

Research and innovation

The Global Forum on Agricultural Research (GFAR) brings together all those working to strengthen and transform agricultural research for development around the world. As part of this role, GFAR is working with New Agriculturist to showcase and raise awareness of important initiatives and their outcomes, to update and inspire others.



Agri-enterprise

The majority of the world's poor live in rural areas and most of them rely on agriculture for their livelihoods. By diversifying into higher value, on-farm enterprises, families can broaden their income opportunities, but most suffer from a lack of resources and assets and poor access to complex globalised markets. In this edition, GFAR highlights three examples from Peru, Costa Rica and South East Asia where investment or interventions have helped smallholders address market constraints, and improve the profitability, efficiency and competitiveness of their activities.

Valuable vegetables at 3,000 metres

High in the Peruvian Andes, the Syngenta Foundation for Sustainable Agriculture has been working with Helvetas Swiss Intercooperation and McDonalds to enable smallscale vegetable farmers earn a better living.

Developing the next generation of agri-preneurs in Costa Rica

In Costa Rica, The Coca-Cola Company has joined forces with one of its orange juice suppliers - TicoFrut - to engage smallholders in the supply chain and train the next generation of orange farmers.

Smallholder aquaculture: sustaining the impact of private investment

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Valuable vegetables at 3,000 metres



Farmers have been selling their lettuces to McDonalds
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High in the Peruvian Andes, tourists set off from the city of Cusco to see the Inca ruins at Machu Picchu. Numerous chefs and hoteliers serve both the visitors and Cusco's large population. In the past, all salad vegetables came in by air from large farms around Peru's capital, Lima. Yet, nearby Andean smallholders also grow tomatoes, onions and lettuces. But although well supplied with water, and just a short drive from Cusco, these small farmers were not used to growing the high quality of vegetables demanded for the restaurant market.

The Syngenta Foundation for Sustainable Agriculture (SFSA) believed that smallholders should and could have access to this lucrative source of income. "We believed there had to be an opportunity here," says SFSA agribusiness manager Robert Berlin. "But unlocking the opportunity required the right partners." The choice fell on Helvetas Swiss Intercooperation (HSI) and McDonalds. "Many people are surprised by this combination," says Berlin. "But the two organizations are both committed to this region. The hamburger chain's Cusco outlet wants more local ingredients, and HSI is committed to helping Andean farmers earn a better living. Those goals are easy to align."

Hearts, heads and quality

HSI provided farmer training in the local language Quechua. "Helping people to change the way they work means you have to reach their hearts as well as heads," says SFSA's communication manager, Paul Castle. "This project requires the smallholders to alter a lot of old habits. I don't think that would have been possible if everything had been in Spanish." Symbolising this local touch is the project's name *Qorichacra*, which means 'golden farm' in Quechua.

Shaping the shift from old habits to modern farming were the expectations of Arcos Dorados (AD), the McDonalds business operator in Latin America. HSI taught smallholders about AD production protocols, hygiene measures and how to build greenhouses with wood and netting. "We're committed to buying more local produce wherever we operate," says Leonardo Lima, head of quality at AD. "But without compromising on our standards in any way."

AD's strong commitment to local sourcing is crucial to the project's success. "We needed a partner ready for longer-term engagement," explains Berlin. "Cusco's small family-run restaurants understandably don't have that stamina, or the willingness to risk a project failure."



HSI provided farmer training in the local language
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Launched in 2010, the project provided two years of capacity-building and training. Weekly deliveries to Cusco's McDonalds restaurant began in October 2011. The original 14 smallholder families from two villages have been joined by a dozen neighbours, all trained by HSI, the farmers selling 20 per cent of their lettuce production to AD. The remainder goes to other local customers. "That shows another advantage of teaming up with AD," notes Castle. "By proving that smallholders really can contribute to the highly demanding McDonalds supply chain, we raised the confidence of other local buyers."

Better housing, bigger income

Rolling out the scheme within Cusco is only part of the story, however. "In November 2012, deliveries began to a second McDonalds restaurant," Carola Amézaga, SFSA project director in Peru, proudly reports. "That outlet is down south in Arequipa, our country's second-largest city." SFSA is now in discussion with AD about a possible expansion to Brazil.



Local farm experts have helped villagers refurbish their houses
©Syngenta Foundation and Arcos Dorados

Amézaga recently joined SFSA from HSI. "Hand in hand with the new demands on vegetable quality and hygiene, we combined the agricultural work with a home improvement scheme," she explains. "Local farm experts called *Kamayog* help villagers to refurbish their houses and improve their domestic hygiene. The scheme runs as a friendly competition and has already greatly improved local living standards." Again, because the *Kamayog* speak Quechua, they can build better rapport with the farmers than Spanish-speakers from Lima or abroad.

Smallholders like Fortunato Ccolque are happy to show visitors, including local magazine and TV journalists, the difference that this scheme has made to their housing. The improvements include cleaner food preparation and separate quarters for humans and animals. Grower Leopoldo Quispe Velásquez is also delighted to talk about the huge leap in his lettuce income. This used to be only 500-600 Soles per year (about US\$200). Today, he and his neighbors earn over 11,000 Soles (US\$4,000) each from a range of vegetables. "Thanks to *Qorichakra*, average family income rose 177 per cent between 2010 and 2012," adds Berlin. "And we believe that this kind of scheme could be repeated in many other countries."

Links

- Syngenta Foundation (<http://www.syngentafoundation.org>)

Written by Paul Castle, Syngenta Foundation

Developing the next generation of agripreneurs in Costa Rica

Smallholders across the globe are an important source of agricultural raw materials for the food and beverage industry. However, these raw materials are often consolidated by processors which then transform the harvested produce into value-added ingredients. In Costa Rica, The Coca-Cola Company has joined forces with one of its orange juice suppliers - TicoFrut - to engage smallholders in the supply chain and train the next generation of orange farmers via a participatory research project. The long-term aim is to increase smallholders' earnings and provide a reliable, steady supply of safe, good quality, raw materials for processors and the food industry that have been grown in a sustainable manner.



An 'experimental' orange grove has been established
©Jane Yeomans/EARTH University

Establishing links

Costa Rica is an established source of a variety of fruits, such as bananas and pineapples, as well as coffee, sugar and many other tropical crops, which are used both domestically and exported. The country is also a producer of oranges, most of which are exported as frozen juice concentrate. But with growing demand and increasing prices for orange juice, orange production is becoming an attractive proposition for small growers in the northern part of the country, in the provinces of Guanacaste and Alajuela, as well as in neighbouring Nicaragua.

In an effort to establish an early link with current and future growers, The Coca-Cola Company and TicoFrut launched a project to train rural youth in the sustainable production of oranges in the Los Chiles district of Alajuela. After conducting a stakeholder consultation, an 'experimental' orange grove to test and demonstrate practices related to citrus sustainability was established on an underutilised piece of land in a rural school - *Colegio Técnico Profesional de Los Chiles* - that is accessible to many growers in the area.



Students are receiving formal training in all aspects of citrus production
©Jane Yeomans/EARTH University

As well as gaining experience by working in the orange grove, students from the high school are receiving formal training in all aspects of citrus production, from planting and fertilisation to sampling and harvesting. Parents of the students, most of whom are smallholder farmers, are also given the opportunity to attend these training workshops and to visit the experimental grove to learn best practices including plant spacing and selecting rootstocks. At these workshops the farmers also gain contact with extension agents and buyers (TicoFrut).

Costa Rica's EARTH University has been enlisted to provide guidance and technical supervision. Each month, University staff spend three days conducting workshops, meeting with teachers and extension workers, and working with

TicoFrut to manage the grove. Workshops in the community are also conducted for parents and other producers who have no way of getting to workshops held at the school.

Sustainable growth

Nitrogen fertilisation is commonly practised by Costa Rican orange growers and much needed research is being conducted on the use of biofertilisers and compost as alternatives to synthetic fertilisers. Two strains of indigenous nitrogen-fixing bacteria, *Azotobacter*, are being tested as biofertilisers. In addition, students are taught how to make compost, using pineapple processing waste, sawdust, and the sludge from the wastewater treatment plant at TicoFrut's processing site. Greenhouse gas emissions from the compost experiments are being tracked in an attempt to identify ways of minimising emissions. Also the University is teaching the students how to collect and process data from the project, providing valuable skills in citriculture, in research and scientific protocols.

The presence of The Coca-Cola Company, TicoFrut, and EARTH, working in partnership with the teachers, has motivated the school to reactivate other production areas on the farm, and the workshops have helped the school maximise the resources that they had available, making positive changes to the farm's management. Without the presence of the project, it is almost certain that this transformation would not have occurred.

In 2014, the trees at the school's farm will have reached commercial maturity and the first harvest will take place. Harvested fruit will be sold by the school to TicoFrut and will generate a much-needed revenue stream. This money will be used to continue improving the farm, so students can learn more, as well as to improve the condition of student dormitories.

It is also hoped that with exposure to new and sustainable methods of growing citrus, producers will be able to expand their production and market this to buyers, such as TicoFrut. "With increased demand for food globally, mutual reliance between smallholders and the food and beverage industry has the potential to deepen," says The Coca-Cola Company's Ernesto Brovelli. "Establishing a link with the youth early on will guarantee a smooth transition for smallholder farmers into supply chains."

Written by: Ernesto A. Brovelli (The Coca-Cola Company and Professor at the University of Florida) and Jane Yeomans (Professor at the EARTH University)



The University is teaching the students how to collect and process data from the project
©Jane Yeomans/EARTH University

Smallholder aquaculture: sustaining the impact of private investment



Cage culture in Magura, Bangladesh
©Khaled Sattar/WorldFish

The growth of aquaculture - now the fastest growing food production system in the world - is increasingly attracting private investment. Much of this investment, however, is in larger enterprises and input services such as feed, seed and processing. Little is targeted at smallholder farmers who, as a result, continue to face constraints in accessing finance, technology and markets. In 2010, WorldFish set out to explore the business case for investment in smallholder aquaculture by examining several donor funded projects. Research found that investments in smallholder farmers and their organisations can be commercially viable, creating economic as well as social and environmental benefits.

Generating income

Over 95 per cent of aquaculture farmers in Aceh, Indonesia, are small-scale, growing brackish water shrimp and fish ponds of around 1 hectare. In 2007, the total production of aquaculture in Aceh was valued at US\$70 million, up from US\$45 million in 2006. This represents a 50 per cent increase in production value over the period 2006-2007. The increase is due to a combination of factors, including an increase in the number of farmers, an increase in the area of ponds, and an increase in the price of fish. The increase in production value is a significant achievement for smallholder farmers in Aceh, and it demonstrates the potential for aquaculture to provide a sustainable source of income for smallholders in developing countries.

Fish remains the most important source of protein in many countries across the world. In many countries, fish production is static or declining. In an increasingly important source of fish for human consumption, the world's fish supply will need to double in the next 20 years to meet the demand. This presents a significant opportunity for many smallholders in Asia and Africa to diversify their income sources and improve their livelihoods.

In India, local service organisations were set up, through donor funding, to assist small-scale, commercially-oriented shrimp farmers to form farmer groups and reduce shrimp disease problems, primarily through adopting simple management improvements. Farmer participants in the project grew from five volunteers in 2002, to 17,147 in 2011. Financial analysis of the project over the period of 2002-2006 showed that, from an investment of US\$0.3 million, US\$8.9 million of farm gate revenues and US\$3.52 million of profits were created for 730 farmers.



Over 95% of aquaculture farmers in Aceh own or operate brackish water shrimp and fish ponds of around 1 hectare
©Mike Lusmore/Worldfish

And in Bangladesh, a USAID-funded project provided US\$0.5 million of technical and organisational assistance during 2008 and 2009 to small-scale shrimp and fish farmers. This investment created US\$52.5 million in income and US\$20.6 million in profits in 2011 for almost 23,000 farmers.

All three cases from Indonesia, India and Bangladesh raised incomes for smallholders, and in two of the countries there was a significant business case for investment at the project level. Key success factors included the setting up of local technical services which improved farmer access to technologies. Strengthening farmer groups or producer organisations also enabled smallholders to obtain other inputs, such as cheaper feed and improved seed, coupled with finance.

Having established the high return from investments into small-scale aquaculture, the next step was to better understand the requirements to turn donor-funded projects into economically and socially sustainable aqua-businesses. The research showed that investment in the development of the capability and capacity of fledgling enterprises, and most importantly their business skills, is critical. The enterprises must also be linked to business services such as microfinance, technical and market development and the collaborative purchasing of inputs. Engagement of all actors along the whole value chain has the potential to deliver higher rewards but care must be taken not to displace traditional actors, such as local traders, by making sure that they continue to draw equivalent value in any changed way of operating. The need for time to build the capacity and networks among smallholders and intermediary organisations is key in establishing new, robust, businesses in the aquaculture sector.

New partnerships for impact

With the increasing understanding of business models for investment, WorldFish has been able to share its research findings with the private investment community. In December 2011, in conjunction with A-Spark Ventures of Utrecht, WorldFish hosted a meeting involving scientists, entrepreneurs, impact investors and other interested parties, which resulted in the establishment of a new investment facility for aquaculture, named Aqua-Spark Fish for Good

(<http://www.worldfishcenter.org/events/aquaculture-clinic-a-spark-good-ventures-worldfish-center>)>Aqua-Spark. An agribusiness 'incubator' - which helps investors develop robust business plans - has been established by WorldFish to build research and development initiatives into investable small and medium-sized aquaculture enterprises.



Investments in smallholder fish farmers can be commercially viable
©Michael Phillips/WorldFish

The Aqua-Spark financing facility opens a new opportunity to connect commercial investment to WorldFish research with aquaculture communities in Bangladesh, India and Indonesia and to create impacts and sustainability at scale, beyond what has been possible in grant-funded projects. New aquaculture businesses are being explored in Cambodia and Myanmar, which have potential for expansion through commercial investment based on aquaculture technologies developed through WorldFish research. In the future, connecting the research of WorldFish more directly to the creation of new business opportunities, and facilitating access to the most appropriate financing, will help to catalyse investment in small-scale aquaculture. This will provide positive environmental, social and economic value for smallholder producers, local services, impact investors, seafood buyers and retailers.

Links

- <http://www.worldfishcenter.org/events/aquaculture-clinic-a-spark-good-ventures-worldfish-center>)
- WorldFish Incubator: Sustainable Aquaculture Made Possible (<http://www.worldfishcenter.org/resources/publications/worldfish-incubator-sustainable-aquaculture-made-possible>)
- Investing in Hope: Rusli's Story (<http://www.youtube.com/watch?v=BOzzxnzAqWQ>)

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