Perspectives

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Institutional change in agricultural research:
Factors of success

There are many options for institutional reform, but there are also many factors that can thwart efforts to achieve the purpose of change which, in the final analysis, should aimed at improving the contribution of technology to economic and social development.

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Abstracts
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There is no question that science and technology have made significant contributions to the socioeconomic development of nations. Current theorists and specialists in this area have stressed the importance of this contribution even more than their predecessors did, inasmuch as they consider knowledge in its many forms to be the most important variable explaining the different levels of development achieved by different countries.

The significance of this contribution may be seen only insofar as policies foster the adoption of knowledge by a society. This in turn calls for adequate levels of funding, a strong institutional research infrastructure, and adequate incentives to enable society to appropriate technological innovations, as well as innovations in business and in trade.

The Latin American and Caribbean countries have always recognized the contribution of science and technology to the growth of agricultural production, estimated by some authors at nearly 40% over the last forty years, thanks to increased investment in research. During the early 1980s, spending on research averaged around 1% of the region's agricultural gross domestic product (AGDP). However, this growth has mostly occurred, and continues to occur, in fresh produce for domestic consumption and export, rather than for innovations geared towards value-added products and enhancement of agro-industrial processes.

Funding of agricultural research, especially for public institutions, has been falling since the 1980s. Between 2000 and 2005, investment for this purpose averaged around 0.4% of the agricultural product, about half the level invested between 1960 and 1980. As a result, there has been a steady decline in the growth of agricultural productivity, especially in the Caribbean and in Central America. Agricultural productivity has also decreased, although to a lesser extent, in the Andean countries. Only the Southern Cone countries have maintained a high level of investment in research and technological development, and this has enabled them to generate steady productivity increases in the agricultural and agro-industrial sector.

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The drop in research funding throughout the region went hand-in-hand with a decline in agriculture's share in national accounts, which today averages around 12% in the regional economy. According to recent studies conducted by the Inter-American Institute for Cooperation on Agriculture, however, the contribution of agriculture to the economy has risen by approximately 30% of national GDP; this would suggest that there is a growing phenomenon of under-investment that could affect future contributions. There is a paradox here, especially since a number of specialized studies show average returns of over 40% on investment in agricultural research in the region, as well as significant increases in productivity, sometimes higher than those attained in other sectors.

All this helps explain why, with a few exceptions, the institutional research infrastructure has been weakened, especially in the public sector; private investment is also inadequate, as it accounts for only about 15% of the regional total. At the same time, however, there is also a growing demand for technology on the part of the production and agro-industrial sectors, which are faced with serious competition from other countries that are investing more in research and innovation.

Faced with this scenario, the demand for new institutional structures, as well as for studies and proposals for reorganizing existing agricultural research institutions, especially public ones, has reached unprecedented levels compared with previous decades. Solutions for the problem of institutional aging and limited operating capacity must be sought, and the dissemination and effective transfer of technologies and strategic information to production sectors must be increased. What is needed is not only technology but also modern, well-equipped and efficient research organizations that can help implement a much-needed improvement in sectoral competitiveness.

There are many examples of institutional reforms in the region that have successfully responded to the needs of both the public and the private sectors. In many cases, however, problems have arisen with proposed reorganization efforts that have caused reforms to be postponed and even, in some cases, to fail, thus aggravating the crisis. Moreover, particularly in cases of postponement or failure, a new type of demand for institutional change has arisen, this time from within the research organizations themselves, inasmuch as they want to ensure their survival by implementing a measures that reflect a business-like approach and are not always geared towards improving the institution's capacity to meet the needs of users.

The right kind of institutional change

Before we undertake an analysis of institutional reform processes, we should point out that organization theory, which is usually absent from neoclassical economic theory, is now widely recognized as a useful tool that can enrich and open up new avenues for exploring institutional economics. According to this theory, which is still being developed, the performance of a firm – this being understood as covering different types of organizations – is determined by certain institutional arrangements which in turn play a key role in achieving collective results and impact.

This means that the volume and quality of results and, ultimately, the contribution of technology to the development of agriculture and agribusiness depend not only on the amount of funds and human resources invested, but also on the types of institutions and organizations involved in agricultural research. Thus, while technology is not neutral in terms of its impact, since it has different effects on the factors of production and the target population, producers and non-producers alike, neither are different types of organizational structure neutral in terms of their influence on development efforts.

Consequently, the organizations involved in research and technological development may have a different impact in different cases; in other words, the same levels of funding and human resources may have a greater or lesser impact, depending on what institutional arrangements and plans are involved. An institution's contribution will depend to a large extent on its decision-making processes and management methods, particularly in connection with:

- Development of methodologies and systems for disseminating in timely fashion strategic information on the social groups for which an organization is working.
- Description of the demand for technology, setting of priorities and efficient allocation of resources.
- Design and implementation of appropriate incentives, with a view to maximizing the staff's performance and contribution to achievement of the organization's purpose.
- Design of new and systems for the monitoring and exercise of power within the organization, providing for the participation of users and beneficiaries of the services provided by the organization.
- Implementation of on-going learning processes and encouraging innovation, as strategic factors in defining the basic competencies of the organization.

With this general approach, the different courses taken by organizations can be identified as they evolve. This evolution occurs parallel to changes that take place in its surroundings, rules and technologies. However, it can be either positive or negative (or regressive), the latter being the case when an organization develops or maintains a form or model that is not right for the new institutional structure and the situation of its users and their production resources.

The time has come to adopt a new paradigm, the initial characteristics and basic orientations of which

For research and technological innovation, the advent of the new paradigm – drawn along by globalization and trade liberalization, major changes in production structures, income and consumption, and a new scientific and technological revolution — might well be

have already been defined. The substantive task involves moving forward with an aggressive program of institutional and organizational transformation.

characterized as the breaking forth of new policies and rules for adjusting the role of the State and private sector organizations to the new demands of society.

The more out-of-touch institutions/organizations are with the needs of the social groups for which they work, the greater will be the likelihood that their efforts will be inadequate or unimportant, and consequently, the greater the likelihood that they will be called into question at the political and social levels. If the situation is extreme, it could, as it has in some countries, lead to the disappearance of certain research and development organizations. If there is a pressing need to adopt the new paradigm, priority might be given to undertaking the reconstruction of institutional capacities, with special emphasis on the following tasks:

a. Redefining the strategic vision and the mission of the organization;

b. Redirecting its lines of work towards new priorities;

c. Rebuilding or transforming the fundamental capacities of the organization or system;

d. Redesigning the institution's policies and rules, in line with the new paradigm.

The general feeling in the region is that the time has come to adopt a new paradigm for agricultural research, the initial characteristics and basic orientations of which have already been defined. Thus, the substantive task involves moving forward with a program of institutional and organizational transformation that will make it possible, on the one hand, to take advantage of installed capacities and, on the other, to develop new competencies. This should allow for greater participation in the distribution of the economic and social benefits of the new era, thanks to the increased adoption of knowledge in the production and processing of products, as well as in the processes and services of agriculture and agribusiness.

In fact, the cost of generating technical change will be higher in the less efficient research organizations. This is the case when the ratio between the value added of the benefits of the technology developed is very low compared with the total operating costs of the organization concerned. Thus, the cost/benefit ratio of an institution, or the social and private profitability of an organization are not consistent with the amount of resources invested in the effort. In such cases, there may be a significant disincentive to channeling further resources into the organization in question.

What this suggests is that a distinction must be made between studies of the social and private profitability of investing in certain technologies or products and studies aimed at determining *the social and private profitability of the organization per se*. This is directly related to the need to conduct more thorough studies of so-called "institutional productivity".

Types of institutional reform

Five basic types of comprehensive or partial organizational reforms have been developed in the region. The idea is not only to solve internal problems, but also to improve an institution's efficiency and ability to transmit results to those who will eventually make use of them. The reforms may be summarized as follows:

1. Reforms designed to increase an organization's capacity to "internalize" and appropriate technologies that are available at the regional or international level (spillovers) through collective action on the part of groups of organizations, going beyond the borders of individual participating countries. Some examples of this approach are cooperative research programs known as PROCIS (Programas Cooperativos de Investigación y Transferencia de Tecnología); specialized thematic or product networks; regional research funding systems organized as international consortiums (such as the Regional Fund for Agricultural Technology - FONTAGRO); initiatives carried out by a particular organization or country and directed at other countries; and advanced scientific and development centers, such as the Virtual Laboratories Abroad (LABEX) initiative carried out by the Brazilian Agricultural Research Corporation (EMBRAPA).

2. Reforms designed to improve the coordination and mobilization of national capabilities for technological innovation through the mechanism of "national systems". This institutional innovation is rarely used in the region and has been implemented in only a small number of countries. It has had a significant impact, however, since it is designed to achieve economies of scale and of scope through the joint efforts of different organizations (public and/or private) and make better use of available resources and know-how, thereby increasing the effectiveness and impact of investment in research and development.

3. Reforms designed to encourage private sector participation in financing and/or implementing agricultural research programs, usually through para-governmental resources – for example, in Colombia and Uruguay – although also through other types of cofinancing and participation. In some countries, such initiatives have fostered the establishment of private research centers, often focusing on specific products.

4. Proposals for partial or overall reform of research organizations, especially public agricultural research institutes (INIAs), with a view to improving efficiency and operating capacity. This is, without a doubt, the most prevalent category, although not necessarily the most successful. According to information gathered by the author, of a total of 21 reforms to INIAs carried out over the last eight years, only eight (38%) can be considered successful. In ten cases, the reforms did not significantly change the existing situation, and in the others, success cannot be guaranteed over the medium and long terms. Even so, there are worthwhile lessons to be learned from the successful cases which can be applied to other organizations involved in implementing changes.

5. Improvements in national policy making, generally with a view to strengthening the adoption of knowhow and technology by society, increasing funding for strategic research priorities and improving levels of institutional competence. Such policies, of course, entail defining the role and the extent of public participation in agricultural and agro-industrial research, and offering incentives to encourage the participation of other stakeholders. In the American hemisphere, there are different policy models, each of which has very important characteristics.

Clearly, there are many ways reform can be carried out. Some models can easily be replicated in different countries and organizations, while others are too specific to be easily “exportable” to other environments and circumstances.

Five reasons why institutional reform can fail

It is important to find out why some institutional reforms do not succeed. Following are five reasons which, in the author’s opinion, most often lead to the failure or postponement of reform efforts:

1. **Changes in top leadership positions.**. In many agricultural research and technological development organizations in the region, especially those in the public sector, changes in top leadership are too frequent. When institutional changes have been put underway prior to such changes in leadership, important initiatives are often delayed and sometimes even cancelled. This quickly leads to a loss of institutional memory and of valuable information on the changes proposed.

2. **A defensive corporate culture.** This is the “invisible” but efficient system of vested interests within the organization undergoing change. The corporate culture develops different strategies for ensuring that changes do not affect those involved or that existing prerogatives and power structures within the organization do not change. Reforms that are initiated from within the organization, with the participation of individuals who represent corporate interests, are less likely to succeed.

3. **Inadequate reform design.** In some cases, reforms are not adequately designed and as a result, the processes implemented hinder efforts to find a solution to the problems identified. This may be due to the requirements or prerequisites for orientation of the reform; the team of specialists proposing the new design and organizational strategy; or it may be that those responsible for giving final approval to the reform have made changes that work against could some of the most important components of the original proposal.

4. **Inadequate human and financial resources.** The mandate and legal intricacies of a reform proposal may cause some opportunities to be missed. Or the reform proposal may not include incentives for attracting human or financial resources. In some cases, the reform effort is managed in such a way as to reduce the financial commitment of one or more contributors to the organization (directly or by suggesting alternative sources of financing), which makes it more difficult to achieve success over the long term.

5. **Poor management.** Many groups in the region find it hard to understand that institutions need to rely on specialists with ample management experience who are familiar with the needs of an organization devoted to the development and application of different forms of knowledge. Management positions in research organizations are often filled by researchers at the culmination of a career in specialized fields; rarely are such posts filled by a candidate who has been through a careful selection process based on his or her management skills. Experience in the region has shown that the best researcher is not always the best manager, although it is also true that the best manager still needs input from good researchers.

A final comment concerning the path to success

With the experience gained in the region, we can point out certain factors that play a key role in ensuring the success of any institutional reform effort.

1. **A policy decision to address reform and support its implementation over time.** The decision must be clearly directed at drafting the proposal and taking further decisions to clarify specific issues relating, in particular, to the legal standing of the organization, its interaction with the national system implicitly or explicitly involved in research, and future financing of the initiative, including, if necessary, the design of adequate incentives to attract financing in addition to public financing.

2. **Selection of a team that is qualified to move forward with project preparation.** It is essential not only to identify a qualified team of consultants, but also to select a good national counterpart team, and to ensure access to information on similar experiences within and outside the country. As a general rule, and in keeping with ethical principles, it should be made very clear that members of the team responsible for designing the project will not be

eligible for management positions in the new organization, so as to avoid any bias that might work against key components of the proposal.

3. **Clarity of purpose and conceptual leadership.** This is crucial and should be based on a clear understanding of what the change is supposed to achieve. The nature of the organization must be well defined. Many proposals are based on the assumption that organizational structure (organization chart, positions or posts, etc.) and funding are the key elements to consider, but that is a shortsighted approach. Full consideration must also be given to the legal framework of the organization, which defines its sphere of action; the needs and demands of users; the existence of alternative suppliers of technology, and the services provided by the organization. In addition, the existence of an institutional complex of real or potential allies, competitors and service providers should be taken into account. Only then will it be possible to define accurately the "core business" of the organization, its real competitive advantage and hence the direction and orientation to be sought by the proposed changes.

4. **Diagnosis and assessment of alternatives.** In preparing the project, it is important not only to clearly identify the need for change, but also to diagnose and assess the situation and its implications, and to design possible alternatives (costs and benefits of each one compared with the existing situation).

5. **Confirmation of support for the proposal finally selected.** Representatives of the different social groups in which the organization will be interacting should participate in the process of change, i.e., political authorities, members of other research and technological development organizations (whether or not they are organized in National Systems), agents of private production sectors, and so-called "external sensors" (specialists in institutional strengthening and managers of organizations that have successfully implemented reforms, within or outside the country).

6. **Selection of a good management team.** The manager or director should be identified, but there must also be a management team large enough to carry out the new tasks. Of course, this team should be selected on the basis of professional criteria, and if appropriate, consideration should be given to appointing a transition team to implement the early stages and pave the way for the new management team that will be responsible for the central aspects of the new model.

7. **Design of a good plan for implementing and monitoring and/or evaluating the changes made.** Regular evaluations should be conducted of the results achieved and, in general, of the progress of reforms, in order to ensure that potential problems are identified and rectified in time.

The Latin American and Caribbean countries have a wealth of institutions that are developing technological innovations; however, their operating capacity is limited, to a large extent, by the situations mentioned above. There is a clear need, however, for a serious effort to be made to reorganize and replenish funding for research organizations, especially public ones, not only because this is crucial to attract private investment for research, but also because the future competitiveness of agriculture and agribusiness will depend on their ability to incorporate new knowledge into production processes.

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