Never

**5. What is the worship of the totem of your nationality?** Please specify.

**6. What is the most important festival of your nationality?** Please specify.

**7. What are taboos of your nationality?** Please specify.

**8. Does your nationality have clan chiefs (castellans)?** ① Yes ② No

**9. How do you resolve the disputes with others?**

- ① Ask village cadres for help. ② Settle the matters privately. ③ Ask the elderly to mediate. ④ Others

**10. Does your nationality have some taboos about land?**

- ① Yes ② No

**11. Do you interact with people from other nationalities in daily life?**

- ① Often ② Occasionally ③ Never

**12. Does there are any intermarriage with other nationalities in your family?**

- ① Yes ② No

**13. Do you feel that you are a minority in daily life?**

- ① Often ② Occasionally ③ Never

**14. Were you discriminated because of your ethnic identity?**

- ① Often ② Occasionally ③ Never

**15. In your opinion, the differences between you and Han people in life are:**

- ① Very obvious ② Obvious ③ Not obvious ④ Small ⑤ No difference

**16. In your opinion, the differences between you and Han people in the customs and habits are:**

- ① Very obvious ② Obvious ③ Not obvious ④ Small ⑤ No difference

**17. In your opinion, the differences between you and Han people in languages are:**

- ① Very obvious ② Obvious ③ Not obvious ④ Small ⑤ No difference

**18. In your opinion, the differences between you and Han people in planting crops are:**

- ① Very obvious ② Obvious ③ Not obvious ④ Small ⑤ No difference

*Thank you for your support! This is the end of the questionnaire.*

#### **Appendix 4: (Village) Cadre Interview (Symposium) Outline of Hunan Integrated Management of Agricultural Land Pollution Project**

I. Basic Conditions of Project Villages (Counties) (Each department is required to introduce based on scope of its management business and the following questions.)

1. Population (number, gender, nationality, belief, occupation, and number and ratios of agricultural population and non-agricultural population)

2. Natural resources (land, forest, mineral products, etc.) owned by village (county) and utilization of such resources

3. Economic income of village (county), main sources and their ratios and ranking in township

4. Composition of livelihood model (agriculture, non-agriculture and animal husbandry) and development conditions

5. Economic development level of village (county): What is the income per capita of the village? How about the poverty condition? What is the economic development ranking? How about the development condition of collective economy?

6. History and planning of development of village (county)

7. Problems and status quo of infrastructure of village (county)

8. Conditions of ecological environment and influence on local people's lives

9. Composition and operation conditions of formal agencies and informal organizations of village (county)

10. Experience of similar projects implemented in village (county)

II. Ethnic Minorities (applicable for villages with many ethnic minorities; this part can be omitted if the villages have no ethnic minorities or the ratio of ethnic minorities is small) (Each department is required to introduce based on scope of its management business and the following questions.)

1. Types, population, ratios and residential places of ethnic minorities of village (county)

2. Sources of ethnic minorities

3. Informal social organizations of ethnic minorities

4. Main natural resources owned by ethnic minorities as well as convention and common law of environmental protection

5. Conditions of economic development, production and consumption of ethnic minorities

6. Beliefs of ethnic minorities

7. Government aid for ethnic minorities

8. Association conditions among different nationalities (intermarriage)

III. Opinions of Each Sector

County Government:

1. What is the influence of heavy metal pollution of the land in this county on farmers' lives, rural economic and agricultural production?

2. What efforts are made by the county in this regard? What effect and experience are obtained?

3. What kind of control measures planned by the county during “13th Five-year” planning?

Environmental Protection Bureau:

1. Basic conditions of current heavy metal pollution of soil of the county, including pollution sources, degree of pollution and scope of pollution.

2. What kind of method currently adopted by the county to monitor heavy metal pollution of soil?

3. Influence of heavy metal pollution of soil on farmers, including residents’ bodies and ecological environment.

4. What kind of control measures is adopted by the county regarding heavy metal pollution of soil and how about the effect?

5. What measures are adopted by the county against heavy soil pollution of soil during “the 13th Five-year” planning?

Agricultural Bureau:

1. What kind of method is adopted by the county to detect the influence of heavy metal pollution of soil on crops and what are the basic conditions?

2. Influence of heavy metal pollution of soil of county on crops, including influence on yield and output value.

3. What measures are adopted by the county against heavy metal pollution of soil and what kind of effect is obtained?

4. What plan does the county adopted to administer heavy metal pollution of soil during “the 13th Five-year” planning?

Financial Bureau:

1. What the influence of heavy metal pollution of soil on the economic development of the county?

2. What efforts are made by the county in terms of control of heavy metal pollution of soil and how about the effect?

3. What planning is adopted by the county against heavy metal pollution of soil during “13th Five-year” planning?

IV. Opinions on the Project (Each department is required to introduce based on scope of its management business and the following questions.)

1. What kind of benefits will the implementation of the Project bring to the village (county) and who would benefit most from the Project in your opinion?

2. What kind of difficulties encounters during implementation of the Project in your opinion?

3. Will the agricultural pollution producing place project have an impact on the activities already locally launched. What kind of impact will be caused if any?

4. Does the village (county) have sufficient labor to participate in agricultural pollution producing place administration project?

5. What factors would influence implementation of the Project in your opinion (economy,

management, technology and finance)?

6. What are the negative influences of the Project on the local region (society, culture, economy and environment”)?

7. What countermeasures can be adopted to mitigate the negative influences of the Project on the local region?

8. Are women and ethnic minorities willing to participate in the Project?

**(Note: This interview outline also applies to county-level group interview or cadre interview. The questions of interview can be added or deleted according to specific conditions. The purpose of the interview is to get to know the social, economic and cultural background information of the Demonstration Areas as well as opinions of villagers and town cadres on the Project.)**

## **Appendix 5: Villager Symposium (Interview) Outline of Hunan Integrated Management of Agricultural Land Pollution Project**

### **I. Interview Questions:**

1. Do you know the Project? When do you know the Project? Where do you learn the Project? What messages do you learn? What else do you want to know?
2. Is your villager is a rich village or a poor village compared with other villages in the counties? What's your opinion on the causes of poverty if you think that your village is a poor village?
3. What about losses caused by pollution of agricultural producing places to your family and village and how about the recovery work?
4. Are you for or against the Project? Please explain the reason if you are against the Project.
5. What kind of influence would be imposed on your family's production and life after implementation of the Project (positive or negative)?
6. What issues of the Project do you care about most? Please list the issues and sort them according to degree of importance.
7. Who would benefit most from the Project?
8. What are your suggestions on the Project? (The suggestions shall be sorted according to degree of recognition.)
9. What kind of influence of construction of the Project will be imposed on your village's existing natural environment as well as its culture, historical heritage, religious belief and tourist attractions?
10. What is the influence of construction of the Project on women's production and lives and what their requirements and suggestions on the Project (inquiries from the women only)?
11. What is the influence of construction of the Project on production method, lifestyle and customs of your nationality and what about your suggestions (inquires from the ethnic minorities only)?

### **II. Mapping:**

1. Make daily life diagram and season activity diagram as per sex.
2. Make daily travel diagram and daily intercourse diagram as per sex.

(Note: This interview outline also applies to household interview. This interview outline is launched on the basis of questionnaire survey.)