AGRECOL computer training.

Improving farmer livelihoods by access to information

Supporting the agriculture sector in Bolivia with information and communication technologies

Landlocked Bolivia is the highest, one of the most culturally diverse countries in Latin America and very rich in natural resources such as gas, zinc, gold and tin. Yet despite ample cultural and natural assets Bolivia is one of the poorest countries in the region. The economic and political crisis has paralysed the main productive sectors in the country, such as industry, agriculture and commerce. At the same time the country has great agricultural potential.

The International Institute for Communication and Development (IICD) is working in Bolivia to support developments in the agriculture sector by use of information and communication technology (ICT) tools.

The agriculture sector in Bolivia

Bolivia can be divided in 3 regions: highlands, lowlands and valley region, all with different climates and vegetation, and all with their own urban centre. The population of the country reached over 9.2 million inhabitants in 2008: 63% of the population is concentrated in urban areas and 37% in rural areas. Rural population is very dispersed over vast areas of land, with the country as a whole having as little as 8.4 inhabitants per square kilometre.

Almost two-thirds of its people, many of whom are subsistence farmers, live in poverty and have low levels of education. The concentration of wealth in the hands of few has always been a factor contributing to the widening of the

poverty gap. Rural poverty in Bolivia is inextricably linked to the low development of the agricultural sector. 40% of the workforce is active in the agricultural sector, accounting for almost 15% of the Gross Domestic Product, whereas 17% is working in industry accounting for 55% of the GDP. The main agriculture produce are soybeans, coffee, cacao, cotton, corn, quinoa, sugarcane, rice, potatoes and timber.

The majority of Bolivia's poor live in rural and remote areas and have livelihoods that are closely linked to smallholder agriculture. The low productivity of the farm sector and the low prices that farm products command in the marketplace are central concerns to them. The use of small-scale production techniques, unskilled labour, water shortages, the lack of basic production infrastructure, and the high cost of resources all have a negative effect on productivity.

Being spread over a vast area of land makes it difficult to provide services to the scattered communities, which means that rural people often have insufficient access to public services, electricity and information. But also in political way the rural communities are marginalised and isolated. Rural poor do not have access to credit, water and inputs (seeds and fertiliser) and they often lack secure land rights.

The IICD Roundtable workshop for the agriculture sector that took place in 2002 identified three main obstacles that stand in the way of agricultural products being successfully commercialised: lack of infrastructure (roads, storage facilities, electricity); inefficient post-harvest handling and distribution; and a lack of information. Small-scale farmers operate at the tail end of a long chain of intermediaries where the relationship between the small producers and the buyers is uneven. In Bolivia farmers 'sell low and buy high'.

ICT in support of agriculture and rural development

Agriculture in the 21st Century is one of the most diverse economic sectors, encompassing individual farmers, farmer organisations, government agencies, research institutes, traders, multinational corporations, NGOs and many others. A productive sector depends on a fruitful and fair interaction between the diverse actors – communication and information flows are critical to this process. However, different approaches are required when working with different target groups. The various groups have different information needs and modes of access. The technology and socioeconomic context of the group determines the selection of ICT in terms of content, media and form of communication.

Information and communication technology projects in the IICD Bolivia Country Programme, TICBolivia, seek to close the information gaps that hold back the sector and that handicap rural communities dependent on small-scale agriculture. Access to information makes it possible to enhance economic opportunities through increased market access, improved negotiating powers and better production methods.

Analysis of the impact of IICD-supported projects indicates that ICTs can contribute to achieving the first Millennium Development Goal to 'eradicate extreme poverty and hunger' by raising the income of small-scale farmers and strengthening the agriculture sector.

The choice of ICT in each context depends on the available infrastructure and level of literacy and education prevailing in a specific situation. Connectivity in rural areas as well as in locations of other stakeholders can be achieved in various ways. Dialup lines, ADSL, use of mobiles, cable- or satellite connection. The latter, often combined with MESH boxes (a communications network in which there are at least two pathways to each node) to share bandwidth, is applied increasingly. These more affordable and reliable wireless networks are implemented to link up rural information centres in the projects of ACLO, CEPAC and AOPEB and are found to provide sustainable solutions for access to information in the rural areas.

It is necessary to monitor technical options as with technologies continuously evolving the optimal choice of ICT in a given situation changes. Possibilities for two-way interaction between farmers, and between farmers and agencies, increase with increasing connectivity, and with it the possibilities for local content production and validation, but also for making phone calls over the Internet (VOIP).

Studies undertaken by the UK Department for International Development (DFID) and the World Bank provide a useful framework for clustering ICT interventions in the agricultural sector in terms of their relationship with different aspects of the problem of rural poverty: poor agricultural sector performance, low productivity and farm incomes, and the lack of political empowerment and social inclusion of rural communities.

The projects can also be grouped according to three areas of activities:

- Improving knowledge flows and policy environment in the agriculture sector.
- Increasing the economic viability of farm enterprises by increasing profitable market access and production efficiency.
- Increasing the political empowerment and social inclusion of rural communities.

Improving infrastructure and telecommunications are mentioned as priorities in Bolivia's Poverty Reduction

Farmers participating in the AGRECOL project.

Objective	ICT application	Project and implementing agency
1. Conducive policy environment	• ICT policy and strategy development in the agriculture sector • Coordination and systematisation of agricultural information	ICT strategy for the agricultural sector – Ministry of Agriculture (concluded, but not implemented due to change in government)
2.a Increased profitability of small farms	• Price information • Delivery systems	• Agriculture information systems in the valleys of Santa Cruz - ICO • Chuquisaca marketing information system - ACLO • Information System for Innovation and Competitiveness of Small Farmers - CEPAC • Agriculture Information and Communication System Santa Cruz – Departmental Government of Santa Cruz
2.b Increased market access	• Marketing and selling online • Facilitating contacts between producers and suppliers • Circulating information about market conditions and export requirements	• Commercial information and advisory system for agriculture producers - CEPROBOL • Technical-commercial information centres for the agro-ecological sector – AOPEB • Market access for export organisations in Bolivia through the eFresh portal – CEPROBOL, AOPEB
2.c Increased production efficiency	• Enhancing access to information and expertise about effective traditional and modern production methods	• GIS system for certification of cacao producers – El Ceibo, CEPROEST • ICT for the exchange of farmer experiences in ecological agriculture - AGRECOL
3. Political empowerment and social inclusion	• Enhancing social status by use of ICT • Increasing negotiating power of farmers • Access to information on land/rights/cadastre • Rural access to ICT	• ICT for agriculture in the Chiquitano region - APCOB

Table 1: Overview types of ICT applications per objective

Strategy Paper (PRSP). The paper calls for public service infrastructure along with basic public services, to be provided for the more vulnerable groups in society as an essential step in the poverty reduction process. The strategy paper also recognises the key role of the informal economy for poor people's livelihoods. Furthermore the importance of enhanced social inclusion and participation in political processes within a more transparent institutional framework is acknowledged.

Information and communication technology (ICT) can play an important role in empowering, increasing social participation, and providing economic opportunities for marginalised groups such as small-scale farmers, through better access to markets for example. The technologies can also help improve the quality and transparency of public services countrywide.

The IICD country programme: TICBolivia

The agriculture projects are providing access to agricultural information, by means of ICT, through 56 information points serving 226 small and medium-sized producer organisations. The TICBolivia Country Programme currently includes ten agriculture projects.

Agriculture information systems in the Valleys of Santa Cruz

The region of Vallegrande, near the consumer market in Santa Cruz, is known as the granary of Bolivia, producing large volumes of vegetables and fruits of very high quality. But the farmers face fierce competition from foreign producers, which are producing at larger scale and benefit from government subsidy schemes. The region is lacking good roads and means of communication which also hampers competitiveness. Average income in the region is US$ 920 per year. The farmer community of 30,000 producers consists primarily of small producers, with 38% of them living in poverty.

The project is operational since 2002, and provides price and production information. A very successful radio programme, 'El Correo del Agricultor' (The Farmer's mail), is broadcasting market price information, gathered on the market in Santa Cruz, to 15,000 farmer families in the region. The programme is well received among producers and has a strong impact on the negotiation position of the small farmers, resulting in better market prices.

The project has developed an on-line information system on production volumes in the provinces of the 'Valles' in the department of Santa Cruz. The database lists information on the production – fruits and vegetables - of 500 producers of 18 farmer associations. This information is used to assist farmers in taking longer-term decisions on crop production planning. Training of the producer associations' representatives ensures their ability to update the database independently from ICO (Instituto de Capacitacion del Oriente), the project owner.

The price and production information system developed by ICO forms the basis for leveraging on a larger regional scale throughout the Department of Santa Cruz, in collaboration with the Departmental Government which started in 2008.

Agriculture sector focus group meeting.

Commercial Information and Advisory System for Agriculture Producers

The Bolivian Export Promotion Centre (Centro de Promoción de Bolivia - CEPROBOL), a professional executive institute under the Ministry of Foreign Trade, provides advice on export markets. In April 2003 they started an initiative to enhance their market information services for their nine regional promotion offices. They invested in information systems (a large scale database on export markets, a web site and an e-commerce platform), yet focused the information services exclusively on large exporters and agro-processing industries and did not invest in training of project staff. As a result of their involvement in the IICD Roundtable workshop on agriculture, CEPROBOL decided to open services to NGOs and grass-root organisations serving small-scale producers with the support of IICD.

The project aims at increasing decision-making powers of producers. As it is difficult to reach individual end-users directly, CEPROBOL works via intermediary producer organizations and NGOs, which are eligible for free advisory services on potential export markets. Needs assessment are routinely conducted to stay informed about the actual needs of the small-scale producer groups.

Part of the project team has received ICT training via

A digital camera is used to record this beekeeper's experiences.

participating in the APCOB project training. A large number of support services and a wide range of paper and digital information bulletins have been developed. In addition, CEPROBOL has set up a knowledge base containing information on Bolivian exporters, country profiles, agricultural produce profiles and other market records, and has developed information packages for Bolivian embassies. CEPROBOL has been present in a large number of national and international commercial events where they facilitated the presence of potential Bolivian exporters.

Technical-Commercial Information Centres for the Agro-Ecological Sector

Ecological agricultural production has seen significant developments over the last decade: increased production, stricter demands in terms of quality control and certification, increased expectations among consumers, and growing demand for product information by national and international trading companies.

The key objective of this project is to enhance the technical production capacity and the commercial negotiation capacity of producers of agro-ecological products in Bolivia, producing for the national and international markets. Services offered to producers include information on market tendencies, latest production technologies, certification norms and rules. The information centres are operated by local producer organisations, which receive training and coaching in the use of ICTs and providing of information services. To enhance exports of ecological products buyers can find monthly updated information on volumes and qualities of key products such as cacao, coffee, nuts, castaña, tropical fruits, amaranto, tea and quinoa online.

The 41 member organisations of the Asociación de Organizaciones de Productores Ecológicos de Bolivia (AOPEB) are the key target group of the project, representing over 25,000 small producers throughout Bolivia. Information services are currently being offered to 100 organisations and related families. AOPEB has 7 telecentres and 11 capacity development centres.

Results of the AOPEB project are:

- Development of 7 Internet-linked information centres throughout Bolivia, operated by the member organisations and now fully self-sustaining;
- Training of the project team in development and management of advanced information systems;
- Development of a data base-driven website with technical and commercial information on selected agro-ecological products and a market place for demand and supply;
- Development of 1 central and 5 satellite Internet access points in offices of member organisations of AOPEB in 5 departments in Bolivia;
- Systematisation and regular actualisation of information;
- Capacity development in the use, exploitation and maintenance of the centres for communication and marketing officers and leaders of the 41 member organisations of AOPEB.

Marketing Information system Chuquisaca

The ACLO (Fundación Acción Cultural Loyola) Foundation

supports the productive, commercial and organisational development of small farmers in the Chuquisaca Region in Bolivia. This project focuses on capacity development in research and generation of marketing information, and has developed a system for the dissemination of information on volumes, prices, commercial strategies, quality standards, market tendencies and consumer preferences. Aim is to support farmers in finding new markets.

As a result of the project, there is a well-structured programme for capacity development in management of small companies. There is a much-consulted price and market information system available on-line and connectivity has been significantly improved. Most of the information is disseminated through Radio ACLO, ACLO's own radio station.

The ACLO project is in independent continuation. An Information Network about Agricultural Markets is being developed as well as a Monitoring System for Information and Communication Technologies (SMTIC). This system has three main lines of action:

- Agricultural business management, agricultural marketing and the promotion of municipal economies, by use of ICT;
- The Research Services on Agricultural Markets (SIMA) consisting of periodical gathering and analysis of information about prices, amounts of agricultural products in the market, rural and urban markets, wholesale and retail markets, and the identification of potential customers in the local area, in the Department and on a national and international level;
- The Municipal Productive Information System (SPIM) that sets up a broadcasting system providing information through the mass media and a website to display all the information about goods and services offered.

ICT supported exchange of farmer experiences in ecological agriculture

Responding to a lack of appropriate and timely information, this project uses ICT to support the exchange of successful experiences related to organic agriculture and the sustainable use of natural resources among farmer communities. The project comprises the registration of experiences and the production and participative distribution of training material based mainly on multimedia presentation tools, combining texts, digital photography, audio, video, printed material and the production of testimonial radio programmes broadcasted through rural and community radio stations.

Main purpose is the creation of suitable conditions for remote communities of small organic farmers to be included in a more and more competitive market, easing the way for the producers in the nine participating associations to find new markets for their products and by-products. It is focused on the capacity of associations to concur in common proposals. The project has set up three main lines of work:

- a training and capacity development programme;
- a system for research and generation of information;
- a system for the dissemination of marketing information and communication, regularly updated and easy to access, providing information about prices, customers, commercial policies, quality standards, market trends and consumer preferences.

The AGRECOL project applies ICT instruments to enhance the exchange of experiences of small farmers producing ecological products.

The project has demonstrated that it is feasible to directly involve farmers in generating content and in systematising information which is of relevance to end-users.

Information System for Innovation and Competiveness of Small Farmers

Lacking information between the different actors in the agriculture value chain hampers the free market system. With all actors operating separately the position of small producers is less competitive. Therefore producers need to adopt a better structured and coordinated information strategy.

The NGO Centro de Promoción Agropecuarios Campesino (CEPAC) supports farmer families, social organisations and local governments to improve agricultural production. They started implementation of this project with ICT features similar to the AOPEB projects. It includes an information centre in the region of Ichile near Santa Cruz, fed with information from headquarters in Santa Cruz. The focus is on marketing and production information of the principal products produced in the region. In addition, a radio programme "Vamos al mercado" (Let's go to the market) was developed to promote the information services. The project provides a direct link between small farmers at community level and market and production information provided at the local and national level.

The project developed a price and product database and publishes a monthly bulletin, TIC@gro-Mercado, with key information on production methods and marketing outlets. A database and a virtual library (BiblioTIC) are used to organise all the information downloaded from the web. So far, 60 people from this project have received ICT training, and the project has great potential for expanding to other

sectors and organisations. Many requests were received to send promoters with ICT training to different communities and associations in other regions.

Geographic Information System for the production of cocoa

The El Ceibo association exports cocoa to various countries. This export benefits a large number of smallholders in Alto Beni Province, Bolivia. The business plan indicated that an increase in quality and, hence, income, could be obtained from organic certification of these cocoa growers. To this aim, the project has created and maintains a Geographic Information System (GIS) database with socio-economic data on smallholder cacao producers for certification under the Fair Trade label. Over 1,200 farmers are eligible for inclusion under the Fair Trade label within the framework of the project. Before introduction of the GIS database 8 forms needed to be filled out per farmer per crop; a very time-consuming business. With the information stored in a database it is sufficient to update where necessary. The database is directly accessible to the certification agency in La Paz, which considerably saves processing time.

The database is operational, but a large quantity of information still needs to be inputted and completed. Thereto a proposal focusing on consolidating results of the 1st phase of the project and expanding the outreach of the project is under discussion. The proposal also aims at introducing a new technological component, using Personal Digital Assistants (PDAs) in the field that are connected to the Internet, so that farmers' data can be uploaded to the database in real time. In collaboration with FAUTAPO (Fundación Educación para el Desarrollo), it is looked into using this experience to advice other organisations on the use of GIS systems for products such as e.g. quinoa (a type of cereal).

Farmers participating in the AGRECOL project.

ICT for Agriculture in the Chiquitano Region

This project aims to strengthen small indigenous farmers in the Chiquitano region in terms of their integration into local economic development through access to information and means for communication. ICT is used for gaining access to market information for 4 key products (honey, sustainable wood products, handy crafts, and medicinal plants), information on production methods and promotion of indigenous produce. In addition, the project aims to increase participation in local and regional decision-making and inclusion in local development planning. Direct beneficiaries include the indigenous farmers in 115 communities in the region.

ICT is used to connect 115 communities through voice radio and to set up 3 information centres in indigenous communities. A handover of 3 centres to local governments has taken place and assistance was provided in the set up of a regional radio network. Information services offered consist of weekly radio programmes, monthly information bulletins and inclusion of indigenous people's demands in local development plans.

The project is interesting for different reasons:

- Target group represents the poorest people in this remote rural area
- Active involvement of local government allows gaining experience with collaboration between NGOs, grass-root organisations and local governments
- The project provides information services and advice only on request by the target group, which will clarify whether there is real demand for this kind of services
- The objective reaches beyond market and production information, and includes participation in local decision making by indigenous people, which is interesting from a governance perspective.

So far five project team members, three Internet operators, three radio operators and 115 rural reporters have been trained.

Departmental Agriculture Information and Communication System Santa Cruz

The Department of Santa Cruz is the main producer of agricultural products in Bolivia. Despite the fast growth of production, almost half of the rural population lives on half a dollar per day. Strengthening of the agricultural sector is therefore a key objective of the Departmental Government. The programme aims to increase the income of farmers and their families through better access to price and market information, estimating an increase of at least 10% to 20% in revenues. Information collection, dissemination and digital exchange of agriculture information between the government and private sector and small and medium farmers are necessary tools to achieve this. There were no established information and communication channels the government could use to reach the farmer community.

This leveraging programme, which started in January 2008, builds on the project experience of ICO in the province of Vallegrande, which has implemented an agriculture price information system using a combination of internet-linked information centres and rural radio, and a system providing information on expected production volumes at provincial level serving as a decision support system for farmers. The Departmental Government of Santa Cruz has decided to take over and replicate the system in 15 other provinces in the department.

The Instituto de Capacitación del Oriente (ICO) project is operational since 2002, and provides price and production information to farmers.

In the pilot phase, 60 staff of provincial government will be trained and 300 representatives of farmer associations.

The programme reaches a large group of farmers as they will have access to Internet at the provincial government offices and at information centres operated by IICD project partners and other projects in the provinces. Through this network of information centres, at least 2,000 farmers in two provinces are expected to become direct users in the first phase. Additionally, other beneficiaries are the farmers that are being informed through rural radio programmes. Currently 50,000 farmers are reached by the ICO project, which will transfer the radio services to the local government.

Market access for export organisations in Bolivia through the eFresh portal

Access to new markets, export in particular, is vital for strengthening farmers' associations which are often hindered in their expansion by the limitations of low demand at the local or regional markets. To provide Bolivian smallholder associations and cooperatives with efficient access to the world market of fresh agricultural produce, annual subscriptions to the eFresh portal (a trading platform for buyers and sellers) were offered to four cooperatives and associations connected to CEPROBOL and AOPEB. This participation in the portal is combined with support in public relation activities.

The project has recently started, but it appears to be

AGRECOL training.

important to involve associations that are in the right expansion stage, i.e. about to start export or just having started export. It is expected that export volumes will increase and that product quality and presentation will improve as a result of this project.

Impact of the programme

To date, the agriculture projects have provided ICT and technical training to over 1,250 people and 3,780 small-scale producers participate actively in the projects. Meanwhile, another 140,000 producers are benefiting indirectly from the projects; this includes the small agricultural producers who visit the information centres to use the computers or the internet or who listen to the agricultural radio programmes that are aired through the projects.

The projects target predominantly small producers, with low incomes, in rural areas and enhancing their capacity to take informed decisions and strengthen their negotiation position. Analysis of the data collected via 1304 questionnaires received through IICD's monitoring and evaluation (M&E) system shows that the projects have succeeded in their efforts to reach and support small producers with very low income (50%) or with an average income (46%). The majority (94%) of the project users lives in rural areas.

The focus of the programme is on access and exchange of information on market prices, supply and demand variations in the markets and agricultural production techniques by means of relevant communication tools. Clear direct impact is registered by ICT projects focusing on price information and market access. Direct but less strong impact on poverty is found with projects supporting efficiency and sustainability of agricultural production and projects focusing on political empowerment.

Economic indicators show lower impact in 2007 than in 2006. A possible explanation for this decrease can be found in the effect of the political, social and economic crisis that is affecting the country and that has had an enormous impact on the sector. Political instability and environmental problems have compelled technicians to reduce their support to the projects and this has resulted in a lack of motivation, fewer training opportunities and less communication for effective support to the farmers. Analysing the economic impact in more detail, the participants considered the strongest impact to be derived from better access to market price information which improved their negotiating position. A smaller group indicated that they had benefited from having access to information on how to increase the efficiency of their production methods. Almost 50% of the farmers perceive a direct improvement in their income. Their estimate of the increase in income is around 10%, representing an increase in annual income of US$ 100.

Through the projects a wide range of information services is made available to the users. 93% of the users declare to be very satisfied with these services as the projects have enabled them to meet their objectives. Information about prices, national and international markets and new production techniques have shown the users how to increase production. The services are made available through the

Internet, through two-way radio communication and radio broadcasts, the telephone, etc. A user of the AOPEB project affirmed: "Thanks to this ICT project of AOPEB we were finally able to get fair prices, we learned about standard practices concerning ecological production, APAEY gained access to the Internet and we have currently more and better perspectives". Another user, from CEPAC stated: "Now I have a better access to information, more time to communicate with others and I get all this at a lower cost."

Nevertheless, a high percentage of the users is not satisfied with the Internet service. Access has been very problematic and hence communication limited. Internet has not reached all communities yet, despite the efforts made by the projects. The high costs and low quality of Internet connectivity remains a principal limitation to reach the objectives of the projects.

Participation of women in the projects - only 30% of the users are women - is a shortcoming that needs special attention. This remains a very important challenge for the Bolivian programme. Illiteracy and heavy workloads are among the factors that inhibit women from participating. Cultural attitudes also prevent women from attending meetings or visiting rural centres. But although women present only 30% of the direct users, it is noted that this percentage is much higher amongst the beneficiaries of the projects. Reason for this being that information disseminated by radio broadcast by-passes certain barriers and hence does reach women audiences.

Capacity building

IICD places great emphasis on capacity building, one of the aspects of its programme most valued by partners and end-users.

End users in the agricultural projects have benefited from training opportunities responding to their particular needs. 73% of the users declare to be very satisfied with the quality of the training received. Technical support is particularly important for self development and 68% of the project staff affirms to be very satisfied with the support received.

The statement of an AGRECOL project user supports these findings: "In the past, I didn't have photos or experiences to show to anybody. Now I carry them everywhere in my computer and I can show them to other producers' families. With our cameras we take pictures to provide evidence for our bio-indicators and to show to others how to fight against the plagues that damage our crops. Currently I am putting the documentation of experiences into practice and I use this material when I go somewhere else to exchange experiences with other agricultural producers."

However, retention of centre managers is a challenge; many leave after having received ICT training, as this enables them to find better jobs.

The users further indicate wanting the project technical staff to visit them more often and cater for follow up activities.

Lessons learned

When analyzing and summarizing opinions and trends in the demands of users and members of the technical teams of the projects during the last five years, these are the needs most frequently repeated. Requests from the users:

- To increase follow up actions from the technical teams to the information centers;
- To continue and extend training activities for the users;
- To provide more computers and equipment to increase access to information for the users;
- To facilitate access to a high quality Internet connectivity and at affordable prices.

Requests from the project teams:

- To continue the support for technological innovation;
- To organize periodic meetings to promote exchanges;
- To provide support to obtain more funding in order to enlarge the project coverage and to include more beneficiaries.

To explicitly address these needs, for 2008 and 2009 IICD will work on connectivity issues - through the rural wireless networks set up with CEPAC and AOPEB -, organise more end user training – by supplying small follow-up funds -, and support leveraging – via the Departmental Agriculture Information and Communication System Santa Cruz project.

Further lessons learned

- Building partnerships between the government (allocating funding and building long-term human and technical infrastructure) and NGOs (on-the-ground experience) is valuable for sustaining development.
- Support of advisors with experience in local administrative and political processes is essential to get political and financial support from the government.
- Local level governments are often not involved or consulted during the formulation process. At the start of a leveraging programme it is very effective to organise a Roundtable workshop with government representatives from national to local levels as this creates ownership and awareness. Presenting and building on local project experiences allows the government to better understand the practical usefulness of ICT.
- An important lesson is found in the effectiveness of combining information centres with agriculture radio programmes, providing price and market information. These programmes have become the most popular programs in the region with a large and loyal audience.
- Projects go through an initial phase of awareness raising and skills development which only thereafter lead to empowerment and economic impact. It takes time before the human capacity, tools and content are developed and lead to actual economic benefits for end-users. Analysis of

ACLO documenting good practice by photography.

M&E data indicates that after two years the levels of empowerment and economic impact increases with some 20%. This suggests that it pays off to sustain support for several years.

- Retention of trained staff is a challenge. One important way to overcome this problem is to seek ways to train a larger group of users making the projects less dependent on one or two contracted managers.
- A train-the-trainer methodology, whereby trained staff is encouraged to transfer their skills to others within their team and institution, is a tool to counter staff turnover. Continue capacity development efforts during the project implementation.
- Focus training as much as possible on practical, on-the-job required applications.
- ICT projects require training in technical skills to install and maintain ICT applications, but since use of ICT in organisations brings along institutional changes it is important to involve various segments of the organisation and cater for training in 'soft skills' such as information management, project management and change management.
- Include a budget for maintenance of ICT equipment.
- Monitor the gender balance and ensure participation of women during formulation and implementation.
- Radio broadcasts provide a good option to reach women that are encountering barriers in actively participating in projects.
- Information should address local needs: it should be context-specific, delivered timely and accurately and presented in an appropriate language and format.
- Seek suitable connectivity solutions and combine new and traditional ICTs where appropriate and focus on sustainability of ICTs. Explore cost sharing options for satellite connectivity among various local groups. Fees from casual users of information centres may be used to subsidise services for farmers.
- Monitor whether the right target groups are reached. In some projects the wider public and students use the offered services for personal, educational and entertainment purposes rather than to obtain agricultural information. Information centres may consider installation of additional computers to cater for both the needs of the target group of farmers and other users. This expansion can be sustained

Video documentation for the AGRECOL project.

by introducing a payment system for casual visitors.

- Develop mechanisms for learning between project partners and other practitioners. This includes a participatory monitoring and evaluation system that emphasises learning, national knowledge exchange networks for capturing and sharing lessons learned and innovations (face-to-face and by means of technology), and cross-country exchange to allow learning and synthesis of information between various countries.

Contact information

For more information on the IICD Bolivia country programme and agriculture programme please visit www.iicd.org or send an email to information@iicd.org.

With the right tools, people in developing countries can considerably improve their livelihoods and quality of life. Better access to information and communication technology (ICT) is particularly vital in enabling them to achieve their goals. This is why the International Institute for Communication and Development (IICD) creates practical and sustainable solutions that connect people and enable them to benefit from ICT. As an independent not-for-profit foundation, we put knowledge, innovation and finance to work with partners from the public, private and not-for profit sectors. Together, we can make a world of difference.

IICD International Institute for Communication and Development
Visitor's address: Raamweg 5 | 2596 HL The Hague | The Netherlands
P.O. Box 11586 | 2502 AN The Hague | The Netherlands
Phone: +31 (0)70 311 7311 | Fax: +31 (0)70 311 7322 | E-mail: information@iicd.org | www.iicd.org
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