

# ICT Solutions for Inclusive Agricultural Value Chains

Strengthening farmer organisations to use technology to increase, sustain and benefit from agricultural growth.



IICD POSITION PAPER  
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# INCLUSIVE AGRICULTURAL VALUE CHAINS

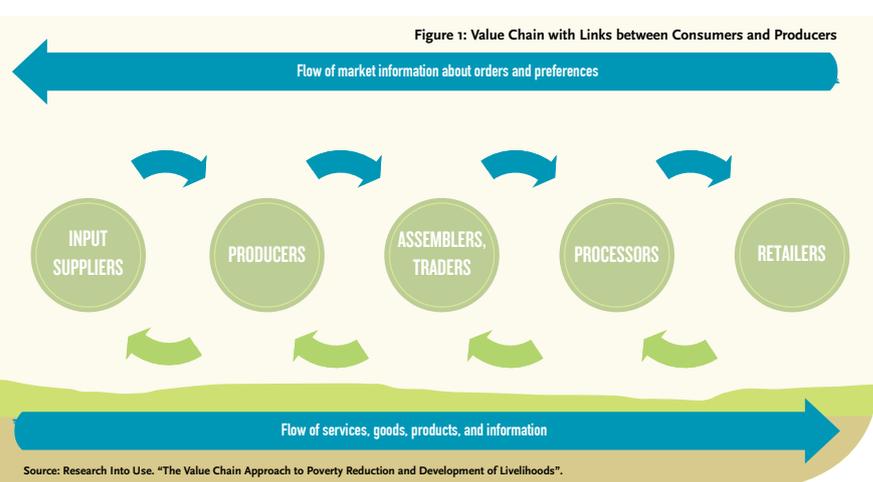
**Smallholder farmers in developing countries remain underprivileged, lacking access to critical information required for their agricultural activities. They are often not able to produce sufficiently for their community and often see limited incentives to produce more than what is needed for their own livelihood. This is primarily caused by the limited access to the inputs, support services, markets, and credit that would enable them to increase their production and sales volumes.**

In many cases, small-scale producers are also vulnerable to environmental and economic shocks, subject to high transaction costs due to poor infrastructure (power, communications, roads), and are unable to fully benefit from the established good practices or the latest appropriate technological advances. Besides this, they are increasingly facing intense competition from advanced multinationals, which operate in a globalized food market to which small scale producers have very limited access.

It has been proven<sup>1</sup> that growth and modernisation of the **agriculture sector** in developing countries is one of the most effective **mechanisms to alleviate poverty**.

products at each of its intermediary stages: (1) **Pre-production** (research and development, input supply, production planning); (2) **Production** (production in the field); and (3) **Post-harvest and Marketing** (transport, storage, processing, packaging, certifying, distributing, wholesaling and retailing to the consumer).

Under the right conditions, smallholders can be at the forefront of a transformation in the world's agricultural systems<sup>2</sup>. Unfortunately, even though modern Value Chains can usually offer wages and self-employment with better pay and working conditions than in traditional agriculture, they can also be channels to transfer costs and risks to the weakest nodes – smallholder farmers<sup>3</sup>. Therefore, the purpose of the development of **Inclusive Agricultural Value Chains** is to safeguard the interests of the smallholder farmers, who otherwise remain at risk of profiting the least from the Agricultural Value Chain development. The key mechanism for achieving this **inclusive development** is improving the ability of vulnerable small-scale producers to sustainably **increase productivity, access markets and increase their income** in order to allow for the long-term social benefits in their rural areas.



One of the approaches for agricultural development which has recently gained momentum is strengthening of the **Agricultural Value Chains** - systems which identify a set of actors and the full range of their respective activities that aim to bring agricultural products from farmers, through intermediaries, to end consumers. Within the Value Chain, a combination of physical transformations and inputs of various services adds value to the

<sup>1</sup> Comparative studies have shown that growth in agriculture in developing countries is 5 times more effective in reducing extreme poverty (<1 USD/day) than that of other sectors (combined in a "non-agricultural" aggregate) (Christiansen, L. (UNU-WIDER), Demery, L. (Development Consultant), Kuhl, J. (Development Consultant) – UN presentation June 2010).

<sup>2</sup> IFAD, UNEP, 2010. "Smallholders, food security, and the environment".

<sup>3</sup> FAO, IFAD, ILO, 2010. "Agricultural value chain development: threat or opportunity for women's employment?".

# IICD'S APPROACH TO STRENGTHENING INCLUSIVE AGRICULTURAL VALUE CHAINS

**IICD considers development of the Value Chain to be one of the valuable approaches to agricultural development. When working in that context, IICD believes in the need for strengthening inclusion in the Agricultural Value Chains. IICD improves capacities, access to information and the linkages between key Value Chain actors. It uses its expertise to help local stakeholders mainstream ICT solutions and consolidate their capacity.**

IICD has almost 20 years of experience in introducing **ICTs for agriculture** in development context. This experience shows that the use of the range of recently emerging **ICT solutions positively affects inclusion of smallholders** in the Agricultural Value Chains, providing that it is supported by thorough capacity building of all the stakeholders and applied with the business logic of the Value Chain. The use of ICTs improves the performance and profitability of agricultural activities, allows for mitigation of the inherent risks and provides access to information and services essential for smallholder farmers and their organisations to link to vertically integrated Value Chains.

IICD strengthens Inclusive Agricultural Value Chains through **empowering and capacitating Farmer Organisations and, via them, smallholder farmers**, as well as other Value Chain actors, to effectively use ICT solutions. We build multi-stakeholder partnerships and act as a bridge between all the Value Chain stakeholders in order to enable them to jointly design and implement the ICT solutions most relevant for the local context. We focus on strengthening Farmer Organisations' capacity to sustainably work with ICTs as sound, effective and competent FOs are essential for the development of Inclusive Agricultural Value Chains<sup>1</sup>.

Specifically, IICD **supports stakeholders of the programmes focused on improving Value Chain efficiency via our integrated capacity building approach**. (For details of IICD's integrated capacity building approach - often referred to as a 'Social Innovation Process' - please see page 4). For that, we work with our broad, well-established network of local partners (such as ICT companies, IT service providers, IT consultants and software developers, training and capacity building institutions, M&E specialists and others). This network has deep

knowledge of national and international ICT developments and a successful track record of joint 'ICT for Agriculture' deployments - what makes IICD's integrated approach to empowering the Value Chain actors to implement ICT solutions truly unique.



<sup>1</sup> EuropeAid, ANALYSIS AND DEVELOPMENT OF INCLUSIVE VALUE CHAINS TO SUPPORT SMALL-SCALE PRODUCERS TO ACCESS AGRICULTURAL MARKETS, 2011

# IICD'S APPROACH TO STRENGTHENING INCLUSIVE AGRICULTURAL VALUE CHAINS

**IICD's integrated capacity building approach - referred to as our Social Innovation Process - includes:**

- Conducting an in-depth **analysis** of the local information and communication needs within the Value Chain and mapping the existing information and communication flows and channels;
- Enhancing Farmer Organisations' and other Value Chain actors' **awareness** of potential ICT-based solutions and their prospective added value;
- Supporting the Farmer Organisations and other Value Chain actors in defining and formulating the **objectives** of the implementation of ICT solutions, therefore gaining adequate understanding of the current state of the situation (e.g. in terms of available technologies) and business processes (e.g. how people do their work);
- Linking the Farmer Organisations and other Value Chain actors to the **network** of local (ICT) technical providers and ensuring their close and smooth collaboration;
- **Training** all stakeholders to acquire all relevant ICT and non-ICT related skills needed to successfully work with the ICT solutions. That includes, apart from building ICT capacities within Farmer Organisations, directly building digital and mobile literacy of smallholder farmers to capitalise on the introduced ICT solutions;
- Assisting the Farmer Organisations and other Value Chain actors in the design, development, implementation and maintenance of an **ICT solution** that is relevant and achievable in the local context of the Value Chain (technological and social dimensions) and will remain sustainable;
- Guiding the Farmer Organisations and other Value Chain actors through the **business transformation and change management process** needed to sustainably embed ICT solutions into organisational processes;
- Guiding the Farmer Organisations and other Value Chain actors in **scaling up** the ICT solution.



# IICD'S ICT SOLUTIONS FOR STRENGTHENING INCLUSIVE AGRICULTURAL VALUE CHAINS

**IICD's ICT solutions foster inclusion of smallholders at each stage of the Agricultural Value Chain by improving and enhancing the following areas:**

MANAGEMENT AND ADMINISTRATION OF FARMER ORGANISATIONS

PRODUCTION (THROUGH ACCESS TO QUALITY EXTENSION SERVICES, AGRICULTURAL INPUTS AND GEO-DATA)

ACCESS TO MARKETS AND INFORMATION ON MARKET PRICES AND DEMAND

ACCESS TO FINANCE AND FINANCIAL INFORMATION

Additionally, IICD's ICT solutions support multi-stakeholder programmes focused on strengthening Inclusive Agricultural Value Chains via improving their Monitoring & Evaluation, Accountability and Feedback practices (see box below).

Implementation of each of IICD's ICT solutions that support vulnerable small-scale producers is always bolstered by IICD's abovementioned integrated capacity building approach. In terms of technologies, our ICT solutions always use a locally-relevant combination of information and communication tools, such as: mobile devices and mobile applications (voice, SMS, USSD, Java and Android applications), web-based platforms accessed by desktops or laptops, community radio, video, multimedia, Interactive Voice Response systems, call centres and dynamic databases.



## Improving Monitoring & Evaluation of the programmes that strengthen Agricultural Value Chains

- M&E (mobile) data collection, tracking and monitoring systems

IICD has developed and implemented a specialised system for the evaluation of ICT4D work. We adapted and used this system to support large scale evaluations of programmes, and designed and executed custom-made evaluation systems for other organisations.

Integration of ICT solutions in the monitoring and evaluation processes increases impact and efficiency of the interventions, allows the systematic changes to sustain themselves, and ensures regular incorporation of farmers' feedback into project design and implementation. It allows for reducing costs and time, improving data validity, and building ownership and participation. This is reached through engaging programme actors in M&E activities, increasing the scale of the evaluations and the variety of data collected and easing many of the implementation burdens.

# IMPROVING MANAGEMENT AND ADMINISTRATION OF FARMER ORGANISATIONS

## ICT SOLUTIONS

Member administration systems,

Internal communication tools,

Mobile data collection systems  
(optionally linked to GPS measurement),

Planning support tools,

Assessment and monitoring tools



LAPTOPS

DESKTOP

VOICE



SMS



JAVA



ANDROID

## SERVICES

Various sets of information systems and other ICT tools introduced by IICD support Farmer Organisations in improving their **internal institutional and financial management, administration and planning**. These enable Farmer Organisations to collect, analyse, manage and utilise **bulk socio-economic data** regarding the FO members (smallholder farmers) and their production. Information obtained this way varies between e.g. types of available crops, estimated total volumes of production, areas of production, production patterns of farmers etc.

Additionally, ICT solutions allow Farmer Organisations to record and keep track of all their **transactions** - from produce collection, to warehouse delivery, to cash payment and shipment to customers. Moreover, ICT tools assist Farmer Organisations in their internal and external **communication**, facilitating dissemination and exchange of all the relevant information internally and between FOs and smallholder farmers.

## ADDED VALUE

Increased professionalization of Farmer Organisations' operations supports smallholder farmers – their members – to become part of the formal **markets**, and increases their **satisfaction and trade performance**. ICT solutions improve management and efficiency of FOs' **operations** and internal organisational processes. They allow FOs to better plan, estimate, and monitor production volumes, arrange higher-volume sales, access higher-value market segments and connect to networks resulting in new business opportunities. FOs benefit from transparency, traceability and proper facilitation of the information related to their produce delivery, sales, payments, and shipments. Finally, staff is able to efficiently communicate with each other, and exchange valuable, locally relevant information with smallholder farmers, allowing them to benefit from various initiatives and available information.

The chairman of the association of potato farmers in Eldoret, Kenya saw a great increase in clients and stated: "Before, we had to look for buyers to sell our potatoes to. Now, demand has increased so much, we are actually looking for potatoes to satisfy the buyers."

"Thanks to the project, some heads of household have begun to evaluate their needs according to the quantity of grain needed for their own consumption and free up any surplus, which has helped to decrease the sellout of cereal (below market value) in rural markets and has united cooperatives for collective commercialization of their products." Local partner CRCR, Mali

## RECENT RESULTS

18

Number of projects in 2013  
Bolivia, Burkina Faso, Ethiopia, Kenya,  
Mali

600%

Increase of number of transactions reported by Ethiopian FOs (FA project area) thanks to the ICT-enhanced external communication with other VC actors (six times in 2013 compared to once in 2011)

601

Number of Farmer Organisations  
advised on sustainable use of ICT

For footprint on economic performance of FOs, please refer to "Improving access to markets, and information on market prices and demand".

# IMPROVING PRODUCTION THROUGH ACCESS TO QUALITY EXTENSION SERVICES, AGRICULTURAL INPUTS AND GEO-DATA

## SERVICES

IICD's ICT solutions improve **quality and availability of the extension services** delivered by Farmer Organisations, NGOs or government. Mobile, radio and other technologies provide smallholder farmers with access to the quality local and expert knowledge and advice on production methods and agricultural good practices, as an input to their farming. They are used not only to disseminate knowledge on production techniques but also to shorten the feedback loop and information flow between smallholder farmers and local and national agricultural experts. Local extension workers use sets of ICT tools to enhance quality of their service – e.g. multimedia and other ICT tools enable participatory recording and screening of production techniques in the field.

Additionally, ICT solutions enable collection of various **(geo)data** and delivering (geo) information relevant to farmers and their agricultural practices, including e.g. weather forecasts, climate conditions or soil information. Moreover, ICT solutions facilitate smallholder farmers' access to locally relevant information regarding various types of agricultural inputs, such as seeds, fertilisers, pesticides or animal health products. They can stimulate small-scale producers' access to inputs, and assist the suppliers to track the movement and quality of inputs across the input distribution chain.

## ADDED VALUE

Improved access to the relevant, quality extension information on agricultural production techniques and to agricultural inputs enables smallholder farmers to **improve their productivity** and therefore the quality and volumes of their production. It can also encourage some of them to venture into production of higher value crops. Altogether, that allows them to increase their **yields and profitability**, and minimise their risks. Small-scale producers' increased access to information regarding various types of agricultural inputs strengthens technological and commercial innovation in local farming systems. Altogether, producers are better equipped to respond to the challenges they face at the different moments of production cycles.

## ICT SOLUTIONS

- ICT-enhanced extension tools,
  - Farm Information & Management Systems,
  - Multimedia mobile clinics,
  - SMS consultation services



## RECENT RESULTS

12

Number of projects in 2013  
Bolivia, Ethiopia, Kenya, Mali, Peru, Zambia

450%

Increase of yields reported by potato farmers in Kenya (ADS-NR project) thanks to improved production techniques and access to inputs

50%

% of members of FOs in Ethiopia (FA project area) who ventured into production of a high value crop (Kabuli chickpea) after improved agronomic skill trainings using audiovisual materials were introduced

135,000

Number of small-scale producers that used ICT to access production and market information in 2013

50%

Decrease of losses reported by farmers in Bolivia (ProInpa project) reached by extension workers using ICT-based 'extensionist toolkit'

"Learning through video screenings has really interested me and my sweet potatoes farm yield has doubled through adoption of new growing practices."  
(Eric Osedo, Kabondo Sweet Potatoes Marketing cooperative ADS-Nyanza, Kenya)

"There is a lot of enthusiasm to embrace the latest farming techniques such as greenhouse technology and use of certified improved planting material and I believed this is being triggered by the recent wave of ICT platforms emerging that are making free information which is of a high quality available to them even in their mobile phones" Eric Sirengo, Syngenta

# IMPROVING ACCESS TO MARKETS AND INFORMATION ON MARKET PRICES AND DEMAND

## ICT SOLUTIONS

Market Price Information Systems,  
ICT-enhanced marketing,  
Certification and traceability systems,  
Agricultural trading platforms



“Since I learned about the use of the market price information SMS code, I have been inquiring the market prices whenever I want to sell my produce. This has helped me to know the price in the market so as to bargain effectively and avoid being paid poorly by middlemen. On learning of the availability of computer trainings and use of internet, I have trained on basic computer packages and production plans, and record keeping.” (Isaiah Kigen, ADS-NR, Kenya)

“ICT technologies are helping us connect directly with the markets. We no longer entirely rely on the services of the exploitative middlemen and because of this we have more money for the same products we have been farming at a seemingly low price because we believed the prices the brokers quoted to us” (Hillary Kiplagat, potato farmer, Nyaru Kenya)

## SERVICES

IICD's ICT solutions play key role in enhancing farmers' and Farmer Organisations' access to real-time information regarding **market demand and price**. Market Price Information Systems utilise various technologies to collect information on current prices and historical price fluctuations of various commodities from different markets, and enable farmers and Farmer Organisations and Unions to access them. They also link smallholder producers to the updates regarding market trends, supply, and demand.

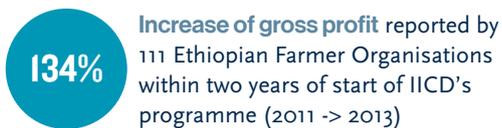
Additionally, ICT solutions provide information necessary to improve small-scale producers' **access to markets** and their **marketing and sales** strength. ICT-enhanced marketing and trading platforms connect smallholder farmers and FOs to alternative markets, allow effective coordination of external communication and marketing of their produce and services, and support initiation of transactions with potential buyers. **Certification** systems enable mobile collection and application of (geo-referenced) information related to processes in the supply chain, production, crops, or yields. This information enables traceability of the origin and/or life history of a product needed for the (ecological) certification process of smallholder farmers and their produce.

## ADDED VALUE

Increased access to information on market demand and prices is essential for improving farmers' and their organisations' negotiating position and decision-making ability regarding their production and sales. Dissemination of relevant information on supply and demand for products enhances producers' **production planning**. Effective and transparent access to market price information across the whole Value Chain means more timely sales from producers and no need for them to rely on the services of exploitative middlemen anymore, which results in **increase of their revenue and income**. Such access also improves the communication flow among value chain actors, enhancing the link between commodity exchanges, traders, buyers, and sellers of agricultural produce.

Small-scale producers are also able to increase sales volumes and revenue by entering and improving their position on the **new** local and international **markets**. This happens due to new ICT-enhanced marketing and opportunities to reach higher-end market segments that require certification and produce traceability.

## RECENT RESULTS



# IMPROVING ACCESS TO FINANCE AND FINANCIAL INFORMATION

## SERVICES

IICD's ICT solutions improve **financial inclusion** of smallholders by improving their access to finance and financial information. They facilitate transfers and payments between various actors within the Value Chain. ICTs also open information and communication channels for financial services (such as credit, savings, insurance) tailored for agricultural purposes. Mobile-based applications and tools enhance e.g. credit assessments and provide financial institutions easy in-the-field access to credit history and payments management of their clients. They also improve quality and reach of the **financial management**, microcredit and microinsurance **education** to smallholder farmers. Additionally, financial departments of Farmer Organisations implement financial software, strengthening their organisational and financial management capacities.

## ADDED VALUE

Improved access to finance and financial information stimulates flow of the capital between Value Chain actors, ensures greater financial inclusion of rural entrepreneurs, and builds their financial management capacity. ICTs facilitate increasing affordability of financial services and smallholders' access to them by making informal providers more secure and formal players more convenient and flexible. Strengthened organisational and financial management capacities of Farmer Organisations allow them to be more **'bankable'** and provide better access to capital for the agricultural producers related to these associations.

## ICT SOLUTIONS

Micro-insurance & Micro-lending support systems,

Mobile payment systems



SMS



JAVA



VOICE



ANDROID

## RECENT RESULTS

2

Number of projects in 2013  
Bolivia, Peru

43,000

Number of small-scale entrepreneurs  
reached with rural finance services in 2013

12

Number of financial service providers  
that have integrated ICTs in rural finance  
services in 2013

400%

Increase in efficiency of work of rural  
microcredit officer-advisers (PROMUC,  
Peru) (measured in time spent per client)

“In the past, a credit officer-adviser had to spend about 20 minutes with a client. Now with the help of ICTs this only takes 5 minutes. Also, during the training sessions we used to rely on flip charts and our illiterate clients were not able to understand. With the use of videos this is no longer a problem.” Julian Sarria, project manager of PROMUC, Peru.

# ICT Solutions for Inclusive Value Chain Development

Sustainably improved production and access to markets and finance, allowing for increased income of small-scale producers and long-term benefits in rural areas

Inclusive Agricultural Value Chains

PRE-PRODUCTION



PRODUCTION



POST-HARVEST AND MARKETING



Sustainable use of relevant ICT solutions by the capacitated Farmer Organisations and small-scale producers

MANAGEMENT AND ADMINISTRATION OF FARMER ORGANISATIONS

ACCESS TO QUALITY EXTENSION SERVICES, AGRICULTURAL INPUTS AND GEO-DATA

ACCESS TO MARKETS AND INFORMATION ON MARKET PRICES AND DEMAND

ACCESS TO FINANCE AND FINANCIAL INFORMATION

IICD's integrated capacity building approach



# IICD IN AGRICULTURE

## 2013

601

Farmer Organisations advised on sustainable use of ICT

135,000

Small-scale producers used ICT to access production and market information

12

Financial service providers integrated ICTs in rural finance services

43,000

Small-scale entrepreneurs reached with rural finance services

### MALI

32,500

SMALL-SCALE PRODUCERS USED ICT TO ACCESS PRODUCTION AND MARKET INFORMATION IN 2013

### ETHIOPIA

134%

INCREASE OF GROSS PROFIT REPORTED BY 111 FARMER ORGANISATIONS WITHIN TWO YEARS OF START OF IICD'S PROGRAMME (2011-2013)

### PERU

400%

INCREASE OF EFFICIENCY OF WORK OF RURAL MICROCREDIT OFFICERS (PROMUC) [MEASURED IN TIME SPENT PER CLIENT]

### BURKINA FASO

135%

INCREASE OF TOTAL ANNUAL TURNOVER REPORTED BY 115 FARMER ORGANISATIONS OF NUNUNA FARMER UNION (2012-2013)

### GHANA

ICT4AGRICULTURE PROJECTS IN THE PAST

### KENYA

450%

INCREASE OF YIELDS REPORTED BY POTATO FARMERS (ELRECO PROJECT) THANKS TO OBTAINING HIGHER PRICES AND IMPROVED PRODUCTION TECHNIQUES (2012-2013)

### BOLIVIA

50%

DECREASE OF LOSSES REPORTED BY FARMERS IN BOLIVIA (PROINPA PROJECT) REACHED BY EXTENSION WORKERS USING ICT-BASED 'EXTENSIONIST TOOLKIT'

### ZAMBIA

87%

FEMALE MEMBERS OF THE FARMER ORGANISATIONS REACHED BY IICD'S PROGRAMME IN 2013

### MIX OF TECHNOLOGIES



SMS



VOICE



JAVA



ANDROID



WEB-BASED PLATFORMS



RADIO



VIDEO



CALL CENTRES



DIGITAL MEDIA

### MOBILE SERVICES

IICD'S FOOTPRINT 2013

25 PROJECTS

641,118 TEXT MESSAGES SENT & RECEIVED

3,176 VOICE MESSAGES

**IICD's vision** is a world in which people are fully able to use information and technology to better their own future and that of their society.

**IICD's mission** is to enable 15 million low-income people in developing countries to access and use ICTs to address the challenges that they face, understanding that ICT offers opportunities for increased well-being and sustainable economic development in all sectors.

*IICD leads the Connect4Change (C4C) consortium in which five Dutch NGOs have joined hands to set up and support ICT4Development programmes. Our partner in the 'ICT for Economic Development' programme is ICCO. ICCO connects people, organisations, knowledge and innovative ideas, supporting programmes in Asia, Africa and Latin America that contribute to a dignified human existence and a strong local economy. Other consortium partners are Akvo, Cordaid, Edukans, and Text to Change is a preferred partner.*



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