Agricultural Research and Innovation Regional and Global Forums

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Abstract:

Supranational initiatives to promote agricultural research and innovation have been under way for many decades and continue to interest countries and national and international organizations. This manuscript sets out to describe and analyze the characteristics and purposes of a subset of these initiatives – the Regional and Global Agricultural Research Forums, as well as their prospects for the future. In addition, it presents an in-depth study of one such forum, the Forum for the Americas on Agricultural Research & Technology Development (FORAGRO). The general analysis of the Forums was mainly based on secondary information obtained from the Internet and also on interviews with their managers. The findings from FORAGRO derives from two complementary studies conducted in 2015 and 2016, one oriented to diagnose the status of FORAGRO, and the other concerned with the proposition of a plan for its restructuring. FORAGRO was analyzed throughout official documents, a web-based questionnaire answered by more than 35 stakeholders from various countries in the Americas and several interviews with members of FORAGRO’s Executive Committee. The main findings were discussed in the context of recent trends and conceptual evolution in agricultural RDI domain. The analysis of Regional and Global Agricultural Research Forums and particularly of FORAGRO show their disconnection from innovation systems approach (and of productive and value chains concepts) and their feeble recognition of the gradual weakening of the role of public research and the strengthening of the leading role played by private research. As a consequence, there is a quasi-absence of non-research – particularly from industry and producers – and non-agrarian centered agents in these Forums, which block a more innovation-driven perspective and threatens their high potential to influence RDI agendas. A complete rearrangement of the regional and global agricultural Forums, taking into account systems of innovation approaches, is needed in the near future to redeem their original focus as a place where interconnections among stakeholders may occur and evolve.

Keywords: Agricultural Innovation System (AIS), Research, Development and Innovation (RDI), Regional and Global Forums

1. Introduction

A movement to create Regional Forums on agricultural research began in various parts of the world in the mid-1980s. Continental and regional initiatives by public organizations and private nonprofits in Africa, the Middle East, the Caucasus, Southeast Asia and the Far East led to the institutionalization of six agricultural R&D forums that promote agricultural research and pursue a common research agenda among countries. Over time, the focus on R&D has extended to R&D and innovation (RDI).
Besides the six regional forums, in 1996 the Global Forum on Agricultural Research (GFAR) and GCARD - a global conference on agricultural research -, were created. GFAR defines itself as “a global platform for agri-food research and innovation. We represent organizations working across the world in scientific research, education, rural extension and advisory services; business and enterprise; international development agencies; and farmers’ and civil society organizations.”

GFAR endeavors in various ways to be a sort of forum of forums, seeking to restore the leading role played in world agricultural research by international and national agricultural research institutions.

The main stakeholders that supported these associations are national agricultural research organizations, regional institutions involved with funding and promoting economic and agricultural development, and international agricultural research centers (IARCs).

Another initiative, this time more recent, dating from 2012, is the Tropical Agriculture Platform (TAP), which is linked to the Food & Agriculture Organization (FAO) and promotes capacity building and innovation in agriculture to boost development in less developed countries.

As can be seen, supranational initiatives to promote agricultural research and innovation have been under way for many decades and continue to interest countries and national and international organizations.

This manuscript sets out to describe and analyze the characteristics and purposes of the regional and global agricultural research forums, as well as their prospects for the future. It discusses their motivations, composition, governance structure, funding, modus operandi, and capacity to act as drivers of sectoral agricultural RDI systems.

From the empirical standpoint, the paper presents an overview of the agricultural RDI forums in operation today worldwide and an in-depth study of one such forum, the Forum for the Americas on Agricultural Research & Technology Development (FORAGRO). The findings outlined here are the results of a study conducted in 2015 and 2016 for FORAGRO.

The paper is organized as follows. The next section briefly presents the main concepts involved in agricultural RDI, especially the innovation systems approach, emphasizing sectoral RDI systems and their use in studying the organization of research and innovation in agriculture. Section 3 outlines the methodology used in the study. Section 4 presents the main findings and a case study of FORAGRO. The last section presents conclusions and highlights the forums’ potential to promote sectoral RDI systems.

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1 For details see: http://www.gfar.net/
2 IARCs are agricultural research institutions located in various countries and in operation since the late 1950s. Their main remit is to develop and disseminate genetic material and new varieties for less developed countries. They were especially important in the movement that became known as the Green Revolution, organized by the US government, the World Bank, and the Ford, Rockefeller and Kellogg Foundations in the 1950s and 1960s. Currently there are 15 IARCs located in several countries. The IARCs are linked to the Consultative Group on International Agricultural Research (CGIAR), a body that was strongly supported by the World Bank and acted as the main coordinator of agri-genetic research in less developed countries for about four decades. For details see http://www.cgiar.org/about-us/research-centers/
2. Prior Literature

This review of the literature is organized in two parts. The first part addresses recent trends in the organization of RDI in agriculture, emphasizing the gradual weakening of the role of public research and the strengthening of the leading role played by private research in an increasingly diverse and complex agricultural RDI environment.

The second part discusses the approaches used by agricultural RDI systems. The term “approaches” in the plural is used precisely because a set of similar concepts has been applied by authors who took more than a decade to use the concepts and indicators that had already become classical in the national and sectoral innovation systems literature. Until very recently the discussion of systemic organization in agricultural RDI was confined to the agrarian world and ignored the concepts used in the literature on policy, management and economics in science, technology and innovation such as the concepts disseminated by the OECD since the beginning of the 1990s (OECD, 1992).

The organization of RDI in agriculture

The institutions implemented in the second half of the twentieth century to foster research and technological diffusion in agriculture are in crisis (OECD, 2012). The global structure of international organizations dedicated to agricultural research created in the 1950s, 1960s and the 1970s had been considered the focal point of the so-called Green Revolution for decades. Since the beginning of the 2000s they have been losing their centrality in the international arena of scientific and technological development.

The same can be said of national agricultural research institutes (NARIs), once considered the most important centers of agricultural research within countries (Ruttan, 1990). Today these organizations do not play the same central role they used to play. This is true for both developed and emerging economies.

Analyzing the case of agricultural research in the United States, Fuglie & Toole (2014) point to the stagnation of funding for public research, the increase in private research efforts, and the emergence of new institutional models in both public and private organizations. According to these authors, private investment in agricultural research in the US more than tripled in real terms between 1960 and 2010. RDI was concentrated in seeds and biotechnology, evidently alongside pesticides and farm machinery, historically the typical research areas favored by large corporations.

For an idea of the numbers involved, the authors show that private investment in biological inputs rose from less than 5% of total investment in the early 1980s to more than 50% in the 2000s. Today it accounts for an even larger share of the total, as shown by Pardey et al. (2016). There is a new division of labor between the public and private sectors, with private companies playing a role previously assigned to public research, as in the case of genetic improvement and production of seeds for varieties of commodities.3

According to Fuglie et al. (2011), in 2009 the top four companies in the

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3 We mention varieties of commodities to distinguish them from hybrid corn and seeds of vegetables, which have always been developed by seed companies.
agricultural input sector accounted for more than 50% of global markets in seeds of commodities, pesticides, animal health products, farm machinery, and animal genetics. It can be said that since the start of the twentieth century the agricultural research model closely tied to national public research institutions and international centers such as the IARCs mentioned earlier has given way to a new model in which RDI by large corporations predominates.

Pardey et al. (2016) show that this change in the relations between public and private research is even more evident when high-income and low-income countries are compared. In the authors’ own words:

“in 2011, for every dollar of private AgR&D spent in high-income countries, a meagre 0.8¢ was spent in low-income countries. Moreover, whereas private firms in rich countries spent $1.10 for every public AgR&D dollar in 2011, the comparable private investment in poor countries was 15¢” (Pardey et al., 2016).

Another important finding by these authors is that for the first time in over 50 years of investment in public agricultural research, medium-income countries are investing more than high-income countries. They point to two concurrent movements: an increase in public research compared with private research in countries like India and China, and a decrease in the relative importance of public research alongside an increase in the importance of private research in high-income countries.

Traditional research organizations are looking for new spaces, although it is not yet clear what spaces these are, as shown by several authors (David et al., 2000; Fuglie et al., 2011; Fuglie & Toole, 2014; Joly et al., 2016; King et al., 2012; Pardey et al., 2016; Salles-Filho & Bin, 2014). Public-private cooperation has been the response in various countries, including the US, as shown by Fuglie & Toole (2014), but no new models are identifiable so far.

Authors such as Atkinson et al. (2003) attribute this growth in private research in life sciences to changes in technology intellectual property (IP) rights. While both the public and private sectors protect IP rights to their developments, only corporations really use IP commercially.

The fact is that there is a new complexity in the ways research and innovation are done in agriculture (Larédo & Mustar, 2004; Salles-Filho & Bin, 2014). It is true that other knowledge areas and economic sectors had already undergone similar changes in RDI arrangements. Contributions such as those of Åström et al. (2008), Edquist (1997), Larédo & Mustar (2004), Lundvall (1992), Nelson (1993) and Senker (2000) showed the importance of analyzing how public organizations and private nonprofits were repositioning themselves in general, as were the other actors in RDI systems, such as universities and training centers.

The changes in agricultural research may have been more impactful because in the recent past there has been a change in protagonism that has left major research organizations such as those of the Latin American and European countries without compass, while the IARCs and CGIAR continue seeking ways to reposition themselves in the international research arena.
**Innovation systems and agricultural research and innovation systems**

Since the early 1990s there has been a great diversity of authors and approaches dedicated to developing the concept of innovation systems, primarily in regard to national systems. Authors such as Lundvall (1992), Nelson (1993) and Edquist (1997) studied the structure and content of national innovation systems (NIS). They all agree that while there is no such thing as the “ideal” NIS structure, improvements to the effectiveness and performance of the systems depend on two factors: (i) alignment of interests and coordination between organizations and public and private institutions; and (ii) controlled exposure to global competitiveness.

The first point refers to the presence of R&D entities, companies, government and appropriate legal frameworks interacting in a more or less aligned manner. The second relates to competitive stimuli, which only the external market can bring to bear on these systems as determining factors.

Despite its generic nature, analysis of the innovation system approach can be carried out either in vertical or crosscutting perspective. Innovation Systems can be national; local/regional; sectoral; and/or technological. Although national, regional and sectoral approaches can be used independently, they can also be employed as complementary concepts, since in practice they usually influence each other.

While “(...) an innovation system is made up of elements and relationships that interact in the production, promotion and use of new and economically useful knowledge (...), a national system comprises elements and relationships located within or deeply rooted in the borders of a national state” (Lundvall, 1992). A broader perspective defines innovation systems as “(...) all-important economic, social, political, organizational, institutional and other factors that influence the development, diffusion and use of innovations” (Edquist, 2005, p. 183).

Sectoral innovation systems are “(...) a group of new products already established for specific uses and the group of players which carry out market and non-trade interactions for the creation, production and sale of these products. Sectoral systems have a base of knowledge, technologies, supplies and demand. Agents are individuals and organizations at several levels of aggregation with specific learning processes, competences, organizational structure, beliefs, objectives and behaviors. They interact through communication, exchange, cooperation, competence and command processes and their interactions are made up of institutions” (Malerba, 2002).

These concepts have been used to analyze the most diverse situations and to identify agents, relations among agents, and interaction dynamics. They all assume the presence of various categories of stakeholders and their relations, with a sort of well-balanced relationship among research, markets, regulation, and other institutions with a role in driving innovation.

As the objective of this manuscript is not to present an updated review of the literature of innovation systems - and similar concepts -, suffice it to say that the literature of research and innovation policy and economics of agriculture – with few exceptions – has evolved in a more or less isolated trajectory.

As shown below, although those concepts on the systemic view of RDI have been used for practically all sectors and national development models, agriculture
lagged behind in including them in its analyses (Klerkx et al., 2012; Turner et al., 2016).

That inward-looking trajectory can be seen in the reports prepared by policy institutions such as the Organization for Economic Cooperation & Development (OECD, 2012 and 2013), the World Bank (2006, 2008, 2012) and the European Commission (2016), and particularly the documents from the CGIAR, as it is shown below in this manuscript.

System thinking is not new in agriculture. It dates from the 1950s, even before the advent of innovation system approach. According to Klerkx et al. (2012), five shifts in theoretical perspectives on agricultural innovation can be identified: (i) starting in the 1950s, research using the input-output matrix that pointed to an integrated view of agriculture and the concept of agribusiness; (ii) the diffusion of innovations and technology transfer, central since the 1960s; (iii) early farming systems research, starting in the 1970s and 1980s; (iv) agricultural knowledge and information systems (AKIS) in the 1990s; and (v) agricultural innovation systems (AIS) since the 2000s. Other similar historical perspectives may also be found in the literature, emphasizing such concepts as filières and Agricultural Complexes, to mention only two (Pope, 2012; IICA, 2013).

According to an OECD conference on AKS (OECD, 2012),4 AKS could be a relevant approach to identify differences in research systems across countries and regions. This concept addresses systemic network problems, although it focuses more on research and diffusion of technologies than innovation.

As can be noted, none of these concepts, particularly the more recent, have been based on the notion of systems of innovation. For instance, a quick look at the references to the main documents produced by the World Bank and the CGIAR reveals an almost complete absence of the literature on STI policy, economics and management.

Furthermore, the documents produced by the organizations involved in agricultural research and innovation show a striking disconnect from the new organizational reality of agricultural research, now far more centered on private investment and independent of the international and national research centers.

As noted by Salles-Filho & Bin (2014), not one of the more than 50 references at the end of CGIAR’s 2011 strategy document can be considered to belong to the vast field of social studies in science and technology, “including the sociology of science and innovation, the economics of technology and innovation, or even science and technology policy” (Salles-Filho & Bin, 2014).

Intellectual isolationism has prevented enrichment of the discussion of agricultural research and innovation by the vast treasure of ideas and concepts that have been developed and applied, especially concepts such as national, regional and sectoral systems of innovation. This aspect will be analyzed below with regard to the regional and global agricultural RDI forums.

We argue that the use of such concepts as systems of innovation, be it from the sectoral, national or regional viewpoint, can assist the organization and effectiveness of global and regional forums inasmuch as it permits a more

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4 The OECD Conference on Agricultural Knowledge Systems (AKS) held in Paris in June 2011 discussed experiences, approaches to AKS, and how to foster development and adoption of innovation to meet global security and climate change challenges.
comprehensive view of the stakeholders, policies, strategies and modus operandi involved in the dynamics of research and innovation in agriculture, thereby surmounting the dichotomy between generation and diffusion that has always oriented the organizational logic of agricultural research.

The next section presents the methodology used to characterize and analyze the global and regional RDI forums, highlighting the case of FORAGRO.

3. Methodology

In 2015 and 2016 the Inter-American Institute for Cooperation on Agriculture (IICA) commissioned two studies to review the functions and organization of the Forum for the Americas on Agricultural Research & Technology Development (FORAGRO). The first study diagnosed the status of FORAGRO, and the second proposed a plan for its restructuring. The two studies were linked and complementary.

The core motivation of IICA was the necessity of analyzing the effectiveness of FORAGRO as a promoter of common agricultural research and innovation agendas among countries in a hemispherical perspective (the Americas) and to propose changes in its organizational model, including governance, stakeholders’ commitments, and financial and institutional sustainability.

Apart from a comprehensive review of the literature on the organization of agricultural research, FORAGRO was analyzed through official documents, a web-based questionnaire answered by more than 35 stakeholders from various countries in the Americas and several interviews with members of FORAGRO’s Executive Committee, for a total of more than 20 interviews. It is important to mention that respondents were mostly involved with research and policy organizations, either national or international. There were very few representatives of producers, and none of suppliers of inputs, processing industry and other members of the productive chain.

Regarding the analysis of all other forums mentioned in the Introduction, this was mainly based on secondary information obtained from the Internet including websites, reports, articles and general documents. In addition, managers of three of the other agricultural research forums were interviewed by telephone, particularly those of Africa (FARA), the Caucasus (CACAARI), and the Global Forum (GFAR).

Complementarily, a broad search for other types of organizations that operate directly or indirectly with regional or international cooperation in agricultural research and innovation was also performed. Some 75 such organizations were identified worldwide, besides those mentioned here, all of them dedicated to cooperation and diffusion in RDI, reflecting the growing interest in this activity.

All this material was the basis for two reports, one with a diagnosis and the other with a proposal for the restructuring of FORAGRO. Both were discussed at two events attended by more than 50 experts and stakeholders. The first event took place in Brasilia on November 2015, and the second in Turrialba, Costa Rica, in November 2016.

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5 The reasons why respondents had such a bias are twofold: a) FORAGRO has a historical institutional base on research and research policy organizations; b) very few potential respondents from other kind of organizations are aware of FORAGRO.
Owing to the characteristics of FORAGRO, the studies were exploratory and
descriptive, an approach that seemed best suited to provide initial knowledge
about the topic or research problem (Richardson, 1989; Gil, 1997). Data
treatment and analysis were organized so as to interpret, explain and categorize
the materials collected with a view to answering the questions posed. Data
analysis consisted of a recombination of the evidence collected in order to
clarify, verify and refute the initial questions of the study (Yin, 1987).

4. Results and discussion

To support the general discussion of this paper on the role of forums for
cooperation in agricultural RDI and the potential for applying the innovation
systems approach in the context of these forums, we present the results in two
parts, starting with a brief characterization of global and regional agricultural
RDI forums. This is followed by a case study of FORAGRO that examines its role
and the prospects for influencing agricultural RDI in the hemisphere through this
forum.

Agricultural RDI forums

Appendix 1 presents an overview of the regional agricultural RDI forums, the
Global Forum (GFAR), and the Tropical Agriculture Platform (TAP).

A consolidated analysis of the forums shows that their main forms of action are
as follows: (i) defining a strategic vision and a common research agenda; (ii)
sharing knowledge and information among their members; (iii) extending the
technical capabilities of stakeholders; (iv) attracting investment in research and
innovation (advocacy).

Secondarily, some forums also take action with the following aims: (v)
prospecting for priority themes of RDI; (vi) defining and implementing
programs, networks and specific projects; (vii) promoting technology transfer;
(viii) issuing publications; (ix) seeking funding for members; (x) assuring
accountability to specific stakeholder groups; (xi) training in technical areas.

Generally speaking, it can be seen that the forums’ activities are broad in nature,
target different stakeholders, and could perfectly well use systemic approaches
such as sectoral, regional and even national innovation systems.

With regard to forms of membership and governance structure, the forums
have very similar structures. Typically there is an assembly, a steering
committee, and an executive secretary. In all cases the steering committee
comprises representatives of donors and development funding organizations.
Another point worth highlighting is the frequent participation of political
instances or groups with strong political influence in the steering committees.

Private-sector participation is uneven and typically not of material significance,
revealing a weakness from the standpoint of innovation systems. All regional
forums have membership schemes.

With regard to forms of funding, grants from donors and membership dues are
the predominant sources for regional forums. The donors have different profiles,
but almost all are multilateral or regional organizations with the capacity to
invest in collective action.
The World Bank and FAO, as well as the IARCs and GFAR, are important donors to these forums. In the case of FARA (Africa), there are regional programs for the continent with very large budgets on the order of millions of dollars. The European Forum, EFARD, is a special case in that it is funded by the European Initiative for Agricultural Research for Development (EIARD).

GFAR also receives substantial funding from the European Commission and ministerial agencies for cooperation and international affairs. TAP is funded by FAO and other sources, mainly governments and government agencies.

With regard to membership dues or contributions, most forums use this arrangement, with dues varying according to the type of membership. Amounts range from US$100 to US$5,000 per year.

With regard to the sums handled by the forums, with the exception of FARA, whose budget is much larger than those of the other regional forums (leaving aside EFARD), annual budgets range from US$20,000 (CACAARI) to US$100,000 (AARINENA) and US$200,000 (APAARI).

An important point to be deduced from the analysis of these forums is a tendency to include a large and varied group of actors, albeit without effective mechanisms to guarantee participation and genuine engagement, especially as far as private-sector actors are concerned, as these typically participate very little. While the forums seek convergence among different actors, most of them continue to focus on agricultural research, and most prioritize public research. An innovation systems approach, if implemented effectively, could provide opportunities for new directions by fostering deeper engagement with key innovation system stakeholders.

**The case of FORAGRO**

FORAGRO was established in 1996 with the challenge of going beyond regional or sub-regional cooperation to strengthen hemispheric agricultural research cooperation. Since the start of the 2000s, FORAGRO has been a reference for the dissemination and promotion of technology and innovation in agriculture on a hemispheric scale. It is a full member of GFAR, where it represents the Americas.

Since its inception FORAGRO has sought to act as an instance that procures and promotes technological solutions for agricultural development, engaging and interacting with actors in innovation and technological development systems. In this context it is worth noting a clear intention to be recognized as a protagonist in technological research and an articulator of various regional actors.

In its 20 years of existence, FORAGRO has produced studies of trends and priorities, and set agendas for agriculture and agricultural research in the hemisphere. It has implemented an important technological information sharing system called INFOTEC, currently maintained by IICA, with 22,000 users. It has also organized many events, including international meetings of its members, seminars, and workshops.

However, despite significant progress FORAGRO has not become a fully representative voice of the Americas for agricultural RDI. Notwithstanding the efforts made, particularly between 2000 and 2010, FORAGRO has developed a mostly agrarian focus – i.e. not encompassing the whole productive and value chain – which limits its capacity to engage with private sector actors.
chains -, and has kept its sights on issues that are relevant mainly to Latin American countries. It has not succeeded in engaging with countries outside Latin America so intensely or profoundly, or with issues that lie outside agricultural research but are part of RDI systems.

**FORAGO’s functions and activities**

Table 1 presents the results of the survey on stakeholders’ views of the activities FORAGRO should perform. The priority chosen by most respondents was acting as a source of exchange and dissemination for information, research, opinions, perspectives and trajectories regarding scientific and technological development and innovation in agriculture. This option was preferred in the top two positions by 57% of respondents. It was also the option with the smallest standard deviation and variance among all functions with the highest scores.

It is a broad function that points to a view of FORAGRO by stakeholders as a space for discussion and convergence of ideas, demands and opportunities that require debate and collective agreement.

The next two prioritized functions complement the first preference. They are (i) proposing RDI agendas of common interest to members; and (ii) developing mechanisms and facilities for articulating actors in innovation systems with a view to scientific and technological development and innovation.

The pursuit of a common agenda is key to FORAGRO’s essence and origin, and stakeholders continue to see it as a central function of the forum. Similarly, developing mechanisms and facilities for articulation complements the agenda theme as well as the information exchange theme.

In other words, the stakeholders consulted see FORAGRO as a space for the discussion of cooperative research agendas, which in a systemic vision only make sense if different categories of stakeholders, including producers, industrial suppliers and demanders, are committed. When these stakeholders are not involved, a condition of system failure shows up (Bergek et al., 2008; Klein-Woolthuis et al., 2016; Turner et al., 2016).

<table>
<thead>
<tr>
<th>Function</th>
<th>Average position*</th>
<th>Min</th>
<th>Max</th>
<th>Standard deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acting as a source of exchange and dissemination for information, research, opinions, perspectives and trajectories regarding scientific and technological development and innovation in agriculture.</td>
<td>2.57</td>
<td>1</td>
<td>6</td>
<td>1.58</td>
<td>2.49</td>
</tr>
<tr>
<td>Proposing RDI agendas of common interest to members</td>
<td>3.23</td>
<td>1</td>
<td>7</td>
<td>1.78</td>
<td>3.18</td>
</tr>
<tr>
<td>Developing mechanisms and facilities for articulating actors in innovation systems with a view to scientific and technological development and innovation</td>
<td>3.43</td>
<td>1</td>
<td>7</td>
<td>1.87</td>
<td>3.49</td>
</tr>
<tr>
<td>Performing prospective studies (or locating, synthesizing and disseminating existing studies) on the future of scientific and technological development and innovation in agriculture from a global and regional perspective.</td>
<td>3.60</td>
<td>1</td>
<td>7</td>
<td>1.80</td>
<td>3.25</td>
</tr>
</tbody>
</table>
Developing lobbying mechanisms to strengthen RDI in national and international organizations responsible for regional and global agricultural policies.

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<th>N</th>
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<th>M</th>
<th>L</th>
</tr>
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<tbody>
<tr>
<td>Disseminating RDI and communicating its importance to society.</td>
<td>4.83</td>
<td>1</td>
<td>7</td>
<td>1.77</td>
</tr>
<tr>
<td>Identifying gaps and training FORAGRO members in new competencies.</td>
<td>5.86</td>
<td>2</td>
<td>7</td>
<td>1.50</td>
</tr>
</tbody>
</table>

*1 = most important; 7 = least important

**governance model**

FORAGRO's governance structure displays limitations with regard to representation. In particular, stakeholders come mostly from public agricultural research organizations and agricultural policy institutions, which points to an agro-centric trajectory with a bias toward science. Clear evidence of this bias is the fact that according to the bylaws only representatives of national agricultural research institutes (NARIs) can be the president of FORAGRO. With this governance model it is harder to develop a systemic vision of RDI.

**funding model**

FORAGRO has invested about US$150,000 per year on average since 2003. The main sources of funding have been IICA, the NARIs, and other organizations linked to agricultural research.

Very few organizations not directly linked to agricultural research contribute funds. Even within the agricultural sector, donations from private organizations of farmers, companies that supply inputs and farm machinery, or agro industrial processing companies are rare. This reinforces the observation that FORAGRO is agro-centric and biased toward public research, which hinders the adoption of a systemic vision.

**5. Final remarks**

Agriculture is more and more part of global value chains; it is also part of complex agribusiness activities and connected to many global objectives, such as food security and climate change, to mention only two (OECD, 2012).

Regional and global Forums on agricultural research have a high potential to discuss and diffuse these themes and to influence RDI agendas. However, they have been developed under concepts that do not allow a systemic perspective or a sense of innovation systems, as pointed out by several authors such as Lundvall (1992), Nelson (1993), Edquist (1997), and Malerba (2002). Neither regional systems nor sectoral systems of innovation have been employed as conceptual approaches to develop Regional and Global Agricultural Forums.

Those concepts are at most employed as marginal references, without concrete consequences in the organization and coordination of the Forums. Forums’ structures, agendas, activities and governance – and even their financial sources – indicate an agri-research-centered model. This can be seen both in terms of a
quasi-absence of non-research– particularly from industry and producers – and non-agrarian centered agents. This situation entails problems of system failure (Bergek et al., 2008; Klein-Woolthuis et al., 2016).

Turner et al. (2016), discussing the agricultural innovation system of New Zealand, drew similar conclusions, pointing to persistent “blocking mechanisms” that have kept the agricultural innovation structure centred on science – or research – and disconnected to other categories of stakeholders particularly those more innovation-driven.

According to Klerkx et al. (2010) several studies have reinforced the idea that interactions between agricultural research networks and their innovative environment have been poorly steered. Nevertheless, innovation networks can enhance effective reformism by creating tangible visions that serve as vehicles to create understanding about innovation and mobilize support for it, and by employing several kinds of boundary spanning individuals that are able to forge effective connections between innovation networks and their environment.

Because innovation networks can only partially influence their institutional environment, and because unintended consequences of actions and random events influence the course of the innovation process, innovation network actors need to continuously re-interpret the contexts in which they move. This constant reflection by the innovating actors on their position vis-à-vis their environment needs to be supported by dedicated facilitators, monitoring, and evaluation methods aimed at systemic learning.

The regional and global agricultural Forums could have taken enormous advantage of these conceptual ideas since they were conceived to act as an Agora, a place where interconnections among stakeholders may occur and evolve. Concepts of systems of innovation, whether regional, sectoral or trans-sectoral, may supply the necessary drivers to rethink Forums.

For this to happen it would be necessary to bring about a complete rearrangement of the regional and global agricultural Forums. First they have to be much more comprehensive in terms of categories of stakeholders, overcoming the agri-research-centered model; secondly, more systemic-driven Forums should have a coherent model of governance, allowing a better balanced composition of stakeholders into steering committees. Thirdly, activities must be focused on few big challenges common to the large majority of stakeholders and countries.

This is also the direction to be pursued by FORAGRO to redeem its recognition as a protagonist in technological research and innovation and as an articulator of various regional actors and others stakeholders. Therefore, FORAGRO must (i) reinforce their essence and origin in the pursuit of a common agenda, development of mechanisms and facilities for articulation and information exchange; (ii) promote the commitment of different categories of stakeholders, including producers, industrial suppliers and demanders; and (iii) renovate their governance and funding models to support a more diversified composition and guarantee their long-term financial sustainability and legitimacy.
6. References


## APPENDIX 1

### Appendix 1: Forums for RDI in agriculture – overview

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Name</th>
<th>Founded</th>
<th>Mission</th>
<th>Members</th>
<th>Governance Structure</th>
<th>Funding Structure</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>AARINENA</td>
<td>Association of Agricultural Research Institutions in the Near East and North Africa</td>
<td>1985</td>
<td>Contribute to the enhancement of agricultural and rural development in the Region by fostering agricultural research and technology development and by strengthening collaboration in this regard within and outside the Region in order to achieve greater self-reliance in food and agriculture, and to improve the nutritional well-being and overall welfare of the people of the Region, while at the same time sustaining and further improving the productive capacity of the natural resource base.</td>
<td>The membership consists of Full Members and Associate Members. Full Membership is open to national agricultural research institutions or higher education institutions in the 28 member countries. Associate Membership is open to regional and international agricultural research institutions operating in the region, among others. Only Full Members vote at meetings.</td>
<td>Executive Committee with five members appoints Executive Secretary for four-year term. The latter organizes a General Conference which meets every two years and is normally funded by the member institution in the host country.</td>
<td>Main source of funding is annual membership dues.</td>
<td>Main activities are thematic networks, and generating and disseminating information via Regional Agricultural Information System with three modules: National Agricultural Research Information Management System; Near East &amp; North Africa Rural and Agricultural Knowledge and Information Network; WANA Agricultural Researchers Information system.</td>
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<td>APAARI</td>
<td>Asia Pacific Association of Agricultural Research Institutions</td>
<td>1990</td>
<td>Promote and strengthen agriculture and agri-food research and innovation systems through partnerships and collaboration, capacity development and advocacy for sustainable agricultural development in the region.</td>
<td>Currently has members in 20 countries from Japan to Iran. Members include national agricultural research institutions/councils/organizations/universities, private-sector organizations etc. from countries of the Region, and partner organizations such as World Bank, ADB etc.</td>
<td>General Assembly, Executive Committee, Executive Secretary.</td>
<td>Permanent funding from membership dues. Other sources for annual budget include donations, grants and specific programs.</td>
<td>Activities are organized into seven strategies:</td>
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<td><strong>FORAGRO</strong></td>
<td>Forum for the Americas on Agricultural Research &amp; Technology Development</td>
<td>1996</td>
<td>Act as a forum for discussions and proposals on issues relating to scientific and technological development and innovation for agriculture in the Americas (under discussion).</td>
<td>Categories of stakeholders: RDI and extension institutions, cooperative programs and organizations, agricultural RDI forums, funds and foundations that support agricultural RDI, players in production systems, representatives of civil society, and political instances.</td>
<td>Assembly of Members, Steering Committee, Executive Secretary.</td>
<td>Funds from IICA and members in conference or executive committee meeting host countries. IICA funds its Executive Secretariat and running costs. Other sources include FONTAGRO and PROCIS.</td>
<td>Activities are organized into seven strategies: - Ideation (exchange, discussion and synthesis of studies, opinions and thoughts) - Agenda building - Institutional representation</td>
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<td><strong>FARA</strong></td>
<td>Forum for Agricultural Research in Africa</td>
<td>1997</td>
<td>Coordinating and advocating for agricultural research for development.</td>
<td>Constituents, economic and political bodies, development partners, civil society and networks.</td>
<td>General Assembly, Steering Committee, Executive Secretary.</td>
<td>Main sources of funding are donors such as the World Bank and other external organizations.</td>
<td>Activities are organized into three main fronts: - Visioning Africa's agricultural transformation (strategic vision formation) - Integrating capacities for change (focus on enhancing quality of technical capabilities developed in universities and personnel training centers) - Enabling environment for implementation by advocating and communicating (focus on attracting investment in agriculture, agricultural research and rural development in member countries) Also organizes and coordinates common projects and programs via links among actors.</td>
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<td><strong>EFARD</strong></td>
<td>European Forum for Agricultural Research for Development</td>
<td>1999</td>
<td>Strengthen contribution to poverty alleviation, food security, and sustainable development in developing countries by providing platform for strategic dialogue among European stakeholder groups in order to promote research partnerships between European and Southern research communities.</td>
<td>Stakeholders include universities, research organizations, NGOs, producer organizations, other representatives of private sector and youth</td>
<td>Steering Committee, Executive Secretary.</td>
<td>Funding from European Commission and especially European Initiative for Agricultural Research for Development (EIARD).</td>
<td>Activities are organized according to three strategic objectives: - Promoting dialogue among European stakeholders to share knowledge and innovative approaches that enhance the efficiency and impact of agricultural research; - Supporting GFAR’s and GCARD’s global initiatives; - Promoting inter-regional collaboration in joint research activities and capacity building, especially in developing countries.</td>
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<td>CACAARI</td>
<td>Central Asia and the Caucasus Association of Agricultural Research Institutions</td>
<td>2000</td>
<td>Serve as a neutral forum where various stakeholders of agricultural research for development in Central Asia and the Caucasus can discuss and debate on issues critical to the agriculture of the future.</td>
<td>Research institutions, universities, NGOs, farmers organizations.</td>
<td>Steering Committee, Executive Committee.</td>
<td>Membership dues are main source of funding, with attempts to raise additional funds via variable fees and grants from donors. Dues funded annual budget of c. US$20,000 in 2015. ICARDA provides logistics and infrastructure.</td>
<td>Main activities are knowledge exchanges among participants and capacity building in agricultural research and innovation. Works on basis of consortia by type of representative. Three main consortia are producers, universities, and NGOs.</td>
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<td>GFAR</td>
<td>Global Forum on Agricultural Research</td>
<td>1996</td>
<td>Advocate for and catalyze collective actions that strengthen and transform agri-food research and innovation systems.</td>
<td>All six existing regional forums, international agricultural research centers (IARCs), NGOs, producer organizations, private sector, aid services, donors (EC), multilateral organizations (FAO, IFAD).</td>
<td>Assembly of members meets every 3 years as part of Global Conference on Agricultural Research for Development (GCARD); Steering Committee with multiple stakeholders meets annually between meetings of Member Assembly.</td>
<td>Multiple sources of funding include EC, Dutch Foreign Ministry, French government, Swiss Development Agency, IFAD, FAO etc.</td>
<td>Activities are organized into three lines of work: - Studies and forward-looking analysis via Global Foresight Academy - Promotion of effective links among national, regional and international agricultural innovation systems via Alliances for Impact Program - Attracting investment and fostering entrepreneurship in agricultural research and innovation - Capacity building for agricultural research, education, services and innovation - Socially responsible and participatory research, especially in terms of gender equity and youth participation. - Accountability.</td>
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<td>TAP</td>
<td>Tropical Agriculture Platform</td>
<td>2012</td>
<td>Multilateral mechanism to facilitate cooperation for innovation capacity building with aim of developing national capacities for agricultural innovation in the tropics.</td>
<td>TAP has 40 member organizations. Stakeholder categories include: - Research, extension and education institutions - Private sector, civil society, producer organizations - Key international agencies and regional forums (including forums linked to GFAR) - Development agencies and banks.</td>
<td>Member Assembly, Steering Committee, Executive Secretary hosted by FAO, Global Task Force (GTF) to propose and validate Common Framework, and Group of Experts in Capacity Building to develop Common Framework.</td>
<td>Main sources of funding are FAO and EU. Others include aid from German, French and Chinese governments, and GFAR.</td>
<td>Activities are conducted on two main fronts: development of a common conceptual and analytical framework called the “Common Framework on Capacity Development for Agricultural Innovation Systems” (including analysis of innovation systems and spaces for learning and innovation); and stakeholder services, especially: - Advocacy and policy dialogue (enhance clarity and coherence of national policies, and advocate for and raise awareness of Common Framework); - Marketplace (promoting and brokering demand and supply in capacity development for agricultural innovation, research, extension and education); - TAPipedia (global information system for exchanging lessons learned, knowledge, best practice, innovation output etc).</td>
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