

**Enhancing Rural Development through Improved Infrastructure and Innovative
Information Applications**

LAO P.D.R Country Report: Applications

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I. Introduction

This report is part of the study “Enhancing Rural Development through Improved ICT Infrastructure and Innovative Information Applications”. The study seeks to show how improved connectivity and use of ICT applications in the East Asia and Pacific Region can facilitate economic diversification in rural areas, reduce transaction costs and improve public service delivery. Four broad sets of questions are addressed.

First, how well connected are rural populations in East Asia and Pacific (EAP) and what policy changes are needed to improve rural connectivity?

Second, how can high-value information applications be mobilized and scaled-up to improve rural productivity, livelihoods and living standards in the countries selected? What are the lessons learned from experiences elsewhere, and what kinds of advisory support and investments are required?

Third, how much capacity building is required for rural areas to create a society of producers of local knowledge and of users of that knowledge?

Fourth, how can government efforts to promote rural development – in various forms – and to develop rural infrastructure be more closely integrated, conceptually, institutionally and in practice?

The study focus is on four countries - Indonesia, Philippines, Lao PDR and Vietnam – and on three key applications selected for their potential impact on rural livelihoods: *Wireless-enabled financial services; Wireless or Internet-based Market or commodity price information; Internet-based Land Management Systems.*

This Country Report presents the study’s findings for Lao P.D.R. It seeks to identify key demand and supply features associated with the three applications selected and help chart a strategic course of action for realizing their potential.

II. Wireless Financial Services

Mobile Telecommunications and Rural Financial Services

With 6 million people most of whom live in rural areas (79%) and one of the lowest per capita incomes in South East Asia, barely surpassing US\$ 1/day (Table A1), Lao P.D.R. has a very small mobile phone market and one of the region's lowest levels of mobile phone penetration (11%).

In 2006 there were 850,000 mobile phones accounting for about 90% of the total phone lines in the country. There are four mobile operators:

- i. Enterprise's Communication Lao, ETL, the former monopoly operator owned by the Government and has its own mobile network;
- ii. Lao Telecom (LTC), which is 49% owned by Shin Satellite, a Thai company, and 51% by ETL;
- iii. Lao Asia Telecom State Enterprise (LAT), originally established in 2001 with a grant from China to service government agencies (Tanner 2004); and
- iv. MilliCom Lao Limited Company (MLL), a private enterprise in which Government has a small stake (about 16%).

Subscriber data for individual operators is sparse, but mobile market shares are roughly as follows: LTC 60-80%, ELT 10-20%, Millicom 10-13% and LAT 2-3%.¹ Although the mobile market has been open to outside investment and competition², cellular phone rates in LAO P.D.R. were the region's highest in 2006 (Table A1).

Commercial banking has played a minor role in the country's recent growth (World Bank 2006b). The sector has been dominated by three government owned banks which account for about 60% of assets. Formal banking activities are concentrated in Vientiane and other urban areas. Only the Agricultural Promotion Bank has branches serving rural communities. Non-performing loans have plagued state bank operations and may represent as much as 60% of all loans (Freeman 2006). The recent purchase of a 60% stake by the Australia and New Zealand Banking Group (ANZ) and a 10% stake by the International Finance Corporation (IFC), of the country's only private bank, Vientiane Commercial Bank is expected to significantly increase competition and impart dynamism to the country's financial services sector (EIU 2007, page 21).

The microfinance sector is very small in Lao P.D.R. About 60 percent of farmers rely on subsistence agriculture (UNDP 2006, page 70) and use little cash. Community-based models of microfinance are appropriate and the most commonly used in practice (ARCM 2004).

Lao P.D.R. Enterprise des Postes Lao (EPL) operates under the MTPC and provides the principal savings and local remittances service with branches distributed throughout the country. EPL reportedly runs profitably and has been increasing its number of remittance transactions, e.g. from 10,949 in 2001 to 88,671 in 2004 (UPU 2006).

Precursor m-Banking Services in Lao P.D.R.

Millicom International Cellular S.A., started operations in Lao P.D.R. in April 2003 and is also known for its brand name, Tigo.³ The company started out serving Vientiane exclusively but has gradually expanded to provide national coverage except for two provinces. As is common in low income markets the volume of text messages is expanding rapidly, with Tigo recording 10 million messages among its subscribers in February 2007.⁴

Tigo has started to provide precursor m-banking services to help the company reduce churn⁵ and lower distribution costs.

First, the company launched in November 2005 EZLoad a service that enables Tigo retailers to pre-purchase air time credits from the company and then reload customers phones electronically phone to phone. Presently (May 2007), EZLoads represent about 30% of air time sales value. The remaining 70% of sales still use scratch cards. EZLoad saves the company the cost of producing, selling and distributing scratch cards, and makes it much easier to recruit new retailers. Since EZLoad was launched, the number of Tigo retailers has increased from a few hundred to about 1700 in May 2007.⁶ Electronic loading of air time also makes it profitable to introduce very low denomination (electronic) loads which are more in tune with the low income of the country's poor and largely rural market. The minimum recharge prepaid scratch card costs 20,000 Kips (US\$ 2.17), compared to a minimum electronic load using EZLoad of 5,000 Kips (US\$ 0.54).

Second, in November 2005 Tigo also introduced Balance Transfer, a service that enable customers to share air time loads electronically from one phone to another through simple text messaging commands. This service helps Tigo reduce churn and effectively makes every customer a potential retailer. Prepaid plans have an expiration date and in a low cash economy the ability of customers to remain in the network is limited. Electronic load sharing enables family, friends and associates to share loads and avoid outstanding load balances from expiring. In practice, some customers are apparently also using the service occasionally to send remittances over long distances within the country; e.g. for example, by sending an electronic load over the phone to a far away customer who then resells the load to the local load retailer in exchange for cash.

Millicom is also in discussions with the Postal service to provide remittance services within Lao P.D.R. at a lower cost using its electronic load transfer platform.

The company identifies two constraints in further expansion of its financial services. First, it is not clear what kinds of regulatory requirements it would need to comply with in order to provide the service. Second, given market limitations, it is not clear that there is a business case for expanding m-banking services; i.e. whether the company can make a profit by providing a more complete range of m-banking services.

m-Banking Options

There are two entrepreneurial m-banking options. A mobile operator may partner with a licensed commercial bank to offer m-banking services (Box No. 1) or it may opt to go at it on its own as leading enterprise (Box No. 2). The advantages and disadvantages of either option are related to cash in - cash out options and regulatory constraints. M-banking is subject to strong network effects. Its usefulness is directly proportional to the number of merchants that accept the use of electronic transfer of money credits. M-banking therefore requires the build up of a dense network ("ecology") of merchants that makes it convenient for customers to get cash for their electronic money or use it for the purchase of goods and services. Mobile phone banking raises no special issues for telecommunications regulators but does present important challenges for financial regulators.

Text Box No. 1: Smart Money: a mobile banking partnership

Smart Money, was introduced in the **Philippines** in December 2000 by Smart Communications, the leading mobile phone provider in the Philippines, in partnership with Banco de Oro (BDO), one of the top seven commercial banks in the country. Smart Money customers may use their mobile phones to transfer credit to and from other users, transfer airtime credit from one user to another, make cashless purchases at shops where the retailer has SMART Money account and at any MasterCard enabled retailer, receive payroll credit on their phones directly from an employer signed into the system, pay their utilities and receive international remittances. The service operates in conjunction with a prepaid debit card issued by Banco de Oro enabling lower income subscribers to participate using BDO ATM machines and making payments in stores that accept Master Card.

Smart Money accounted for less than 0.1% of total service revenues posted by the company in 2006, but direct revenues are a poor measure of the importance of the Smart Money platform. Smart Money helps increase outreach, reduce churn and lower distribution costs. Smart's CEO estimates that churn among Smart Money customers is about 0.5% per month compared to 3% among non-Smart Money customers. Use of the SmartMoney platform also eliminated the need for the production, storage and distribution of prepaid scratch cards and makes it easier for Smart to service low income customers who can only afford purchase air time loads in small denominations. A potential retailer needs very little money to start reselling air time: a GSM handset, a retailer SIM card preloaded with 50 text messages and costing US\$ 3.10. Since e-Load was enabled in May 2003 to end 2004, the number of retail dealers increased from 50,000 to 700,000. Most retailers are micro-entrepreneurs: neighborhood stores, housewives, students working part time. By September 2003, two thirds of Smart's pre-paid user's were loading electronically

There are two important advantages of a partnership arrangement. The first is related to how soon the service can be useful to customers. For example, in the case of the Smart Communications alliance with Banco de Oro in the Philippines (Box Number 1), an expansion of the number of merchants that allow use of the mobile phone purchases is necessary, but the partnership immediately enabled widespread use of the Banco de Oro pre-paid card for encashment or to make purchases in the many outlets that use Master Card world wide. A drawback of this approach, from a social standpoint, is that it involves use of a prepaid card, a requirement that will limit participation by rural low-income people who rely on a subsistence economy and are more accustomed to operate on a cash basis.

The second advantage of a partnership concerns banking regulations. When m-banking is linked to a bank, the latter institution takes care of compliance with financial regulatory requirements. Furthermore, some countries – e.g. South Africa – only allow m-banking services to be provided in conjunction with licensed banks (Lyman, Ivatury and Staschen 2006, page 3).

Text Box No. 2: GCash Mobile Banking and Rural Microfinance

GCash was launched in October 2004 by GXchange, a subsidiary of Globe Telecom, the second largest mobile phone operator in the **Philippines**. The service is run with no direct ties to any banking institution. Globe subscribers register to GCash to extend the use of their mobile phones as electronic wallets. Once registered, subscribers can use their GCash wallet to send and receive funds and make cashless purchases at shops where the retailer originates the transaction using her own phone or buy prepaid airtime via SMS. Start up costs for a new customer simultaneously enrolling as prepaid mobile and GCash using second hand equipment can be as low as US\$ 13.00.

A precursor to GCash, AutoLoadMax was launched by Globe in 2003 to enable electronic loading of air time. By December 2004, AutoLoadMax accounted for 90% of reload transactions and about 62% of total reload value. AutoMaxLoad presently supports an extensive network of active distributors which by the end of 2006 numbered more than 400,000. Another GCash precursor financial service, ShareALoad, started in January 2004, enables Globe subscribers to top up the air time of other Globe users in increments of P1 up to P150.

Since November 2004 the USAID sponsored Microenterprise Access to Banking Services (MABS) Program (www2.rbapmabs.org) has been working with G-Xchange and the Rural Bank Association of the Philippines (www.rbap.org) to experiment using GCash as a microfinance service delivery platform. Participating banks become retailers where GCash customers may cash-in or top up their electronic wallets. Bank loan customers may also pay back their loans electronically using Text-a-Payment or make deposits into their savings accounts using Text-a-Deposit. Rural Banks are also using the m-banking to manage their payroll and pay their staff electronically.

At the end of 2006, out of a total base of 15 million Globe subscribers, an estimated 500,813 were registered users of GCash. The average monthly value of transactions is about US\$ 117 million.

Direct operation of an m-banking service by a mobile operator offers the advantages of a simple unified management and no need to share profits. Some partnerships with banking institutions will still be desirable, mainly to help develop the network ecology that is indispensable for the service to be useful to customers (See example in Box No. 2).

At present, there does not appear to be a Laotian commercial bank poised to help develop an m-banking ecology. State banks are weak and their use of technology is limited. This may change in the near future as competition increases and new entrants introduce innovations to the banking sector.

Is there Widespread Demand for Wireless Financial Services in Lao P.D.R.?

Success Factors and Potential Demand

The most mature experience with m-banking in Asia is that of the Philippines. The conditions that facilitated the emergence of m-banking in the Philippines provide a useful backdrop against which Lao P.D.R.'s m-banking potential may be assessed.

- i. A **large population** constitutes a financially attractive potential market and gives entrepreneurs a significant incentive to innovate.
- ii. A concentrated **urbanized** population facilitates **mobile penetration** and the development of **an m-banking ecology** of parallel encashment facilities and vendors willing to accept electronic payments.

iii. A **text messaging culture** is a distinctive feature of mobile use in the Philippines, and is closely linked to a **young literate and relatively low income** (but not extremely poor) **population**. Low income people recur to texting as a more affordable means of communication than voice calls. Youths are amenable to texting in part because of their greater dexterity and also because they generally have lower income than mature working adults.

Using these criteria as a benchmark, Lao P.D.R. appears to have limited m-banking potential (Table A1). The overall size of the market is constrained by the country's population of only 6 million. The population is very young (62% less than 19 years old), but this positive feature is offset by illiteracy affecting 23 percent of adult males and 39 percent of adult females. Perhaps the greatest challenge will be to expand mobile service to very low income rural communities (Lao P.D.R. is 79% rural compared to 37% in the Philippines). In 2005, Lao P.D.R.'s per capita income was less than US\$ 440 compared to US\$ 1,300 in the Philippines.

Financial Regulatory Constraints

Lack of information and regulatory criteria and of standards for m-banking is a challenge. Should the country's Central Bank, the Bank of the Lao People's Democratic Republic wish to promote m-banking, it will need to develop its own regulatory framework striving to achieve a balance between managing risks and enabling innovation. To encourage innovation and support entrepreneurial flexibility, the two main options should be allowed: either a partnership between a mobile operator and a licensed bank or direct service provision by a mobile operator. The key issues to consider are presented in Annex B.

Competition is Key to Stimulating the Supply of Wireless Financial Services

Lao P.D.R.'s experience is a textbook example of the power of **competition in telecommunications** in bringing about innovation and investment. Notwithstanding the country's limited m-banking potential, Millicom, a private company that entered the market as recently as 2003, is already offering a fairly advanced set of precursor m-banking services. In contrast, no similar services are being offered in the larger Vietnamese market, which is also less open to competition from private firms than Lao P.D.R.

Competitive pressures stimulate operators to use wireless services as a strategic innovation to help them reduce churn, achieve lower distribution costs and expand their network to reach low income customers.

Keeping customers loyal is a major challenge in Laos' predominantly pre-paid (97%) market (Table A1). Churn can create swift and significant changes in revenue as users shift from one company to another in response to discounts offered by competing networks. Churn is significantly lower among m-banking customers because the service is not readily transferable from one operator to another. In the Philippines, Smart Telecommunications CEO has estimated the churn rate among SmartMoney customers at 0.5% per month compared to 3% among non-SmartMoney customers (Wishart 2006, page 16).

Wireless financial services, even precursor services, also help operators reduce retail distribution costs, as they no longer have to produce, store and distribute prepaid scratch cards and enables them to communicate and interact faster with retailers making it easier to increase the number of retailers very rapidly. They also enable operators to introduce low value air loads which are more affordable by low income people

As competitive pressures also rise in the financial sector, banks will need to develop new ways to expand service to an increasing number of low-income customers profitably. They will only be able to do this by adopting innovative ways to lower service delivery costs.

The high transaction costs of serving a large number of customers with limited assets or credit history each of which generates only a little revenue is a critical challenge of microfinance, worldwide. The challenge is greatest in rural areas because of the lower income and greater dispersion of the customer base. Microfinance institutions have achieved sustainability and earned a profit on commercial terms, but mostly at the expense of limited-value products such as small high interest short term loans. Modern institutional approaches (village banking, group lending, credit rating) and modern technologies (computerized record keeping, PDAs) have helped lower costs; but the costs of service delivery remain high.⁷

M-banking can radically lower microfinance service delivery costs (Owens 2006, 2007) by:

- i. reducing transaction costs of microfinance institutions, in the delivery of both savings and credit products;
- ii. reducing errors and increasing transparency in the transfer and recording of loan disbursements and payments and savings deposits;
- iii. reducing opportunities for fraud, counterfeit and theft by providing a secure electronic mode for transferring funds (as opposed to, for example, travelling long distances to transfer cash); and
- iv. facilitating record keeping on each client through the computerization of transactions made through mobile phones, thus making it easier for microfinance institutions to tailor products and services for segments within their large pool of small customers.

An example of use of m-banking as rural microfinance service delivery platform is given in Box No. 2.

III. Agricultural and Rural Market Information Systems

MIS Objectives

Agricultural and rural market information systems (MIS) have different target audiences and objectives. Government officials, for instance, need timely information to make their decisions and craft public interventions. Data requirements for this purpose are not overly demanding in respect of timeliness or even quality, except perhaps in the event of natural disasters and emergencies. The statistical methodologies involved are well known and Ministries of Agriculture supply the required information in accordance with their budgetary constraints.

The focus here is on market information systems (MIS) that service farmers. Farmer needs tend to be diverse and systems developed generally have three main objectives:

- i. **Reduce price instability and intermediation costs** by disseminating timely information about prices and market conditions to improve farmers' bargaining power and farmers' ability to time and coordinate their supply response to better respond to market requirements. This objective is paramount in respect of fresh perishable produce markets.
- ii. **Expand market opportunities** for farmers and agro-processors by facilitating access to new marketing channels.
- iii. Produce and disseminate **market intelligence** information to help farmers and agro-entrepreneurs innovate, enter new markets, develop new products and new marketing and organizational techniques that add value to farm output.

MIS operated by Ministries of Agriculture have traditionally focused on the first objective. To empower farmers and mitigate price instability they collect and disseminate product and input price and market supply data. The information is gathered at wholesale market sites by support staff, sometimes with the assistance of traders and farmers, and subsequently disseminated using traditional broadcast media, radio, television, newspapers and fliers. These data collection efforts are costly. Price data is site specific which means that every major market needs to be covered; and, in order to be reliable, data should also be frequently updated (e.g. daily). The high cost of timely data gathering and dissemination challenge developing country governments. The resulting information systems are commonly deemed unreliable or too irregular to be useful.⁸ Farmers consult the information disseminated by government and even use it as baseline information (e.g. as a starting point when negotiating with buyers), but tend to rely more on price and market information obtained through their own network of traders, farmers, and friends (David-Benz, Wade and Egg 2005).

Producing and disseminating information products and market intelligence to expand marketing channels or add value (objectives ii and iii) has been costly (e.g. fairs, specialized analytical reports for niche products) and the target audience usually small. Justification for public sector involvement is limited and private analysts and market brokers have been the prime service providers.

The emergence of ICTs has stimulated innovative efforts by private enterprise, governments and donors to take advantage of lower data collection and information dissemination costs to produce more commercially valuable information services. Some examples of initiatives addressing the first objective follow:

In **Sri Lanka**, a pilot project funded by the Information and Communications Technology Agency (ICTA) developed a Govi Gnana (Farmer Knowledge) System to increase the transparency, accuracy and timeliness of price information on about 130 vegetable products traded in the spot markets at Dambulla Dedicated Economic Zone (DDEZ) and in the smaller the Meegoda Dedicated Economic Zone (MDEZ) (de Silva 2005). Local traders fed the system to improve performance and compete with other wholesale markets. The system was also supported by 3 investigators with PDAs roaming around the market verifying the information provided. Centrally located gigantic screens broadcast the information and have become popular among farmers visiting the markets. Government recognizes the new approach as a public service but has yet to assume running costs and the system's sustainability remains uncertain.

In **Senegal**, a value added operator on GSM, Manobi, has since 2003 been providing price and weather information to fisherfolk and has since expanded to a broader range of farmers. Market data is gathered in three locations in Dakar by four collectors using PDAs, and retransmitted to farmers and fisherfolk via mobile phones. In the vicinity of Kayar, the system extends wireless coverage 14 km from the shore of allowing fisherfolk to access information while they are still at sea. The sms version of the Xam Marsé system launched in May 2005 reportedly serves 3,400 farmers who receive a free daily price update through their mobile phones. One clear advantage of Manobi has been its flexibility to tailor services to suit the specific needs of individual farmers – e.g. a farmer's sms may obtain information on a specific product, as opposed to a having to browse through a list of products most of little interest. (David-Benz, Wade and Egg, 2005). There is also the potential to use sms services to expand market outlets through systems that take remote purchase offers to buy or sell (objective ii above) and provide market intelligence over the mobile phone (objective iii). Donor funding supported the development of the Manobi application, initially IDRC and InfoDev (2003, page 34) and subsequently Swiss Cooperation (Manobi 2005), but Manobi hopes to operate at a profit. In August 2006 Manobi partnered with IICD to carry out pilot projects in Burkina Faso, Ghana, Mali, Uganda and Zambia (Manobi 2006).

In **the Philippines**, the Ministry of Agriculture partnered in 2005 with an applications development company and a Telecommunications company (Globe) and set up a system for reporting prices in response to sms requests. A farmer or consumer wanting to learn of prevailing prices may send a simple sms and he will get in return price information gathered in Metro Manila retail "wet" markets. The cost of the service is about US\$ 0.05 for the service involving 2 messages (query and response), which implies a surcharge on the standard cost of about US\$ 0.03. For the Ministry of Agriculture the system presents an opportunity to disseminate the data collected through a new channel. For the content manager and Globe, the service is a profit opportunity by making price information available in a convenient and timely manner. The price service along with weather information generated considerable initial enthusiasm - about 200 queries a month, but interest has since subsided to less than 20 sms per month in February 2007.

In Lao P.D.R. MIS initiatives have been donor sponsored, few and of short duration and have made practically no use of ICTs. An overview of the most pertinent country experience follows.

LAO P.D.R. MIS Related Experience

The e-Governance Action Plan prepared by the India National Information Technology Center estimates that the Ministry of Agriculture and Forestry is among a group of Lao P.D.R. government agencies where less than 10% of staff use computers connected to the Internet. It further estimates that less than 0.1% of farmers have had access to or used computers (STEAs 2006, page 5). With very limited penetration of the Internet or mobile phones (11% in 2005, mostly in urban areas; Table A1), use of these new tools in LAO P.D.R. for marketing purposes by either farmers or Government has been negligible.

From January 2001 to December 2002 FAO supported the project "Development of Market Information and Market Extension Capability" (TCP/LAO/0065) with technical assistance amounting to US\$ 271,000. Activities included studies, the establishment of a Market Information Service operated by the Ministry of Agriculture and Forestry (MAF) and training (FAO 2003). The Service was started in March 2002. Prices were collected in 10 provinces on Tuesday every week and sent by fax to Vientiane on the same day. To expedite dissemination, the national units in the Department of Agriculture were to process the data using a spreadsheet for dissemination during a weekly radio program. Radio programs began in Luang Prabang on 1 May 2002 and were subsequently expanded to other provinces. Data collection costs amounted to about US\$ 800, national radio broadcasts US\$ 30/month and provincial radio broadcasts US\$ 10/month. Since the project's end, Market Information Service activities have apparently been discontinued.

More recent market assistance has been provided by the Sustainable Development of Peri-Urban Agriculture in South-East Asia Project (SUSPER) sponsored by the Government of France and implemented between 2002 and July 2006. Unlike Viet Nam, where SUSPER helped establish a Market Information System that is still running (with ADB assistance), activities in Lao have been more limited and focused primarily on analyzing vegetable marketing in Vientiane (Kennavong et al, 2003; Kethsonga, Thadavong and Moustier 2004; Sithixay 2006) and helping farmers serving that market develop basic marketing strategies (Lecoq 2003).

The most deliberate efforts to develop information systems and ICT applications are being realized by the National Agriculture and Forestry Research Institute (NAFRI; www.nafri.org.la/), with assistance from the Lao-Swedish Upland Agriculture and Forestry Research Programme (LSUAFRP). NAFRI has developed a long term Information Service Strategy for 2004-2010 focused on improving the quality of agricultural research by improving researchers' ability to access and use information and their ability to communicate research results to stakeholders: farmers, and district, provincial and national policy-makers (NAFRI 2004).⁹

An important element of NAFRI's service strategy is the build up of its capacity to make use of ICTs and for this purpose it has developed a complementary ICT Plan and Policy program for 2004-2007 (NAFRI 2004a). The key constraints to overcome are a weak infrastructure serving NAFRI headquarters and affiliate centres and limited skills of research staff in the use of computers and the management of information systems and networks. These limitations are being addressed by the information component of the LSUAFRP. Three noteworthy applications have been developed to date:

the Lao Agriculture Database <http://lad.nafri.org.la/lad/index.html> with bibliographic information and select downloadable digital texts;

the National Agriculture Library Database: <http://nalis.nafri.org.la> to manage the resources of NAFRI's library which presently contains 8,000 materials; and

the Lao Agrovoc, a translation of FAO thesaurus of over 15,000 terms used in Agriculture and Forestry http://lad.nafri.org.la/agrovoc/agrovoc_la.php

Also noteworthy are efforts by the National Agriculture and Forest Extension Service (NAFES; www.laoex.org/index.htm) and NAFRI to work together in the production and dissemination of agricultural information through an Agricultural Management Working Group (AIM; www.laolink.org/AIM.htm). Since its creation in January 2006 the group has met 5 times and has developed an AIM Concept Plan (AIM March 2007).

AIM also carried out a survey of the staff (37 respondents) of projects and divisions and Centers of NAFES and NAFRI, and of technical departments of MAF and STEA and of various international organizations working in Lao P.D.R., to identify resources. The survey showed that the kinds of agricultural information available may be categorized in three groups: about 45% is information on techniques, 35% on methodologies, 13% on policies and 7% on marketing. These initiatives are largely donor funded, with national agencies participating in the production of information services. Approximately 50% of respondents were unaware of the NAFRI website; 75% were unaware of NAFES website.

In November 2006 the Laos Extension for Agriculture Project (LEAP), as Secretariat of the Government of Lao/Donor Sub Working Group on Farmers and Agribusiness launched a Google Group, LaoFAB, to enable networking among interested professionals and the exchange of materials and messages. On 24 May 2007, LaoFAB had 224 members¹⁰.

Other activities supportive of marketing applications include: the development of Lao fonts for computers (with support from UNDP's Information and Communication Technology for Development Project) and, more recently, for mobile phones (in partnership with Lenovo)¹¹, and plans by the Science, Technology and Environment Agency (www.stea.gov.la) to establish telecenters to serve rural communities.

Is there Widespread Demand for MIS Services in Lao P.D.R.?

There is considerable evidence showing that farmers everywhere demand and recognize the value of market information. What is less clear is whether the public or private sectors can develop ICT applications to supply this demand in a sustainable way; i.e. whether the benefits of particular applications outweigh the costs of the service and whether the institutional models used to deliver the service are sustainable.

Farmer needs for information differ from market to market. To appreciate farmer demand for agricultural market information services and the adequacy of the supply response – the MIS applications that are being developed to meet that demand – it is useful to distinguish between different requirements according to the three MIS objectives identified. Given Laos' limited experience with market information systems - regardless of whether they use ICTs or not - the three sections that follow focus on lessons learned from international experience.

Reducing Price Instability and Intermediation Costs

The need for timely site-specific price and market information is most exacting for fresh produce, such as fish and fruit and vegetable markets. Improvements in the timeliness of information provided are appreciated by farmers whenever those systems are instituted. What has been increasingly happening is that farmers who have a telephone prefer to receive market and price data through this means¹². The possibility to disseminate price information economically via sms is technologically within reach, but organizing a sms service that is attractive for farmers to pay its cost remains a challenge.

Alternatively, when farmers and traders have access to mobile phones, farmers are quite adept at collecting the information they need and act in their own best interest coordinating sales and in the process lowering price variability and intermediation costs (Box No. 3).¹³

Text Box No. 3: Effect of Mobile Phones on Market Prices and Fisherfolk Income in Kerala, India

Fish farming is important in Kerala, employing as many as a million people. Fish is sold every day along the beach in small markets that operate only for a few hours – typically 5 AM to 8 AM. Until 1997 fisher folk had no information on market conditions. Fuel costs and difficult road conditions limited fishermen to visiting and selling their product in only one market each day right. Data collected during this period shows wide price dispersion in markets that were not all that distant from each other. It was not uncommon to find several fishermen with their catch unsold while in nearby markets buyers left without fish.

Mobile phones were introduced in Kerala gradually starting in 1997. Towers were built to serve cities along the coast and in the process provided coverage 20-25 km out to the sea. By 2001 about 60% of all fishermen and retail and wholesale, traders were using mobile phones to coordinate sales. The standard deviation of fish prices expressed as a percent of the average price went from 50-60 percent before mobile phones to less than 15% after they were introduced. Waste which previously averaged 5-8 percent of the catch was eliminated entirely. Fisher folk profits increased by 8 percent while and consumer prices were reduced by 4%. These effects are directly attributable to the introduction of mobile phones. These impacts were staggered, with price effects observed in the different coastal markets soon after mobile coverage was expanded to serve the corresponding sea area. (Jensen 2007; The Economist 2007)

Expanding Market Channels

E-commerce in Lao is negligible. The few telecenter experiments that have been undertaken – e.g. by the UNDP project - have not been sustainable. The 5 telecenters to be installed with assistance from the Government of India, could provide an opportunity to help develop new marketing channels for agro-entrepreneurs and deliver other public services to rural communities. These experiments would have the best chances of success if they are carried out with private sector participation (Box No. 4).

Text Box No. 4: B2BPriceNow.com Dual Approach: e-Commerce and Expanded Farmer Access to ICTs

B2BPriceNow.com **in the Philippines** seeks to expand market opportunities for farmers and rural residents by increasing their access to ICTs and to new market channels (www.b2bpricenow.com). The company's strategy is to build up a loyal customer base of farmers by helping financially sound cooperatives to start their own telecenter on a profit basis and simultaneously demonstrating the power of ICTs for e-commerce, training cooperative members in the use of ICTs and providing services through its online market place and via sms.

By March 2007 twenty four B2B Centers had been established under the company's franchise (<http://b2bcenter.biz>). Services offered in B2B Centers are Internet/Computer access, photocopying, fax, sale of cellular phones and mobile air loads (retail and wholesale), remittances, courier services and sundry goods.

As the number of B2B centers have increased, so have the number of registered-user sessions in the B2BPriceNow.com e-commerce portal. If plans to expand services materialize company profits and its prospects for sustainability will rise. Especially promising are the company's plans to broker, support and promote among cooperative members and B2B Centers the use of a Land Bank prepaid card expected to also enable some m-banking services.

Providing Market Intelligence

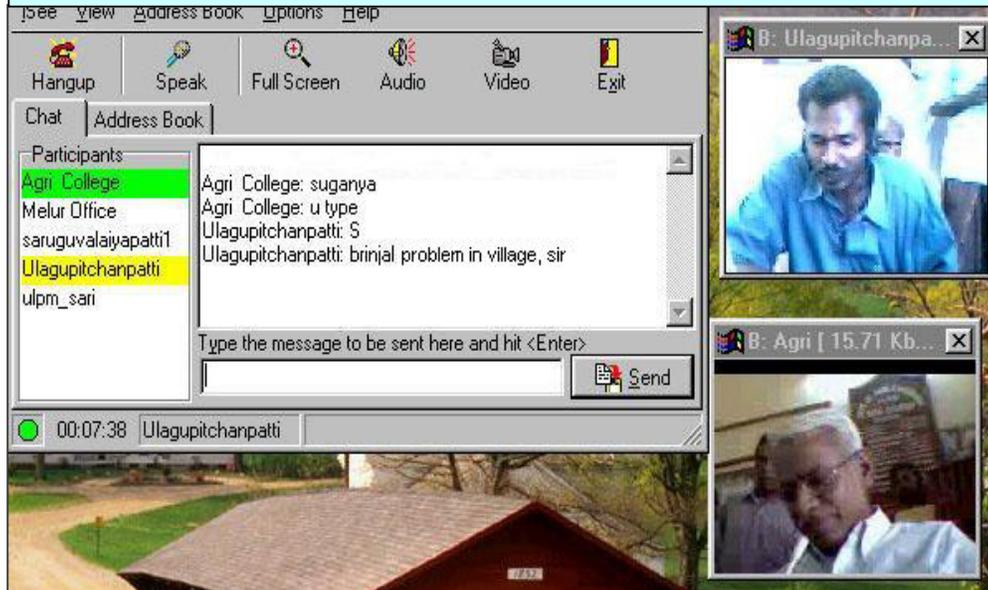
Market intelligence comprises strategic analysis of markets and marketing prospects. The demand for this kind of information largely comes from firms well endowed with human and physical capital that are in a position to seize new market opportunities and profit from them. Market intelligence information often involves a broad range of information fields, such as production practices, selection of variety, product quality control, processing methods, packaging, marketing channels, financing, etc.

In a developed country like the US Government MIS tend to be more useful for the better educated farmers and for analysts and consultants who use the information produced by government as raw data from which tailor-made information products are prepared – especially market intelligence – to address the specific needs of individual farm entrepreneurs (Just and Zilberman 2002; Wolf *et al.* 1998).

By lowering costs of interaction between civil servants and the public, ICTs are opening up opportunities to make available specialized expertise to individual micro-entrepreneurs and small farmers at relatively low cost. In particular, the provision of personalized **advice online**, where users determine the kind of information they need and interact directly with advisors, is a promising emergent application. Advice is available for a fee from Google Answers (<http://answers.google.com/answers/>), at US\$ 2.50/query. Agricultural extension advice online services are also being experimented with in India, by the International Institute of Information Technology, Hyderabad, (<http://agriculture.iiit.net/agrids/>); by IIT-Madras, and n-logue Communications (www.n-logue.com/services.htm; Box No. 5) and by Chile's Technical Cooperation Service (www.redsercotec.cl; Box No. 6).

Text Box No. 5. Technical Assistance through Videoconferencing

Because India is a land of many languages, a purely text based system of advice online (as Chile's Redsercotec) would be impractical. Instead, n-logue's provision of technical advice using ICTs uses a low bandwidth videoconferencing application developed by IIT Madras and commercialized by Oops (www.oops-india.com/), as well as through the exchange of highly compacted video-clips.



Text Box No. 6: Chile's Advice Online Service

The experience of Chile's Technical Cooperation Service, SERCOTEC, with advice online stands apart from other online business development service initiatives. First, Redsercotec is a public service provided at no charge to small and micro-entrepreneurs. Second, it is directed to serve not just a narrowly defined group (e.g. farmers) but all of Chile's small entrepreneurs with a broad range of interests and needs for information and services (e.g. legal advice, training, entrepreneurship, information on specific sectors like agriculture). Third, to be able to meet a broad range of interests, SERCOTEC has partnered with many other institutions to provide expert advice. Fourth, the system has been operational since March 2002 and was upgraded in 2004, and SERCOTEC thus has had time to garner experience. Through trial and error and careful monitoring, the agency has drawn on this experience to increase reach and effectiveness. Fifth and most importantly, the system is low cost, easy to implement and requires low maintenance. It has significant potential for replication elsewhere, to help public agencies increase their reach and become more citizen-oriented, transparent, and accountable at reasonably low cost, provided minimum conditions of literacy, a single language and access to ICTs apply.

Users registered in Chile's Redsercotec's website may send specific queries to any one of about 90 specialists (57 SERCOTEC staff members plus those of 29 partner public and private institutions) covering 45 thematic areas. An answer to each query is given within 48 hours. Upon receiving the advisor's reply, users are invited to rate the response on a 4-level scale from excellent to unsatisfactory.

To submit a query users first need to register in the system. Registration enables Redsercotec to better know its online clients. At end of May 2005, there were a total of 29,187 registered users. The face to face clientele of Sercotec numbers 10,000; the number of Redsercotec's registered users as of July 2005 is nearly 30,000. (Proenza *et al* 2006)

An advice online system would be suitable for Lao P.D.R. The advice categories could include a broad range of areas: Agriculture, Forestry, Fisheries, Quality Control, Training, Entrepreneurship, Financing, Legal Advice and Marketing, Land Administration, Concessions, Contract Farming and Agribusiness. The system would enable farmers and rural producers and traders to assess their readiness to engage in new high value agricultural activities, penetrate new markets, and to identify the commercial and legal requirements of tapping these markets.

Unlike other kinds of e-government services, no major re-engineering of procedures would be needed. Political determination would be needed, to institute the system and to encourage an initial staff cadre to participate. The donor community could be a catalyst in its establishment. Costs would be affordable. Chile's system, for example, is managed by a small office staffed by three people and costs of development and maintenance are low. In Lao P.D.R., the initial target group would be foreign investors and entrepreneurs with access to the Internet.

Low literacy rates and low penetration of the Internet could limit farmer outreach, and in a service modelled after the IIT-Madras example (Box No. 5) might be a bit more difficult to organize but easier for farmers to use. As mobile phone penetration in rural areas expands, to increase outreach the system could be adapted to mobile phone service through sms. To prevent excessive demand from overburdening advisors, a fee could be charged for the sms version of the service.

Success Factors and Constraints

Success Factors

There are some promising initiatives but no clear examples of ICT applications that increase agricultural market information and keep the public sector engaged. There are also promising private sector initiatives, but it is early to say whether entrepreneurs will be able to earn a competitive return on investment and continue functioning.

The most conclusive evidence shows that mobile phones enable farmers to search for the market information they need at low cost. When farmers and the trader community have phones, farmers engage in successful arbitrage and coordinate their supply response and their sales. In the process, they earn higher incomes, and price variability and the cost of market intermediation declines (Box No. 3). **A key success factor for increasing market information is therefore deepening rural mobile phone penetration.**

When it comes to packaged applications developed and managed by the public sector or by private firms, defining success factors is difficult because there are no clear sustainable successes to point to. In general, ICT initiatives that encourage greater interaction between citizens and the public sector and that make government and individual staff more transparent, responsive and innovative to citizen's needs (e.g. Boxes No. 5 and 6) should be encouraged, as they are likely to help producers carry out their own search in order to service their individual requirements for market information.

Constraints

World wide, the sustainability of publicly sponsored MIS has been challenged on two fronts. First, institutional sustainability has been difficult to achieve because the agencies entrusted with MIS operation are usually also responsible for many other functions. When budgetary allocations are made, farmer services often receive low priority. This is particularly true when agencies cannot show, for example through user satisfaction surveys, that the services provided are effective and appreciated by farmers. Second, achieving financial sustainability has been difficult because of the high costs of producing and disseminating reliable timely data using traditional media.

Ultimately, the principal obstacle in the way of effective MIS applications is in the very **nature of farmers' market information requirements**. Farmers demand for market information is very particular. It varies by product and depends on the individual farmer's location. Each producer is in the best position to identify the specific nature of the information they need which in practice means that there are almost as many information requirements as there are farmers.

The quality of market information is also dependent on the trust that farmers have on its source. Farmers trust neighbors, family and friends who are familiar with conditions in a given market, more than they are likely to trust a website or a system generated text message. Up until recently the costs of such exacting market information search have been prohibitive, but once there is widespread access to telephones they enable immediate low-cost market search (Box No. 3). With very low rural penetration of telephony this is still a major constraint to information delivery through telephones in Lao P.D.R.; but the situation is rapidly changing.

Other constraints in Lao P.D.R. with respect to MIS applications delivered online are negligible rural penetration of the Internet and limited digital literacy (i.e. the ability of the rural adult population to use the Internet).

A generally **weak public sector**, limited in its ability to innovate and more importantly, sustain innovative effective services, is another important challenge.

IV. Land Information Systems

Land Administration and Land Management in Lao P.D.R.

Traditional customary land use has long been recognized in Laos, although applied with variations between different areas by the countries' 47 different ethnic groups. Since 1986 when a New Economic Mechanism was adopted government has sought to impart greater protection to land use rights held by individuals and enterprises to stimulate investment and the use of land as collateral for credit. The Land Law of 1997 and subsequent decrees have gradually strengthened land use rights and have started to provide a foundation for the emergence of viable land and credit markets.

The new legal framework enables systematic adjudication of land use rights on a significant scale. Government has embarked on a 25-year Lao P.D.R. Land Titling Program, which is supported by World Bank credits and technical assistance from AusAID. The first Lao P.D.R. Land Titling Project (LLTP) was implemented from 1 July 1997 through 30 September 2003. The second LLTP started in October 2003 and is scheduled for completion by 2009 (Carter and Heuangsavath 2007; Virachit and Lunnay 2005; World Bank 2003; World Bank 2006a).

Land Administration in LAO P.D.R. is under the control of the Department of Lands (DOL), which until recently was an appendage of the Ministry of Finance (MoF). In December 2006 the National Land Management Agency (NLMA) was created the DOL together with the Department of National Land Use Planning and Development (DONLUPAD) and a part of the Department of State Assets were transferred to the new agency.

Provincial land offices are in charge of field operations of systematic and regular land registration activities. Village heads and neighbors are also engaged in verifying land use rights. At the initiative of the LLTP, the Lao Women's Union (LWU) helps conduct village level meetings and provides information on gender related rights to land. The LLTP is presently working in urban and surrounding areas in Vientiane and in 7 of the country's 17 provinces. Systematic adjudication is the approach followed because sporadic adjudication is costly.

Over 400,000 land parcels have been adjudicated to date (by LLTP I and II) and Survey and Adjudication Teams have developed a productive system that presently allows them to adjudicate 3.1 land parcels per day. In 2005 Virachit and Lunnay reported that about 28% of all parcels are being registered in the name of women only, 20% in the name of men only, and 41% to men and women jointly. The LLTP has also instituted a land valuation system that is easy to apply following a clear distribution of responsibilities for village officials and the staff of the District and Provincial Land Offices. Government revenues from land taxation have increased, even if overall collection is still low particularly in the case of taxes collected in urban areas (Keith *et al* 2006).

Registration of transfers of land use rights in urban areas of Lao P.D.R. is still one of the most expensive in South East Asia (Tables A2, A4), especially in terms of the time required by the process. Registration in rural areas is probably even more costly given the distance that beneficiaries of land adjudication must travel to the Provincial Land Offices. The high costs of subsequent titling could discourage registration of land transfers (by sale or inheritance) and bring about a return to informal recording of rights thus undermining the gains being made by the LLTP. The project is addressing this challenge by helping establish simple customer oriented land registration processes and developing a Model Land Office in Vientiane Municipality with streamlined procedures.

In comparison with the country's neighbors, land is plentiful in Lao P.D.R and not subject to undue population pressure (UNDP 2006, page 23). China, Thailand and Viet Nam, are growing fast, have rising demand for wood and agricultural products, limited forest areas and are already making intensive use of their agricultural land at relatively high cost. Opportunities for more intensive use of Laos' resources exist and the Lao Government has sought to attract foreign investment.

Nevertheless, most of Lao P.D.R.'s 2,326,800 km² is mountainous. Arable land suitable for permanent cropping is perhaps less than 5%, and only 6% of the territory has slopes below 20% (ADB 2006). Only six percent of the territory is used for agriculture, about equally divided between crops and livestock. An additional 30,000 ha are under shifting cultivation. Forty five percent is still under forest cover, but the shift to a market economy is increasing pressure on forest lands (UNDP 2006).

Since 1975 about 146,000 ha have been ceded by Lao P.D.R. to foreign companies for the establishment of wood plantations (UNDP 2006, page 79). Concessions to establish rubber plantations or contract farming arrangements have also been negotiated. In practice the amount of land available for these projects has fallen short of expectations and some agreements have been difficult to fulfill. Planning concessions requires a regularly updated inventory (which for practical purposes can best be done using IT) of available lands and an analysis of suitability of land for the kind of use that the land is to be put and of possible environmental restrictions and impacts (GTZ 2006). Further, in Laos, special care is needed to ensure that communities utilizing the land or with customary tenure rights over the land under consideration are consulted and compensated satisfactorily before a concession is granted.¹⁴

Planning concessions is an urgent but not the only land management requirements of the country. Many agencies use land information to plan and implement projects and public interventions that affect land use in Lao P.D.R; e.g. land and water resources management and land use planning by NAFRI, NAFES and MoA, town planning by Urban Planning Research Institute, roads and rights of way planning by the Ministry of Communications, Transport, Post and Construction (Table A3).

LIS Experiences and Plans in LAO P.D.R.

Laying the Foundations

The LLTP has begun to implement a long term computerization strategy expected to take 10 years or more to implement. Four important considerations informed the design of the project's computerization strategy (Brazenor 2005).

First, there is very limited capacity within the Department of Lands (DOL) to develop, administer or operate systems and networks. There is some knowledge of computers within DOL staff, but the basic skills and practices required for professional management of systems, such as regularly updating and keeping files and folders virus free, keeping software license agreements up to date and maintaining equipment in working order are not appreciated as indispensable expert routines. Further, computer skills are negligible among staff in Provincial Land Offices (PLOs) and Survey and Adjudication Teams (SATs).

Second, cadastral survey maps are kept in paper form at the respective provincial office. These paper maps are of little use for land management (e.g. planning of concessions) unless the data they contain is first available in digital format. Transaction costs are high for participants in real estate and credit markets who must travel to the different land offices in order to review cadastral information.

Third, during the early stages of the project cadastral maps prepared often used different standards and were of low quality. Using paper maps located in different agencies is costly and their usefulness variable.

Fourth and last, lack of coordination between agencies requiring land use data is common (not only in Lao P.D.R.) and gives rise to the duplication of efforts and the creation of datasets and tools using different standards and different software that do not and frequently cannot exchange information (are not interoperable).

The LLTP has been laying the foundations for the computerization of land registration (Carter and Heuangsavath 2007). Some of the important steps taken to date are the following:

The Project has introduced quality assurance procedures including the preparation of reference manuals describing processes and guidelines, improved drafting standards and the scheduling of audits to ensure that cadastral maps are of good quality and kept up to date.

Through a pilot activity of the LLTP realized in 2005 in collaboration with the National Geographic Department, the Vientiane Municipality Land Office scanned, rectified and digitized information from 114 cadastral map-sheets from Vientiane province. This exercise helped identify the steps involved and the costs and main consistency and reliability requirements of a larger undertaking.

A draft proposal has been developed and is presently under discussion, to convert hard copies of 256 cadastral map-sheets (mostly in 1:1,000 scale) to create a Digital Cadastral Map for two districts in Vientiane Capital City covering 26,990 urban land parcels in 16 villages (LLTP 2007). The resulting digital cadastral map will join together land registry information with mapping data in a unified electronic database.

A comprehensive program of training of LAD and provincial staff in the use of computer and GIS software is planned in parallel with the Digital Cadastral Map exercise for Vientiane.

LLTP computerization activities (e.g. Cadastral Map proposal) are being planned in coordination with other agencies using land information and with a view to sharing the land database developed.

The LLTP is also supporting the development of a National Land Information Coordination Strategy (Grant 2006, Mitchell 2007, Marquardt 2007). It may be expected that the newly created National Land Management Authority will assume a lead coordinating role. The recent creation of a National Land Management Agency (NLMA), integrating several land data users should facilitate land information sharing. Plans under discussion envision the incorporation of other government units into the NLMA, including the NGD, the Institute of Town Planning, the Department of Water Resources and Meteorology, the Department of Geological Survey and Mineral Resources and the Department of Protected Areas and Wetlands.

Institutional Challenges

Notwithstanding these advances, LIS development in Lao P.D.R. is challenged by important institutional issues.

Training of staff and, especially the leadership of the DOL, PLOs and SATs will overcome in part the lack of skills noted. In Lao P.D.R., however, such skills are very dear and have high commercial value. Retaining of skilled staff after training will remain a significant challenge for all government agencies. Computerization plans would do well to consider not only the need to develop staff skills, but also ways to institutionalize the ability of the DOL to retain staff with specialized skills by paying salaries that are competitive with the private sector and probably higher than those generally paid by public sector agencies.

Outsourcing offers a partial solution. One advantage of outsourcing is the relative ease of hiring personnel remunerated at comparatively high rates thus overcoming bureaucratic restrictions which often limit the remuneration that national agencies can pay. There are however limits to outsourcing land administration systems development and good reasons to pursue internal capacity building and direct management of land records databases by Government staff. The issue of capacity building and proper remuneration of systems development and systems management staff will not go away and will need to be addressed by Lao authorities as part of the DOLs institutional plans and computerization strategy.¹⁵

In planning LAO P.D.R.'s land information coordination strategy it is important to bear in mind the strict security requirements of the cadastre database. Trust in land registration is essential. If land registry records are not trusted by citizens, they will resort to informal contracting of user rights and the registration system breaks down from user desertion (Arruñada 2003). This is probably why in many countries land administration agencies are **quasi-independent public service monopolies** subject to the control of the state, that have considerable operational independence and salary scales that differ from most other public agencies. Even where they are joined to other functions (geographical institutes, tax collection) the preservation of the security and integrity of the land rights records database usually takes precedence (See Honduras example on Box No. 7).

In Lao P.D.R. it is probably advisable that the guardianship of digital cadastral maps be vested on a technically upgraded Department of Lands. Ideally, the NGD and other land management agencies should be able to use the information in the database, but no agency, other than the DOL, should be in a position to directly access or alter property rights records.¹⁶

Development of a Cadastral Map is an important advance, but is unlikely to have much effect on the costs of registration of subsequent transactions. A logical next step is the development of an automated system that links the cadastral map to new transactions as these occur at the initiative of citizens in the local land office. Such a system could be started on a pilot basis in Vientiane¹⁷. Its implementation may require the reengineering of some procedures and perhaps some adjustments in the legal framework. Potentially, the system could reduce the costs of recording, updating, administering and publishing large quantities of data in a secure environment, thus lowering the costs of registration, to the Land Administration Department and to citizens, of subsequent transactions. Lower costs would remove one important obstacle to **formal** registration by citizens of changes in property rights. It would also open up opportunities for online publication of land records through the Internet, land management and, eventually, e-conveyancing (Box No. 7).

Text Box No. 7: Land Administration and LIS in Honduras

The Land Administration Program of Honduras, PATH is a first \$25 million credit in a series of 3 APL operations foreseen. The PATH draws on the success of a previous intervention, The Rural Land Management Project, PAAR, that laid the foundation for modern land administration in Honduras. With PAAR support the Property Institute, IP, was created as a decentralized agency of the Presidency with own patrimony and financial, technical, and administrative autonomy. The functions of the previous Property Registry – a dependency of the Supreme Court, were transferred to the IP. The IP was given jurisdiction over the country's 22 registries, plus the Cadastre, Intellectual Property Rights and the National Geographical Institute.

The new legislation provides a framework for a technologically modern cadastre. It authorizes the IP to: "make use and implement the use of digital signatures and systems that enable the electronic implementation of procedures." and enables the registration of property rights "in a Web page, in an electronic data base or in a similar medium".

The National System of Property Administration, SINAP, developed by PAAR-PATH, is a Web-based system comprised of four sub systems the most important of which is SURE. The SURE makes extensive internal use of digital signatures to authorize different users to input or consult data or issue certificates. Also, all new property titles issued as part of a cadastral effort in State lands are electronically recorded in the IP in digital form with no paper trace. All subsequent land rights transactions are incorporated into the system as they occur.

Two other SINAP modules facilitate land use management:

SINIT - National System of Territorial Information: Intended to gradually join together and administer in an integrated fashion all of the geographic information generated by various government agencies.

RENOT - National Registry of Territorial Norms: Incorporates all regulations that affect the use of the national space (urban zoning, contamination and environmental monitoring, restrictions on natural resources use, restrictions on the use of resources in support of anthropologic, historical and administrative requirements) and identifies any weaknesses or conflicts between regulations.

PATH has also begun to establish municipal wireless networks. It has started in the capital city, Tegucigalpa, through the establishment of a low cost secure connectivity service to SINIT partner institutions. These low cost infrastructure networks will help increase access to the Internet by small municipalities.

PATH estimates that the times of registering a document was reduced from six months to fifteen days in Tegucigalpa and San Pedro, the countries 2 main cities. In a third one, Comayagua, the implementation of the SINAP has doubled the number of monthly transactions carried out by the registry. The World Bank's Cost of Doing Business in 2006 highlights Honduras' achievements in cutting down by half the costs of registration. (Proenza 2007)

Is there Widespread Demand for LIS Services in Lao P.D.R.?

The long term potential demand for Land Information System (LIS) services in Lao P.D.R. is significant. Four broad categories of users may be identified.

Demand from citizens is the more important category, in respect of size and of its potential impact on national growth and development. It is a demand derived from the citizen's need of a trustworthy system of property registration and information on property rights. Demand is highest in urban areas, but should also increase in rural areas as these become more integrated to the market economy.

Government officials, decision-makers and urban planners presently use a variety of ad hoc often non-standardized GIS and mapping applications for land management purposes. Their effectiveness would increase considerably if they had access to a reliable land inventory with information on who has rights over land stored in an interoperable database available online that seamlessly linked textual and mapping information.

Demand from land information from foreign investors is likely to involve relatively few users, but, if it is fulfilled, could make a significant contribution to increasing investment and improving national incomes.

Lao P.D.R. LIS supply to date has been minimal, but the LLTP project is on course, laying the foundations for developing such systems.

Success Factors and Constraints

Success Factors

Land Information Systems can make an important contribution to land administration and land management in Lao P.D.R., but for maximum effectiveness careful crafting of the institutional setting will be necessary. Experience from Honduras (Box No. 7), Thailand (Box No. 8) and elsewhere (Proenza 2007) offers important lessons in this respect.

First, a single agency that unifies land registration with land valuation, tax collection and mapping, is in the best position to create a system of land administration that runs efficiently, even if (as in Thailand) it runs at a relatively low level of computerization.

Second, advanced land information systems that make enable citizen use of the Internet can help lower costs and increase rural services significantly; e.g. by providing seamless integration of data, reducing the distance that citizens must travel to register subsequent transactions and enabling e-conveyancing.

Third, land administration systems can also serve as a foundation from which to build land management systems (as in Suphan Buri province in Thailand or in Honduras) to help plan local government interventions with greater precision and in reference to specific persons or enterprises occupying the land.

Fourth, Governments do not always develop LIS even when they can yield clear benefits to citizens and even when the land administration functions generate substantial revenue (the Thai case). Leadership from staff and decision-makers and donor encouragement and technical assistance may be necessary.

Text Box No. 8: Land Administration and LIS in Thailand

The Thai population is predominantly rural - 68% compared to 37% in the Philippines (Table A1). Registering urban property in Thailand takes less than two days (Table A14) and not much more in the countryside. Beyond those living in forest lands, the great majority of people enjoy secure land tenure. Efficient as it is, land administration in Thailand is carried out predominantly using manual procedures. The Department of Lands (DOL) has 880 offices distributed throughout the country, of which about 50 Provincial offices are fully computerized. The District offices perhaps use one computer in the front desk, but only to automate the more routine operations. The DOL however has no integrated database and its online services are limited (e.g. downloading of forms, respond to online queries from customers).

Efficient land administration in Thailand is the result of a sensible institutional setting for land administration and simple, secure, customer service oriented procedures. When the World Bank 20 year 3-loan program started in 1984 Thailand already had a sound institutional framework. Since 1901 the DOL has had responsibility for all aspects of land registration, including cadastral mapping and registration of land rights; and in 1981 DOL was given responsibility for a Central Valuation Authority. Registration of land in Thailand requires no intermediation by notaries, lawyers or the court system. The World Bank supported program's achievements were to expand the cadastre, introduce customer service focus and invest in a huge expansion in rural land titling. The number of titles increased from about 6 million before the program, to over 30 million presently. Efficiency also increased: DOL staff numbered 15,000 before the project and only 11,000 presently. The total amount collected by DOL on government's behalf (registration fees & taxes) amounts to about US\$ 1.37 billion annually. The annual amount used by DOL to run operations is about US\$ 91 million.

The DOL system has limitations. Transactions must be registered by contracting parties in the province where the land is located. The DOL is now implementing a 3-5 year program to computerize all Provincial land offices (about 300 remaining), prepare digital cadastral maps, set up automatic data entry in 15 sites, expand Online services which are presently very limited. The estimated cost of the LIS project is US\$ 10 million. Another longer term project envisages a paperless land office in every province, for a total cost of US\$ 350 million.

A third notable LIS initiative by the Government of Suphan Buri Province (about 100 km from Bangkok) helps plan local and national government interventions. The system, for example, proved to be very valuable in programming post-Tsunami assistance by enabling the swift identification of property owners in the affected areas.

Constraints

Most rural real estate transactions in Lao P.D.R. involve the exchange of small properties of low market value between poor people that know each other and are carried out far away from the service windows of public property registries. Land administration is therefore expensive, particularly in low density rural areas with difficult access typical of many parts of Lao P.D.R.¹⁸ Diversity in cultures and in traditional land tenure patterns make the use of differentiated approaches necessary.

Information systems can make an important contribution to land administration and land management in Lao P.D.R., by reducing the costs of land administration and of servicing rural areas. Implementation of these systems is a long term endeavor that is likely to require significant changes in procedures and legislation.

V. Emerging Policy Roadmap

Role of Private Sector, Government and Donors

ICT applications in the three areas considered can contribute to sustainable rural development in Lao P.D.R. Furthermore, a view of the proper role of the public and private sectors and of donors begins to emerge (Table A5).

Wireless Financial Services

In countries where m-banking has advanced (e.g. the Philippines South Africa) **the private sector has been the dynamic force driving wireless financial service innovation and development.** Private provision of m-banking services is high impact, profitable and self-sustaining.

Notwithstanding its limited market potential, Lao P.D.R. today benefits from wireless financial services from one company (e.g. electronic air time load, electronic sharing of air time between customers) which surprisingly are more advanced than those found in Viet Nam.

Government can support further wireless financial services innovation in three important respects.

First, it can stimulate greater competition in both telecommunications and banking services. This is likely to require greater participation from private capital in part from foreign investors.

Second, government can support an expansion in rural telephony through smart subsidies to help private entrepreneurs develop rural infrastructure. To further increase competition the leading operator should probably be excluded from such contests.

Third, Government will need to develop a suitable financial regulatory framework for m-banking services. Central Bank authorities need to develop a framework that protects consumers from undue risks, fraud or crime and ensures that service providers adopt adequate risk management measures; while at the same time facilitates and encourages innovation in financial service development, in particular to better serve rural communities.

Donors can support the Lao P.D.R. Government through technical assistance to help develop regulatory frameworks that foster greater competition in banking and telecommunication and through loan and equity financing to expand rural telephony and develop wireless financial services. They can also help disseminate good practices, promoting the exchange of information between countries and by providing seed funding to encourage new product development (technical assistance, training, performance testing and monitoring) to expand rural service.

Market Information Systems (MIS) and Services

Lessons of experience with Agricultural and Rural Market Information Systems are tentative. Farmers can be empowered by increased information on prices, greater marketing channels, and more market intelligence information. The Internet and mobile telephony in particular are drastically reducing the costs of providing these services. What is not clear is whether the costs of providing these services can be sustained by public agencies or even whether private enterprise can make a sustained profit without relying on government or donor support.

Promoting low cost access to mobile phones appear to be the best way to empower farmers with the ability to gather market price information from trusted sources that are relevant to their particular needs and to reduce intermediation costs and price variability. There is a role for both Government and donors in helping to develop rural telephony, as well as increasing Internet connectivity to expand farmer access to opportunities to establish new contacts through email and search for market intelligence information in the Web.

Further testing of MIS applications that promise to be self-sustaining may also be considered. It is not important whether a public agency or a private enterprise leads the effort; public-private partnerships may in fact be a way to increase efficiency, leverage resources and spread risks. Selective donor support of the more promising initiatives is recommended. Donors should closely monitor and assess cost and benefits before up-scaling these efforts.

Land Information Systems (LIS) and Services

Government institutions have a direct role to play as arbiter of property rights and keeper of land records. Lao P.D.R. has made substantial progress by laying the foundations for Cadastral Mapping and contributing to the development of a Land Information Coordination Strategy. LIS can significantly increase the effectiveness of land information and land management services and international experience can inform future developments in Lao P.D.R.

The private sector has a role supporting LIS development. Its involvement must be in harmony with the essential requirements of land administration as a public monopoly service.

Donors have played a key role testing new ways to improve land administration service delivery, and helping Lao P.D.R. develop an adequate institutional framework for land administration. International experience shows this is a long term undertaking in which donors can make important contributions.

Promising Donor Interventions

International experience illustrates donor approaches that have worked well in Lao P.D.R. and some promising new approaches that could help expand information services to rural communities.

Wireless Financial Services

Loans from the World Bank or equity investment from the IFC to finance smart subsidies in support of the expansion of rural telephony could help increase mobile phone penetration. If properly designed these interventions could also increase competition in telecommunications.

The USAID sponsored Micro-enterprise Access to Banking Services (MABS) Program (www2.rbapmabs.org) in the Philippines is another kind of intervention that could be suitable for Lao P.D.R.. It is a relatively low cost but high impact model intervention that has shown how a program of **technical assistance, training, workshops and seed financing and the sponsorship of partnerships** between telecommunications operators, rural banks and central bank officials, can help extend the wireless financial services frontier to rural areas by encouraging an increase in the network of cash-in and cash-out m-banking outlets and by helping to develop new wireless financial products (e.g. text-a-deposit, text-a-payment, automated payroll services) to lower the costs of rural microfinance.

Market Information Systems (MIS) and Services

Interventions **that increase mobile phone penetration** are most likely to yield high impact meeting farmers' demand for market information. Some of these interventions were outlined in connection with wireless financial services.

For Lao P.D.R. there are also good reasons to consider **Agricultural Development Projects that include telecommunications infrastructure development components**. The ability of Vietnamese technical extension and research staff to communicate, network, learn and service farmers and traders is presently shortchanged for lack of rural connectivity and limited telephony. The separation between the two sectors is common due to tradition and in deference to donor's bureaucratic configurations. But the technical justification for separating sectors was never very strong and is less so now that the link between telecommunications and rural and agricultural growth is better understood. Guatemala's Project to Support the Rural Economic Development Program (World Bank 2006) offers one example of a credit operation that supports telecommunications development (50% of total funding), together with agricultural marketing and trade (25%), general transportation (25%); and general agriculture, fishing and forestry (5%) in a well articulated fashion.

There appear to be no major initiatives to expand **market intelligence** delivery to farmers in a systematic and significant way in Lao P.D.R. Indonesia's **Farmers' empowerment through agricultural technology and information project** is an example that combines support to the country's extension service with the delivery, via the Internet and mobile phones, of market intelligence and technical services, and is expected to increase interaction between extension agents, researchers, farmers and traders.

Plans to establish in Lao P.D.R. a few telecenters connected to the Internet, presents the country with an opportunity to expand rural service delivery at relatively low cost. Installation of the centers, however, is a first step. In rural communities, parallel **adult digital literacy** programs, beginning with local government officials, is probably also indispensable¹⁹. Ongoing and future projects in Lao P.D.R. should test the use of the proposed telecenters to be established by STEA to train local government officials and entrepreneurs in simple computer literacy skills, and use these facilities to deliver services (market information, land information) to rural residents.

Land Information Systems (LIS) and Services

The LLTP II is making progress in the development of the country's land information systems in support of land administration and land management.

The more sophisticated online services may yet take time to attain, depending on the country's ability to meet institutional and infrastructure challenges. Unfortunately, policy-makers are often lured by sophisticated portals that provide online land administration services. What is not always appreciated is that these portals have been set up only after major institutional transformations, that have involved the reengineering of procedures and significant legislative changes.²⁰ To increase understanding among decision-makers and project planners, **studies, workshops and exchanges of staff** on LIS approaches, specialized LIS topics and Internet service requirements could be very productive.

Notes

1. According to MCPC statistics for 2006 the total number of mobile phone lines being used were 849,892. (www.mctpc.gov.la/departmentofpostandtelecommunication1.html). At the end of the first quarter of 2007, Millicom reported 91,869 subscribers (MIC 2007) in Lao P.D.R. In 2004, the Director General of the Department of Post and Telecommunications, Phommathansy (2003), estimated LTC's share of the mobile market at 83%, Millicom's at 5.8%, ETL at 8.7% and LAT at 2.5%. Figures for December 2004 presented in Chanthavixay 2005 show the following mobile market shares: LTC 67%, ETL 19.7%, Millicom 10.2% and LAT 3.4%.

2. "Although it is listed as a sector of strategic and national security interest, in practice, telecommunications is the most open and competitive services sector in Laos, with the field presently divided among Lao, Thai, and Chinese telecommunications entities." (US Trade Representative 2006, page 426).

3. The company used Tango as its brand name until it was changed to Tigo in 2007. Details on the company and its services are available in www.tigolao.com

4. Of course, this number is quite small compared with those registered in larger markets, for example, 500 million text messages per day in the Philippines in 2006.

5. Churn rate is the proportion of subscribers that cancel their subscription. Any time-frame may be used but churn rates are often quoted on a monthly basis. A 3% monthly churn consistently applied over a 12 month period would result in a loss of nearly 30% of the initial customer base.

6. In the case of Smart Communications in the Philippines, from the time of launching electronic load in May 2003 to the end of 2004 the number of retail dealers increased from 50,000 to 700,000.

7. "the edges of commercial microfinance are defined by cost structures of current delivery technologies" (Peck Christen 2006).

8. "...the track record of such services around the world has not, on the whole, been very satisfactory....FAO conducted a survey of all FAO member countries. This indicated that, while a large number of countries do operate some type of MIS, the vast majority of services cannot be considered to provide commercially useful information for farmers and traders. A large percentage of MIS are primarily data-gathering exercises, and even this is done inadequately. MIS suffer because they are frequently operated by government officials who lack a commercial approach. More importantly, the majority face significant resource constraints." Shepherd (1997, page 1.)

9. "We seek to improve researchers' ability to better access and use information so as to improve the quality of their research and in turn assist them to communicate their results and recommendations to better inform decision making at different levels (from farmers, district planners, provincial coordinators, to national policy-makers)". NAFRI 2004, page 12.

10. The group is a closed group requiring approval for membership but may be joined by visiting the following link: <http://groups.google.com/group/laofab?hl=en>

11. The use of Lao fonts is not a major obstacle block for the spread of mobile phones. Lao language is a South-western Tai language and is connected to Thai (Enfield 1999). Presently, most phones in use in Lao P.D.R. use Thai script which is similar but has more characters than Lao script. From a national policy concern, however, the use of Lao font

is important. A commonly cited proverb is: "Language reveals one's nationhood, manners reveal one's lineage" (Enfield 1999, page 258).

12. In the case of Viet Nam's fresh vegetable price information system established with support of the Sustainable Development of peri-urban Agriculture in South-East Asia Project (SUSPER), the following was reported:

"While in the general meeting, the preferred means of dissemination turned out to be the telephone as participants to the general workshop may be ones with easier access to telephone than the rest of farmers and traders. Television was more often quoted in the village meetings." (RIFAV 2006, page 35).

In The Philippines, during the MIS test period of the improved Agricultural Market Information System (AgMaris), the Provincial Agriculture Statistics Officer for Bukidnon received several sms requests for price information from farmers, and respondents to an impact assessment survey suggested giving cellular phones to the agricultural technicians so that the Bureau of Agricultural Statistics officer working in the Agora market on market days could report of prevailing market conditions to these technicians and to the Municipal Agricultural Officers and they could then in turn inform farmers (FAO 2004).

13. For a recent review of telecenters see Fillip and Foote (2007).

14. "More plans for rubber plantations across the country have been announced, although it may be that some of the concessions awarded to foreign investors over the past year will have to be partially or completely abandoned because of a lack of available land. Vietnam's state media announced in February that a Vietnamese company had signed an agreement with a representative of the Lao government to plant rubber trees and build a rubber latex processing mill on 8,000 ha of land in the southern province of Sekong. A local official of the province said that the project was part of the province's reforestation plan, but it is doubtful whether such officials will be able to supply the large areas of land being promised to concession holders. Land laws in Laos guarantee rights to local land users, and the terms of the deals for contract farming that are being arranged throughout the country are often far from clear. In Xaignabouli province district officials are pressuring people to relinquish land as a patriotic duty. The province has contracts with Chinese and Thai companies for around 8,000 ha of rubber plantation, but in 2006 only 630 ha was planted. If villagers refuse to allow appropriation of their lands, the boom in contract farming may pose social and political problems in the near future." (EIU 2007, page 17)

15. Outsourcing can help, provided that it does not jeopardize the trustworthiness of registry data and does not tie up land agencies to rent extraction by contractors. Examples of satisfactory outsourcing (from Proenza 2007) include:

Public (Norsk Eindomsinformasjon Ltd in Norway) enterprises and public agencies (National Informatics Centre's development of Bhoomi system in Karnataka, India) have proven capable of developing, installing and administering reliable land information systems.

Panama's Registry outsourced to a private enterprise the development and installation over a 5 year period of a Digital Registry System (REDI) that was subsequently turned over for administration by Registry staff. The project included the successful installation of a network of 100 computer work stations, optical fibre infrastructure, database servers and Jukebox storage units, scanners, and the digitization of 19 million documents and software development including the establishment of a Web based consultation system.

Outsourcing also carries risks.

In the Philippines, an IFC sponsored program to hire a private consortium to “Build, Operate & Own” computerized functions of Registry of Deeds has stalled for failure by the contracting parties to agree on a fee structure and with respect to ownership rights of the Land Registration Authority over the systems developed once the 10-year contract period has ended (Details in Proenza 2007a).

In Guatemala, the Public Registry’s information system was developed in 1996 by GBM (www.gbm.com), a regional subsidiary of IBM. A few years later the GBM staff managing the system convinced RGP authorities to hire them directly to replace GBM as the contractor. This change proved disastrous. In May 2003 the RGP’s information system collapsed and, for lack of backups, some 430,000 images of electronic and physical records were lost. GBM was hired anew to help recover the records and refurbish the system. As of March 2006 some 375,000 images had been recovered. Prior to the system’s collapse, the cost of outsourcing the system’s management amounted to US\$ 40,000 a month; under the new contract, outsourcing costs doubled to US\$ 80,000 a month.

It is probably no coincidence land administration systems integrating textual and mapping information are often developed (e.g. in El Salvador and in Honduras) with own agency staff. Three reasons appear to favor in-house development:

i. In-house systems development encourages ownership; i.e. a direct link between the system and the institution and a commitment by the leadership to successful implementation. This helps when dealing with complex systems that are invariably challenged by implementation problems that are difficult to gauge by managers with limited technological expertise.

ii. For maximum impact, information systems should be developed in parallel with the reengineering of cadastre processes and changes in legislation. Consultants can recommend and support reforms, but ultimately a personal connection and commitment by authorities is needed, as well as their familiarity with the potential, constraints and basic features of the systems under development. The rapport and commitment required will be easier to obtain from authorities that assume direct responsibility for in-house development.

iii. It is not infrequent that several donor funded land management projects run in parallel, often providing for systems development but not always using the same approach, standards and software. Coordination of these separate efforts can best be done locally, by authorities and agencies with direct responsibility for in house systems development.

16. Information sharing agreements zealously guard the security and integrity of cadastre data (Proenza 2007; Onsrud 2003).

Panama’s Registry does not authorize access to its systems by the Geographic Information System of the DCBP (cadastre). Updating of property information in the cadastre is done manually by staff physically located in Registry premises.

Guatemala’s General Property Registry (RGP) does not authorize access to its system by the Geographical Information System of Guatemala Municipality’s Directorate of Cadastre and Administration of the Unique Tax on Real Estate (*Impuesto único sobre bienes inmuebles*, IUSI).

In 2003, the Norwegian government united the registry and cadastre into a single agency, the Norwegian Mapping and Cadastre Authority, NMCA (www.statkart.no). One

of the main objectives is to maintain an up to date unified database, but always protecting the security and integrity of registry information which can only be modified at the request of the property owner.

17. The development in-house by the staff of DOL- is recommended. Nevertheless, to give a notion of the costs involved, consider that in Nicaragua in 2006, the outsourced cost of developing a similar system was US\$ 1.5 million.

18. In small communities there is no need for formal means of recognizing rights; members know who has rights over an asset and what she may or may not do with it. It is when land is scarce and actively traded and acquires a high value and when communities grow and discover the benefits of transferring rights to strangers outside the community or to people about who little is known that the need for property rights institutions arises. (Libecap 1999, Henssen 1995, Arruñada 2003, Wallace and Williamson 2005)

19. Funding of digital literacy campaigns to train select low-income groups has become part of national efforts to further ICT development and is usually incorporated into broader ICT programs. In Korea, for example,, Government carried out mass media informatization campaigns (Park 2001) and established Education Information Centers in schools and post offices, used to provided free or low cost information education to an estimated 10 million people, mainly students, government staff, soldiers and housewives (Lee [2002]). In Chile, a national digital literacy campaign (Gobierno de Chile 2004) in parallel with a significant expansion in telecenter facilities provided for digital literacy training of 500,000 people between 2003-2005.

20. Computers enable the automation of simple routines, but for in order for information systems to have a significant impact, parallel changes in institutional procedures are usually required; i.e. a re-engineering of traditional ways of doing things is necessary (Brynjolfsson and Hitt 2003; Dedrick, Burbaxani and Kraemer 2002).

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Annex A. Tables

Table A1. Selected Indicators, South East Asia

	Population			% Illiteracy > 15 yrs		% population earning less than US\$2/day	GNI per capita (2005)	Cellular subscribers per 100 people (2005)	% Prepaid (2005)	Mobile Cellular tariffs US\$ (August 2006)		
	Total (millions 2006)	% <= 19	% Rural	Male	Female					Per minute local call		SMS
										Peak	off-peak	
Cambodia	14.4	59.8	80	15	36	77.7	380	7.5	57.9	0.12	0.11	0.03
Indonesia	225.5	47.2	52	6	13	52.4	1,280	21.1	92.6	0.11	0.09	0.01
Lao P.D.R.	6.1	62.2	79	23	39	74.1	440	10.8	97.2	0.17	0.14	0.04
Malaysia	25.8	51.6	33	9	15	9.3	4,960	75.2	85.0	0.10	0.10	0.01
Myanmar	51.0	n.d.	69	6	14	n.d.	n.d.	0.3	n.d.	n.d.	n.d.	n.d.
Philippines	84.5	54.6	37	7	7	47.5	1,300	41.3	92.0	0.13	0.13	0.02
Singapore	4.4	28.9	0	3	11	n.d.	27,490	100.8	36.7	0.14	0.14	0.03
Thailand	64.8	37.8	68	5	9	25.1	2,750	43.0	51.8	0.05	0.05	0.08
Timor-Leste	1.0	n.d.	74	n.d.	n.d.	n.d.	750	n.d.	n.d.	n.d.	n.d.	n.d.
Viet Nam	85.3	48.3	74	6	13	n.d.	629	11.4	80.5	0.15	0.15	0.02

Sources:

State of World Population in 2006, UNFPA www.unfpa.org/swp/

US Census Bureau - International Data Base: Population Pyramids www.census.gov/ipc/www/idbpyr.html

World Bank - Key Development Data and Statistics

<http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20535285~menuPK:1192694~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>

Data on % of population earning less than US\$ 2/day is from various surveys taken between 1997 to 2002. See World Development Report 2007

ITU 2007: www.itu.int/ITU-D/ict/publications/ict-oi/2007/index.html

Table A2. Cost of Registering Urban Property in East Asia

	Ease of Doing Business Rank	Registering Property Rank	Cost of Registering Urban Property		
			No. of procedures	Time (days)	Cost (% of property value)
Cambodia	143	100	7	56	4.6
Indonesia	135	120	7	42	10.5
Lao P.D.R.	159	148	9	135	4.2
Malaysia	25	66	5	144	2.4
Myanmar	n.d.	n.d.	n.d.	n.d.	n.d.
Philippines	26	98	8	33	5.7
Singapore	1	12	3	9	2.8
Thailand	18	18	2	2	6.3
Timor-Leste	174	172	n.d.	n.d.	n.d.
Vietnam	104	34	4	67	1.2

Source: World Bank, Doing Business in 2006 www.doingbusiness.org

Note: Poorest performers had a rank of 175 for Doing Business and 172 for Registering Property.

**Lao P.D.R. Country Report: Applications
Annex A. Tables**

Table A3. Sample Stakeholders Using Land Information for Land Use Planning and Land Management Purposes

Description of project or activity	Executing Agency	Funding
Computerization of Land Administration in Vientiane Municipality	Department of Lands (DOL) National Land Management Agency (NLMA)	Lao Land Titling Project II (LLTP II) -World Bank
Land Valuation for Tax assessment	Legal Division of Dept. of Land Adm., NLMA	Lao Land Titling Project II (LLTP II) -World Bank
Planning for conservation, mgmt, use of land, water and other natural resources	Department of Land Use Planning and Dev., (DONLUPAD), NLMA	Government of Lao P.D.R.
Establish and manage a land and natural resource information system	Center for Research and Information of Land and Natural Resources, NLMA	Government of Lao P.D.R.
Registry of State Lands	Department of State Assets, NLMA	Government of Lao P.D.R.
Establishment of Pilot Land Info. Center in Vientiane Municipality	NAFES	Lao Extension for Agriculture Project (LEAP) - Swiss Agency for Development Cooperation (SDC)
GIS for Land Management	Science, Technology and Environment Agency, STEA	ICT Project – China
GIS for Ag. Policy Support	MAF Information Centre	n.d.
Land Surveying, mapping and geodetic control	National Geographic Department, NGD	n.d.
Land and Water Resources Management and Land Use Planning	NAFRI	Lao-Swedish Upland Ag. & Forestry. Res. Prog. LSUAFRP - Swedish International Dev. Coop. Agency (SIDA)
Road Management System - Planning of roads and rights of way	MCTPC	n.d.
Management of Mekong River Resources	Mekong River Commission Secretariat (Vientiane)	Commission Members
Urban planning for large urban areas	Urban Planning Research Institute	n.d.

Table A4. Cost of Registering Urban Property in Vientiane

Procedure	Duration (days)	Cost
1. Notarization of Sale-Purchase Agreement	2-3	LAK 300,000 plus 500 per page
2. Inspection of property by a land official	10 days	(Cost paid in procedure 3)
3. Obtain a certificate of land guarantee and the land map	1	LAK 30,000 (certificate) + LAK 30,000 (map)
4. Parties go to the village where parcel is located and inform the Village Chief.	1	(Cost is paid in procedure 6)
5. Obtain stamp and signature from the district land office	2	(Cost is paid in procedure 6)
6. Collect certified information with regard to the purchaser (copy of the contract between providers of capital, copy of the Enterprise Registry, copy of the articles of association).	3-10	LAK 50,000
7. Change of records in Land Register Book with information of the new owner.	10 days	LAK 30,000 + LAK 20,000 (stamp duty) + 1% of property price (transfer tax) + 3% property value (registration fee)
8. Give public notice of the transaction (publication of information notice at the village and district offices and in the media. Parties must wait for up to 90 days to continue with registration process)	up to 90	LAK 40,000
9. New land deed is delivered to the buyer by the Land Management Authority (provided no claim by third party occurs)	15	No charge
Total	135	4.2% of property value

Source: World Bank, www.doingbusiness.org

The assumed value of the property is 50 times the national per capita income:
LAK 235,628,014 (about US\$ 23,700).

**Lao P.D.R. Country Report: Applications
Annex A. Tables**

Table A5. Emerging Roadmap of Roles of Public and Private Sectors and Donors

	Regulatory and Legal Framework	Innovation, Service Development and Investment
Wireless Banking		
Government	develop financial regulation foster competition, in telecom and banking sectors support m-banking innovation	Stimulate greater private investment in rural telephone development through smart subsidies.
Private Sector		develop and invest in secure customer service application compliant with Central Bank regulations.
Donors	Technical assistance and training to improve telecom regulation	Credit financing of smart subsidies to develop rural telephony Provide seed money to encourage pilot testing of rural microfinance services. Dissemination of know how
Agricultural and Market Information Systems, MIS		
Government	promote telecom competition and increase rural telephony provide interactive market intelligence services	Use telecenters to deliver market information & other services and provide digital literacy training (esp. local gov. officials) partner with private sector to experiment with applications dev.
Private Sector		develop and invest in applications to serve rural areas develop sustainable (profitable) rural Internet access points
Donors	Tech. assist. and training to improve telecom regulation	Seed funding for pilot testing and dev. of rural service.
Land Information Systems, LIS		
Government	land titling institutional reform	Develop applications (e.g. cadastre index map, valuation, sms) Use public Internet access points to update land records
Private Sector	stakeholder participation in governance of land administration agency	develop and install applications under contract to State Land Admin. Agencies.
Donors	Provide Technical assistance and training to improve land titling institutional and legal framework Help develop LIS for land admin. and land management.	Long term program loans for land administration Fund investment and tech. assist. to develop LIS services.

Annex B. m-Banking: Key Financial Regulation Issues

The key financial regulatory issues that a country's central bank needs to address in relation to m-banking are:

- i. how to protect the public from fraud and ensure a reliable, continuous and secure service;
- ii. how to prevent technology risks from severely affecting a bank's capital or earnings;
- iii. how to regulate financial service providers that are not banking institutions; and
- iv. how to prevent the use of the new electronic platform for illegal money laundering activities .

The Central Bank will need to build up its capacity to understand and regulate risks associated with the electronic banking services. It might find it useful to create, as was done in the Philippines, a Core Information Technology Supervisory Group within the Bank. The steps to be followed in order to approve an application to provide electronic banking services will need to be defined, and a list of the risk management measures that applicants must implement will have to be specified.¹

Some of the requirements that applicants should meet are the following:

- i. demonstrate that adequate risk management procedures and monitoring systems are in place;
- ii. show that a manual describing corporate policy has been prepared addressing all security issues associated with the service (authentication of sender and receiver, non-repudiation of transactions effected, enforces access rights of parties involved, assures data transmitted wirelessly is not altered and that no one other than the transacting parties can understand the data);
- iii. give evidence that the system has been tested and these tests have yielded satisfactory results; and
- iv. present a business plan detailing banking channels and systems and providing for continuity of the service has been adopted.

In the same way that mobile telephone service operates predominantly on a pre-paid basis (97.2% in 2005, Table 1), m-banking in Lao P.D.R. will also be pre-paid. Accordingly, at any one time the mobile operator providing m-banking services will be

¹ The Central Bank of the Philippines has issued four Circulars detailing the procedures that institutions wanting to provide electronic banking services must follow. The first two, numbered 240 and 269, were issued in 2000 and envisioned a bank as the service operator. These circulars (esp. 269) describe the steps to be followed to approve an application to provide electronic banking services and lists the risk management measures that applicants must implement⁶. The other two circulars were issued in 2006. Number 511 gives detailed guidelines for Technology Risk Management and proposes that banks' follow an integrated risk management process that involves planning, implementing and measuring and monitoring performance. Circular number 542 specifies rules e-banking service providers must follow to protect consumers from fraud, robbery, money laundering and other crimes.

Filipino Central Bank circulars may be downloaded from www.bsp.gov.ph/.

holding a considerable amount of funds from its customers. This is why a regulator evaluating an m-banking application from a mobile operator wishing to provide the service on its own without direct link to a bank, meet the following conditions:

- i. it is a financially sound company;
- ii. the systems and network used by the company are secure, robust and reliable and has in place procedures for addressing emergencies;
- iii. the funds involved are relatively small in relation to the financial capacity of the firm; and
- iv. the company is capable of managing the risks associated with providing the service without posing a significant threat of abscondment or loss of customer funds.

The Central Bank will need to assume a "de facto" regulatory function over the company and the latter must in turn accept to give the Central Bank regular oversight access to its systems, procedures and database. Before approving any new m-banking services, Central Bank staff should work closely with the company to ensure that secure reliable procedures are used.

Sample regulatory requirements applicable under either of the two entrepreneurial options include:

Know Your Customer (KYC)	a key step for mobile banking is ensuring at the outset face to face interaction with the customer and that a photocopy of every customer's picture is kept on file.
Anti-Money Laundering Requirements	in addition to KYC requirements, limits should be set on how much money can be transferred per day or per month
Text a deposit services	to ensure confidentiality of deposits, a deposit using this service can only be made to a licensed bank.
Expeditious approval of participating banks	Bank branches wanting to provide m-banking services (e.g. encashment, text-a-loan-payment, text-a-deposit) should be trained and certified by the Banking partner institution (or creditable banking association) as qualified to provide the service.
Strong encryption and masking of password	To prevent e-banking identity theft (as money is transferred in cyberspace or as a result of mobile phone theft), strong encryption algorithms must be used and the password entry is masked; e.g. showing *** instead of the alphanumeric characters entered by the customer.
Consumer protection	Customers must be made aware of the risks involved in using the service and the company must have disclosed procedures for handling customer complaints.