

## Agricultural innovation in Nicaragua: "TO INNOVATE IS DARING TO THINK DIFFERENTLY."



With their own creativity and support from the Pymerural project, the beekeeping Mendozas have trebled their income.

To increase their income, small farmers must produce more and better quality goods. This seems simple enough. But how can it be achieved? How can you promote innovation on Nicaragua's farmlands and do so by methods that are available to all producers? These were the challenges faced by three Swiss Agency for Development and Cooperation projects which set out to foster agricultural innovation on a large scale. The answer? We need not look very far: the key is to research, identify and put to good use ancestral farming techniques, enhancing them with modern inputs.

This Latinbrief presents simple, inclusive, replicable and low-cost experiences and innovations arising from three emblematic programmes that reached more than 13,000 smallholder farmers, boosting their income by 15 to 30%: **Pymerural** (Rural SMEs), facilitated by the Swiss Foundation for Technical Cooperation (Swisscontact); the **SICTA Network**, implemented by the Inter-American Institute for Cooperation on Agriculture (IICA) and the **Technology Market Development**-programme, promoted in coordination with the Nicaraguan Agricultural Technology Development Foundation (FUNICA).

Among the 1,400 bee farmers supported by the Pymerural programme are Fabricio Mendoza and his wife. For them innovation does not mean so much "technology" as it does "creativity". A few years ago the Mendoza family lived exclusively from agriculture, but doing someone a favour changed their lives. One day a relative asked them for a place to keep some beehives while he dealt with some other business. For Fabricio Mendoza and his wife this presented a challenge as well as an opportunity to diversify their sources of income. They did not just copy the practices of other experienced bee farmers but adapted what they had learnt to their own needs. Progressing steadily along a collective learning curve, they redesigned



**“Made in Nicaragua”:** beekeeping suits developed by Nicaraguan beekeepers are a popular addition to the market.

the feeders and pollen traps for their beehives, as well as a new beehive smoker prototype. Their beehive boxes were then used as a model for training new bee farmers under the Pymerural programme. The Mendozas also designed new protective clothing, which did not previously exist in Nicaragua. Today they make and market their own beekeeping clothing.

This beekeeping family started out with 16 beehives which produced some 250 kilos of honey per year. Currently, they own 85 beehives producing 2,700 kg, which are marketed in the form of 3,000 500-g jars under the Ambrosía brand name. “The honey market has evolved. A 300-kg barrel, which used to cost about USD 240, now sells for USD 800,” explains Fabricio who, thanks to improvements in production processes and the rise in the price of honey, has tripled his income. Technical and financial support from the Pymerural programme was instrumental in developing simple, inclusive, replicable and low-cost technologies.

The programme was aimed not only at working together with small farmers, but also at fostering the standardisation of processes and methods in order to promote apiculture around the country. This was achieved through cooperation with the Ministry of Family Economy (MEFCCA) and the National Beekeeping Commission of Nicaragua (CNAN). “As a result, the training and exchange of experiences among suppliers from Nicaragua, Honduras and Costa Rica was promoted effectively. Several technical guides for bee farmers were also produced and the first regulations were established, which represents a huge step forward for the industry,” said CNAN facilitator Javier Ayala. These changes in the regulations

and policies have had a significant positive impact on the lives of bee farmers. Many have succeeded in increasing their income, as in the case of Fabricio Mendoza’s family.

The Pymerural programme also set up a network of safety control laboratories and trained more than 166 CNAN technicians as well as 66 providers of equipment and inputs throughout the country.

El programa Pymerural también conformó una red de laboratorios para control de inocuidad y capacitó a más de 166 técnicos de la Comisión Nacional Apícola de Nicaragua y a 66 proveedores de equipos e insumos en todo el país.

**Pymerural**, which ran from 2008 to 2014, was facilitated by the Swiss Foundation for Technical Cooperation (Swisscontact) and financed by Swiss Cooperation in Central America. The Programme created and/or sustained 15’300 jobs in Nicaragua and Honduras. It also supported 16’700 SMEs and producers to increase their competitiveness in both food and non-food agro-industrial value chains. The development of value chains generated additional net incomes of 21.6 Mio US dollars.

### MAKING THE MOST OF TRADITIONAL KNOWLEDGE

Just like the bee farmers, small-scale maize and bean growers in the northern and central regions of the country also sought ways of improving production and increasing income. Innovation was the key to achieving their goal – and

they did not have to go far to find suitable technologies. These, though fallen into disuse, formed part of their ancestral knowledge. All that needed to be done was to revive, improve and replicate the old technologies on a large scale.

The recovery, enhancement and exchange of knowledge throughout the Central American region was promoted by the **Agricultural Innovation Network (SICTA)**. The partnerships established through this programme between producers’ associations, governmental institutions, the private sector and research centres played a key role in disseminating the technologies and reaching a broader section of the target population.

One of the revived technologies was the use of a protective cover on bean crops – a simple, low-cost improvement which involves little more than covering the crop with plastic sheeting and which enabled producers to increase their revenues by 45%. This technique – already used by the indigenous population in pre-Columbian times – was shared by Andrés Picado, a



**A new look for an old custom:** covering the beans prevents them from rotting and massively increases crop yield.



**Drying beans on hemp twine in the open air reduces post-harvest losses.**



**Mind the gap: sowing seeds too densely reduces yield.**

small-scale farmer from the region of Boaco. It was then successfully replicated in other areas of the country in coordination with the Nicaraguan Institute of Agricultural Technology (INTA) and the Santa Lucía (Boaco) Producers' Association.

Another effective practice is the use of an inoculant for beans, which is marketed under the brand name "Nitronat". These are bacteria produced by the bean itself

which are isolated and added to the bean seed to strengthen the roots and nodules, and improve nitrogen uptake. This bio-input increases yield by 30%, thus lowering production costs," explained Osman Matús, a technician of the Inter-American Institute for Cooperation on Agriculture (IICA). The bacterium is processed and marketed by the Union of Agricultural Producers of Nicaragua (UPANIC). In view of the inoculant's benefits and success,

the Nicaraguan government included it in a "technological package" distributed to farmers in a drive to plant 50,000 apple trees. The inoculant is also marketed in Honduras, El Salvador and Guatemala.

The SICTA network also promoted a web portal called El observatorio regional (Regional observatory) (<http://www.observatorioreedsicta.info>), which publicises the innovations developed in the maize and bean value chains. The platform enables users to exchange views and information with people in other countries and includes a network of contact persons and experts, as well as video tutorials.

The **SICTA network** project was implemented by the Inter-American Institute for Cooperation on Agriculture (IICA) and financed by the Swiss Agency for Development and Cooperation (SDC) in Central America. It ran from 2004 to 2014 in seven Central American countries and benefitted over 40,000 producers, 30% of whom were women. The project identified 55 simple and effective technologies and contributed to improving production systems, post-harvest handling techniques and the marketing of staple grains.

## **"TO INNOVATE YOU HAVE TO WORK IN PARTNERSHIPS."**

Interview with Marylaure Crettaz, SDC Regional Advisor for Employment and Income



### **Disseminating new technologies on a large scale takes a long time. Why is this the case?**

The main obstacle to the adoption of a technology is lack of information: ¿How does it work?, ¿Where can you buy it?, ¿How do you apply it? Then there is the added problem of low levels of education. It has been our experience that farmers with a higher level of education are more likely than others to adopt innovative technologies. Another problem is that small farmers often find it difficult to access credit on favourable terms, which makes new technologies unaffordable.

### **How can these obstacles be overcome?**

To spread innovative technologies on a large scale it is essential to create partnerships between NGOs, farmers' associations, universities and private companies. Furthermore, dissemination cannot depend on announcements or radio broadcasts alone, but must also be backed by technical assistance from agribusinesses, government outreach agencies and NGOs. It is important to link the promotion of technologies to the provision of credit and other financial mechanisms. ICTs are also a powerful tool for promoting innovation. Many farmers today have mobile phones and access to social media. We must take advantage of this new situation. Recently, I learnt about a group of Honduran farmers who were using WhatsApp to share important information about prices and weather conditions.

### **The SDC also works with the private sector. How do private businesses contribute to agricultural innovation?**

In the case of coffee-growing – but this applies to other crops as well – I was struck by the fact that innovation largely

originates from export companies. They improve agricultural and post-harvest processing practices in order to meet market expectations. The challenge is to enable other public and private agencies to share this knowledge in order to disseminate it more widely and boost its impact.

### **What is the role of the state?**

The role of the state is to propose effective policies and create incentives and coordination mechanisms. But the state cannot manage the innovation system on its own. It must work together with other institutions such as universities researching new varieties, technological service providers and private companies, which are key to the transfer of technology, the farmers' associations that use the technologies and so on. I think it is very positive that Nicaragua now has a National Agricultural Research and Innovation System (SNIA) designed to coordinate the various academic, private and public stakeholders and thus contribute to the country's agricultural development.

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## INDIVIDUAL IMPROVEMENTS BENEFITTING THE COMMUNITY

A key challenge is the dissemination of knowledge. In order to turn individual innovations into technologies benefitting the entire community, knowledge must be disseminated on a large scale. To this end, providers of agricultural technology services and the farmers themselves joined forces to supply technological innovations that were both affordable and environmentally friendly.

This idea was at the heart of the **Technology Market Development** project, which succeeded in establishing a market for wholesome and sustainable technologies. The project speeded up the dissemination of such technologies as botanical seeds, organic plant nutrients and animal nutrients, artificial insemination, greenhouse seedlings, fermented livestock feed and related equipment. As one of its major results, the project produced a "Catalogue of agricultural technologies of Nicaragua", which describes 60 different technologies, including their characteristics, advantages, economic benefits, prices and points of sale. The catalogue is available at <http://funica.org.ni/index/images/destacados/Catalogo.pdf>

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## COW-FATTENING WITH CASSAVA YOGURT

One environmentally-sound technology developed by the San Antonio family cooperative led by Denis Mayorga and his wife Aura is a livestock feed based on probiotics and cassava yogurt. This has been a commercial success: the family, which used to produce 20 quintals of feed per day, now

produces at least 300 quintals. The new feed meets the livestock's biological needs. The cattle are healthier and more vigorous and the fattening process is quicker. The know-how provided by experts from Cuba, Nicaragua and Switzerland was a crucial success factor for improving and marketing the new product. "This transfer of knowledge enabled us to improve and expand our business – to understand the meaning of productivity and how it can be achieved," says Denis Mayorga.

With the support of the project, the San Antonio family cooperative forged an alliance with Nicaraguan livestock farming associations, thus allowing the cooperative to distribute the feed nationwide. The cooperative also registered its brand name and developed an improved packaging system. "This is basically local knowledge enhanced by technical knowledge," points out Denis Mayorga.

For Julio Monterrey, of the Nicaraguan Agricultural Technology Development Foundation (FUNICA), the innovative aspect of the Technology Market Development project consisted in making use of the know-how which forms part of farmers' traditional culture, improving this know-how and turning it into new business opportunities that stimulate the local economy: "A farmer who achieves a better harvest thanks to a new technology, and who manages to sell it for a good price to a local business, will come back to buy that technology, and this sets in motion a virtuous circle of growth of the agribusiness sector in the region, thus promoting development," explains Monterrey.

The **Technology Market Development** project was implemented by the Nicaraguan Agricultural Technology Development Foun-

ation (FUNICA) and financed by the SDC in Central America. From 2007 to 2014 the project launched 30 start-up businesses providing agricultural technology services. With support from the project, 50,000 farmers became acquainted with new, clean technologies, and 26,000 purchased them. The key to success was to bring together small enterprises, organisations and individuals offering easily accessible technologies, and to match this supply with demand.

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## DARING TO THINK DIFFERENTLY

Innovation is an ongoing trial-and-error process. A case in point is the beekeeping clothing developed by the Mendozas, which went through ten different versions before they settled on the one that is successfully marketed today. The same applies to the bean-based inoculant, which required numerous attempts to identify the ideal inputs to reproduce the bacterium and find out, for example, that soil from the Río San Juan area is the most suitable for this process. Innovating also involves learning a new technical language and making changes to one's daily routine. Initially, this means more work and represents a challenge for many producers, but the effort is certainly worthwhile.

In this way, through field visits to the farmers and the exchange of experiences with other countries in the region, Swiss Cooperation has promoted low-cost innovations. It has also contributed to developing a regulatory framework and established a network of partnerships to facilitate the transfer of knowledge and a better flow of information.

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## IMPRINT

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This publication is also available in German, French and Spanish.



**Cattle feed from yoghurt and cassava flour: the Mayorgas present their product at an agricultural fair.**