Towards a Global Agricultural Research System: 
A NARS Perspective

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1. The Challenge: Sustainable and Equitable Development in a Changing World

As we near the threshold of the 21st century the world is faced with an increasingly complex challenge of feeding its growing population, while assuring an equitable and sustainable development. Scientific and technological progress is generating the knowledge and the tools to make this possible. Nevertheless, the environmental and socio-economic deterioration that is being confronted in many parts of the world poses an unprecedented challenge of mobilizing and applying the potential capacity scientific progress has generated, to the solution of these problems and to generate a sustainable and equitable development process. The capacity to respond to this situation will have an impact on the wellbeing of all societies, making it a global issue. And the rapid process of deterioration, with its long-term and pervasive impacts, gives it a sense of urgency that requires an effective and collective response.

This challenge is being confronted in a context characterized by profound processes of transformation in a rapidly changing world. Key changes are taking place in four main dimensions that are leading to a transformation of agricultural research for development, and to the new strategic role this area of science plays. These four dimensions are: (a) the socio-economic context, (b) the knowledge or science context, (c) the institutional context, and (d) the process of globalization. A brief analysis of these four dimensions follows.

1.1 The Socio-economic Context

Despite the very important technological advances of this century, including those of the Green Revolution, the world is still faced with increasing poverty, both urban and rural poverty. The figures are staggering:

- More than 800 million remain undernourished.
- One third of the pre-school children are in this situation, with the impact this has on school performance and future productivity.
- In some countries more than 65% of the population remain below the poverty line.

Recent studies carried out by IFPRI and other organizations have clearly pointed out to a set of contradictory trends that are presently taking place, and will tend to dominate the coming decades. On the one hand, the aggregate supply/demand picture for food as compared to population presents a relatively balanced picture, if present investment levels in agricultural research are maintained or increased. But despite this positive picture at the global level, the world will continue to face a dual and contradictory situation, based on two different realities. On the one hand, wealthy countries, together with a small number of developing countries (mainly from Asia), will enjoy low food prices and food surpluses, or affordable imports. On the other hand, poorer, slowly
growing countries will face a growing problem of food security that will have to be solved through food imports.

Food surplus will be generated in developed countries, specially the U.S., and a growing food deficit accompanied by growing food imports will predominate in developing countries. The proportion of the malnourished population, specially in the case of vulnerable populations, will continue to increase. If instead of maintaining present rates of investment in agricultural research, national and international institutions further cut back their investments, the relatively favorable aggregate food situation could worsen, generating a global food security situation and worsening environmental problems and sustainability.

Desertification, deforestation and environmental deterioration is a growing problem, even in countries that are well endowed in natural resources. With the population likely to increase by another four billion by the year 2020, and the problems of growing natural resource degradation, agricultural research is faced with a major challenge. This demanding task is to improve farm family income to alleviate poverty, increase food production, provide employment opportunities for the resource poor and landless farmers to ensure household food security, while conserving the natural resources in a sustainable fashion.

1.2 The Knowledge or Science Context

Agricultural production is becoming increasingly knowledge-based and science-intensive. New strategic research areas have merged and developed, with profound effects on our capacity to produce food and manage natural resources and the environment. There are three new key areas of knowledge that may play a critical role in potentializing or empowering our capacity to respond to these increasing challenges:

- Biotechnology and its various applications.
- Research areas related to Sustainable Agriculture.
- Information and Communications Technology (ICT).

These new research areas do not replace plant breeding and production systems, research (including on-farm research). On the contrary, the new research areas are generating enabling technologies that complement and deepen the previous research approaches. They provide new tools for addressing these issues, which can be combined with other very important research tools related to crop improvement and crop management. The latter will continue to be the mainstream of agricultural research.

These new areas of science, and the enabling technologies they generate, represent a great potential in terms of increasing our capacity to respond to the social and economic challenges we face in terms of poverty, resource-degradation and food security. If well utilized, they can significantly increase our capacity to cope with these problems and promote development. But at the same time we also face the clear possibility of widening technology gaps between developed and developing countries, due to differential research capacities and to the increasing limitations of accessing these technologies, given their
nature of proprietary technologies. This is what a recent report of the CGIAR Private Sector Committee calls the barriers to the freedom to operate that research institutions and developing countries will face, due to the increasing number of proprietary technologies.¹

This trend reflects an important change that is taking place in the nature of biological technologies. In evolving from technologies that manipulate plants (species, varieties) to technologies that manipulate cells and molecules, we have witnessed the emergence of technologies that are much more easily appropriated. It is not easy to reproduce or duplicate either the biotechnological process that has led to the final product, nor the final product, given the complexity of the knowledge involved and the investment requirements. The fact that an increasing proportion of the relevant knowledge and techniques are of a proprietary nature is having two important implications. On the one hand, the flow of knowledge is increasingly constrained by this new reality. Secondly, in order to participate in the technology development process it is important for any research institute (IARC or NARS) to develop a research capacity as well as generate research results (a knowledge asset), that enables it to participate in active knowledge exchanges, through joint ventures or other relevant research partnerships. As a recent report points out: ‘If a global ‘trait market’ evolves, developing countries and the Centres will be able to participate in this market more effectively if they have a cache of ‘trading chips’ in the form of traits generated through their own research.’² The knowledge-exchange capacity and bargaining power of research institutions becomes an important element in the new context.

The challenge here is to develop a framework or environment that may facilitate strategic alliances and joint ventures between the various actors involved in these research efforts, bringing closer together the normative framework and incentive structure related to the development of technologies of a public good nature, with the framework and incentives that prevail in the biotechnology industry and in the development of proprietary technologies.

1.3 The Institutional Context

A more diversified institutional structure of stakeholders has developed in recent years in the are of agricultural research and natural resource management, both at the national and global levels. Traditionally, given the nature of the knowledge and the technology related to these fields, most of the research effort has been carried out by national public research institutes, or by international research centres, that have been concerned with the generation of knowledge that can be characterized as international public goods. Given the fact that the technology was not easily appropriated, the private sector played a relatively marginal role, specially in the are of development research. The

¹ See CGIAR: Strengthening CGIAR-Private Sector Partnerships in Biotechnology; CGIAR Secretariat, April 30, 1997.

² See CGIAR: Ibid., p.3.
other two important actors were universities (specially in developed countries), and advanced research institutes or centres of excellence, quite often with close links to universities.

In more recent years three other actors have started to play a central role in this process: Farmers’ Organizations, NGOs and the private sector. The first one because farmers have become more organized, and have been able to build on the learning experience generated by a variety of participatory research schemes and rural development projects. This has allowed for the emergence of approaches to research an extension that places the farmer at the centre of the process, as a key actor, and not just as a user of technology. In a similar way, in many countries NGO’s have either complemented the role of the State, or filled a gap generated by the weakness of public research institutions, specially in terms of reaching the farmer and working with him (inefficient technology transfer mechanisms). In Latin America and the Caribbean, in Africa and in Asia there is an increasingly rich experience with NGOs, with community organization, and with participatory research approaches, that could provide the basis for more efficient research and technology transfer systems.

The role of the private sector has become increasingly important, reflecting the fact that biological research and the technology generated by it has become more privatized, as a result of the incentive to invest in it. Presently, it is estimated that the private sector is responsible for approximately 80% of the research in plant biotechnology worldwide. By 1992 the US private sector alone was spending 559 million in agricultural biotechnology research, reflecting a 50% increase over 1985. One reason for this surge is that the market for agricultural inputs is big. Farmers in the US purchase US$3.5 billion of planting seed per year. It is estimated that total global sales of agricultural biotechnology products will reach US$3 billion to US$5 billion by the year 2000.3

The private sector has thus become an important player in the basic research end of the range of activities that constitute the basic-strategic-applied-adaptive research continuum. This is a fundamental change with respect to the traditional role this sector had played, in terms of basically being an user of knowledge and research findings generated by the public sector (as public goods). These changes also raise the related issue of property rights and plant breeder’s rights, and the role they play in the knowledge generation and dissemination process.

This evolving institutional environment has to be taken into consideration in the process of strengthening science and technology for sustainable agriculture, and in developing new approaches to cooperation in this area through strategic alliances and research partnerships. These partnerships, built on collaboration and mutual benefit, are becoming much more effective than traditional ‘aid programs’. This is an important dimension of the new joint ventures among interested stakeholders, especially in the present context of diminishing funds for traditional ODA.

1.4 The Process of Globalization

The fourth dimension of the present context in which we operate is the process of globalization, the symptoms of which are all around us. Globalization has clearly changed the way financial markets and the economy operate, where the transnational dimension, a global view of markets, and a capacity to operate in them, has become an essential part of being competitive in the present world. This is true even for the small farmer, given the increasing importance of the global context for his everyday life and wellbeing. The global dimension is no longer of interest only to large and export-oriented producers. It is part of the context in which everyone operates, with a direct impact on his viability as a producer of the wellbeing of his family.

But globalization is also reflected in changes that are taking place in the scientific community and in the organization of research. Technological innovations are seldom generated by individual research institutions or firms. They are increasingly the product of transnational research networks, or networks of learning, that are playing a central role in the process of knowledge generation and knowledge dissemination and applications. In some areas of research, such as sugar cane, these transnational networks are responsible for having generated most of the varieties with present commercial utilization. We will come back to this point in the subsequent analysis we will make of the role of research partnerships and strategic alliances (see section 4).

Given the increasing importance of proprietary technology the process of globalization is characterized by two contrasting trends. On the one hand, globalization is taking place in terms of markets and in terms of the final products. But at the same time, we are witnessing increasing constraints in terms of knowledge flows and technology transfer because of the increasing importance of proprietary technology.

There is another important aspect of the impact of globalization on the general topic of agriculture, research and development. This refers to the fact that the challenges represented by poverty, food security and environmental deterioration in developing countries are no longer an issue of concern only to those countries. Given the increasing interdependence of the world, they are rapidly becoming global issues. Much in the same way the global context has an impact on small farmers and peasants, and their viability as producers, these development issues have an impact on the wellbeing of urban dwellers in New York or in any large metropolitan centre, and on the global capacity to assure sustainable development. Globalization does require us to take a fresh look at institutional arrangements and collaborative mechanisms, based on common interests and mutual benefits to those involved in them.

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2. **Mision and Goals of the Global Forum on Agricultural Research (GFAR)**

In order to respond to the opportunities and challenges described in the previous section, the Global Forum on Agricultural Research (GFAR) was established in October of 1996. This initiative forms part of the renovation process launched by the CGIAR, aimed at mobilizing and integrating the various stakeholders of agricultural research for development (ARD). The Mission of the Global Forum is to:

“Help mobilize the various stakeholders that constitute the global agricultural research community, in their efforts to alleviate poverty, increase food security and promote the sustainable use of natural resources”

In order to carry out its mission, the following goals were adopted by the various stakeholders that constitute the GFAR:

a) Facilitate the exchange of information and knowledge.

b) Facilitate the participation of all stakeholders in formulating a truly global framework for development-oriented agricultural research.

c) Foster cost-effective, collaborative partnerships among the stakeholders of agricultural research and sustainable development.

d) Promote the integration of NARS and enhance their capacity to produce and transfer technology that responds to user needs.

e) Increase awareness among policy-makers and donors of the need for a long-term commitment to, and investment in, agricultural research.

3. **Operationalization of GFAR: An Emerging Programme of Work**

In the process of operationalizing the Global Forum, the two GFAR Secretariats that were established (one in the World Bank and the other one in FAO) are concentrating their efforts in **four priority areas**:

a) **Development of a shared Vision** to mobilize the world scientific community in their efforts to alleviate poverty, increase food security and conserve and manage natural resources. In the process of developing a shared vision the GFAR Secretariats hope to gradually address two complementary aspects: (1) provide *fora* (i.e. workshops, electronic discussion groups, etc.) where the stakeholders of agricultural research for development can discuss issues of common interest (for a list of possible topics see paragraph 5.6.); (2) seek to derive a common agenda of those issues which can better be addressed at the global level (global issues),
because of the need of economies of scale, the need to pool resources, the greater efficiency generated by the possibility of taping knowledge from various sources, etc. It has to be emphasized that this is a gradual and participatory process, involving the various stakeholders of agricultural R&D for development.

b) **Strengthening NARS and the Regional/Sub-Regional Fora that have been established to foster/facilitate cooperation among them.** One of the key objectives of the Global Forum is that of strengthening NARS, because of the key role this stakeholder plays in working with farmers and with end-users, and thus in the process of technology transfer and technology adoption, which is a critical step in assuring development impact of ARD efforts. NARS also have a larger challenge to respond to, which are the research requirements generated by the agricultural and rural development of each specific country, and its integration with the other production sectors of that economy.

c) **Promote cost-effective research partnerships** among the stakeholders of agricultural research and sustainable development. Here the GFAR Secretariats seek to promote a greater understanding and use of the new forms of research organization that are emerging, assuring the participation of NARS in them. The building-up and strengthening of cost-effective research partnerships is the main *raison d’être* of the Global Forum. Research networks, research consortia, virtual research centers and collaborative research projects are different forms of research partnerships. These are the building blocks of a *Global Agricultural Research System*, which has been imbedded in the Mission Statement of the GFAR.

d) **Development of a series of activities aimed at taking full advantage of the opportunities created by the new information and communication technologies** in seeking to achieve the objectives of the Global Forum (poverty alleviation, food security and sustainable use of natural resources). The emergence of a *Global Agricultural Information System* is one of the dimensions of a *Global Agricultural Research System*. The second one cannot really develop if a significant capacity is not developed in the first one. Besides information systems, the ICT revolution is also generating new opportunities, as well as dangers of increasing inequities, in their various applications to agricultural and rural development.

In order to focus and orient the activities that should be carried out in developing these four priority areas, the Global Forum is concentrating its attention in three Themes:

- Development of new institutional and organizational approaches for ARD.
- Genetic Resources Management (GRM) and Biotechnology
- Natural Resources Management (NRM) and Agroecology.

Thus the efforts of developing a Shared Vision, strengthening NARS, and promoting research partnerships are concentrating on these three specific themes. The interaction between these two ways of looking at GFAR activities defines the
Programming Matrix that is being used to structure and organize GFAR endeavours (see Figure). In the different cells of the matrix there is a reference to the various activities that are being carried out.

As it is pointed out in the footnotes of the above mentioned matrix, the third column (NRM activities) is basically being developed by the NGO Committee as the Lead Stakeholder, the two GFAR Secretariats interacting with the NGO Committee to provide support to these activities, in coordination with the interested RF/SRF and NARS. This is an interesting example of the style of decentralized way of operating that is emerging in the GFAR, with a given Lead Stakeholder taking the responsibility for actually implementing the activity. The fourth row of this matrix is related to the outcome of the Consultation Meeting that recently took place in Rome (March 29-31), and the decisions that were taken at this meeting.

**NOTE:** This section is still being written. A few more ideas will be added, describing some of the activities mentioned in the Programming Matrix, in order to make clearer the nature and scope of there activities.
Towards a Global Agricultural Research System: A NARS Perspective

- GFAR Programme of Work 1999-2000 -

<table>
<thead>
<tr>
<th>New Institutional &amp; Organizational Approaches for Agricultural Research for Development (ARD)</th>
<th>Genetic Resources Management (GRM) and Biotechnology</th>
<th>Natural Resources Management (NRM) and Agroecology (1)</th>
<th>Global Networks on Commodities Chains</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Implementation of a Shared Vision</strong></td>
<td>a) Support to stakeholder consultations on their own Vision 2025, and contribution to the GFAR Vision 2025. b) Participation in the gradual emergence of a Global Research Agenda.</td>
<td>a) Monitoring trends and their implications for NARS of critical issues related to Genetic Resources, GRM and Biotechnology. b) Review of IPR issues in GRM. c) Contribution to the development of a Shared Code of Conduct in Bioethics.</td>
<td>a) Development of a vision of the role of Agroecology in providing an increasingly important source of food and of the role of NRM. b) Better understanding of the integration of Universal Science with Local Wisdom. c) Contribution to an NRM Consultation organized by the NGO Committee</td>
</tr>
<tr>
<td><strong>Strengthen NARS &amp; RF/SRF</strong></td>
<td>a) Support to the integration of NARS: From the NARIs to the NARS model. b) Rethinking research organizational structures (because of regional/sub-regional integration and new research partnerships). c) Development of a sustainable funding strategy for regional/sub-regional organizations</td>
<td>a) Support to the formulation of National Research Policies in Biotechnology. b) Contribution to national capacity building in GRM.</td>
<td>a) Identification of the most suitable models of networks favouring NARS’ participation for the priority commodities identified.</td>
</tr>
<tr>
<td><strong>Promote cost-effective Research Partnerships</strong></td>
<td>a) Study of the different approaches to research networking and on how to increase their effectiveness. b) Documentation &amp; dissemination of successful cases of Research Partnerships (RP). c) Promotion of new innovative cases of RP involving the private sector &amp; other stakeholders.</td>
<td>a) Promotion of Regional networks in biotechnology. b) Role and participation of NARS in the Advanced Research Platforms established by ARIs. c) Support to the implementation of the Leipzig Plan of Action.</td>
<td>a) Assistance to Regional/Sub-Regional Organizations in identifying priority commodities in which global research networks should be promoted. b) Formulation of research network strategies at the regional level. c) Improvement of network management capacity in Regional/Sub-Regional Organizations.</td>
</tr>
<tr>
<td><strong>Use of ICT in developing a GKSARD (2)</strong></td>
<td>a) Development of an Enabling Framework to promote the emergence of a GKSARD. b) Support to EGFAR and the development of its strategic ‘Observatory’ function. c) Assistance to WAICENT in its normative work to improve information flows. d) Strengthening collaboration between Regional Information Systems (RIS) (e.g. InfoSys in Europe with other RIS).</td>
<td>a) Facilitation of access to GR information and to GRM policy issues (a good model is the case of SINGER of the CGIAR). b) Valourisation of the role of CGIAR considering the strategic databases and germplasm collections that exist in IARCs.</td>
<td>a) Favouring the involvement of NARS in research networks established by developed countries (e.g. ESCORENA). b) Preparation of a conceptual paper on how to develop innovative research partnerships for commodities chains.</td>
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(1) The NRM dimension is being developed in cooperation with the NGO Committee. The latter is the lead stakeholder, being responsible for most activities.

(2) In this row we present the outcome of the Rome Consultation on Information Initiatives in ARD (Rome, March 29-31, 1999).
4. Preparation of GFAR-2000

One of the main activities presently underway is the preparation of the next plenary meeting of GFAR (GFAR-2000) and the support to be provided to the RF/SRF in order to assure a strong NARS participation. The GFAR-2000 meeting in Dresden, Germany (May 21-23, 2000), is organized on the topic of “Strengthening Partnerships in Agricultural R&D in the Context of Globalization”. As it is the first meeting of the Global Forum since its inception, the Preparatory Working Group has recommended to organize it around three of the four areas of concentration of the Global Forum described in the previous section (see A Proposal for Shaping the Program of the GFAR-2000 Meeting, document GFAR 2000/2, January 1999). This defines the three expected outputs of the meeting, which are as follows:

4.2.1. A shared Vision Statement: This should include the identification of 2 or 3 issues of critical importance for partnership-development. The main immediate task is to identify the main leading ideas or concepts that should be integrated into the Vision Statement. Here the NARS Secretariat is seeking to provide two types of support: (a) Support the formulation or updating of Regional/Sub-Regional Strategies that generate a Shared Vision at the regional level. From the NARS perspective, this is the first critical step in this process. Other stakeholders are carrying out similar exercises (NGOs, IARCs and the private sector). (b) Support the input of RF/SRF into a global Shared Vision that has to be prepared before October 1999, and interaction with other stakeholders in this process. In point 5 below some emerging ideas for the global Shared Vision are mentioned. These are ideas generated by the Regional Strategies and Regional Shared Visions that the RF/SRF have been developing in the last two years.

4.2.2. A framework for developing innovative partnerships: The importance of the development of research-partnerships in the context of the Global Forum has already been highlighted in the previous section. Two cases of partnerships will be presented at GFAR-2000: (a) Cases of successful research partnerships that can portray the benefits of such partnerships and a better understanding of the factors that lead to successful partnerships. These cases can be in terms of specific research partnerships, or in terms of

innovative support mechanisms that facilitate such partnerships (i.e. innovative funding mechanisms for regional/sub-regional cooperation and research partnerships). (b) New research partnerships that the GFAR is helping to establish. A broad regional representation will be assured. There are three ways of presenting these cases: i) A few cases will be presented as case-studies, in either the Working Groups or in Plenary Sessions. ii) Other cases may be presented in the stands or Poster Displays that RF/SRF, as well as other stakeholders, can set up. Written material can be distributed with information on interesting cases. iii) Computers will be available for on-line demonstrations (i.e. linking-up with databases), or for multimedia presentations.

The cases to be presented in either of the two categories have to be selected by the different stakeholders, in particular the RF/SRF. This selection has to be made in March and April of this year, in order to be presented in the GFAR Steering Committee meeting of May in Beijing. In the case of existing research partnerships it is expected that the RF/SRF already have, or can prepare in the next 3-4 months, descriptive material and/or analytical and impact-assessment papers, that can be presented in Dresden. In the case of new partnerships to be forged, the NARS Secretariat has seed-money to support the formulation-preparation of such partnerships. This can be done through workshops or consultants, working directly with the participating stakeholders. An interesting exercise already underway is the identification and analysis of successful cases of NGO-led projects in the area of agroecology and natural resource management, that are potential cases for scaling-up efforts (from the community to the national level). This exercise is being carried out with the support of the NGO Committee of the CGIAR and both GFAR Secretariats. An inter-regional workshop is scheduled for August 1999 where these cases will be analyzed, placing special emphasis on the challenges involved in a scaling-up approach (and on “how” to do it).

4.2.3. Laying the basis for a Global Information System for Agricultural Research and Development: This third output of GFAR-2000 is related to a topic that has been identified as being of high priority by all Regional and Sub-Regional Fora: the problem of access to information and knowledge, and the need to facilitate the application of information and communication technologies (ICT) to agricultural and rural development. The first step in this direction has been the consultation on Information Initiatives in Agricultural Research: Enhancing Global Cooperation organized by GFAR with the support of FAO and the World Bank at the end of March 1999. In this meeting the discussion was on how to enhance global cooperation, and on how to move towards a Global Knowledge System for Agricultural R&D. The GFAR Secretariat has supported the participation of RF/SRF in the meeting, and the NARS Secretariat is working with them in seeing how the Regional/Sub-regional Information Systems can be strengthened and how to introduce a NARS perspective in the emerging
global system. The Regional/Sub-Regional Information Systems have a key role to play in linking Global Information Facilities (the global level) with end-users at the regional, national and local levels. The NARS Secretariat will encourage and support the organization of regional consultations as a follow-up to the global consultation to identify the current ICT requirements faced by the NARS and the means to address them. These ideas are presented in two documents: *Information Initiatives in Agricultural Research: Enhancing Global Cooperation;* GFAR/NARS Secretariat, February 1999; and *Reflections on Agricultural Information Systems from a NARS Perspective,* Rome, NARS Secretariat, January 1999.

In each of the preceding paragraphs, reference has been made to the concrete support the NARS Secretariat can provide to the RF/SRF in facilitating their input into, and participation in, the GFAR-2000 meeting. Within this general framework, each RF/SRF should identify what specific support they require to be able to participate in these three areas. But as pointed out above, the NARS Secretariat is already working with each RF/SRF in preparing their inputs and cases into the preparation process of GFAR-2000.

### 5. Elements for the Construction of a Global Shared Vision: Identification of Strategic Issues

As previously pointed out, one of the main priority areas of the GFAR is the development of a *Shared Vision* that can help to mobilize the world scientific community in their efforts to alleviate poverty, increase food security and conserve and manage natural resources. The generation of a shared vision implies, in turn, the development of a *capacity for prospective analysis and strategic thinking* among the various stakeholders of ARD, and a *forum* that facilitates the exchange of views and the joint analysis of the issues involved in the process of developing a consensus and a sense of ownership of the emerging strategic world view and Shared Vision.\(^6\)

In this process, all the stakeholders of the GFAR have been developing their own strategic plans and/or shared visions within their respective constituencies. The CGIAR does this regularly at both the system-wide level (TAC, System-Wide Review), and at the level of each IARC. The NGO Committee has been carrying out the NRM Consultation that is generating a clear strategic proposal: *Towards Defining a Pro-poor*

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\(^6\) It is interesting to point out that the same process of generating a Shared Vision and building a consensus and a sense of ownership around it, is a key process that is taking place at the national level, where National Fora are emerging in many countries with different scopes and mandates.
Natural Resources Management Strategy in the CGIAR. The Advanced Research Institutes (ARIs) of the developed countries are doing this in some regions, as it is the case with the European Forum on Agricultural Research for Development (Wageningen, April 7-8, 1999), and the Strategy paper that is being discussed. The Private Sector Committee has prepared a strategy paper, and is working with the GFAR in further making an input into the emerging global Shared Vision. The Farmers’ Associations have been actively engaged in developing a global strategic proposal that reflects the perspective of one of the main end-users: the agricultural producer.

Finally, the National Agricultural Research Systems (NARS) of the developing countries have been carrying out a very important effort in this direction, through the Regional/Sub-Regional Fora they have established in recent years. In the last two years the following regional strategies and/or regional visions have been formulated:


c) Latin America and the Caribbean (LAC): There are two important regional strategic plans or prospective analysis of ARD and the rural sector in the context of regional development: (1) “FONTAGRO’s Mid-Term Plan”, Washington, FONTAGRO, 1998. (2) Misión Rural: “El Papel Estratégico del Sector Rural en el Desarrollo de América Latina y el Caribe”, Bogotá, 1999 (in print).

d) Asia/Pacific (A/P): There are two important regional strategic plans or prospective analysis of ARD in this region: (1) “APAARI Perspective Plan”, APAARI, 1995. (2) “Agricultural Research Priorities in the Asia-Pacific Region – An APAARI Overview”, APAARI, 1997.

The analysis and strategic proposals of the NARS through their RF/SRF are important not only because of the key role NARS play in the knowledge generation-dissemination- adoption continuum, but also because the NARS and the RF/SRF are a multi-actorial stakeholder, with a clear participation of the other stakeholders at the local and regional levels. That is, in the NARS and in their RF/SRF there is an increasingly active participation by NGOs, the (local/regional) private sector, farmers’ associations.


9 See the Issues Papers presented and adopted at the last General Assembly of the International Federation of Agricultural Producers (IFAP) in Manila, in May of 1998. Two particularly relevant papers are; “Farmers’ Concerns About Advanced Research”, and “Farmers and Development Issues.”
and IARCs. Thus, given their nature, RF/SRF are important collective stepping stones in the dialogue among stakeholders.

The content and nature of these regional strategic analysis documents vary widely, since they have different origins and different purposes. But it is interesting to see that all the stakeholders felt the need to develop a strategic and prospective view of a rapidly changing world, to orient its efforts towards taking advantage of opportunities and being able to respond to the growing challenges they confront. In a varying degree, all these regional strategic documents cover the following aspects:

a) Analysis of trends and of important contextual changes.

b) Identification of strategic issues they confront. This is probably the single most important element all of these reports address.

c) These strategic issues constitute elements for a regional strategy, but in most cases they fall short of really defining such a regional strategy. The latter requires a more elaborate and integrated approach, with a larger consultation among the regional stakeholders in order to develop a sense of ownership of the strategy.

d) The reports have some elements of a Vision for the Future, but their prospective analysis is relatively weak. This is an aspect that can be clearly improved.

e) Two of the reports address the issues of regional research priorities. In the case of the other reports the emphasis is on the identification of strategic issues, more in terms of policy and institutional aspects. Thus the regional priorities are identified in terms of important strategic issues of an institutional nature, and to a much lesser extent regional research priorities in terms of production and technological constraints, and thus research issues.

f) It should be pointed out that at the national (corporate) and Sub-regional levels there has been a much more detailed analysis of policy issues and research priorities (for example at the level of the PROCIS in LAC, or the cases of SACCAR, ASARECA and CORAF in Sub-Saharan Africa).

In this analysis of the results that are coming out of these exercises we will concentrate on the second element mentioned above, which is the strongest aspect they have: the identification of strategic issues. The strategic issues that are been identified by the various stakeholders tend to fall in five mayor themes, of which the first one is related to the overall strategic importance of ARD in the contemporary world, and the other four are related to four substantial themes of strategic importance. At the most aggregate level, these four substantial themes help to envisage the emerging priorities in the process of defining a global Shared Vision.

- The strategic role of agricultural research for development (ARD) in addressing the development challenges described in section 1 in this paper.
• Strategic issues aimed at developing a favorable institutional and policy environment for effective ARD and for innovation in the rural sector. The importance of this theme reflects the fact that much of the constraints that have limited the effectiveness of agricultural research, as well as the adoption and development impact of the technologies that have been generated, are of an institutional and policy-related nature. This is the reason why this dimension is a very important component of the strategic issues being identified.

• The Science Context (A): Strategic issues, research priorities and policy considerations aimed at developing a Genetic Resource Management (GRM) capacity in NARS.

• The Science Context (B): Strategic issues, research priorities and policy considerations aimed at developing a Natural Resources Management (NRM) capacity in NARS.

• Developing a Capacity in Knowledge Management: Strategic issues and policy considerations related to the access to information and communication technology (ICT), in order to benefit from the new opportunities this technology is generating, and to strengthen the knowledge management capacity of developing countries.

A brief analysis follows of some of the main strategic issues that are emerging from these exercises, organized in these five categories. This is a first attempt at producing a checklist of Strategic Issues that are being identified by the various Regional/Sub-Regional Strategies. In this initial stage, this information is presented in a form of a checklist. But this should evolve towards a more structured (focused) and coherent set of strategic issues, that could serve as a basis for the development of a Global Shared Vision.

5.1 The Strategic Role of ARD

Three important issues have been raised in this first category

a) Mutual benefits that can be generated by ARD to both developed countries (DCs) and developing countries (LDCs) that can lead to a Win/Win situation. This win/win situation can be generated by the role of ARD with respect to such strategic factors as climate change, world stability, food security and generating options to rural populations that may otherwise end up migrating to developed countries out of lack of opportunities, or generating huge security costs in trying to control instability and social unrest. A more direct type of win/win situation is that generated by the relationship between investments in ARD, agricultural production in LDCs and exports to them from DCs (in terms of the demand for goods and services that the more dynamic countries generate).10

10 An interesting analysis of the relationship between agricultural growth in LDCs generated by investments in ARD, and the increased demand for exports from developed countries, with
b) **The increasing importance of issues that have to be tackled globally, that is leading to an emerging Global Agenda.** This is a different way of looking at some of the factors mentioned in the previous point. Some of the major challenges we face have to be tackled through a global effort, either because their impact has consequences for all countries (i.e. climate changes), they require concerted and complementary efforts by several countries (i.e. biodiversity conservation and management), or they require a level of investment that only through the pooling of resources, at the regional or global levels, can we hope to reach a critical mass to have an impact at all on the problems being addressed. One of the challenges we face is to assure that all stakeholders can participate in the determination of this Global Agenda.

c) **The Sense of Urgency that has to orient our efforts,** given the extremely quick deterioration that can be observed in the multiple interactions between poverty (closely related to employment and the capacity to generate income), food production (food security) and sustainable development (deterioration of natural resources). The present rates of deforestation and of soil erosion in some regions are threatening to convert countries well-endowed with natural resources, in resource-poor countries in a relatively short time-span, with the consequences of these trends at both the local and the global levels. Water is rapidly becoming one of the main challenges that many countries are confronting in this turn of century.

These and other strategic issues can lead to clear incentives to policy-makers for an increased investment in ARD, both in developed and in developing countries, and for the need to strengthen international collaboration in this area (both at the regional and global levels). But given the profound changes that are taking place around us, this also requires a significant re-thinking of agricultural research (ARD) in order to make it much more effective and efficient, taking into account the opportunities generated by the new areas of science, and generating innovative institutional and organizational approaches that the new environment and challenges require. It is not a question of simply doing more of the same. This is one of the reasons why the second area of concern (development of new institutional and organizational approaches) is generating such interest in all of the regional strategy efforts.

### 5.2 Development of New Institutional and Organizational Approaches for ARD

This second category groups a range of strategic issues that play a key role in developing an appropriate institutional and policy framework for ARD, seeking to make it more relevant and effective in terms of its real development impact. We only list the strategic issue, with a series of bullets under each one in order to specify its scope and content.

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**both DCs and LDCs winning in this process, is found in Per Pinstrup-Andersen: The CGIAR, International Agricultural Research and the United States; Washington D.C., CGIAR Secretariat, March 1998.**
a) Importance of developing a capacity for Strategic Thinking and for Policy Analysis:

- Understanding the challenges and opportunities of the Science-based globalized world of the 21st century.
- Understanding the forces that are shaping the rapid changes taking place around us and the new emerging societies.
- Role of the agricultural and rural sector in the emerging societies.
- Understanding the trends in science: Developing a capacity in technology assessment.
- Development of a capacity for Policy Analysis
- Development of a capacity for Planning, Monitoring, Evaluation and Impact Assessment.
- Importance of regional and sub-regional integration and of their implications for research policy and research approaches.

b) Re-thinking ARD organization: Integration and modernization of NARS:

- New institutional models for organizing agricultural R&D
- Integration of NARS: Interrelationships among NARIs, Universities, NGOs, Farmers’ Organizations and the private sector.
- Development of a capacity to forge partnerships.
- Strengthening the capacity to manage networks and other forms of partnerships.
- New funding schemes and funding strategies: Continuing role of public funding, Competitive Funding Schemes, new innovative funding approaches.

c) Changing role of the State and public/private sector joint ventures and partnerships:

- Changing role of the State. But clear need to continue assuring production of knowledge public goods that are essential to an equitable and sustainable development.
- New organizational forms emerging from public/private sector joint ventures, and from alliances with various stakeholders (NGOs, farmers’ associations and other community-based groups).
- The role of private sector research and strategic partnerships between the public and private sectors.

d) Promoting Rural Innovation: Increasing the effectiveness of agricultural research:

- Importance of an innovation-approach as a way of increasing the effectiveness of agricultural research.
- How to promote rural innovation: implications for research design.
- Strengthening Rural Innovation Systems: Developing better linkages in the Technology Generation and Transfer System.
• Development of participatory research techniques.
• Developing productive partnerships with farmers.

(e) Institutional Innovation: Development of an institutional and policy environment for agricultural and rural development:

• The need to re-think the institutional environment in the agricultural/rural sector (i.e. in credit, marketing, access to land).
• Linking the agricultural sector with the other sectors of the economy: Importance of developing an integrated agroindustrial approach to food chains.
• Developing an adequate policy environment conducive to innovation and to the equitable distribution of the benefits of development.

(f) Human capital development and Education for a Sustainable Development:

• Challenges posed on the Educational System. Specificity and requirements of rural education.
• Development of human resources.
• Graduate training. Regional facilities.

(g) Strengthening Regional/Sub-regional cooperation mechanisms:

• Importance of strengthening regional/sub-regional cooperation. Experience of SACCAR, ASARECA and CORAF in Africa, and of the PROCIS in LAC. Complementarity between the regional and sub-regional levels.
• Funding mechanisms to support the regional/sub-regional cooperation (i.e. experience with FONTAGRO in the LAC region).

5.3 The Science Context (A): Developing a Genetic Resources Management (GRM) Capacity

(a) Strategic importance of developing a technology assessment capacity to analyze trends in science and their implications for developing countries.

(b) Importance of assuring access to relevant technologies, including biotechnology. Strategic role IARCs can play in this process.

(c) National strategies and policies in capacity-building in biotechnology and in GRM.

(d) The need to develop research partnerships and/or research consortia bringing together key research groups in agricultural biotechnology in a given region or sub-region, as a way of developing a critical mass of human and financial resources to be able to reach the level of excellence and research capacity required to operate efficiently in this field. This, and other forms of NARS/NARS cooperation, should play an increasingly important role in the construction of the emerging global research system.
e) The need to assure that biotechnological applications respond to the needs of the small producer and the rural poor.

f) Importance of developing a multilateral system of facilitated access to genetic resources, and to the equitable sharing of costs and benefits. This process has advanced much more within the CGIAR system, although important issues are still under discussion here. But once agreement is reached within this system, the challenge of developing similar approaches for the rest of genetic resources is enormous.

g) **IPR issues** related to the access to and use of genetic resources, and sharing of benefits related to GRM, is one of the main concerns that has come up systematically in all regional strategic analysis.

h) With the growing concerns related to bioethics, and the complexities of the issues involved, there is a growing awareness of the need to move in the direction of developing a shared *Code of Conduct* that should apply to development-oriented research.

i) Besides South/South cooperation mentioned above (NARS/NARS), three other research partnerships have been identified as being of strategic importance:

- **NARS/ARIs:** This relates to the role that *International Advanced Research Platforms (IARPs)* can play in carrying out joint research efforts with partners in the south, in training, in strategic and perspective analysis, etc.

- **NARS/IARCs:** This relates to the new strategic role the International Centres can play, as centres of excellence for strategic research, and as centres that facilitate access to relevant technologies.

- **NARS/Private Sector:** There are some interesting cases that are already emerging of research partnerships (agreements and contracts) between NARS and the private multinational sector (besides the joint research efforts with the national private sector), with important applications coming out of them. It is important to learn from these experiences, and see how we can identify win/win situations, where we can combine the research capacity of these two sectors in achieving the development objectives we are pursuing. The issues of IPR and of Bioethics play an important role in this process.

Obviously multiple combinations are possible and are being used. In the CG-mandated crops IARC/NARS/ARI partnerships have emerged in various cases and are playing a very important role. Outside the CG-mandated crops the other forms of partnerships tend to predominate, although they are based in more recent experiences that could play an increasingly important role in the emerging global research system. This is the case of global networks in non-CG mandated crops.
It should be pointed out that several of the strategic issues that are mentioned in this section (i.e. points g, h and i) are equally applicable to NRM considerations, that is the topic of the next section.

5.4 The Science Context (B): Developing a Natural Resources Management (NRM) Capacity

This fourth area of concern is receiving clear attention in all regional strategy documents. This theme or research area is being elaborated in close coordination with the CGIAR NGOs Committee, that is palying a lead role in developing some of these ideas. One of the issues we are addressing is that of how to strengthen the participation of NGOs in both NARS and Regional/Sub-Regional Fora, in order to change the traditional situation where NGOs have played a very marginal role in the national and regional/sub-regional systems. This entails a process of change, which in many cases requires changes of attitude and of “organizational culture”, that have lead to mistrust, and sometimes tense relations, between two important stakeholders of ARD.

a) Role of Agroecology as an increasingly important source of food, and as an approach to develop a natural resource-management (NRM) capacity.

b) Strategic importance of having a good characterization of the main agroecosystems, and of their technological constraints. Much of the knowledge that exists is dispersed in many different institutions, each one with a part of it, both within a given country and at the global level.

c) Important role of NGOs in developing ecologically-oriented agriculture and NRM research. This leads to the challenge of integrating NGOs more proactively in NARS and in priority-setting.

d) One of the main challenges we face is that of how to make the transition from successful, but isolated, cases of agroecology and NRM in specific communities, to the national level in order to have an impact in the rural population of a given country. This is the challenge of scaling-up. Along with the NGO Committee an international workshop is being organized for August of this year, where specific cases will be examined from the perspective of systematizing these experiences in a scaling-up process.

e) Closely related to NRM at the community level, a very important and strategic issue that is being systematically mentioned in most regional strategies, is that of how to integrate Universal Science with Local Knowledge, or Local Wisdom, related to the conservation, management and use of natural resources in a sustainable way, and the production systems that go with this. this is leading to a total re-valorisation of the importance of local knowledge, and of how to relate it with modern science.

f) A very important strategic issue that is being emphasized is that of the geopolitical value of agriculture and of ARD, in the sense of the interaction between
production, NRM, regional development, spatial distribution of the population, generation of opportunities and the use of space. This has to do with the multifunctionality of rural space, and the multiple interactions of this process with development.

g) The need to strengthen forestry and fisheries research, two areas of ARD that have developed less than other research areas in many NARS, and the need to integrate them with the other areas of ARD, in developing integrated and productive approaches to NRM in a sustainable way. Given the increasing importance of fisheries and of aquaculture as a source of food, and of forest management as an increasingly important global issue, these two research areas cannot continue to play the marginal role they have played in many NARS.

5.5 Developing a Knowledge Management Capacity: ICT and the Management of Knowledge

a) The importance of the access to information and communication technology is being clearly highlighted in all the regional strategies and strategy documents, as being of strategic importance in the new environment of ARD.

b) This entails both strengthening the capacity to access information and knowledge, through improved information flows among the stakeholders (improved information systems), as well as access to ICT as such. WAICENT plays a particularly important role in this respect.

c) This also implies monitoring the rapidly expanding area of applications of ICT in the agricultural and rural sector, and of making sure that the new ICT technologies are also used to address rural development problems and the needs of the rural poor. Interesting experiences are appearing in this area, that could be shared among the interested stakeholders. EGFAR can play an important role in this respect.

d) Knowledge Management is not only a question of ICT. The latter is only a tool that facilitates the organization and processing of information. The development of a knowledge management capacity involves institutional and information management skills that have to do with the capacity to use and apply knowledge effectively in the solution of development problems, combining knowledge from different sources in a dynamic and agile way. This includes a knowledge management issue that was mentioned in the previous theme: the integration of universal (scientific) knowledge with local knowledge and local wisdom. This is an important dimension that involves issues of cultural and historical identity, that play an important role in this process.

e) One of the interesting applications of ICTs is that of the development of knowledge systems as decision-support mechanisms, that are playing an increasingly important role in natural resource management, environmental monitoring and similar topics. The use of GIS in regional development is playing a similar role as
a decision-making tool. Interesting experiences are appearing in both developed and developing countries (i.e. Sub-Sahara Africa, Asia/Pacific, WANA and LAC). But in many cases these capacities are appearing in other institutional sectors in developing countries, and are not being fully incorporated by NARS and their institutions. In fact, there is a cleavage that sometimes exists between the ARD research institutions and those that are interested in ICT as a development tool. An example of this is that most of the discussion on the Global Knowledge (or Information) Society quite often is more oriented towards its impact in the urban and the (so called) “modern” sectors, as if it were not equally relevant for the agricultural and rural sectors.

f) In the recent Consultation Meeting that took place in Rome on this theme (March 29-31), it was decided to encourage the development of an “Enabling Framework”, oriented at facilitating the emergence of a Global Knowledge System in ARD (GKSARD), whose purpose is to facilitate the flow of information and knowledge among the various stakeholders. Besides strengthening global information facilities and facilitating access to them, the importance of Regional Information Systems was highlighted as playing a key role in this process. The latter play a catalytic role in facilitating the interaction between information supply and the end-user at the local level. In this respect, InfoSys in Europe can play an interesting role in working with the Regional/Sub-regional information systems of the developing countries.

This first attempt basically presents a check list of strategic issues that are coming out of the various regional strategy-formulation endeavours, classified in the five categories we have used in this report. These categories do identify five major strategic themes, and thus entry points, that have gradually emerged through the process of developing the Global Forum. The various strategic issues as well have a lot of potential complementarities between them.

Some reports have advanced or emphasized more some of these aspects, or strategic issues, than others. The exchange of these various approaches and experiences can, by itself, contribute to enrichening and dynamizing this process, within each region. Secondly, through the continuing dialogue with the various Regional/Sub-Regional Fora, and with the other stakeholders of the Global Forum, we hope to gradually facilitate the emergence of a Shared Vision of ARD in the new global environment in which we live. This will imply an effort of starting to prioritize and focus the various issues mentioned above, as well as the relationships, complementarities and synergisms that can be established between the various agendas of the stakeholders involved, within the common framework defined by the Shared Vision. As pointed out in several occasions, it is important to understand and respect the different agendas that the key stakeholders may have, while at the same time seeking to maximize the value added by the complementarities and synergisms, or even joint efforts and strategic alliances, that can be established between them. The European Forum on Agricultural Research for Development provides a very important forum to advance this process.