Background

The Nicaraguan agricultural and livestock sector experienced wide policy shifts over the last two decades. State intervention during the Sandinista period (1979–1990) was reversed by subsequent governments that drastically reduced credit, curtailed government technical assistance services, and liberalized foreign and domestic input and output markets. However, government withdrawal was not accompanied by promotion of institutions to facilitate competition in input and output markets, and/or provision of credit and technical assistance.

In 1993, with World Bank assistance, the Government articulated a comprehensive strategy that included the Agricultural Technology and Land Management Project. The Nicaraguan Institute of Agricultural Technology (INTA) was created to provide advisory services to farmers, and experimented with cost sharing strategies (Keynan, Olin and Dinar 2001). However, by 2000, a number of challenges remained: (World Bank 2000):

- **Low coverage of extension services** – Less than 15 percent of farm households used advisory services, only half the services were provided by the government;
- **Incoherent research agenda** – government and donors were funding many different activities without a shared strategic vision;
- **Shallow penetration of information** – The country lacked an effective, integrated and useful system to meet the information needs of farmers, extension agents, researchers and government agencies;
- **Disconnect between public and private sector** – Scientists conducting agricultural research, or providing extension and training services in Universities, INTA, the National Tecnologucial Institute (INATEC) and NGOs worked in isolation, without effective linkages;
- **Low technical education** – High levels of illiteracy among poor farm households (32 percent in agricultural areas and 40 percent amongst the poorest in 1993), and limited schooling (62 percent of 15-39 year-olds only attended 3 years) were a leading causes of slow implementation of product and process innovations, and perpetuated agricultural/urban divides.
- **Peasant holdings becoming smaller** – the number of farm families almost doubled since the 1963 census, cultivated land increased by only 63 percent (Arguello et al. 2002). Expansion of agricultural land is reducing forest coverage, causing dramatic environmental problems.

Key policy and institutional reforms

In response, in 2001, the Government launched a phased, long-term investment program in agricultural technology, to implement policy and institutional reforms. The Bank—
funded Agricultural Technology Project supports the following components:

**Institutional capacity development** - The main public institutions related to agricultural technology are being strengthened. A Directorate of Agricultural Technology (DTA) has been created within MAG-FOR, and is designing and implementing agricultural technology and training policies and coordinating and monitoring publicly funded research, technical assistance and agricultural technical education and training activities. The Fundacion Nicaraguense de Tecnologia Agropecuaria (FUNICA), a private body accountable to a Board of Directors bringing together public and private stakeholders, serves as a permanent forum for discussing and agreeing on technology. FUNICA manages a competitive fund facility with two windows. One window (FAITAN) finances agricultural research projects presented by research organizations and institutions, domestic and foreign. Another window (FAT) stimulates competitive, private agricultural advisory services.

**Nicaraguan Institute of Agricultural Technology (INTA)** - the main institution responsible for innovations generation and diffusion is being helped to increase its capacity, to gradually withdraw from its traditional role as direct field provider of advisory services and become instead the main provider of: (i) strategic and adaptive research; (ii) technical assistance which generates positive externalities; (iii) agricultural technology and knowledge captured from foreign sources; (iv) basic and registered seed; and (v) second-tier services to other agricultural service providers.

**Developing an agricultural technical education and training system** - The program supports: (i) in-service training to technical assistance and education staff provided by private sector (universities, NGOs, agro-industrial companies) and public sector specialists; (ii) education and training of future agricultural trainers; (iii) pilot initiatives to improve literacy and assist agricultural youth and unemployed adults to work as farmers or skilled/semi-skilled farm workers, and (iv) in-service training for agricultural public sector management, administrative and technical staff.

**Developing an agricultural technology information system (SIA)** that brings together several independent sources of information available nationally and internationally. The system should provide relevant and timely information on market trends and opportunities, agro-meteorology, agricultural services, business opportunities and best practices to: (i) agricultural researchers, technical staff, subject matter specialists and trainers at all levels, to improve the quality of their professional services; (ii) farmers, directly or through development agents, to enhance their decision-making ability; and (iii) policy decision-makers and program design and monitoring units.

### The Impact of the Reform

FUNICA began in 2000. It funded 5 of 55 research proposals under the first call, than developed a fast-track procedure for financing research projects within six months. Another scheme provides quick mini-grants (approved within 30 days) for validating existing technologies. A third initiative would provide mini-grants to less favored areas of the country, where a pilot finances technical assistance to groups of farmers, provided by freelance agronomists or by NGOs.

INTA is showing signs of renewed vitality, with many validated innovations, and more staff training and publications. It still needs to become more flexible, less costly, and more demand-oriented. In 2002, INTA provided co-financed technical support to 11,343 families, cost free information through mass media and mass contacts to 16,577 families and contracted private suppliers and NGOs to provide co-financed technical support to 13,412 more families.

INATEC developed new curricula, involving NGOs and Farmers Unions of all political affiliations as sources of information, and decision-making and advisory board members. Private Input Suppliers, Output Traders and Food Processors are being contacted to strengthen the existing network and attract private resources into the system.

SIA created a portal and website, with a wealth of information about partners and links to other websites, such as MAG-FOR and INTA.

An articulated, detailed project monitoring and evaluation system was devised, with 136 indicators (DSE/MAGFOR 2002). Opinions of producers, technicians and the public are monitored through periodic polls (agrobarometro), providing invaluable feedback.

Early, encouraging signs of strong commitment came from several donors providing financial and human resources through the Project; and many Nicaraguans in the relevant institutions who showed willingness to change and personal
engagement with this long term, complex, promising approach.

**Sustainability Risks**

The reforms’ sustainability is affected by three risks.

(i) Financial sustainability is a major issue for agricultural technology systems throughout the world. The program depends heavily on donors. In the longer term, as more private operators enter the market and diffuse validated information, the public role can shift away from delivering private goods (from seeds to information) and focus on information that is a public good, and supporting marginalized farmers. More private investments are needed in input supply and processing.

(ii) Institutional sustainability is a moderate risk due to the participation of many institutions and the need for them to relate in new ways, i.e., public-private partnerships for research and technical assistance.

(iii) Environmental sustainability presents a minor risk, even though program activities are expected to improve knowledge and diffusion of environmentally friendly technologies. Stakeholder groups cannot continue to exploit Nicaragua’s natural resources in the traditional way; innovations are needed to improve agriculture overall performance.

**Lessons Learned**

The first two years of program implementation had encouraging results. Stakeholders agree that performance exceeded expectations. This may be due to the innovative mechanism used to initiate and guide change, and maintain its momentum.

While the program focuses on gradual (medium to long term) change, it became clear that quick concrete results were needed to maintain enthusiasm and political support. Since many measures would take a long time to show their strengths and weaknesses, a preemptive mechanism was needed to spot potential implementation risks early. The government, assisted by a specialized firm, undertook a series of short-term results-producing initiatives. These rapid-results initiatives helped explore implementation risks and issues, and ways to tackle/mitigate them.

Tackling this implementation challenge required leadership groups at all levels of society and all relevant sectors. They conceived strategies for making change happen, and to organize, mobilize, and energize people at all levels to take collective action that yields intended results. The “leadership groups” had to work differently with their constituencies, behave in new ways and leverage new skills. The World Bank team needed to play a critical, catalytic and facilitating role: as advisors, coaches, and partners to counterparts in these “leadership groups,” as they worked with their own constituencies to translate collective intent into action and results.

The first cycle of initiatives developed ownership and accountability for results at local levels, and a positive sense of “challenge” at all levels. Achieving results lays the groundwork for longer-term reforms.

Many important lessons were learned in the first two years:

- Reforms must be devised as a whole and approached together, linking institutions that rarely act together. External agents can help break the status quo.

- The elite head and staff of existing institutions like INTA and MAGFOR, resist change. External individuals/teams can accelerate the innovation process.

- Institutional modification and/or capacity building take time, and dedicated effort. This justifies longer-term programs, but should not be an excuse to neglect technical, social and political needs for achieving quick results;

- Formal education qualifications often exceed real knowledge and skills. Staffing should be based on practical criteria and the capacity to achieve concrete results.

- External expertise is required to provide inputs and suggestions from countries with successful experiences, and opinions that are less likely to be interpreted as political rather then technical;

- Continuous feedback is needed, to changes procedures that prove ineffective or uselessly fatiguing;

- Developing a proper communication strategy needs serious attention from the program’s inception. Besides the standard technical communications typical of exten-
sion activities, a more sophisticated strategic communication approach should be considered when promoting reforms. Besides farmers, communications activities should target policy makers, opinion leaders, donors, and even urban dwellers.

- Technology generation and transfer in combination are necessary but not sufficient to increase productivity; increasing productivity alone will not guarantee increased net income and well-being. In a competitive, open environment, emphasis must also be given to other important factors, particularly development of infrastructure, marketing and farmer organizations.

**Moving forward**

Within a broad agricultural growth strategy, the Nicaraguan government is financing and promoting a new efficient, demand-driven, agricultural technology, knowledge and innovation system that responds to farmers’ needs.

The institutional reforms include:

- **Repositioning INTA**: In a free market environment where various actors can offer advisory services, the public sector should concentrate on creating a policy and regulatory environment and improving the quality of services that only government can offer. INTA’s new role should include: (i) research on public goods and strategic programs of national interest, (ii) serving as the agricultural technology issue “think-tank”, (iii) becoming the agricultural sector technology bank and diffusing technologies to service providers, (iv) involving local stakeholders in setting research agendas, and (v) maintaining strong linkages with international institutions and networks associated with the Consultative Group on International Agricultural Research and adapting new genetic materials to local conditions.

- **Supporting FUNICA**: to be a forum for consensus building among public and private actors. FUNICA could fund research through competitive proposal calls, establish partnerships with well-reputed overseas universities, and develop a competitive fund for extension and eventually other activities (technical education, marketing, pre-investments, etc.).

- **Developing a competitive market for agricultural training**: Successful technology transfer and adoption requires regular training for technical assistance providers and receivers. Reforms should open agricultural technical education to private service providers. INATEC will need to develop capacity to manage this process. Key technical staff of MAGFOR, INTA, INATEC, IDR and INAFOR need regular training.

- **Increasing information flows**: As markets increasingly influence producers’ decisions, an integrated market and price information system could have a large payoff.

**References**


**Notes**


2 The total, 41,332 is 20% of families counted in the 2001 Agricultural Census, but Arguello et al (2002) note that the Census reported only 12% of families as receiving advisory services (including from other providers). This discrepancy needs investigating.

3 Since most agricultural information is transmitted orally (Agrodiversos 2000), from advisors to farmers and farmer-to-farmer, this jump into the Information Age might is being questioned.

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