



The role of rural extension in innovation management





The role of rural extension in innovation management

This document has been created within the scope of PROCISUR workgroup on extension.

Eng. Julio César Catullo, INTA Argentina.
Eng. Héctor Gabriel Varela, INTA Argentina.
Agronomist Carlos Alemany, INTA Argentina.
B.S. Guillermo Torres, INTA Argentina.
Eng. Fernando Chávez, INIAF Bolivia.
Dr. Lucio Brunale, Embrapa Brazil.
Dr. Otavio Balsadi, Embrapa Brazil.
Agronomist Marcelo Zolezzi, INIA Chile.
Agronomist Francisco Tapia, INIA Chile.
Eng. E.H. Juan García Miró, MAG Paraguay.
Agronomist Federico Cantero, IPTA Paraguay.
Dr. Miguel Sierra, INIA Uruguay.
Agronomist Horacio Saravia, INIA Uruguay.



Designer: Esteban Grille

Cover photos: www.inia.org.uy

Table of Contents

	Introduction	5
1.	Background	7
2.	Problems and challenges	7
3.	Knowledge building for development	9
4.	Paradigms that help us understand innovation processes	10
5.	Reference framework for extension in innovation management	13
6.	Challenges of technical assistance and extension	15
7.	Bibliography	18

Introduction

The Cooperative Program for Technological Development in Agrifood and Agroindustry in the Southern Cone -PROCISUR, created in 1980 with the support of the Inter-American Development Bank -IADB, constitutes a joint initiative of the National Agricultural Research Institutes (from Spanish, INIA) of Argentina, Bolivia, Brazil, Chile, Paraguay, Uruguay and the Inter-American Institute for Cooperation on Agriculture -IICA.

From its inception, PROCISUR has promoted various cooperation modalities according to the dynamics characterizing the progress of science and technology applied to agriculture and to the evolution and changes experienced by the institutions integrating the program. Within this context, with the new demands posed by society to research institutions so that they contribute with greater emphasis with innovation processes, a new vision arises of the role of extension in the different innovation processes. This vision contemplates both a higher participation of agents and more coordinated actions involving both systematic knowledge from science and technology and tacit knowledge acquired along the productive process itself.

The institutes integrating PROCISUR are significant players in national innovation systems and, as such, they have undertaken the challenge of strengthening their institutional nature in the aspects demanded by today's society. Therefore, PROCISUR seeks to include the issue of extension in its cooperation agenda. This first conceptual document has been drawn within this process, seeking to trace the road that we must follow, considering the realities and the diversity of our agricultures, the history and expertise characterizing national research institutes and the IICA, in order to face the challenge of promoting more and better innovations for society.

The drawing-up of this document was actively supported by professionals of the national research institutes and, therefore, it represents a shared regional vision. We trust that this publication will contribute to the development of a cooperation agenda for the role of extension in innovation management.

Emilio Ruz
Executive Secretary
PROCISUR

1. Background

During the second half of the 20th century political decisions were made in many countries of the continent that were conducive to discontinue their rural extension systems. However, in this new century, this decision is being re-examined and the new debate proposes the recreation and modernization of rural advisory, technical assistance and rural extension systems (ATER: Technical Assistance and Rural Extension). This situation takes place within a context where the hegemony of the neo-liberal line of thinking to organize our societies is losing ground. This has weakened the State and its capacity to intervene.

Continuous support –by the State– to processes aimed at strengthening rural extension public systems has been vital to start recreating increasingly solid institutions that are capable of providing solutions –through innovation management– to increasingly complex social, economic, environmental and institutional problems. Innovation is understood as a horizontal process in which practices are modified, arising as the result of social interactions and it takes into account agents' previous experiences. The context becomes the maximum reference, interaction is the preferential strategy and ethics guarantee the commitment to the sustainability of all life forms. Significant knowledge is generated and adequate within its application scope. Thus understood, innovation processes go beyond the creation of knowledge and technologies as they also include the subsequent appropriation, use and assessment thereof.

Under the new scenarios, emerging challenges and approaches of our time, technical assistance and rural extension in the countries of the Southern Cone must facilitate innovation processes for territorial development –with social inclusion and environmental sustain-

ability– by strengthening the capabilities of all the economic and social agents, the promotion of collective actions and inter-institutional coordination.

2. Problems and challenges

We are currently experiencing global processes that persistently or increasingly generate social exclusion, to which we may add the uncertainty regarding the environmental impact of the over-exploitation of natural resources and ideological questionings of the expectation of continuous growth of production and consumption. Within this framework, challenges arise for the rural extension systems of the Southern region, which compel us to re-think and re-position extension.

World crisis in the dimensions of energy, environment, food, finance and politics

The financial, economic and technological trends of the last few decades generated progress but also global imbalances that have ended up unleashing a multi-dimensional crisis (food, energy, politics, the environment, finance and society). Due to the force of globalization, the crisis has expanded to many countries, regardless of their wealthy, middle- or low-income sectors, although the final impact on the population is yet unknown as we are living this phenomenon as we speak.

Food security: a priority problem

As of the world food summit called by FAO, food security is connected to the possibility that all people may have access to sufficient food in terms of quality and quantity. Likewise, this has been defined as a right that must be protected both by governments and the international community. At present, nearly 1,000 million people suffer from star-

vation worldwide. The highest concentration of these people lives in rural areas.

Persistency of rural poverty exceeding the agricultural scope

The polarization of income distribution as well as the regional and territorial imbalance of the distribution of products and surplus generates asymmetries between and within territories. Access to resources (land and water) and the displacement of peri-urban productive activities of the big cities due to increasing land values, continue to cause the expulsion and impoverishment of dwellers and small producers. A territorial perspective and the integration of public policies are required.

Changes in agricultural structure, with concentration of property and holding. New agents in the territories

Agricultural production has adopted complex forms, more concentrated and very independent from the intensive use of external capital and inputs. New agents arise in the territories whose main goal is profitability. Concentration affects the competitiveness and transparency of markets in the productive chain and suggests defective pricing and an inequitable distribution of the economic surplus among the different intervening agents.

Use of natural resources: global warming, pollution, soil depletion, forestry

The growth of the world's food production was based on technological innovation and the expansion of the agricultural frontier. However, at present special attention is drawn to mechanisms for sustainable production. Restrictions to certain production methods, good agricultural practices, certification and land use planning are some of the issues of the new agricultural agenda.

Experiences presented at the 3rd European Forum on Rural Development report that ecologically efficient agriculture in many production systems can have better results than agriculture carried out through conventional practices. Climate change adds an extra factor to the limited availability of natural resources and the uncertainty regarding their production capacity.

Competitiveness of family agriculture

The growing volatility of prices in the international market, the economic concentration of primary and agro-industrial production, and the globalization of technologies with private appropriation are aspects that increase the difficulties of middle-sized and family agriculture to achieve competitiveness. It is essential to implement regulatory frameworks, public policies and strategies that promote and support this sector, thus ensuring the generation of opportunities and innovative production and marketing practices.

Added value

It is urgent in all food-producing countries to add and capture value, both in the primary and in the transformation and marketing phases, improving income levels, generating employment opportunities and adding value to territorial identity. The possibility to work together with agro-industry increases producers' possibilities through different modalities (agreements, fidelization) improving the tuning of production with the requirements of agro-industry.

Effective integration of research and extension

Further work is required in what regards effective articulation schemes and devices between the different research and technical assistance and extension systems according to each country's characteristics, history and institutions.

Inter-dependence of all countries in what regards food production

The effect of globalization compels us to work in an articulate manner with other countries, both at a public and a private level. Supra-national frameworks provide the possibility to strengthen platforms that will potentiate the synergies offered by networks and, in this respect, the Southern Cone has considerable advantages.

3. Knowledge building for development

The problems and challenges mentioned in the foregoing point imply the strengthening of the capabilities of Latin American States and civil organizations to promote and consolidate sustainable development processes, among other aspects, to approach the new great challenges in the territories and their agri-food and agro-industrial sectors.

Several perspectives coincide in the appreciation of learning and knowledge building processes. In today's society, knowledge constitutes a strategic input for development; it promotes creativity and constitutes the raw material for innovation. It is inexhaustible; it grows exponentially in virtuous feedback cycles and is potentiated by the interactions between the territory's agents and disciplines. It is a unique resource that grows while being shared. In this respect, the need to improve knowledge building and access to knowledge becomes mandatory, both for governments and for the institutions related to development processes, as well as for communities, companies, individuals and organizations committed to improving society's quality of life. For this, it is essential and urgent that the State guarantees access of the whole population to knowledge and promotes more socially-inclusive means.

Knowledge building depends on the exchange of data, information and ideas. However, knowledge is broader and deeper than data and information, as it is a combination of experience, values, information and knowhow that serve as a framework for the inclusion of new experiences and actions. If knowledge is not exchanged between those who generate, adapt and use it, wealth and/or welfare generation becomes more difficult. Therefore, not only knowledge from scientific research should be appraised, but also implicit knowledge –both ancestral and recent- from production, distribution and consumption activities generating significant input for innovation process. The latter knowledge, called tacit, is basically acquired through experience gained along the production process and is represented by the organizational and institutional practices of social and economic agents. It also includes the knowledge possessed by social groups or communities, generated through historical and cultural processes, and who are an integral part of their territorial identity.

Tacit knowledge is characterized by its trans-disciplinary nature, its heterogeneity and organizational diversity. It is produced within its application context and socially shared; therefore, it is possible to talk about socially-distributed knowledge.

Tacit knowledge, be it contemporaneously acquired through work or traditionally transmitted by culture, is gaining greater significance for development processes. Mainly encoded knowledge –resulting from continuous research processes- is developed in the regions, while mainly tacit knowledge must take the best advantage of the former. And vice-versa: encoded knowledge is each day more dependent on tacit knowledge in order to be recreated and generate feedback. The more intense interactive processes of the different types of knowledge are, the more efficient they will be to transform reality.

Pre-existing cultural density is important in knowledge building for technological in-

novation and this requires more intensive interaction between the members of a territory, an organization or a company (relational capital). Knowledge building processes are partly endogenous. The complexity of the cognitive cycle constitutes a key element to make a difference, therefore, knowledge is generated within contexts and then returns to them. That is, abstract knowledge, produced by science and translated into technology and devices, needs supplementary elements: contextual information and knowledge. It is dynamic because it regenerates itself and expands through learning. Knowledge building, acknowledgement and rescue of productive and technological identities and, therefore, knowledge in the productive and organizational fabric, represent a significant development force.

4. Paradigms that help us understand innovation processes

There are multiple meanings of innovation that can be framed within different paradigms that were predominant in different times, under various economic, political, social and cultural contexts.

The characteristic actions, methodologies and strategies of each of these models still coexist in the daily contemporary practice as a result of the dominant education styles of researchers and extensionists incorporated into institutions over the last few decades.

Linear innovation models

By the late 50s, the design of science and technology responded to a linear conception that understood technological development as a unidirectional process. The generation of new technologies had a pre-defined sequence according to an innovation process conceived by technological development -“technology push”. This model is based on a univocal de-

pendence of the results of the basic research for the creation of technological developments that would invariably result in social benefits. In the 60s, “demand pull” approaches arose that were also framed within the linear innovation model, but proposed a change in the logic of the generation of scientific knowledge –only modifying the direction of the linear chain-. In this new conception the relationship with the user is considered but only to take as a starting point the attraction generated by the demand, without questioning the linearity of the previous model.

In the 80s, the debate over the linear innovation model began. In this respect, Kline and Rosenberg propose an interactive chain-linked design of the innovation process combining interactions within companies and interactions between individual companies and science and technical systems. This systemic model allows to build knowledge through a group of related activities (both horizontally and vertically) going from invention to marketing, emphasizing the existing continuous interactions and feedback between the different links of the chain.

Interactive models

The determinist linear approach has mainly penetrated the conception of the relation between technology and society, either by considering that technology determines social change –technological determinism- or considering that society determines technology –social determinism-. In the practice, these theoretical approaches have built a categorical separation between social, environmental, economic and technological problems, constituting different languages that are very difficult to communicate and integrate.

Over the last few years, new innovation process and technological change approaches have been developed, in an attempt to overcome previous limitations and contradictions. They are based on the conviction that it is impossible to separate and establish a

priori distinctions between technology, society, the economy and the environment. This conceptual feature has been described by the metaphor of the seamless fabric, by which the development of technologies must not be explained as a linear process of technical knowledge influenced by social factors, but rather, it constitutes a network that integrates in a complex manner heterogeneous facts (devices, institutions, rules, knowledge, etc.) with several agents (technological and professional organizations, political agents, entrepreneurs, users, etc.) in a non-linear way. In these models, learning performance has a fundamental role, including multi-directional and simultaneous relations between stages, activities and agents in what regards cumulative knowledge.

These new approaches attempt to simultaneously show the social nature of technology and the technological nature of society, generating a complex and integrative level of analysis, called socio-technical analysis.

Some of the characteristics included in the concept of technology, from a socio-technical, systemic and integrative point of view, are:

- In general, technologies operate within the framework of a historically and territorially defined socio-technical configuration.
- Understand and assume that all technology is social and that all technology is a cultural expression.
- Go beyond the static and linear notions of transfer and diffusion to pass on to a transduction process understood as the transformation of a type of signal or energy into another one of a different kind.
- Go beyond the concept that technologies conceived in developed countries are universal and global. That is, there is no reproducibility but rather re-application. Each solution is useful for each situation, as part of the knowledge implied by it is encoded and another part is tacit.

- Local dynamics and the strong interactions generated between users and technology re-signify and modify the meaning of technology.
- Technologies are conceived to actively participate in processes of socio-political, socio-economic and socio-cultural change. They constitute a material basis for affirmations and sanctions and they can promote socio-economic development and support democratization processes.
- To speak of the development of technologies with social inclusion implies to develop new modes of complex socio-technical systems of products, processes and organizations, focused on the dynamics of social and economic inclusion, democratization and sustainable development.

These approaches allow to anticipate problems, diagnosing research and extension paths and supporting the generation of socio-technically adequate local production dynamics, technological change and innovation.

Likewise, technologies currently represent a significant role in change and territorial development processes with social inclusion, as they demarcate agents' positions and behaviours, condition social distribution structures, production costs, access to goods and services, generate social and environmental problems, and facilitate or complicate the solution thereof.

These perspectives about the way to create knowledge, learning and innovation are based on the participative and inter-disciplinary nature that must originate them. In this respect, the dialogue between knowledge scopes arises from the acknowledgement of the individuals participating in the processes of group knowledge building. Galano (2006) points out that: *“Interdisciplinarity shall promote other joint processes for knowledge building. The interdisciplinary approach, either from a mere techni-*

cal process or from a complex theoretical inter-disciplinarity phenomenon, shall definitely break free from the yokes of reductionism, mechanicism and from the different deterministic “tribes”... this does not imply the abolition of disciplines, but rather the constitution of other disciplines that are fundamental as categories for knowledge building, and the withdrawal of the feudal walls that have isolated the various knowledge scopes.”

This interactive concept of technological change implies to acknowledge the existence of the different visions and interest at stake of the various social agents and institutions involved. The different perceptions of their own problems and the possible choices to overcome them generate tensions, disputes and conflicts, from which different technological “paths” are developed.

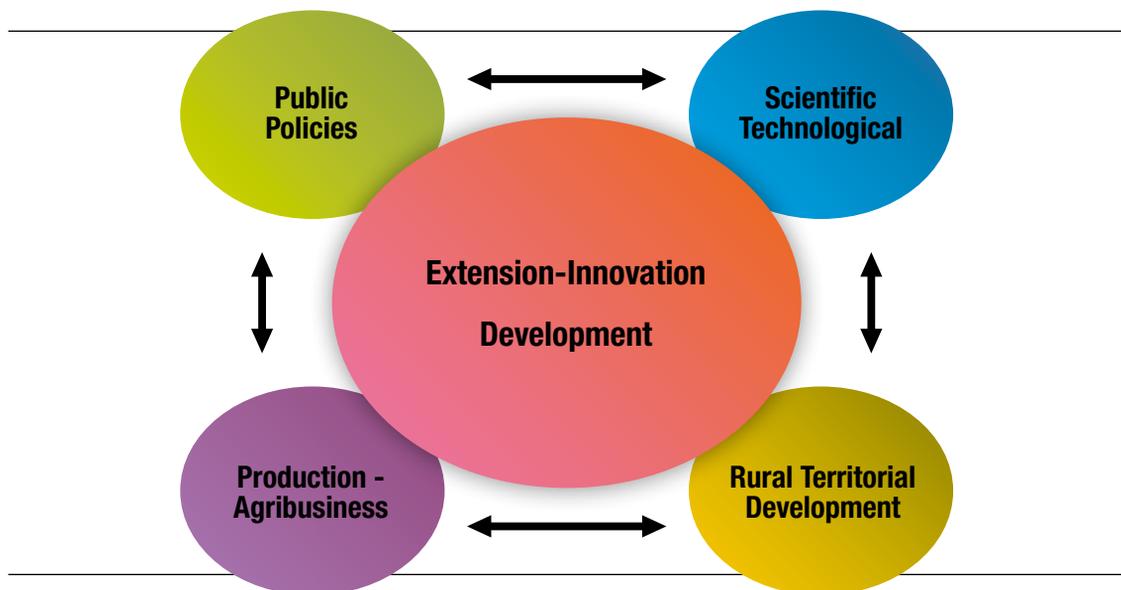
We understand innovation and knowledge systems in their broadest sense, as the articulated group of agents, networks and/or organizations linked to development: science, technology and extension system, producers, networks and organizations of producers and companies, community organizations and different government levels. That is, they include the productive, scientific, technological,

educational, cultural, economic and legislative scopes related to and interacting with each other. Innovations are developed based on joint efforts made by agents and the complex network of inter-institutional cooperation that originates the possibility of interactive learning.

As Lundvall (2009) points out: “Innovation is an interactive process where user-producer relations are essential both for the emergence of new ideas and for the actual adoption and implementation thereof. In the cumulative perspective of innovation, the distinction between invention, innovation and diffusion is blurred, as innovation is modified by the result of its diffusion.”

The scheme for a National Innovation System for Development designed by PROCISUR in its document (PRINIDES 2010) illustrates the necessary components for a virtuous circuit leading to Innovation for Development. Its central circle is precisely the scenario where sub-components must interact, losing their traditional individual identity in order to become gears of shared innovation management for development. Thus, each link contributes its specific skills to the sequence

NATIONAL INNOVATION SYSTEM FOR DEVELOPMENT



as a contribution to the innovation management process, while preserving its particular skills and responsibilities towards the common objective of innovation for development.

5. Reference framework for extension in innovation management

The conceptual and methodological proposals leading society's transforming actions, evolve when they have the capacity to respond to the main challenges of each era. Extension systems in the Latin American southern region are starting to incorporate the new approaches that enable to review their contribution to transformation and how interventions are carried out in: territorial development, innovation –understood as a socio-technical network- and complex thought.

Based on this concept of innovation, extension shares production and organizational technologies due to its joint operation with research, political agents, producers and agribusiness organizations, and social organizations of rural communities. The aim is to favor the creation of scopes allowing to build particular, specific and feasible initiatives, aimed at a better, more egalitarian and solidarity-oriented way of living.

The Global Forum for rural advisory services (GFRAS) has stated that: “the new conception of extension differs substantially from the way in which it was understood 30 or 40 years ago, where it used to have the function of technology transfer and not of promoting learning and innovation processes. In the former model, there was a great difference between the equipment and skills destined to research and those intended for extension. At present, it is considered that they must all be included in an innovation system.”

Extension can be understood as a modifiable –historically created- intervention modality,

related to the various and circumstantial paradigms of the development of each era. We are experiencing the construction of a new rural extension that seeks to provide simultaneous answers to contemporary production, social, economic, environmental and institutional demands.

Extension implies action with others. This action is aimed at the dynamization of spaces where the exchange of information and knowledge boosts innovation processes, responding to the needs of a territory as a social construction, identifying transformation opportunities and incorporating local knowhow and interests. The goal is to increase the management capabilities of the available resources to achieve sustainable growth, where the individual becomes the subject and not the object of actions and interventions.

What are the focal points of the work of technical assistance and extension professionals as innovator managers?

Within a context that requires coordinated actions between the different stages of innovation to ensure the impacts on emerging challenges, we may recognize four functions of extension that are combined according to their particular features: technological change, non-formal education, institutional change and network articulation and formation (multidisciplinary and institutional, among others).

In traditional practice, emphasis has been put on two functions: technological change and non-formal education which mainly focuses on some aspects of production transformation. But, based on the experiences developed in Latin America, it is also essential to reinforce the other two dimensions: institutional change and network articulation and formation. In both dimensions the management issue is vital.

Management –both for institutional and inter-institutional change- must be associated

to processes conducive to changes and transformations in the territories. It may be considered as an intervention process to achieve things in a certain way, based on pre-defined purposes. It does not refer to one single action but to a process including multiple and complex interrelated variables. It is a complex system considering that it accompanies the achievement of certain objectives and includes the planning design, team coordination, professional training, change follow-up and assessment, management of available resources, information generation and management, organizational and communication-al questions within institutions (institutional change), and the relation to the environment (inter-institutional management and network promotion).

Likewise, considering that innovation emerges from social interaction processes, the roles of extension are widened and work teams must consider themselves as territorial complexity analysts, technological referents and, especially, as public managers of innovation processes:

- Territorial complexity analysts: in a constantly changing reality it is necessary to be capable of acknowledging the multiple aspects of the territorial problems as a framework for planning-action. In this respect, multi-disciplinary and multi-sector understanding spaces are dynamized.
- Technological referents: Technological proposals are generated together with the other parts of the innovation system, in order to overcome the problems of rural communities. Different production and organizational alternatives and options are shared and validated with the other agents of the territory, contributing their particular knowhow to local knowhow for new knowledge building, where theory and action are articulated in an ever-improving practice. “Technological” intervention programs must combine activities aimed at

achieving products and operating in the processes.

- Public managers of innovation processes: acting jointly with the research system, the communities and their organizations, extension teams are agents that manage public policies and dynamize innovation. Within this scope, development starts to be conceived as the activation of the potentialities of a community in order to achieve the transformations it has agreed to. To achieve these synergies, social or relational capital building processes must be boosted and catalyzed.

Under this approach, extension systems should facilitate integration and contribute to strengthen the institutions of a territory. This is possible where there is capability to lead the dynamization of networks of public and private organizations, networks integrated by agents committed to a shared project, sustainable in time and inclusive of the different social aspirations and interests of a territory.

Institutional capabilities are required to address problems from an interdisciplinary approach in order to carry out:

- Diagnoses with a systemic vision
- Prospective studies of demands and scenario evolution
- Assessment of the effects and impacts of interventions
- Systematization of practices (local and regional)
- Dynamization of group, community and associative processes
- Inter-institutional management
- Research-Action
- Non-formal education processes
- Training of professionals in technical assistance and rural extension
- Proposals for the definition of public policies
- Strategic communication processes.

This interdisciplinary effort extends the matrix of criteria for intervention, social participation, practice quality and impact validity. Professionals must “advance” based on the alternative paradigms that orientate knowledge generation and innovation management, and face the challenges of the whole scientific and technological system and of extension strategies in particular. These challenges imply transformations in institutions, professional action and training.

6. Challenges of technical assistance and extension

At the Seminar on Rural Extension in the Southern Region: Dialogue on Knowhow (IICA-INTA, 2009), participants analyzed critical factors, challenges and strategies faced by the Rural Extension Services (SER, from Spanish: *Servicios de Extensión Rural*) of the Southern Cone while they prepared contributions for the building of a shared vision on the following 4 subjects: rural extension as a social inclusion tool in family agriculture; knowledge innovation and management with an emphasis on ICT; policies and new institutional arrangements for rural extension and national and regional strategies to strengthen extension (2009). This chapter is a supplementary contribution to the above mentioned debate.

At the level of institutions

Within the framework of the consolidation of a State that leads the dynamization of collaborative networks with the participation of both public and private organizations, research and extension institutions must promote innovative dynamics that favor sustainable and inclusive territorial development.

It is necessary to program, manage and form networks, considering complex problems, and make a call to reformulate innovation sys-

tems. Institutions defining frameworks for the joint management of inter-sector territorial proposals are necessary. In this respect, the role of our organizations is no longer that of generating projects that are subject to revision by other organizations (be them public or private), but that of adding capabilities to joint projects, which must include innovative organization figures in order to integrate resources. The strengthening of public administrations from the point of view of institutions and management, so that they may recognize permanent changes in their environments and propose public policies for improvement, is a task that should be prioritized in Latin American agendas. We consider that it is essential to review the link between research-assistance technique-extension, emphasizing the concept of innovation systems. In order to contribute to this objective, some strategic actions are:

- a) Form teams integrating farmers, researchers and extensionists for the planning, implementation and assessment of institutional strategies and actions.
- b) Technical assistance services and rural extension must be professional, committed and sustainable in order to achieve the necessary continuity to obtain the expected results.
- c) To strengthen training and exchange instances that allow to recognize and approach the complexity of territories, and identify the interests and needs of their different public and private agents for the purpose of designing strategies and implementing joint actions from a trans-disciplinary approach.
- d) Impact assessment is a fundamental aspect as it requires determining through adequate indicators (economic, social, technical and environmental) the impact on producers and on the territories of the extension programs applied. It is essential to reconsider assessments made on interventions. Project success should be measured by the changes

(effects) achieved; however, in most cases we only measure products. Likewise, systems to assess the staff involved in innovation generation should duly consider teamwork. Indicators and criteria that go beyond the reductionism that characterizes the publication of scientific works should be used.

e) The incorporation of information technologies should be potentiated. At present, the inclusion of ICTs should be mandatory for rural extension activities, through social networks or mobile telephony, in order to establish direct and personalized communication with users.

“Although indicators are a significant factor, they are not enough to show what we are achieving with our projects. It is necessary to further stress the observation of the changes that we generate, based on the duly quantified originating situations. Thus, we may notice any deviations and change direction in case it is necessary.

By selecting adequate indicators and orienting planning and follow-up towards the effects, we may be able to realize whether we are getting closer to our original targets”. Barth, Iris.

Professionals and training

The targets of equity and sustainability have lesser relative capacities when approaching competitiveness. Therefore, new conceptual, methodological and instrumental frameworks are required that allow to incorporate the social, cultural and environmental dimensions into management, and the capacities to build spaces for convergence with other disciplines.

Within this framework, Universities should generate a space for critical and creative interaction, interpretation building, proposals and skills, training citizens to actively contribute to the transformation of society as a whole and its reality.

In order to accompany innovation processes we need creative and flexible professionals

who are able to listen to and acknowledge the interests and needs of all those who may contribute to food sovereignty, work to solve the environmental problems inherent to agricultural expansion, contribute to reduce inequalities between regions and territories, reduce the marginalization of rural zones and increase the added value of local production. Therefore, it is strategic to facilitate the evolution of extension teams from mere intermediaries of information between system components (research-extension-producer) to facilitators of horizontally co-designed innovation processes. It is also essential to incorporate capacities to consider the vision of gender, youth and ethnic diversity.

On the other hand, the systematization of our organizational experiences tending to the creation of new institutions turns out to be an instrument of strategic value to create platforms to facilitate the exchange of information and knowledge generated from collective design processes of public policies.

Strategy

The reality of each of our countries makes it necessary to consider the difficulties of complying with an innovation agenda characterized by multiple demands within a highly heterogeneous scenario. Said heterogeneity can be grouped in at least six components, to wit:

- Production and market
- Producers' profile
- Geographical
- Cultural
- Socio-economic
- Environmental

This great variability of situations leads us to propose that it is essential to consider the typologies of production agents in order to achieve their insertion in innovation systems. Broadly speaking, 3 main typologies are considered:

- Those who can access the benefits of technology and are inserted in innovation systems.¹
- Those who are under transition processes and have partial access to some of the benefits of technology, partially knowing and using, in a fragmented way, tools and processes that bring them closer to innovation cycles.
- Those who are not inserted in innovation systems and have marginal access to technology (or who are left aside by technology).

Therefore, it is not possible to think of a single model to face this reality. The strategy to relate to agriculturists having different levels of access to technology must be differentiated. It is fundamental that research and development institutions consider these three sectors, in order not to restrict their scope of action.

At a regional cooperation level

As a conclusion, it is also important to extend international technical cooperation in order to build joint technological solutions –and even contribute to the design of State policies– that may allow approaching the main problems of the shared agenda, generate more inclusion possibilities, and achieve equitable growth. Work articulated between countries would help to generate mechanisms –both national and international– to accelerate the implementation of strategies in view of the growingly urgent, changing and dynamic needs. It is vital to strengthen international platforms that allow to share management models, virtuous cases, innovative experiences and practices generating territorial transformations among agents from similar contexts.

¹ By inserted in ICT we mean that they incorporate systematic and local knowledge into production and relate to other components of their systems. They manage a relatively diversified base of production techniques. They know how to make the value created in production processes their own (they are inserted in the market).

7. Bibliography

- Barth, Iris. (2011). Orientándonos a los efectos: Una herramienta para mejorar la formulación y el monitoreo de los proyectos y de nuestras prácticas de Extensión. Doc. Interno no publicado. Coordinación Nacional de Transferencia y Extensión. INTA.
- Beck, Ulrich. (1998). *La sociedad del riesgo: hacia una nueva modernidad*. Paidós, Barcelona.
- Bijker, W. (1995). *Of Bicycles, Bakelites, and Bulbs. Toward a Theory of Sociotechnical Change*. Cambridge. MIT Press.
- Boisier, Sergio. (2001). *Sociedad del conocimiento, conocimiento social y gestión territorial*. Fundación Universitaria. Sevilla.
- Bourdieu, Pierre. (1991). *El sentido práctico*. Versión castellana de Alvaro Pazos. Editorial Taurus. Madrid.
- Brieva, Susana Silvia. (2006). Tesis Doctoral. Programa de Doctorado en Ciencias Sociales. FLACSO Argentina. *Dinámica socio-técnica de la producción agrícola en países periféricos: configuración y reconfiguración tecnológica en la producción de semillas de trigo y soja en Argentina, desde 1970 a la actualidad*.
- Cano Gallego, Jairo. (1999). *Perspectivas de la extensión para la agricultura: multifuncional y a la medida*. Presentación XI Congreso Nacional Agronómico y de Recursos Naturales, Costa Rica
- Carmona, Alejandra y A. Vásquez. (2006). *Diálogo de Saberes para encontrar propósitos comunes en torno a lo Rural*. Laboratorio de Desarrollo Territorial. Universidad de Chile. <http://www.rimisp.org/boletines>. 29 de julio 2011.
- Catullo, Julio. (2010). *Roles del extensionista rural y capacidades necesarias para abordar la complejidad*. Seminario en el marco del Primer Encuentro Nacional de Economía Agraria y Extensión Rural. AADER. San Luis, 2010.
- Catullo, Julio. (2010). *La dimensión institucional de la Extensión Rural en la Región Sur Latinoamericana*. Documento presentado en el Seminario Taller “Institucionalidad y dimensión ambiental de la Extensión Rural en Latinoamérica”. INTA Expone, Marcos Juárez, Córdoba.
- Catullo, Julio y G. Torres. (2010). *Innovación Tecnológica y Extensión Rural para el Desarrollo Sustentable de los Territorios*. En: *Experiencias Innovadoras de Extensión Rural en América Latina*. Documentos presentados en la Reunión latinoamericana sobre Servicios de Asesoría Rural. Santiago de Chile.
- Catullo, J. y G. Torres. (2011). *Diálogos para la Innovación*. Documento interno no publicado. Taller CR Patagonia Sur. Trelew. INTA.
- Dabas, Elina. (2006). *Viviendo Redes, Experiencias y Estrategias para fortalecer la trama social*. Ediciones CICCUS. Buenos Aires.
- Díaz, Esther. (2003). *La posciencia. El conocimiento científico en las postrimerías de la modernidad*. (2ª edición). Editorial Biblos. Buenos Aires.
- Engel, Paul. (1997). *La organización social de la innovación. Enfocando en/sobre la interacción de los agentes involucrados*. Royal Tropical Institute. The Netherlands, Amsterdam.
- Ferraris, Susana. (2009). *Gestión de la Extensión con Enfoque Territorial*. Documento Interno no publicado. INTA.
- Foucault, Michel. (1979). *Microfísica del poder*. Ediciones de La Piqueta, 2ª edición. Madrid.
- Galano, Carlos. (2006). *Complejidad, Diálogo de Saberes, Nuevo Pensamiento y Racionalidad Ambiental*. Facultad de Humanidades. UAEM. www.asociacion-piuke.com.ar. 29 de julio 2011.
- Galicchio, Enrique. (2011). *Algunas reflexiones sobre concertación y articulación de actores en los territorios. Su relación con la cooperación*. En *Documentos de la VI Conferencia Anual del Observatorio de Cooperación Descentralizada. Políticas públicas y nuevos instrumentos de la Cooperación Descentralizada*. Rosario, septiembre 2011.
- Ibáñez, Eduardo. (2008). *Las teorías del caos, la complejidad y los sistemas: impactos educativos y aplicaciones en ciencias sociales*. Homo Sapiens. Rosario.

- Kline S. J., y Rosenberg, N. (1986). An overview of innovation. In R. Landau & N. Rosenberg (Eds.). *The positive sum strategy*. (pp. 275-306). National Academy Press, Washington". Citado por Brieva.
- Lundvall B. (2009). *Sistemas Nacionales de Innovación*. Ed. UNSAM. Buenos Aires.
- INTA. (2004). *PEI: Plan Estratégico Institucional, 2005-2015*. Edición INTA. Buenos Aires.
- INTA. (2008). Boletín de Extensión N° 78, www.inta.gov.ar/extension/profeder/actualidad/bole78/editorial.htm
- IICA. (2010). *Memorias del Seminario: Extensión Rural en la Región Sur: diálogo de saberes*. INTA-IICA. 2009. Buenos Aires. Argentina.
- Lane, D. y Maxfield, R. (2005). *Ontological Uncertainty and Innovation*. *Journal of Evolutionary Economics*.
- Leff, E. (2001). *Ecología y Capital. Racionalidad ambiental, democracia participativa y desarrollo sustentable*. (4ª edición). Siglo XXI. México.
- Lundvall, B. y Johnson, B. (1994). *The learning economy*. *Journal of Industry Studies* (2), 23-42. London.
- PROCISUR-PRINIDES. (2010a). *Plataforma Regional Innovaciones Institucionales para el Desarrollo: documento conceptual y metodológico*. Edic. PROCISUR. Buenos Aires. Argentina.
- PROCISUR-PRINIDES. (2010b). *Apuntes sobre las implicancias de los Talleres Interplataformas en la estrategia del PROCISUR y acción futura de la PRINIDES*. Edición PROCISUR. Montevideo. Uruguay.
- Sili, Marcelo y Soumoulou, Luciana. (2011). *La Problemática de la Tierra en Argentina: conflictos y dinámicas de uso, tenencia y concentración*. FIDA, Cooperazione Italiana y Ministerio de Agricultura, Ganadería y Pesca. Argentina.
- World Bank. (2007). *Agriculture for Development: World Development Report 2008*. Washington, DC.

