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Charting the CGIAR's Future – A New Vision for 2010
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Report of the NGO Committee

Attached is the report of the NGO Committee which is circulated for information under Agenda Item 9 “Committee Recommendations and Reports”.

Report of activities of the CGIAR NGOC during period ICW 99 – MTM 2000

Committee composition

The Committee has set as a goal to reach a size of 8 members by the end of ICW 2000. This goal will be achieved by the stepping down of various current members who will be replaced by new members already on board (Peter Rosset, Food First, USA and Juan Sanchez, CIED, Peru) and new to be appointed female members from Asia and Africa.

During the MTM-ICW 2000 period, current NGOC chair Miguel Altieri will serve as co-chair of the NGOC with Ann Bayers Waters, who should assume as Chair after ICW 2000.

Activities

- **Workshops**

During this period the NGOC engaged in a number of activities including the organization of various workshops:

** International workshop on scaling up successful sustainable agriculture initiatives. Washington DC , October 22-23, 1999.* 38 participants from some 25 institutions who attended the Workshop which was organized by the NGO Committee of the Consultative Group on International Agricultural Research (CGIAR) with support from the Global Forum on Agricultural Research (GFAR) with the general assumption that there are successful local level SA initiatives which, although spreading on their own through the informal social structures, may be further expanded or scaled up with direct intervention. There are however institutional, political, technological and methodological factors that keep the scaling up activities from realizing its fullest potential of diversifying the benefits and spreading these benefits to more people more quickly. Overcoming these constraining factors is the overall challenge to the scaling up process.

The Workshop participants shared and discussed the current and emerging views on the process of scaling up based on their work and related experiences. These took off from looking into the factors and principles explaining success of local level initiatives and how these experiences may be extrapolated and then examining what impedes scaling up the experiences and how these may be overcome. As the meeting progressed, the discussions converged along two major sets of agenda. These are on (i) clarifying further the scaling up concepts, approaches, principles and issues; and (ii) the role of CGIAR in the whole process of going to scale.

There was a general acceptance in the meeting that scaling up is not just about technologies but is more a development process of scaling up a vision starting from that of the farmers. It is a process for expanding learning and organizational/community capacities to identify and solve new and different problems and adapt to changing situations. It is expansion resulting from not just having more numbers of farmers and larger areas but also from evolving roles and responsibilities that go with

improved capacities and diversification of benefits. In being able to carry on with the discussion on what else constitutes the scaling up process, participants had to go into clarifying concepts and definitions which the Workshop initially intended to bypass. Scaling up, scaling out and scaling down processes had to be differentiated but to later recognise that the up, out and down concepts in fact comprise particular sets of patterns in going to scale.

For many of the participants scaling up connotes a vertical movement of experience, knowledge, impact and effects higher up the levels of local organisation of rural community or society. This implies involving more stakeholder groups up the ladder from farmers to extensionists and NGO workers to local officials, to researchers to policy makers/ministers to donors. Scaling out is horizontal spread within a sector, particularly farmers. Both scaling up and scaling out implies adaptation, modification and improvement (not just replication) of particular technologies and techniques but more importantly of social and agroecological principles and processes. Scaling down is more particular to the replication of whole programs, not just technologies or principles or processes, by breaking them down into smaller programs or projects to facilitate planning, implementation and accountability at lower levels. Some see this as decentralisation or devolution and therefore equate these processes with scaling out as well. In this document going to scale is used as the generic term comprising of scaling up, scaling out and scaling down. However, inasmuch as scaling up appears to be the more common terminology in use, it is used interchangeably with going to scale in this document.

In discussing the concepts associated with scaling up, at least five dimensions of scaling up emerged during the meeting. These included the institutional (vertical integration), the geographical/spatial (horizontal spread), the technological, the temporal and the economic or cost dimensions. In all these dimensions sustainability, participation and capacity building were common themes. Furthermore, the Workshop implied three general strategies adopted by an implementing organisation in dealing with the issue of scaling up relative to how it conceptualised its project/program intervention. These were (i) spontaneous scaling up, (ii) scaling up after achieving initial local success, and (iii) inclusion of the scaling up plan right from the start of project.

** Brazilian multi stakeholder workshop on agroecological research, Seropedica-Rio de Janeiro, November 12-13, 1999.* Professionals from EMBRAPA, UFRRJ, other universities and NGOs as well as from other state research and extension organizations met to discuss the state of the art of agroecological research targeted at smallholders agriculture in Brasil. The group assessed progress and weaknesses of current research efforts, and also identified the opportunities for establishing a working group to expand research and outreach in key areas in order to further advance in the scaling up of sustainable agriculture.

** International NRM workshop , Rambouillet, France, December 14-17, 1999.* This workshop was convened by the CGIAR NGO Committee and the Global Forum for Agricultural Research, as a preparatory workshop for the GFAR meeting in Dresden, scheduled for May 2000. The aim of the workshop was to gather an international audience of participants from research institutes and civil society organizations from

Europe, Africa, Latin America and Asia in order to discuss and review the status of 3 global initiatives being proposed as a main focus of the Natural Resources Management component of GFAR.

For each initiative, namely Interdev (a mutualistic and de-centralized information system on development experiences), Prolinnova (an initiative aimed at building global partnerships in order to promote local innovations) and PolicyNet (a research network on demand driven global policy issues pertaining to NRM), a comprehensive strategy was set up, encompassing the issues of partnerships, conceptual progresses and operationalization.

For Interdev, a timetable and action plan for the experimental phase were devised and a policy to enlarge partnership was drawn. For Prolinnova, 4 areas of partnership were defined and a procedure to establish partnerships was defined. For PolicyNet a collaborative process was initiated on the issue of innovation in Genetic Resources Management, for which a concept paper will be written for circulation prior to GFAR meeting.

In addition, links and synergies between the three initiatives were identified and means to complement them explored. A global vision of the NRM component of GFAR progressively emerged. A Steering Group was formed to formulate that vision in a concept paper to be collectively written for presentation in Dresden, in May.

Each initiative will also be presented separately at Dresden and leading participants were identified in order to organize the preparation of these presentations. Besides Dresden, which is undoubtedly a crucial time for each initiative to make itself known and to gather support, a strategy for their long term sustainability (including funding) was outlined. Both the NARS Secretariat and GFAR Steering Committee pledged support for all 3 initiatives.

GOING TO SCALE:

* *Can We Bring More Benefits to More People More Quickly:* an international workshop held April 10-14, 2000 at the International Institute of Rural Reconstruction (IIRR), Silang, Cavite, Philippines. This workshop is a follow through to the discussions initiated during the CGIAR NGO Committee Workshop on Scaling Up Sustainable Agriculture Initiatives held last October 22-23, 1999 at the World Bank, Washington, D.C. USA.

One of the main objectives of the workshop was to generate 'guideposts' and a list of available/emerging tools for development stakeholders particularly sustainable agriculture practitioners for use in their scaling up efforts. More specifically, workshop participants analyzed selected experiences/initiatives toward a better approximation of:

- *how to plan for scaling up - including when and what to scale up and with whom and with what resources;*

- *how to implement and monitor the impact of the scaling up process - be it to scale out, down, up or a combination of the strategies therein; and,*

The workshop was launched with two keynote presentations, "Thinking through the Issues" and "Scale SEED Process of Integrated Social Development" which provided the overview of scaling up to include the different dimensions. This gave the participants the opportunity not only to understand the basic concepts and principles but also be able to reach an agreement on what scaling up means.

The lessons and suggestions on how the concepts and principles of scaling up are to operate and to be managed vis-à-vis the many considerations and issues highlighted in the Washington workshop were extracted/generated from nine selected case studies. The selected cases were initiatives, projects or programs which are considered to have gone to scale to some extent.

The workshop participants, other than the case presenters, did not present their scaling up experiences during the workshop plenary. They, however, wrote their initiatives as additional inputs to the thematic (small) group discussions. These additional papers also form part of the workshop document on highlights of proceedings.

A documentation and publication, both in print and electronic forms, on ***Going to Scale - Bringing More Benefits to More People More Quickly*** was produced. The publication contains the generated issues, concepts, principles, guidelines and a list of available/emerging tools for development stakeholders' particularly sustainable agriculture practitioners for use in their scaling efforts; and, the highlights and synthesis of the follow through workshop. The publication will be made widely available at Dresden.

**International Workshop on ecological impacts of transgenic crops held at Berkeley, California. March 2-4, 2000 attended by 21 scientists from scientists from 10 Universities, 2 IARCs, 5 NGOs and one private company. After two and half days of discussions the group arrives at the following conclusions and recommendations:*

Although no catastrophic impacts have yet been recorded from the massive use of transgenic crops, the known and potential risks are substantial from an ecological point of view. It was generally agreed that because of the widespread use of transgenic crops, and the impossibility of effectively removing them once they are released, even more effects might persist and accumulate and eventually cause serious ecological impacts. For example nobody can really predict the impacts that will result from the Bt toxin that is released into the soil from roots during the growth of thousands of hectares of Bt corn, or the effects to the soil and general ecosystem from pollen during corn tasseling and as a result of the incorporation of tons of plant residues after crop harvesting.

Not enough research has been done to evaluate the environmental and health risks of transgenic crops, an unfortunate trend as most scientists feel that such knowledge was crucial to have before biotechnological innovations were up scaled to actual levels.

There is a clear need to further assess the severity, magnitude and scope of risks associated with the massive field deployment of transgenic crops.

Much of the evaluation of risks must move beyond comparing GMC fields and conventionally managed systems to include alternative cropping systems featuring crop diversity and low-external input approaches. This will allow real risk/benefit analysis of transgenic crops in relation to known and effective alternatives.

The potential for ecological risks is to a large extent "event and context-specific". The particular risks which may be identified for the first wave GE offerings do not exhaust the list of potential risks from events yet in the pipeline. By the same token, ecological risks identified in the US or Canada may not be relevant to risks in Malaysia or Mexico - whether due to gene flow issues or to disruption of natural pest controls in more biodiverse environments. Risks in a "normal" weather year may not be predictive of those in a dry year (e.g. RR soybean stem splitting in Georgia), or to those experienced by farmers burdened by sporadic pest outbreaks. In short, identification and quantification of risks seems likely to remain an obligate and ongoing complement to the development and release of each new GE crop.

The repeated use of transgenic crops in an area may result in cumulative effects such as those resulting from the buildup of toxins in soils. For this reason, risk assessment studies not only have to be of an ecological nature in order to capture effects on ecosystem processes, but also of sufficient duration so that probable accumulative effects can be detected. The application of multiple methods will provide the most sensitive and comprehensive assessment of the potential ecological impact of transgenic crops.

Further empirical studies of the ecological impact of commercial-scale cultivation of transgenic plants are clearly needed, particularly with regard to the following questions:

- Which cultivated plants have sexually compatible wild relatives that could become troublesome weeds after inheriting fitness-related transgenes, and to what extent will this conversion to weediness occur?
- Will the propagation of certain transgenic plants result in the evolution of newly resistant plant pests (microbial pathogens, insects, and weeds), and if so, how can the evolution of these resistant biotypes be delayed or avoided?
- What effects will plant-produced pesticides have on the population dynamics of non-target organisms, especially beneficial predators, parasitoids, pollinators, components of soil food webs, and fundamental ecological processes?

Ecologists can provide valuable input in the planning and evaluation of high-risk genetically engineered plants, but does documenting the risks of such crops entail the best use of scarce ecological talent? Or should ecologists devote their time and skills to developing the best environmentally sound approaches to deal with real agricultural limitations, which in many cases are management options not related to biotechnology but rather to agroecology?

Overall the group felt that although biotechnology is an important tool, at this point alternative solutions exist to address the problems that current GMCs are designed to solve. The dramatic positive effects of rotations, multiple cropping, and biological control on crop health, environmental quality and agricultural productivity have been confirmed repeatedly by scientific research. Biotechnology should be considered as one more tool that can be used, provided the ecological risks are investigated and deemed acceptable, in conjunction with a host of other approaches to move agriculture towards sustainability.

Publications

- *Towards more effective implementation of IPM in Africa, Proceedings of a workshop held at IITA, Cotonou, Benin, March 29-April 3, 1999*

Integrated pest management [IPM] is increasingly recognized as a vital element in sustainable agricultural development. In IPM, farmers use their knowledge of ecological processes in the agricultural system to combine a variety of compatible tactics to increase the productivity of crops and reduce the impact of pests, diseases and weeds. Pesticides are used as little as possible, if at all, with corresponding benefit to farmers' income, human health and the environment. Although a number of promising IPM options are becoming available, adoption of IPM at farm level, especially in Africa, is disappointingly slow. Poor communication between farmers and researchers is believed by many stakeholders in the agricultural development process to be a constraint limiting IPM adoption. Experience elsewhere has shown that non-governmental organizations [NGOs] can play a key role in brokering exchange of relevant information, empowering farmers and thus promoting the understanding and adoption of IPM. However, in Africa, NGOs so far lack the access to information and other key resources to play these roles effectively. As a contribution towards addressing this problem the NGO committee of the Consultative Group for International Agricultural Research [CGIAR], in collaboration with the International Institute of Tropical Agriculture [IITA], convened a week-long workshop in March 1999 at Cotonou in the Republic of Bénin. Thirty-six participants from 14 African countries took part in the workshop. Twenty delegates represented NGOs while the remainder came from national extension organizations or research organizations [national and international] with a special interest in the use of IPM in sustainable agricultural development. A variety of participatory activities helped participants to analyze constraints to IPM implementation in Africa and identify opportunities. Discussion sessions enabled participants to exchange first-hand experience of IPM implementation and to become familiar with principles, key issues and emerging options and supporting resources for IPM in Africa. On-farm, facilitator-led and farmer-led sessions were given special emphasis to help participants become familiar with participatory approaches that are now widely recognized as crucial to the success of IPM implementation. A tour of the IITA-Bénin station offered participants an insight into novel IPM options that are currently being generated by research. Action planning led to formulation of resolutions and the formation of a Task Force to follow up on the recommendations. The internet website: <http://www.cgiar.org/spipm/news/ngomtg/ngowkmenu.html> was established,

initially to publish the outputs of the workshop and subsequently to serve as a focal point for exchanging information on follow-up activities.

- *Managing knowledge for local innovation, Article for BMZ/BEAF "spotlight" on Knowledge Management by Ann Waters-Bayer, NGOC member.*

Scientific databases on agriculture are expanding by the minute, but it is difficult to apply the information directly to development practice. Non-governmental development organizations (NGOs) have conceived an information system that combines scientific and local knowledge about agroecology and natural resource management (AE/NRM) and is intended mainly for development practitioners. Promising technologies and experiences in NRM will become accessible via an interactive development database "InterDev".

Much documented knowledge comes from science, but how can local innovations - products of knowledge generation by resource users - be fed into InterDev? How can other farmers be helped to access and apply information about these innovations in their own settings, so that they can generate new site-specific knowledge? "Prolinnova" (Promoting Local Innovation) addresses such activities "before" and "after" InterDev.

Studies of the processes and conditions of generating and spreading improvements in AE/NRM should inform decision-makers at various policy levels - therefore the need for a research network "PolicyNet".

At the Global Forum on Agricultural Research (GFAR) in Dresden, InterDev, Prolinnova and PolicyNet will be presented as an integrated set of mechanisms to strengthen partnerships in research and development in AE/NRM.

New paths in development-oriented research Why this initiative? Mainstream agricultural research has developed technologies applicable on well-endowed land. Meanwhile, many NGOs work directly with smallholders in marginal areas to develop site-appropriate technologies and strengthen local capacities to meet new challenges. These NGOs have learned to appreciate the dynamic indigenous knowledge. Many "success stories" of development in smallholder farming derive from local knowledge and experimentation. At farm level, the innovations are often biophysical measures following ecological principles; at landscape level, they are often institutional: new ways of jointly managing common resources. The innovations may be site-specific, but the ideas can inspire farmers in other areas and provide starting points for experimentation. Spreading these innovations can accelerate learning by others trying to improve their land-use systems.

In AE/NRM, especially where climatic variability is high, key factors for success are not external inputs, but labor, knowledge and local management capacity. Scientific research in AE/NRM must aim not to develop perfected technologies, but to develop local capacity to manage resources flexibly, access useful information, test new ideas,

assess the results and adapt to change. This demands new partnerships in generating and managing knowledge.

First steps

Initial ideas were developed by European-based NGOs offering information services in agricultural development. A meeting of these NGOs in Brussels and at the European Forum on Agricultural Research in Wageningen in early 1999 and a North-South meeting near Paris in late 1999 gave opportunities to develop the ideas further. A Steering Group with members from Africa, Asia, Latin America and Europe prepared a concept paper (see <http://www.egfar.org>) which is circulating more widely by email for reactions and suggestions, and hope for lively discussion and action planning at the GFAR. Meanwhile, first steps are already being tested.

InterDev. In the test phase for this shared database, initially only 7 organizations focus on 3 themes: agroecological farming, agroprocessing and urban agriculture, each with interlinked database subsets on: methods and technologies, practical experiences, resource organisations and individuals, multimedia, and bibliographic references. Mechanisms for description, validation, classification and exchange are being developed so that the information can be downloaded and adapted for local use, at the same time as local experience enriches the global database.

Prolinnova. To scale up the promotion of local innovation in AE/NRM through farmer-NGO-researcher partnerships, four types of activities are planned: 1. Identifying and documenting local biotechnical and institutional innovations 2. Joint stakeholder analysis of research approaches and methods to stimulate innovation, including analysis of a) investigating local innovation, b) joint action in further developing innovations, and c) jointly evaluating innovations and impacts 3. Training researchers in the new approaches and methods through various activities, including participation in multi-stakeholder learning groups 4. Regional and global research networks on AE/NRM based on local innovation.

PolicyNet. This research network will study options to improve NRM-related policy at local, national and international level, and make results available to policymakers. The collaboration is meant to strengthen the capacities of southern partners to conduct policy research. The initial focus will be on institutional and political conditions that favor development and spread of local innovations in NRM.

Linkages

InterDev is the pivot, where practice-proven information on AE/NRM flows together and is made accessible. Prolinnova includes mechanisms to identify and document innovations for InterDev, and to promote use of the information in participatory research. InterDev provides PolicyNet with data for comparative analyses and cases for studying conditions that influence innovation and scaling-up processes. The results of Prolinnova-inspired innovation and policy research flow back into InterDev. The initiative is designed to facilitate mutual learning by stakeholders in

research for development of sustainable land-use systems, and seeks linkages with relevant existing initiatives.

**Prospects for agroecologically based natural resource management for low-income farmers in the 21st century, prepared as an issues paper for the GFAR. Miguel A. Altieri and Jean Marc von der Weid, NGOC members.*

Alternative agricultural development approaches and agroecological technologies spearheaded by farmers groups and NGOs around the developing world are already making a significant contribution to food security at the household, national and regional levels in Africa, Asia, and Latin America. Increasing smallholders agricultural productivity not only increases food supplies, but also increases smallholders incomes, reducing poverty, increasing food access, reducing malnutrition and improving the livelihoods of the poor. Yield increases are being achieved by using technological approaches, based on agroecological principles that emphasize diversity, synergy, recycling and integration; and social processes that emphasize community participation and empowerment. When such features are optimized, not only yield enhancement and stability of production are achieved, but also a series of ecological services such as conservation of biodiversity, soil restoration, water harvesting, improved natural pest regulation mechanisms, etc.

Agroecological approaches are increasing production under environmental conditions that are far from ideal, such as on eroded hillsides of Central America, high barren plateaus of the Andes, semi-arid areas in the West African Sahel, exhausted lands in eastern and southern Africa, sloping areas in the Philippines and remote forest margins in many parts of Asia. That yields can be doubled or more in these areas is due in part to the low base of production from which these farmers start. However, absolute yield levels can also become high. These are areas where the need to increase production is greatest and where the soil, climatic and other conditions are most unfavorable. So relative to the poor resource endowments and the urgent human needs, the levels of production being newly achieved are quite significant, and they provide food directly to households that are most vulnerable to food insecurity. These experiences which emphasize farmer to farmer research and grassroots extension approaches, represent countless demonstrations of talent, creativity, and scientific capability in rural communities. They point to the fact that human resource development is the cornerstone of any strategy aimed at increasing options for rural people and especially resource-poor farmers.

Promising research areas for evaluation and promotion of alternative technologies and policies include: green manures, cover crops, polycultures, improved fallows, agroforestry, aquaculture, crop-livestock mixed systems, IPM, biological control, organic soil management and nutrient cycling, processes of technology adaptation and adoption, supportive policies, institutional partnerships and market development.

Results from agroecological initiatives are a breakthrough for achieving food security and environmental preservation among the rural poor in the developing world, but their potential and further spread depends on investments, policies, institutional support and attitude changes on the part of policy makers and the scientific community, especially the CGIAR and GFAR which should devote much of

its efforts to assist the 370 million rural poor living in marginal environments. But the task must be shared with NGOs and farmers organizations.

The ideal way to achieve a qualitative leap in agroecological research is to promote partnerships amongst the various stakeholders in agricultural development processes. One can imagine a variety of combinations amongst the following players: researchers, farmers, officially and NGO-employed extension agents, produce processing and marketing companies, companies supplying inputs (including small seed companies) and equipment, representatives of official programs, credit agents, environmental organizations, etc. Their roles will be quite differentiated, as will be the intensity of their inter-relations, but all will have a say about what products will reach the market, and how. Such partnerships must not be reduced to local alliances amongst partners in a development process, but must encompass broader national and international networks dealing with similar sets of problems, even in differing ecological realities. NGOs have already created such networks of alliances quite effectively, and their experience can be broadened to incorporate many more partners.

Clearly the new kind of pro-poor research will demand paradigmatic and methodological changes, as well as a capacity to intensify interdisciplinarity, in order for development workers to be able to balance ecological, agronomic, economic, cultural and social concerns. In addition to obvious changes in the profile of researchers and extension agents themselves, there must be changes in institutional procedures, to make them more flexible and decentralized, and to modify today's prevailing systems of professional evaluation, which are a major limitation for interested researchers to be able to move towards agroecological approaches.

Failure to promote a people-centered agricultural research and development due to diversion of funds and expertise to biotechnology will forego a historical opportunity to raise agricultural productivity in economically viable, environmentally benign and socially uplifting ways.

**Can genetically engineered crops feed a hungry world?*

San Francisco Chronicle , March 30, 2000, Miguel A. Altieri

MOST PROPONENTS of agricultural biotechnology assert that genetically modified crops are essential to feed the 840 million undernourished people in the world, and to reduce the poverty of the 1.3 billion people who live on less than \$1 per day. They believe that the biorevolution can be harnessed to serve the food and nutritional needs of the world's poor. But will such potential benefits of genetically engineered food crops ever become practical enough to rid the world of hunger? Pro-biotechnology scientists say that with new research methods, biotechnology can be used to develop new crop varieties that are drought tolerant, resistant to insects and weeds, able to fix nitrogen from the atmosphere and even increase the nutrient content in the edible portion of plants. Proponents say modern biotechnology offers enormous opportunities to poor farmers and low-income consumers in developing countries.

The first problem with that argument is that there is no relationship between the prevalence of hunger and a country's population. For every densely populated and

hungry nation like Bangladesh, there is a sparsely populated (but also hungry) country like Brazil.

Even in the midst of superabundance in the United States, there are between 20 million and 30 million malnourished people. Thus, even though crop yields per acre improved dramatically between the late 1960s and the early 1990s, these advances in agriculture have only trimmed the ranks of the world's undernourished by 8 percent - to 840 million from 920 million.

Poverty is the key reason why 840 million people do not have enough to eat. In the past 30 years, enough food was produced to feed everyone - had it been more evenly distributed. Hunger is not a matter of agricultural limits, but a problem of masses of people not having access to food or the means to produce it.

Biotechnology proponents, however, argue that food production will not keep pace with the growth of the global population, which is expected to add 73 million people every year from now until 2020. The biotechnology proponents say hunger will persist unless the potential of biotechnology is realized. I say, if the root causes are not addressed, hunger will persist no matter what agricultural technologies are used. At most, biotechnology has the yet-unrealized potential to deal with the issues of quality and quantity of food but does not address distribution and access. Insisting on technological solutions to hunger ignores the tremendous complexity of the problem. It is too easy to fall into the "paradox of plenty" -- more food accompanied by greater hunger. Any method of boosting food production that deepens inequality is bound to fail to reduce hunger.

This is particularly true for biotechnology, which is being promoted by private corporations to whom poor farmers (who produce most of the basic food crops in the developing world) do not represent an attractive market. For example, the new strain of rice that is capable of producing provitamin A, which is being heralded as the best that agrobiotech can offer the developing world, constitutes a solution that ignores the root causes of why there are 2 million children at risk of vitamin A deficiency. In rural areas of the developing world, food preferences are culturally determined. Asians will not likely consume "orange rice" in the midst of abundant white rice. In fact, Asian small farmers grow diverse rice varieties with varying nutritional content and adapted to a wide variety of environmental conditions. The resulting genetic diversity heightens resistance to plant diseases and enables farmers to derive multiple nutritional uses.

If, as expected, transgenic seeds continue to be developed and commercialized exclusively by private firms, poor farmers will continue to find them too expensive to purchase. The few that will have access to bioengineered seeds will be hurt by becoming dangerously "dependent" on the annual purchase of such seeds.

Choices are surely also being denied to poor farmers when private industries insist upon protecting biotech patents that deny seed saving, an aspect that is of fundamental cultural importance to traditional farmers, who for centuries have saved and shared seeds.

Food production will have to come from agricultural systems in countries with the largest population growth. This poses a major challenge for biotechnology in these tropical countries where farmers are not only resource poor - with no access to credit, technical assistance or markets -but where about 370 million rural poor live in arid or semi-arid zones or in steeply sloped areas.

In the past, such farmers were bypassed by advances in agriculture known as the Green Revolution because their soil, water and labor methods were unsuited to the demanding and costly management practices of improved seeds and accompanying need for pesticides and fertilizers. Biotechnology will exacerbate the problem even more. Some scientists and policymakers posit that a solution would be to increase government investments in biotechnology research. However, larger investments may not yield the desired results. Corporate legal rights to biotechnology is affecting the development of transgenic crops by public institutions. Moreover, the seed distribution channels and networks to reach farmers are being privatized, focusing on commercial farms rather than on poor farmers.

Much of the needed food can be produced throughout the world by small farmers using agroecological technologies. In fact, new rural development approaches and simple technologies spearheaded by farmers groups and nongovernmental organizations around the developing world are already making a difference. These results are a breakthrough for achieving food security and environmental preservation in the developing world, but realizing their potential depends on investments, policies, institutional support and attitude changes on the part of policymakers and the international scientific community.

Failure to promote such people-centered agricultural research and development will miss an historic opportunity to raise agricultural productivity in economically viable, environmentally benign and socially uplifting ways.

Other activities

On April 10-11, Miguel Altieri participated in the CGIAR Consultative Council meeting held at FAO in Rome. Although no major decisions were made at this meeting, NGOC Chair stressed the importance that CGIAR research sharpens its focus on the poor farmers living in marginal environments throughout the developing world (estimated at 370 million). NRM (including genetic resources) research should be the backbone of the CGIAR, and biotechnological innovations used as tools only when appropriate as a complementary approach. Partnerships with NGOs and farmers organizations will be crucial for the scaling up of already successful NRM experiences and the mobilization of a critical mass to rapidly achieve sustainable agriculture in areas so far bypassed by modern science. Task forces inclusive of grassroots organizations can be a flexible and fast organizational instrument to act the local level.

A regional approach to NRM is the only sensible way to create viable partnerships between research and development agencies in order to mobilize human and material resources to crystallize NRM approaches in specific ecosystems of each region.

The protection of the public and free access nature of CGIAR's work can be best achieved by concentrating on NRM and downplaying types of biotechnological work increasingly becoming subjected to proprietary measures. The example of the golden rice for which there are 30 patents is a good reminder for the system as it advances its pro-poor agenda in a complex world of privatized science and patented innovations.