The Huaral Valley Agrarian Information System, Peru

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The Huaral Valley project has been included in this toolkit to illustrate a type of community ownership model in which farmers are directly involved in the decision making and implementation of an agrarian information system. Although originally planned as an ICT installation to manage a network of irrigation canals for local farmers, the infrastructure enables telecoms and internet access for poor farming communities that would otherwise have been excluded from such resources.

The project also illustrates the importance of leadership and vision to ensure that lobbying and advocacy are undertaken, both within communities and also with the government. In this case, the community, through its irrigation board, was able to lobby for changes in the existing restrictive ICT policy and regulatory frameworks. The result has been more affordable and widespread ICT access for local communities.

Introduction

This case study documents the experiences and lessons learned during the implementation of an agrarian information system (SIA – Sistema de Información Agraria) in the Huaral Valley, a coastal area in Peru. The project was initiated in 2000 by the Centro Peruano de Estudios Sociales (CEPES) in partnership with the Chancay-Huaral River Basin Irrigation Board, a local community-based organisation (CBO) set up and owned by farmers. The irrigation board is responsible for maintaining irrigation infrastructure (mainly channels, sluice gates and water reservoirs) and charges farmers for the use of the irrigation infrastructure. The introduction of affordable internet access and telecommunications services to district irrigator commissions and poor farming communities has benefited farming communities by providing improved water management.

Context

Huaral lies 90 kilometres north of Lima, the capital of Peru. The Huaral Valley includes the middle and lower part of the Chancay river basin and comprises three districts, Chancay, Huaral and Aucallama, which form part of the province of Huaral. Together with the district capitals, of which the city of Huaral is the largest, there are several small settlements that lack good roads and telecommunications. The valley has a subtropical arid climate and its agricultural production relies on irrigation, as is the case along most of the Peruvian coast. Agriculture provides livelihoods to the majority of the population.

Peruvian agriculture is characterised by many small farmlands, the result of the agrarian reform of the 1970s during which large farms were expropriated from landowners, and given to cooperatives formed by farm workers or existing peasant communities.[2] The counter-reform process which began in the 1980s allowed the further fragmentation of cooperatives and eliminated economies of scale, resulting in lower incomes for farmers, obstacles for technical innovation, significant

[1] Peruvian Centre for Social Studies

[2] José Matos Mar *La reforma agraria en el Perú* (Lima: IEP, 1980) and *Reforma agraria: logros y contradicciones 1969-1979* 2nd ed. (Lima: IEP, 1984)

advantages for intermediaries in commercialisation and less access by farmers to formal credit.[3]

In Peru, farmers do not traditionally make use of weather forecasts or formal information channels to exploit potential business opportunities, improve agricultural production or find commercial uses; they tend to persist in using their own tried and tested methods.[4] Those who have wanted to initiate changes have made use of social networks to acquire information, or rely on providers for technical support.

In terms of access to information and communications technologies (ICTs), Peru has about 35,000 *cabinas públicas* or commercial public internet access points (PIAPs) for a population of 28 million. About 30% of Peru's population uses the internet, with the *cabinas* providing internet access for 70% of these users.[5] However, most do not provide training or content development, nor is there appropriate content to cater for different interests or groups.[6] Before the SIA project was initiated, there were *cabinas* in the city of Huaral but not in the rest of the valley. Several public agricultural institutions were also without internet access. The project addressed this gap by introducing a telecentre network to provide connectivity to rural communities.

Project history and overview

In the 1970s, the government took over the management of water resources,[7] and in 1979 irrigation user boards were created for every irrigation district. In Huaral, the irrigation board is elected by representatives of seventeen irrigator commissions. Irrigator commissions are formed by registered farmers (irrigators) who are landowners, with an average land area of about four hectares. Each commission draws water from one of the main channels extending from the river. They are usually based at locations formerly occupied by a *hacienda* (large estate).

There are 6,000 "irrigation users", who are small landowners registered with the board. This does not include farmers who rent land or farm workers. Farmers pay the irrigation board for the maintenance and use of the irrigation infrastructure.

When the SIA project was first conceptualised in 2001, the project plan included the installation of one computer at each irrigator commission, with connections to the internet via VSAT. There were, however, concerns from potential funders about the financial sustainability of the project – the technology options were seen as too costly and there were no plans for income generation. This led the project to include an agrarian information system, using wireless technology to interconnect

[3] Fernando Eguren "Revisión y balance de los estudios sobre restructuración de empresas agrarias asociativas", in *SEPIA II: El problema agrario en debate* (Lima: SEPIA, 1988); Angel Fernández and Alberto Gonzáles *La reforma agraria peruana, 20 años después* (Chiclayo: Centro de Estudios Sociales Solidaridad, 1990)

[4] Juan Fernando Bossio "Flujos de Información y Comunicación en contextos rurales: punto de partida para intervenciones en Tecnologías de Información y Comunicación", in *Perú, el problema agrario en debate, SEPIA IX* eds. Manuel Pulgar Vidal, Eduardo Zegarra and Jaime Urrutia (Lima: SEPIA, CIES, CARE, OXFAM, 2002), 662-87; Ignacio Cancino *Determinación de Necesidades Específicas de Información Agraria e Identificación de los Sistemas de Información del Valle de Huaral* (Lima: CEPES, 2001); INEI *Censo Nacional Agropecuario, III - 1994. Resultados Definitivos* (Lima: INEI 1996)

[5] INEI *Las tecnologías de información y comunicación en los hogares: enero-marzo 2008. Informe técnico no. 2 Junio 2008* (Lima: INEI, 2008)

[6] Juan Fernando Bossio and Katia Sotomayor *Public Access to Information and Communication Venues in Peru* (Seattle: University of Washington, 2008) www.cis.washington.edu/depository/landscape/documents/Peru/Chapter_Peru.doc

[7] María Teresa Oré *Riego y Organización: evolución histórica y experiencias actuales en el Perú* (Lima: ITDG, 1989)

several points in the valley. The objective was to allow ICT appropriation by farmers and the rest of the population, improve administration within the irrigation board, and allow farmers to access useful and appropriate information. The proposed system would be partially financed by selling telecommunication services.

Following an information needs analysis in 2001,[8] the information systems design commenced in November 2002, and in 2003, CEPES provided computer training to 280 farmers. In 2004 the content platform[9] was completed and by year-end, the irrigator commissions and the irrigation board's central office were networked and connected to the internet. The system has been operating since 2005 and is maintained by the irrigation board, with professional support from CEPES. Funding was provided from various sources for specific activities during the project development phase, the most significant being GTZ,[10] the Ministry of Agriculture, INCAGRO[11] and FITEL.[12]

After seven years of activities, the success of the project can be seen through the level of ownership claimed by the Chancay-Huaral River Basin Irrigation Board, with CEPES and other institutional actors playing a supporting role. The major benefits of the project have been the enhanced performance of the irrigation board and the improvement of its internal functioning, while ICTs are being appropriated by farmers as tools for decision making. The SIA also provided the first (and in some cases still the only) internet access and other ICT-enabled services in ten small rural settlements. The project includes the establishment of telecentres throughout the Huaral Valley, at irrigator commissions affiliated to the irrigation board. These are interconnected by wireless networks and equipped with Linux operating systems in all computers, a CMS-based web page system, and locally developed software to provide locally relevant information on irrigation management and agriculture. The project is financially sustained by the irrigation board but further developments will need to include organisational enhancements, improved social inclusion and utility development in order to maintain sustainability.

Key institutional players

The Chancay-Huaral River Basin Irrigation Board has been the most important key player and champion of the SIA. During the initial project implementation, buy-in was obtained from twelve irrigator commissions, resulting in a financial contribution of twelve computers to get the project started. Since the project commenced, one of the commissions has improved its buildings to house a telecentre, and another ten have bought or rented buildings where previously they did not have such facilities.

The project has had interactions with three government ministries: telecommunications, agriculture and education. Project approval took more than three years to achieve, due to regulatory restrictions which prohibited the use of digital radio links between different institutions, in this case the board, the commissions and the government's agricultural offices.

[8] Cancino *Determinación de Necesidades Específicas de Información Agraria e Identificación de los Sistemas de Información del Valle de Huaral*

[9] www.huaral.org

[10] Deutsche Gesellschaft für Technische Zusammenarbeit, the German technical cooperation agency.

[11] Innovación y Competitividad para el Agro Peruano (Innovation and Competitiveness for Peruvian Agriculture), a Ministry of Agriculture programme.

[12] Fondo de Inversión en Telecomunicaciones (Telecommunications Investment Fund).

Local and national agricultural institutions were considered key partners because of their information resources. The project did try to engage with the education sector, but contracts could not be implemented due to bureaucratic problems.

Commercial agricultural partners were approached but none saw any benefit in being involved. In 2005 some laboratories became associated with the project as providers of technical information.

Project services

The SIA project offers the following services:

- Interconnection between the information centres of the twelve Huaral Valley irrigator commissions and agricultural government institutions in the city of Huaral.
- A locally developed information system (YACU) for water resource management and cultivation monitoring.
- Internet access at the telecentres, via 62 computers using thin client technology and open source software.
- Telecentre administrators provide – free of charge – agrarian information through web searches and a bulletin board. Farmers are mainly interested in information on water scheduling in order to plan their farming activities; planned sowing cycles in the Huaral Valley and elsewhere to determine crop selection for sowing; market information to determine future selling prices; and technical information such as equipment specifications. Some also use web searching to identify business opportunities and new products. The bulletin board is used to reach those unfamiliar and uncomfortable with using computers. Telecentres also offer photocopy and scanner services.
- Internal telephony: voice over internet protocol (VoIP) telephony between information services in the valley using a server with free locally developed software which allows calls and messaging.
- Public telephony service based on VoIP.

Project outcomes

To date, the project outcomes include the institutional expansion of the irrigation board, improved internal and external communication flows, improved administrative functioning of the board and commissions, telecommunication access improvement in the Valley, and some smaller effects on information access and internet use.

- The irrigation board has a new 1650 m^2 office, has doubled water storage, and is regarded as a leading information project in Peru and elsewhere, becoming "the most important institution in the valley" according to its vice-president. It is assuming leadership status among the irrigation boards at the national level.
- Better communication has been regarded as an important benefit by managers and staff at the board and the commissions, as internal communications and the internet have provided communications access that was previously unavailable and/or expensive. Connectivity between the commissions and the central board office has improved mechanisms for data collection on irrigation infrastructure tariffs, information exchange between board technical officers, risk management of irrigation infrastructure, and water distribution planning.
- The Huaral Valley is recognised as having the most accurate information regarding its farming practices and water distribution, and the YACU system is

extensively used by the irrigation board and the irrigator commissions. Water volume information is registered to determine water distribution, and through the use of a farmers' census, a register is maintained which keeps record of the sowing intentions of farmers. This is done in order to fulfil obligations required by the Ministry of Agriculture and to monitor the situation as this also has an effect on water distribution.

- In ten of the eleven localities with a telecentre there was no internet access before the project was initiated. In one of the communities there were no telephones. The project has also promoted the establishment of private internet access businesses; within a few months of implementation there were new *cabinas* in five of the localities. Huaral's positive experience has resulted in the increased implementation of Wi-Fi networks throughout the coastal regions of Peru.
- The effects of information access are hard to measure in terms of farmers' productivity and income, nor will such evaluation activities be carried out by the board due to capacity and budgetary restrictions. However, a small proportion of farmers are now using the internet and the SIA.

Project drift

The original project objective was to give farmers access to agricultural production and commercial information to improve their decision making. While this is still an objective, board leaders see the SIA's most important function as providing information on water availability, the types of agriculture products on offer, and the provision of an affordable telephony service.

VoIP telephony was, at first, a secondary service enabled by the telecommunications infrastructure installed. Initially this service was limited to internal communications between the irrigation commissions and the board office. This was followed by the provision of external telephony services to the commissions, bypassing the board office line. The service could then be offered on a revenue-generating basis to the commissions, irrigation users (the farmers) and the public. There are, however, regulatory constraints which prohibit the continuation of this service, and it is now only offered to members.

Although originally initiated by CEPES in partnership with the irrigation board, the project is now owned and driven forward by the irrigation board, but with continued support from CEPES. The appropriation of the project by the board and its leaders has made the difference. Pressure exerted by the board has accelerated funding decisions in the telecommunications and agricultural sectors; the board has encouraged laboratories and local agricultural offices to become information providers; and it is the board which has supported the use of open source software in the telecentres, whereas this has failed in almost every other ICT rural development project in Peru. Finally, the board continues to own and shape the project.

Project sustainability

Sustainability is used to describe the capacity of a project or its results to continue existing or working when funding or the presence of external agents (in this case, CEPES) is no longer available. Sustainability has in some cases been reduced to refer only to financial sustainability, but should also include social, cultural, technological, political, legal and organisational aspects.[13]

[13] Karin Delgadillo, Ricardo Gómez and Klaus Stoll *Telecentros... ¿para qué?: lecciones sobre telecentros comunitarios en América Latina y el Caribe* (Ottawa: IDRC, 2002); Klaus Stoll and Michel Menou "Basic

In the case of the Huaral Valley SIA project, the ownership and commitment of the irrigation board has been a key factor in promoting sustainability. Initially, part of the budget originally earmarked for irrigation infrastructure maintenance was used to pay telecentre administrators and the cost of the internet connection. At present, an SIA fee is included in farmers' annual contributions. The SIA – whether or not this includes telecentre services – is now integrated within the organisational functions of the irrigator commissions, and irrigation management is dependent on computer- and internet-based systems.

Social sustainability has been achieved through the appropriation of the project by the board, in this way becoming a resource for the community.

Technological sustainability is achieved through the selection of open source software and linked radio networks, as these technologies are scalable and upgradeable.

Regulatory obstacles have been solved, although there are still some problems regarding legal and/or political sustainability.

Organisational sustainability is being nurtured through the ongoing training of telecentre operators and a group of young people who could replace them. These young men and women are normally the children of farmers who are members of the commissions where they work.

Telecentres and the wireless network produce some additional revenues which pay for the internet connection. There are major differences between telecentres, as some are located in places that already have *cabinas*, whereas others are in poorer communities. The provision of telecommunications services – public telephony and wireless internet connectivity – has been identified as an alternative source of income generation.

Lessons learned

- Social sustainability is critical to achieving financial sustainability – by providing funds and, more importantly, by proposing appropriate modifications that generate revenues to address local needs.
- Telecentres installed in small rural localities show that there is room for private public internet access points (*cabinas*), and local small entrepreneurs are now investing in providing such services.
- The project has shown that Wi-Fi is an affordable and appropriate technology to provide internet access along the Peruvian coast.
- Lack of adequate regulation continues to be a problem for developing community networks, but the commitment of CBOs opens up the possibility of influencing policy makers.
- The board still needs to develop an appropriate business model in order to maintain and enlarge the network. It should include the engagement of other local institutions, NGOs, small enterprises and CBOs.
- Flexibility, improvisation and project drift should not be seen as problems or areas of failure – they are needed in order to achieve sustainability and meet local needs.

principles of telecenter sustainability" *Somos@Telecentros* (28 March 2005) www.tele-centros.org/CR/crsosten.php; Fukao, Tsuyoshi "What are the key factors for the rural telecentre's sustainability? A case study of a rural town in Mongolia" (unpublished MSc dissertation, London School of Economics, 2004)

The future

Board leaders intend to upscale the project within the Huaral Valley and beyond to other parts of the Peruvian coast. They wish to install telecentres in all the currently non-served irrigator commissions (six) and expand the services of existing telecentres by increasing the number of computers, especially in communities not served by private *cabinas*. They also wish to replicate the project with other irrigation boards along the entire coast, especially in the valleys around Lima, in order for them to have access to better information for decision making.

Several actions are being taken to improve the project. ICA/IDRC[14] is funding improvements to the YACU system, a radio programme and a smart-phones utility and usage test. The YACU source code has been cleaned up and new functionalities such as the introduction of geographic information systems (GIS), for example, are being developed. A local radio programme with agrarian information from YACU and other sources is about to be introduced. Farmers may also access such programmes at telecentres and through the internet (through customised radio content). The use of smart phones for the provision of customised information is being tested with 30 randomly selected farmers who are being monitored to assess the impact on agricultural production and productivity. Three hotspots have been installed in the Huaral Valley, and this infrastructure will also provide internet to new telecentres in smaller communities, local institutions and private users who would have access to the network without a large initial investment.

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