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SmartLessons

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Taking Haitian Agriculture to the Clouds: Implementing Google Apps for Government at the Ministry of Agriculture

The January 2010 earthquake that devastated Haiti directly affected the infrastructure and personnel of the Ministry of Agriculture, Natural Resources and Rural Development (Ministère de l'Agriculture des Ressources Naturelles et du Développement Rural, or MARNDR). It weakened the ministry's capacity to lead the economic recovery and food security improvements of the country, and set back research, innovation, and extension systems in the agricultural sector. In addition, most of the existing information systems and a vast number of electronic and hardcopy documents, including reports, studies, files, statistics, maps, and accounting data, were destroyed. This was due, in part, to the sheer physical destruction of the earthquake — but also because MARNDR lacked a centralized archiving system. This SmartLesson describes the successful introduction of cloud computing technology to the MARNDR's ICT system as the primary method to manage knowledge and preserve documents for the agricultural sector in Haiti.

Background

The January 2010 earthquake was not the first time that a destructive event struck the information infrastructure of Haiti's agricultural sector, and weakened its capacity to perform. Certain political events, including the 2004 departure of President Aristide and the embargo of the 1990s, resulted in similar setbacks — for example, the offices of the Ministry of Agriculture in Port-au-Prince were destroyed in 2004, along with archives and computers.

The agricultural sector is especially important in Haiti—it generates a quarter of the country's GDP and provides half of the country's employment. But in order for MARNDR to lead the country's economic recovery and provide much needed government services, the Ministry needs access to reliable information and information systems. This urgency led MARNDR and the World Bank to partner in order to strengthen the agricultural-knowledge management system of the country by making it resilient to future natural disasters and crises, and by adapting it to local conditions.



Reconstruction of the main building of the MARNDR two months after the earthquake.

MARNDR needed to become more efficient and transparent, and more responsive to farmers' and the sector's needs; the quality of public agriculture services also had to be improved in a sustainable manner. After an assessment of public agriculture services in Haiti, we determined that MARNDR's information and communications technology system was at the core of the necessary reforms.

The Ministry faced a number of problems, including:

- *Low level of official email use by MARNDR staff and extension agents;*
- *Difficulty making telephone calls and conducting teleconferences — the lack of a landline phone system forced staff to use personal cell phones;*
- *High costs incurred by staff for electricity, telephone, transport and other services;*
- *Absence of secure and centralized electronic archives for documents;*
- *Difficulty for farmers and agribusinesses in obtaining official forms or making requests; and*
- *An overall reliance on paper systems and outdated communications systems.*

The MARNDR system, deployed across a secure and private network for all Ministry buildings in the country, helps address some of these issues by giving workers full access to their information across devices (e.g. desktops, laptops and tablets) and platforms (e.g. Windows, Mac and Linux); allowing them to work in multiple locations; and leaving fewer data on vulnerable, physical devices.

MARNDR does not have 24/7 air-conditioned rooms, which makes it difficult and unsustainable to install servers. Furthermore, electricity is not available at night, requiring staff to constantly back up their files.

The cloud computing revolution — in combination with the explosion in the use of mobile and wireless devices — presents an exciting opportunity to bridge the digital gap in rural areas of Haiti; it has enormous potential to change and improve the main delivery channels for government services. Lower prices make mobile phones and other new technologies more accessible, and technological advances allow for more flexibility, greater collaboration between agencies, and increased security.



Cloud computing was identified as the optimal platform for the Haitian agriculture sector's ICT system.

Project Description

Through the World Bank-financed Strengthening of Agriculture Public Services Project, the Bank and the Ministry redesigned the ICT system of MARNDR to be based on cloud technology. The objective was to develop and improve the agricultural sector's innovation, research and extension systems, with particular regard to future crisis and natural disaster.

The decision was made to implement a cloud-computing platform as the primary ICT system for MARNDR. Cloud computing is a relatively new technology; it allows users using local computers and an Internet connection, to work work on and modify files, and use applications that are stored remotely. The Bank facilitated an agreement between the Government of Haiti and Google, allowing the Ministry of Agriculture to use Google Apps for Government.

This cloud technology platform was launched in Haiti in May 2011. The platform offers transparent and effective communications, information-sharing, and collaboration tools for MARNDR staff and departments across the country, and also to other government agencies and partners. Apps for Government allows Ministry staff to share and modify agendas and documents, and to communicate through email, video conferencing, or phone from any device with Internet access — meanwhile, the files are safely stored on Google's servers.



Press release on the cloud computing launch.

The ICT initiative was structured around six components:

1. *Installation of network hardware, e.g. fiber optics and Wi-Fi, at MARNDR offices in Port-au-Prince and in 10 regional offices.*
2. *Training for 200 MARNDR staff and users on the new systems, with at least 40 hours of training per staff member.*
3. *A three-week training session for ICT administrators in cloud computing technology and the Google Apps system.*

4. *Establishing sustainable and cost-effective energy sources for the ICT system, e.g. solar energy, inverters, and batteries (currently no MARNDR office has electricity for a full day).*
5. *Providing Internet access through WiMAX and/or satellite.*
6. *An agreement between the World Bank, MARNDR, and Google to use Google Apps free of charge.*

Lessons Learned

1) To design an ICT system in the agriculture sector, incorporate the needs of remote users and plan for the worst.

In Haiti, natural disasters, political crisis, and even theft have marred the institutional memory of the agriculture sector for decades. However, the 2010 earthquake was a wake-up call for MARNDR to rethink the ICT system of the Ministry and the agriculture sector of Haiti in general. Planning for a worst-case scenario, like the one in 2010, where buildings and equipment collapsed, led to an ICT system that would have to do away with any local, physical storage of information.

The system also needed to be equipped with built-in alternatives for when the electricity and/or Internet were disconnected. Given the daily limitations and characteristics of ICT in Haiti — the need to access materials from rural areas, constant electricity cuts, and the reliance on cell phones rather than land lines — a solution was found in a combination of cloud computing, solar electricity, uninterruptible power supply (UPS), laptop and smartphone platforms, and three different Internet connection technologies (to ensure a back up option).

Google Apps for Government allows for off-line use, and users can access their mail, calendar, and documents when they don't have an Internet connection. When users reconnect, Google Apps automatically sends any outbound messages and syncs updates to other documents. Incorporating these features will help prepare the Ministry for worst-case scenarios.

Of course, enabling ministry staff to work from multiple locations raises new security concerns. Previously, security reasons demanded that staff only work from government offices; this had to be addressed in order for cloud computing to be effective as an ICT platform. To maintain security for remote access, the Bank helped MARNDR introduce a two-factor authentication that relies on a password and a code provided by text message. Staff were given mobile modems to connect to the Internet, since being able to work from home or a remote area through an Internet connection or mobile phone, were key aspects of the project.

2) Enlist extension agents to help introduce a new ICT system to farmers and agribusinesses.

The new ICT platform also needed to respond to the needs

of the stakeholders in the agriculture sector — farmers, researchers, and agribusinesses. The extension agent is a pivotal actor, linking these groups with the public sector. Finding an ICT solution that extension agents were comfortable with was key to the rapid adoption of new technologies in Haiti. MARNDR has conducted tests with extension agents by collecting and disseminating real-time food price data from different remote locations within Haiti, comparing the previous, hand-written system to the updated ICT system. Users seem to be using more price data for decision making, though no formal evaluation has been conducted yet.

3) To build local capacity and limit staffing requirements, train ICT specialists in both the public and private sectors on cloud computing

In order to administer and service the new ICT platform, one of the key success factors has been creating in-country capacity. Cloud-computing applications were uncommon in Haiti, so significant training was built into the project, for both MARNDR staff and the IT firms that would eventually provide services to the Ministry. Over 200 users throughout the country will be given 40 hours of on-site training. As a result of the introduction of clouds computing technology in MARNDR, three firms in Haiti now offer their own training in cloud computing and Google Apps.

It was also important to build capacity within the ministry. Only four ICT staff members are required to maintain the new system in the Ministry. Today, MARNDR has a reduced ICT unit supervising one of the largest Ministries in the country. This low ratio of ICT staff to total Ministry personnel would not be possible without cloud computing — maintaining servers and the internal network alone would require at least four times as many personnel.

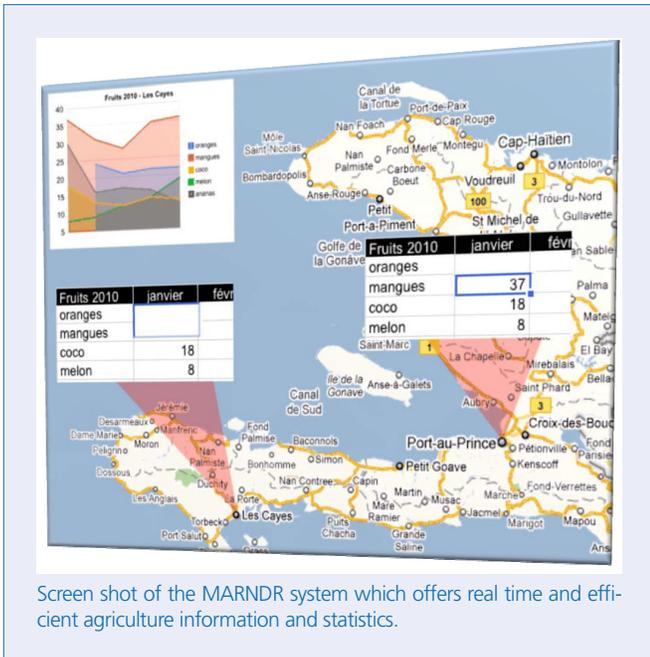


Training of the MARNDR's four ICT administrators in Paris in January 2011.

Conclusion

The 2010 earthquake, destructive and horrific, forced the MARNDR to rethink its ICT infrastructure. One positive result has been the implementation of a cloud computing system for MARNDR, conducted with Bank support. Haiti now joins jurisdictions like the District of Columbia, the City

of Los Angeles, and the State of Arizona in using Google Apps as its primary ICT platform. The new system allows past and future agricultural knowledge to be protected, shared and used, even in times of crisis, and makes the agricultural innovation and extension system more effective and resilient.



Screen shot of the MARNDR system which offers real time and efficient agriculture information and statistics.



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