

Héctor Medina Castro Specialist in Science and Technology, IICA Headquarters

## Modi operandi of multinational agricultural research projects

### INTRODUCTION

Globalization and the advent of multilateral trade accords afford the countries opportunities to tackle common technological challenges, which transcend their geopolitical borders. One way of tapping these opportunities is by creating ad hoc consortia of various institutions in different countries, for the purpose of implementing a multinational agricultural research project designed to achieve common objectives. (1) For operational purposes, the project can be organized in various ways. The modus operandi chosen will depend, among other things, on: 1) the technological capabilities of the institutions taking part (i.e., the stock of knowledge they possess to generate value for the project); 2) the organization of the institutions taking part; 3) the geographic area in which the institutions operate, particularly in the case of applied research; 4) the characteristics of the research that is to be carried out; and 5) the experience of the participants in sharing knowledge and interacting with one another. (2)

This article describes three different modi operandi of multinational agricultural research projects - in this case, projects implemented by the Inter-American Institute for Cooperation on Agriculture (IICA) in the western hemisphere, financed by the Regional Fund for Agricultural Technology (FONTAGRO)..

### Modi operandi of multinational projects

The first modus operandi for multinational projects could be called a centralized partnership. Under this arrangement, several national agricultural research institutes (NARIs) form a consortium with an international center or regional organization devoted to agricultural research, in order to implement a project related to an area of expertise of the center or organization: for example, if the project involved maize or wheat, they could implement it with the International Maize and Wheat Improvement Center (CIMMYT); if it concerned potato or sweet potato, it could be carried out with the International Potato Center (CIP). Under the leadership of the international center or regional organization, the consortium plans the project, secures resources for implementing it from a donor agency and establishes the intellectual property rights of the eventual results of the project. Each institution taking part contributes resources to the project, such as equipment and researchers.

The international center or the regional organization coordinates the activities of the project and, in concert with the participants, allocates the resources provided by the donor - for example, for the purchase of inputs, consultants' fees, travel expenses and the production of publications. The consortium members also implement tasks in line with the project objectives, the plan of activities and their respective areas of expertise. This helps avoid the duplication of activities. They also share information with each other, either electronically or at meetings of the professionals involved. In particular, the international center or regional organization uses its intellectual capital (3) to conduct specific tasks and furnish the other consortium members with knowledge that is incorporated into its products (e.g., improved seed) or separate from them (certain processes, for example) (4)

The second modus operandi of multinational research projects, which could be called a decentralized partnership, is one in which the participants are usually national research institutions - i.e., those that operate only in a single country. Under this arrangement, the consortium members plan activities to achieve common objectives, establish the intellectual property rights of the eventual results of the project, contribute resources and allocate the

funds provided by the donor. One of the institutions involved, in concert with the rest, coordinates the project activities and allocates the donor's resources, pursuant to an established plan. Under this modus operandi, the institutions also contribute their intellectual capital for specific tasks and share knowledge and information with each other.

A third modus operandi, a bipolar partnership, is an amalgam of the two already described. Under this arrangement, the participants are NARIs and international research centers or regional organizations. As in the previous cases, activities are planned with a view to achieving common objectives, resources provided by a donor are allocated to the project and the consortium members undertake specific tasks and share knowledge and information. As under the first type of arrangement, the international centers and/or regional organizations taking part use their particular intellectual capital for specific tasks under the project and share their knowledge with the other institutions. In contrast with centralized partnerships, however, one of the NARIs, in concert with the rest, coordinates the activities and the allocation of the resources provided by the donor.

There are, of course, any number of ways of organizing and managing multinational research projects. However, nearly all the projects described in this article use one of the three modus operandi described.

## First generation of FONTAGRO projects

FONTAGRO is a consortium that fosters multinational agricultural research, mainly in Latin America and the Caribbean, through the competitive financing of multinational research projects. The projects financed by FONTAGRO are implemented by consortia of national and international institutions that conduct research in one of the areas that the Fund regards as priorities. In 1998 FONTAGRO announced its first call for projects. Table 1 shows details of the 12 projects that received financing and the institutions that make up each consortium. The Fund provides partial financing for each project, specifically for equipment and materials, consultants' fees, the travel expenses of the personnel involved and the dissemination of results (FONTAGRO, 1998).

**Cuadro 1. Proyectos que obtuvieron financiamiento del FONTAGRO en la primera convocatoria.**

<b>PROYECTOS</b>	<b>OBJETIVOS</b>	<b>PARTICIPANTES</b>
1- Development, poverty and environmental degradation in Latin	To enhance the capabilities of countries in the region, in particular their agricultural technology innovation systems, for designing strategies and policies aimed at reducing rural poverty and improving natural resource management.	1- RIMISP, Chile 2- INIA, Chile 3- GRADE, Peru 4- CORPOICA, Colombia 5- INTA, Argentina 6- GIA, Chile 7- CIES, Venezuela 8- Universidad de Caldas, Colombia 9- CIP, Ecuador
2- Maize, genetic resistance to insects and diseases in tropical environments in South America	To assess the distribution and incidence of corn earworm, rust caused by <i>Phaeosphaeria</i> , leaf spot caused by the SCMV and the MRFV; determine the economic impact of these pests in the maize-producing countries participating in the South American Maize Program	1- INTA, Argentina 2- IBTA, Bolivia 3- CORPOICA, Colombia 4- INIAP, Ecuador 5- INIA, Perú 6- FONAIAP, Venezuela 7- CIMMYT, México 8- CIAT, Colombia
3- Development of sweet potato products in Latin America	To develop new products and uses for sweet potato, to meet the latent demand and foster higher production, by means of better and broader links among agricultural research, the private sector and the end user of the results	1- INTA, Argentina 2- ISA, República Dominicana 3- FONAIAP, Venezuela 4- INIA, Perú 5- UNALM, Perú 6- IIN, Perú 7- CIP, Perú
4- Selection and utilization of disease-resistant potato varieties for industrial processing in Latin America	To make potato production in Latin America more competitive and sustainable, by identifying, evaluating and using improved and native germ plasm with specific qualities for industrial use.	1- INTA, Argentina 2- FONAIAP, Venezuela 3- INIA, Chile 4- Universidad Nacional, Colombia 5- CORPOICA, Colombia 6- CIP, Perú 7- PROINPA, Bolivia
5- Competitive maize-producing zones in Central America	To identify zones in countries in the Central American region that could potentially attain high, competitive and sustainable levels of productivity for maize, through the application a set of	1- CIMMYT, Costa Rica 2- IDIAP, Panamá 3- MAG, Costa Rica 4- INTA, Nicaragua

	agricultural technologies and policies.	
6- Use of the genetic resources of papaya for breeding and promotion	To organize, strengthen and integrate regional efforts to address the main constraints to papaya growing, in order to make the production of small- and medium-scale producers viable and promote the industrial potential of papaya.	1- FONAIAP/UCV/ CNCRF/IVIC, Venezuela 2- Universidad de Caldas, Colombia 3- Universidad Nacional Medellín, Colombia 4- CIAT/CORPOICA, Colombia 5- Universidad de Costa Rica 6- Universidad de Ambato, Ecuador 7- CIRAD, Francia 8- IPGRI, Colombia
7- Research on extension in Latin America and the Caribbean	To generate suggestions and proposals for strengthening agriculture through the modernization of extension and technical assistance services, using institutional models, and operating methodologies and strategies, relevant to the current situation and the situation in the foreseeable future.	1- IICA, Colombia 2- PRONATTA, Colombia 3- FEDERACAFE, Colombia 4- INTA, Argentina 5- MAG, Costa Rica
8- Integrated pest management in Andean fruit crops	To improve the living conditions of rural families, through the effective management of the main pests and diseases of Andean fruit crops, to enhance the sustainability of production and the protection of the environment.	1- CORPOICA, Colombia 2- INIAP, Ecuador 3- FONAIAP, Venezuela
9- Genetic characterization of populations of <i>Nothofagus obliqua</i>	To evaluate the genetic variability of roble and rauli, through the use of molecular (RAPDs, cpADN) and isoenzymatic markers to help set criteria for conservation, genetic improvement, reforestation and forest management and use.	1- INIA, Chile 2- INTA, Argentina
10-Development of technologies for the integrated management of fusariosis of wheat spike	To develop and validate disease management strategies that are compatible with the policy of sustainable agricultural development at the regional and country levels. The main objective is to contribute to the food security of the consumers of wheat produced in the region, by reducing the effects of fusariosis of wheat spike on the stability of yields, and to guarantee satisfactory health levels by reducing mycotoxin content.	1- INTA, Argentina 2- INIA, Uruguay 3- DIA/IAN, Paraguay 4- CIMMYT
11-Characterization and development of germ plasm to improve the industrial quality of wheat in the Southern Cone	To contribute to the development of germ plasm and varieties of wheat of a higher industrial quality, to make cultivation more competitive in the Southern Cone and make more food available in the region.	1- INIA, Uruguay 2- INTA, Argentina 3- INIA, Chile 4- DIA/IAN, Paraguay 5- CIMMYT
12-Commercial and financial globalization, economics blocs and agriculture: technological scenarios	To facilitate and make resource allocation for technological research and development in the countries of the hemisphere more efficient, contributing knowledge on: a) the role of agriculture in the Americas, b) the competitiveness of the countries, and c) Alternative scenarios of changes in the conditions of international trade.	1- IFPRI, Estados Unidos United States 2- IICA, AC en Colombia CA in Colombia
<p>* <b>Acronyms:</b> CIAT: International Center for Tropical Agriculture. CIES: Economic and Social Research Center (Venezuela). CIMMYT: International Maize and Wheat Improvement Center. CIP: International Potato Center. CIRAD: Center for International Cooperation in Agricultural Research for Development. CNCRF: National Center for Plant Genetic Resource Conservation (Venezuela). CORPOICA: Colombian Agricultural Research Corporation. DIA: Directorate of Agricultural Research (Paraguay). FEDERACAFE: Colombian National Coffee-growers' Federation. FONAIAP: National Agricultural Research Fund (Venezuela). GIA: Agricultural Research Group (Chile). GRADE: Analysis for Development Group (Peru). IAN: National Agronomic Institute (Paraguay). IBTA: Bolivian Technology Institute. IDIAP: Agricultural Research Institute of Panama. IFPRI: International Food Policy Research Institute. IICA: Inter-American Institute for Cooperation on Agriculture. IIN: Nutrition Research Institute (Peru). INIA: National Agricultural Research Institute (Peru). INIA: National Agricultural Research Institute (Chile). INIA: National Agricultural Research Institute (Uruguay). INIAP: Autonomous Agricultural Research Institute (Ecuador). INTA: National Agricultural Technology Institute (Argentina). INTA: Nicaraguan Agricultural Technology Institute. IPGRI: International Plant Genetic Resource Institute. ISA: Higher Institute of Agriculture (Dominican Republic). IVIC: Venezuelan Scientific Research Institute. MAG: Ministry of Agriculture and Livestock (Costa</p>		

Rica). PROINPA: Potato Research Program (Bolivia). PRONATTA: National Agricultural Technology Transfer Program (Colombia). RIMISP: International Network on Methodologies for Research on Production Systems (Chile). UCV: Central University of Venezuela. UNALM: La Molina National Agrarian University (Peru). Fuente: Secretaría Técnica del FONTAGRO, 1998 / Source: Administrative Technical Secretariat of FONTAGRO, 1998.

The projects selected in the first call for bids were financed by FONTAGRO with resources from the Inter-American Development Bank (IDB), which also entered into an agreement with IICA under which the latter was to manage the implementation of the successful projects. Under this agreement, the consortia that received financing were to implement the project and report to IICA, which, on behalf of the IDB, was to: i) transfer the Bank's funds to the projects, ii) ensure that the resources handed over were used for specific, eligible components, and iii) monitor implementation of the activities proposed in the projects submitted to FONTAGRO and that form part of the agreement between the IDB and IICA. (5)

## Modus operandi of FONTAGRO projects

### 1. Centralized partnerships

The first six projects listed in Table 1 operate under this arrangement; the international center or regional organization that coordinates the project is shown in bold. (6) To implement these six projects, IICA signed a contract with the corresponding coordinating center or institution, which pledged to implement the project in line with the proposal presented to FONTAGRO. The terms of this contract are based on the agreement between IICA and the IDB. (7)

Figure 1 shows the modus operandi of these six projects, using as an example the project Competitive maize-producing zones in Central America (project 5 in Table 1). The consortium implementing this project comprises CIMMYT (the technical leader and coordinator of the project), the Nicaraguan Agricultural Technology Institute (INTA), the Ministry of Agriculture of Costa Rica (MAG) and the Agricultural Research Institute of Panama (IDIAP).

Proyecto: Zonas competitivas de Producción de Maíz en América Central  
Project: Competitive maize-producing zones in Central America

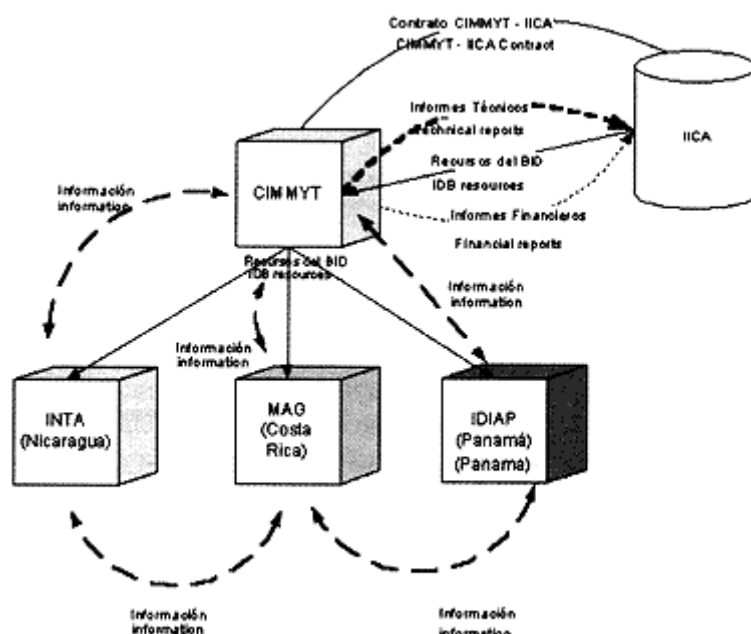


FIGURA 1. Ejemplo de "Asociación Centralizada"  
FIGURE 1. Example of a "Centralized Partnership."

The contract between CIMMYT and IICA establishes, in particular, the terms under which the IDB funds are to be transferred to cover specific project components. As can be seen in Figure 1, IICA transfers these resources to CIMMYT, which then submits financial reports to IICA detailing how the resources were used, and technical reports on the status of the project.

CIMMYT also coordinates the project activities, allocates the IDB resources to the project and distributes them among the consortium members (INTA, MAG and IDIAP), that are implementing the research activities. As was explained in the description of this

arrangement (section 2), all the consortium members share information relevant to the implementation of the project (dotted lines in Figure 1). CIMMYT, in particular, develops methodologies and shares them with the other consortium members, which apply them to achieve the desired results.

## 2. Decentralized partnership

Two projects operate under this arrangement: a) Integrated pest management in Andean fruit crops, coordinated by the Autonomous Agricultural Research Institute (INIAP), of Ecuador; and b) Genetic characterization of *Nothofagus obliqua*, coordinated by the National Agricultural Research Institute (INIA) of Chile (see projects 8 and 9 in Table 1).

Figure 2 shows the modus operandi of the first of the two projects mentioned. The members of the consortium implementing it are the Colombian Agricultural Research Corporation (CORPOICA), the INIAP of Ecuador and the National Agricultural Research Fund (FONAIAP) of Venezuela. The consortium members plan the activities and allocate the resources provided by the IDB and by the institutions themselves. INIAP, in concert with the other two institutions, coordinates the project activities and the allocation of the resources from the IDB.

IICA signed a letter of understanding (contract) with each of the national institutions for the purpose of implementing this project. This letter contained guidelines for disbursing the IDB funds and monitoring their use, pursuant to the project proposal submitted to FONTAGRO. As Figure 2 shows, the members of the consortium present financial reports to IICA on the use of the IDB funds. The coordinating institution (INIAP) is responsible for presenting consolidated financial reports on the project to IICA, as well as technical reports on progress in the implementation of project activities, which are described in the proposal presented to FONTAGRO (dotted line in Figure 2). Lastly, the participating institutions implement activities and exchange information relevant to the implementation of the project (dotted lines in Figure 2).

## 3. Bipolar Partnership

This is the modus operandi of the following projects: a) Development of technologies for the integrated management of fusariosis of wheat spike, coordinated by the National Agricultural Technology Institute (INTA) of Argentina; b) Characterization and development of germ plasm to improve the industrial quality of wheat in the Southern Cone, coordinated by the National Agricultural Research Institute (INIA) of Uruguay; and c) Commercial and financial globalization, economic blocs and agriculture: technological scenarios, which is coordinated by IICA. (8) (See projects 10, 11 and 12, in Table 1.)

For example, in order to implement the first of these three projects, the one dealing with fusariosis of wheat spike, IICA signed letters of understanding (contracts) with all the institutions of the consortium - the National Agricultural Technology Institute (INTA) of Argentina, the Directorate of Agricultural Research (DIA)/National Agronomy Institute of Paraguay, the National Agricultural Research Institute (INIA) of Uruguay, and CIMMYT. These letters of understanding set forth specific guidelines on the disbursement of the IDB funds for the activities described in the project proposal presented to FONTAGRO, in accordance with the terms of reference contained in the agreement signed between IICA and the IDB. The institutions submit reports on the use of such funds to IICA. INTA coordinates the activities of the projects, allocates the IDB funds, in concert with the other participants, and submits technical reports to IICA on the progress of project activities. CIMMYT carries out specific tasks in keeping with its technological capabilities, and shares knowledge with the other participants, which also conduct research and exchange relevant information with one another.

## Comments on the operation of the FONTAGRO projects

In the centralized partnership, the technical and administrative coordination of the project are the responsibility of the same institution. Therefore, decisions tend to be centralized. (9) However, this makes it possible to distribute tasks in accordance with the areas of competence of the participants, allocate resources and coordinate efforts in order to achieve common objectives, taking advantage of any cases in which the stock of knowledge, infrastructure or the environment of the members of the consortium implementing the project complement one another, as well as any economies of scale or scope that may arise.

In the decentralized partnership, the NARIs participating in the project enjoy a relatively high degree of autonomy in implementing their activities (and budgets). However, they must find ways to work together, distribute tasks and avoid the duplication of activities, and, in this way, concentrate their efforts on achieving common objectives aimed at ensuring that as many overall social benefits as possible are obtained in the countries of the participating NARIs, as a whole. (10)

The bipolar partnership allows the international centers participating in the project to implement specialized tasks that complement those of the other participants. At the same time, since the process of making technical decisions is somewhat decentralized, the participating NARIs enjoy a level of autonomy that encourages the project's researchers (Economic Intuition, 2001) initiative to harmonize and concentrate efforts with the international centers, with a view to achieving the proposed common objectives.

## Conclusions

In the last two modi operandi of multinational research projects mentioned, decisions tend to be decentralized. In these cases, regional cooperation agencies (such as IICA) and cooperative programs (such as PROCIANDINO and PROCISUR) have an opportunity to support the management of such projects, contributing their organizational capabilities and their alliances, and to ensure that the efforts of the participants are harmonized and concentrated on achieving common objectives.

It is still too early to determine all the advantages and disadvantages of the different modi operandi considered. The idea of implementing multinational agricultural research projects via consortia of institutions that prepare project proposals, compete for funding and implement the projects is relatively new in Latin America and the Caribbean. However, based on the implementation of the FONTAGRO projects, a factor that seems to have a positive impact on the efficiency with which multinational projects are implemented, in addition to technological capability, is the experience of the participating institutions in exchanging knowledge and working together to conduct research..

## Bibliographical References

*Economic Intuition*. Keeping Ideas Mobile, Spring 2001.

*FFONTAGRO (Regional Fund for Agricultural Technology)*. 1998. Manual of operations. Washington, D.C.

*Gijsbers, G; Contant, R. 1996*. Regionalization of Agricultural Research: Selected Issues. Briefing paper N.o 28. The Hage, ISNAR (International Service for National Agricultural Research).

*Medina Castro, H. 2001*. Per Capita Income Growth and the Nature of New Technologies: Implication for Agricultural Research. *ComunIICA Magazine* 4(15).

*Milgrom, P; Roberts, J. 1992*. Economics, Organization and Management. New Jersey, Prentice Hall.

*Salles-Filho, S; Bonacelli, MB; Zackiewics, M; Valle, M. 2000. Desafios tecnológicos para a agricultura na América Latina e Caribe. Campinas, BR, Universidad Estadual de Campinas.*

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1 These refers to a general objective, and often to several specific objectives linked to the first.

2 Some of these factors, such as technological, organizational and relational capabilities are described in Salles-Filho et al. (2000)

3 "Intellectual capital" means knowledge that generates value and is useful for implementing the project (see Medina Castro, 2001).

4 Certain general aspects of this method are described in Gijbsbers and Contant, 1996. In this article they are dealt with in greater detail.

5 At IICA projects are managed by a General Coordinating Office and several Institute units, depending on the geographic area in which the projects are implemented, particularly the Cooperation Agencies (CA) in Chile and Costa Rica, the Cooperative Program for the Development of Agricultural Technology in the Southern Cone (PROCISUR) and the Cooperative Agricultural Research and Technology Transfer Program for the Andean Region (PROCIANDINO), both under the aegis of IICA. PROCISUR and PROCIANDINO administer projects related to their sphere of action, in conjunction with the IICA CAs in Uruguay and Colombia, respectively.

6 The coordinators of the first six projects are, respectively, RIMISP, CIMMYT, the CIP, the CIP, CIMMYT and IPGRI.

7 Project 7, Research on extension in Latin America and the Caribbean, also operates under this arrangement; however it is coordinated directly by IICA

8 This project is not exactly bipolar because the coordinating institution is not a NARI, but the modus operandi of the project is closer to the bipolar type than to the other two considered in this article.

9 According to Migrom and Roberts (1992), a centralized decision is made at a higher level and, in turn, communicated to the participants in the implementation of the project. The higher level may be: a) an individual empowered to make the decision (for example, the coordinator of the project), or b) the group of researchers participating in the project, which make decision jointly. Decentralized decisions are those made by the participants in the project on an individual basis. In general, in the case of projects, both centralized and decentralized decisions are made in allocating resources and carrying out activities.

10 This is so because it is expected that synergies will develop in a multinational project, in the sense that the sum of the expected national benefits (those which would be obtained when each member of the consortium implements the project with a view to maximizing the national benefits) is less or equal to the expected overall benefit, the one that would be obtained in the participating countries, as a group, when the members of the consortium implement activities together and in a coordinated fashion to achieve, efficiently, the proposed common objectives.