



Strengthening National Programmes for Plant Genetic Resources for Food and Agriculture: Planning and Coordination

Charlie Spillane, Jan Engels, Hareya Fassil,
Lyndsey Withers and David Cooper

Abstract

Efficient and well-coordinated national programmes on plant genetic resources for food and agriculture (PGRFA) can contribute greatly to national socioeconomic development. The recent broadening of interest in the management and use of plant genetic resources calls for the wider involvement of different sectors and stakeholder groups in national PGRFA programmes and planning processes. If PGRFA activities are to meet current and future national needs, they require effective coordination, both horizontally – across different sectors, ministries and stakeholder groups – and vertically – between policy, institutional and field-level activities. Such coordination can minimize duplication of effort and ensure complementarity between activities. Some countries may wish to establish broader national programmes integrating the management of other forms of genetic resources such as animal, forestry, fish and microbial genetic resources. While this paper focuses on programmes for the conservation and use of PGRFA, many of the issues and options presented are equally valid for national programmes with a broader scope.

This paper reviews national PGRFA planning processes and the purpose, functions and possible activities of a national PGRFA programme. Each country will need to define the purpose, functions and activities of its programme according to national needs and objectives. Recognizing that different programme structures may be necessary for different countries, the requirements for meeting core functions are identified, and issues and options for structural organization and planning processes are reviewed, with reference to the experiences of existing national programmes. Major stakeholder groups are identified, and the importance of involving them fully in the planning process is emphasized. The opportunities for integrating PGRFA planning with other national planning processes are highlighted. Regional options for collaborative PGRFA activities between countries are also discussed. The paper concludes by suggesting that participatory planning processes and flexible national programme structures are likely to be the most appropriate, if the continual changes taking place in the physical, biological, policy, legal, economic and social environments are to be dealt with in a manner that effectively supports national socioeconomic development.



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Comments and queries on the contents of this paper are welcome and should be addressed to:

Volume Editor: Jan Engels <J.Engels@cgiar.org>
Genetic Resources Science and Technology (GRST)
IPGRI, Via delle Sette Chiese 142, 00145 Rome, Italy

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IPGRI
Via delle Sette Chiese 142
00145 Rome, Italy

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Foreword

In recent years it has been increasingly recognized that a wide range of stakeholders are actually involved in the conservation and sustainable use of plant genetic resources for food and agriculture (PGRFA), including farmers who manage diversity on-farm, breeders who use genetic resources in their crop improvement programmes, and collectors and genebank curators.

Similarly, it is recognized that the conservation and sustainable use of PGRFA — a key component of biological diversity — can make major contributions to sustainable agriculture. But for this potential to be realized, planning of PGRFA conservation and use activities needs to be carried out in the wider context of national plans for development and environmental management.

The Global Plan of Action for the conservation and sustainable use of plant genetic resources for food and agriculture, adopted at the International Technical Conference, Leipzig, in 1996 reflects these developments, and provides further impetus to them. It gives high priority to building strong national programmes to plan, coordinate and promote country activities.

This publication is intended to assist countries in strengthening the coordination and planning functions of national programmes for PGRFA and adjusting existing programmes to a continuously changing environment. Building upon the recommendations of the Global Plan of Action, and the findings of the Report on the State of the World's PGRFA, it reviews existing practices in a range of countries to highlight key functions of national programmes and provides options on how these can be addressed.

It is hoped that this publication will also contribute to the integration of national programmes for plant genetic resources in national biodiversity strategies and action plans being prepared for the Convention on Biological Diversity.

Geoffrey Hawtin
Director General
International Plant Genetic
Resources Institute

Mahmud Duwayri
Director, AGP
Food and Agriculture Organization of
the United Nations

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Executive Summary

Plant genetic resources for food and agriculture (PGRFA) are vital for national food security and development, especially in developing countries. Strong national PGRFA programmes can help countries improve the conservation and use of PGRFA and are the building blocks for efficient international PGRFA efforts.

The need to strengthen national PGRFA programmes has been widely recognized both at national level and in various international agreements, including the Convention on Biological Diversity (CBD), the International Undertaking on Plant Genetic Resources and the Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture.

Effective planning and coordination are essential ingredients of a strong national PGRFA programme. They are particularly necessary in view of a third characteristic of strong programmes – their need for a high degree of stakeholder involvement.

Rationale

Stakeholder involvement. The successful conservation and sustainable use of PGRFA requires action by a wide range of people in each country. Involving representatives of different stakeholder groups in planning and implementing the national PGRFA programme is vital because it instils a sense of ownership of the programme and hence a sense of responsibility for its success.

Germplasm users, including plant breeders as well as genebank curators, must be involved in national programmes. Farmers' groups and other non-government organizations (NGOs) are still under-represented in national PGRFA planning processes, but their involvement is growing. It must continue to do so if political and public acceptance of PGRFA activities is to be sustained. Given the increasing involvement of the private for-profit sector

in PGRFA activities, national PGRFA programmes need to integrate private-sector concerns into their planning processes if they have not already done so.

Coordination. The effectiveness of national PGRFA conservation and use depends greatly on collaboration between individuals and institutions with differing stakeholder interests. PGRFA activities often span different sectors, such as agriculture, forestry, natural resources and even tourism. They are increasingly complex, often giving rise to problematic issues relating to the ownership of knowledge and resources.

All this implies the need for coordination between the different components of the national PGRFA programme. Coordination needs to be both horizontal – between different ministries and sectors – and vertical – between the policy-making or planning level and the institutional and field levels at which activities are implemented.

Coordination at the policy level can enhance programme efficiency by, for example, ensuring that different ministries integrate their approaches to the development of different sectors, ironing out any confusion over objectives, roles and responsibilities. It is also important for the purposes of presenting a coherent national viewpoint at international fora. At the institutional level coordinating is needed to avoid conflicts and promote synergism between the activities of different groups. This is particularly relevant given the funding cut-backs currently affecting the public sector, which necessitate greater programme efficiency. Coordination at the institutional level can also help increase the capacity of the programme and bridge gaps in its coverage, for example by enlisting universities and colleges in the collection and evaluation of germplasm in neglected species. Field-level coordination is important in

linking the activities of different groups, notably farmers, NGO workers, extensionists and formal-sector scientists, many of whom can benefit from greater contact with one another, particularly in areas such as germplasm exchange.

A well-coordinated national programme can help develop and express a national consensus on PGRFA issues, acting as an intermediary between the higher echelons of government and the many stakeholders in the country as a whole.

Planning. The many stakeholders and complex nature of PGRFA activities mean that a broad participatory process is needed to develop a national strategy and plan for PGRFA activities.

The Global Plan of Action, developed through a country-driven process leading up to the 1996 Leipzig Conference at which the Plan was adopted, serves as a framework for guiding national planning. Many countries are currently building on the consultation process that led to the Plan to launch their own strategic planning processes. National PGRFA plans can be developed as components of a broader national biodiversity strategy or action plan, and should be linked to other relevant national plans, such as those for development and the environment. The most effective PGRFA plans will be those designed to meet broader national planning objectives. Learning from other planning processes is a key advantage of not planning in isolation.

The best planning processes are iterative, leading to an evolving set of priorities and actions that respond to changing needs over time. The resources allocated to the process should take the need for periodic re-assessment into account. Provisions for monitoring implementation should also be built into the plan.

Countries also need to develop national policies on specific aspects of PGRFA management, such as access, exchange and the sharing of benefits. PGRFA policies, like na-

tional plans, are best developed through a broad consultative process involving representatives from all stakeholder groups.

Components of a national programme

Planning processes. Planning is necessary to ensure that national objectives for the conservation and sustainable use of PGRFA are met. Needs assessments, involving consultation with stakeholders, are a prerequisite. At present, the process of developing a national plan can draw upon the momentum established in the preparatory process for the Leipzig Conference, and the Global Plan of Action, which resulted from that, can serve as a guiding framework. National PGRFA plans can be developed as components of broader National Biodiversity Strategies and Action Plans, or, alternatively, be developed separately. Also a range of other national plans in areas such as agriculture, environments and general socioeconomic development can be used as the content for national PGRFA plans.

National policies. Because of the interdependency of countries with respect to PGRFA, national programmes are likely to need to gain access to genetic resources from other countries. To facilitate this, appropriate national policies will be required. Governments are currently negotiating international norms for access, exchange and benefit-sharing through the revision of the International Undertaking in order to bring it into harmony with the CBD. Also, other national policies might affect the conservation and use of PGRFA and therefore consultative processes involving all stakeholders in the development of such policies are important.

Committees. Ideally, a broadly based national PGRFA committee should have the responsibility for planning, coordinating and facilitating all aspects of national PGRFA conservation and use, and linking the various stakeholder groups involved.

Criteria for selecting the representatives of stakeholder groups to be committee members include knowledge of relevant issues, motivation and involvement in relevant activities, and power to mobilize key resources. Clearly worded mandates, unbureaucratic decision-making processes and transparent relationships between the committee and other national bodies will all promote the committee's effectiveness.

Focal points. A useful mechanism for coordinating a country's response to external PGRFA matters is the national focal point. This can be a designated individual, such as the chair of the existing national committee, a government institution or a high-level task force. Many countries have already established a National Biodiversity Unit as the focal point for the coordination of national activities related to the Convention on Biological Diversity. In such cases the PGRFA focal point could be a component of this unit. National focal points may also assist in generating external assistance for PGRFA activities.

National focal points are likely to become increasingly important in facilitating the international exchange of germplasm and in overseeing the equitable sharing of benefits from PGRFA activities.

Programme structures

National PGRFA programmes are of two main kinds, centralized and sectoral. In centralized programmes, a single institution, such as a national plant genetic resources centre, both coordinates and implements most national PGRFA activities. A major advantage of this approach is that the institution has a clear leadership role in domestic activities while also serving as the sole point of reference for external matters. Dangers are that national activities can be dominated by the institution and that *ex situ* conservation may be overemphasized. In sectoral programmes, a range of institutions with separate mandates take

responsibility for different commodities and activities. This model takes advantage of the specialized knowledge and resources of each institution, but it also requires clear delegation of responsibilities and strong coordination across ministries and sectors.

A third model also exists, in which a country has no formally established PGRFA programme but nevertheless has significant PGRFA conservation and use activities, coordinated by a national committee or similar mechanism. Where the coordination mechanism works well, this approach can be as effective as a formally constituted programme, but its disadvantages include lack of formal recognition by government and lack of a secure budget.

Mechanisms for promoting coordination, communication and collaboration

National PGRFA programmes require efficient mechanisms for communicating among stakeholder groups and coordinating activities at the operation level. This can be achieved through networks, lower-level committees, task forces, consortia and so on. These may be crop-specific, based on a specific zone or region, or devoted to a specific theme.

Crop-specific networks are an excellent way of organizing such activities as germplasm collecting, conservation, evaluation and enhancement. They can also be used to promote the exchange of germplasm, greatly enhancing its use. With their relatively narrow focus, they are suitable mechanisms for bringing together specialists from different disciplines to set priorities, plan activities and evaluate impact. Participation in networks can be especially advantageous for countries with a limited national capacity and resources. Farming system or zone-specific bodies are an option for countries that have numerous or complex farming systems. They can be particularly useful in promoting partnerships between farming communities and the formal scientific or government sector.

Theme-specific bodies can be used to build capacity in areas of strategic national importance, such as agricultural diversification, integrated pest management, gender and biotechnology.

Local-level fora may be important in building farmer participation in research and links with the formal sector. They can contribute to the national PGRFA programme not only by strengthening community management of PGRFA but also by exerting a demand pull on the programme's products and services. Examples include local agricultural research committees in Latin America and farmer field schools in Asia. The most urgent need in spreading the use of such fora is to address the problems associated with scaling up and sustaining activities with reduced levels of external support.

Other mechanisms for enhancing planning, coordination and collaboration include workshops or conferences, and Email. National workshops are often used to launch a new programme or programme component, and frequently form part of the national planning process. They are a powerful means of forging consensus between different stakeholder groups. Email is becoming increasingly used as developing countries come on-line, as it cuts the costs and increases the speed of interaction between stakeholders.

Collaborative regional PGRFA programmes or networks can complement national activities and enhance their cost-effectiveness. They provide a useful forum for planning, needs assessment, priority-setting and actual implementation of conservation and use activities.

Buildingsupport

Since most national PGRFA programmes are funded largely by public money, it is important to generate public and political support for them. Public awareness programmes are the key to mobilizing this support. Such programmes can target a

variety of audiences, such as policy-makers, schools and NGOs, and use a variety of media, including national radio and television, newspapers and public lectures.

Many PGRFA activities are long term, yielding benefits only after a decade or more. The national PGRFA programme therefore needs to be seen as a long-term investment and afforded a legal status and funding that will be resilient to shocks, such as recessions or changes in government. Often a small amount of funding consistently provided over 10 to 15 years can achieve more than a higher level of funding available only over a 3-year period.

Identifying and reviewing funding sources is an important function of the national PGRFA programme, especially in the many developing countries where external funding will continue to be essential for the foreseeable future. Programmes will need to do more to distribute information about potential donors and to help stakeholder groups to prepare project proposals.

Conclusion

Strengthening their national PGRFA programmes presents governments with a formidable challenge. Given the importance of PGRFA resources for food security and development, a timely and appropriate response to this challenge can only reap substantial benefits.

I. Introduction

Plant genetic resources for food and agriculture (PGRFA) encompass the diversity of genetic material in traditional and modern crop varieties, breeders' populations, crop wild relatives and other plants that can be used to support food and livelihood security. There are strong economic, social and cultural reasons for countries to conserve, enhance and use these resources. As raw materials essential for national agriculture and food production, PGRFA constitute a public good which is vital to a country's economy. States have sovereign rights over the plant genetic resources within their borders, the authority to establish how those resources are maintained and distributed, and the responsibility for ensuring that they are conserved and sustainably used.

Well-coordinated national PGRFA programmes or systems¹ can help achieve these responsibilities and objectives. They are also the foundation for an efficient regional or international PGRFA effort. They are necessary building blocks for promoting international cooperation on access to PGRFA and the fair and equitable sharing of the benefits arising from their use. This aspect is particularly important given the interdependence of countries with regard to PGRFA: no country is self-sufficient in these resources and national production systems often rely heavily on genetic materials and related technologies found or originating outside their borders (Cooper *et al.* 1994).

To date, the primary purpose of PGRFA conservation and use has been for agricultural development, and more specifically for crop improvement through plant breeding. Where such activities are performed by national institutions, they are usually the responsibility of particular genebanks or plant breeding programmes within a national agricultural research centre.

Many PGRFA conservation and use activities have been highly successful and have already contributed significantly to

the development of improved crop varieties with increased yields. However, plant breeders could doubtless make even more effective use of PGRFA than they do at present, both through conventional plant breeding (and pre-breeding) and through the new biotechnologies. Since PGRFA are vital to the long-term prospects of a number of economic sectors, including forestry, industry and medicine as well as food and agriculture, many other groups besides plant breeders also need to be involved in their management. Even within agriculture, the full benefits of PGRFA conservation programmes are often not realized because of poor links between germplasm curators and potential users – notably plant breeders and farmers.

Only through effective consultation and communication between relevant stakeholder groups can truly efficient national PGRFA programmes be developed. Some countries have already established effective mechanisms for the national-level coordination of PGRFA activities, while others are in the process of developing such mechanisms. In 1975, the International Board for Plant Genetic Resources (IBPGR) reported that there were approximately 10 national PGRFA programmes in existence globally (IPGRI 1993). Since then, increasing awareness among governments of the importance of PGRFA has vastly improved matters such that, in 1995, about half of the countries reporting indicated that they had national PGRFA programmes of one kind or another (FAO 1998:200). Most such programmes are part of national agricultural research systems (NARS) under the auspices of the Ministry of Agriculture (Bellon 1994). However, not all of them accommodate the degree of planning, coordination and stakeholder involvement required to achieve their full potential.

The need to strengthen national-level coordination of PGRFA activities is reflected in

Box 1. National PGRFA programmes

Overall purpose

To contribute to national development, food security, sustainable agriculture and the maintenance of biodiversity through the conservation and use of PGRFA.

Essential coordination functions

- A. Contribute to the development of national policies, plans and strategies
- B. Coordinate and oversee the implementation of national activities, involving all stakeholders; promote links
- C. Provide basic building blocks for regional and international collaboration.

Programme activities *

- Inventorying, exploring, collecting
- Conservation *in situ* (on-farm) and *ex situ*
- Characterization and evaluation
- Genetic enhancement
- Crop improvement
- Seed/variety production and distribution
- Documentation and dissemination of information
- Training and capacity-building
- Research and development
- Fund-raising
- Development of appropriate legislation
- Regulation of access to and exchange of PGRFA
- Public awareness

Stakeholders and partners

- Government ministries and departments (e.g. agriculture, forestry, natural resources, environment, science and technology, planning, finance, trade, research and education)
- Local authorities
- Universities, research and other educational institutions, extension services
- Non-government organizations (NGOs), farmers' organizations, rural women's groups
- Private-sector and parastatal companies, export promotion agencies, etc.
- Regional and international organizations and networks.

Source: FAO 1998:199.

* Although these are typical activities for any national programme, they are not necessarily being implemented by the programme itself. *In situ* (on-farm) conservation is, for instance, carried out by farmers and genetic enhancement is frequently being implemented by a specialized institute.

various international agreements, including Agenda 21, the Convention on Biological Diversity (CBD) and the International Undertaking on Plant Genetic Resources (which is currently being revised through negotiations taking place under the auspices of the FAO Commission for Genetic Resources for

Food and Agriculture). The Convention, which is legally binding, requires that each party "shall develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity".² More specifically, the Global Plan of Action for the Conservation and Sustainable Utili-

zation of Plant Genetic Resources for Food and Agriculture, adopted at the FAO International Technical Conference on Plant Genetic Resources, Leipzig, Germany, 1996, identifies the strengthening of national programmes as one of its primary objectives. One of the Plan's 20 priority activities is the "building of strong national PGRFA programmes" (FAO 1996).

In fact, in the country-driven preparatory process leading up to the Leipzig Conference all 12 of the preparatory subregional meetings and most of the 158 country reports recommended that priority be given to strengthening national PGRFA programmes (FAO 1998:197). In drafting the Global Plan of Action, countries recognized that many existing national programmes suffer from poor planning and management, exacerbated by lack of resources and isolation from related activities (FAO 1996). National-level strategic planning and coordination was felt to be essential for the cost-effective use of resources, including funds (FAO 1998:203). Largely as a result of the momentum created by their preparations for Leipzig, and as part of their efforts to implement the Plan, many countries are now in the process of strengthening or establishing their PGRFA programmes. By 1998 it was estimated that over 100 countries had national programmes of some kind – an increase of some 40% over the number three years earlier.

It is important that each country's national programme has a clear mission or statement of its purpose, developed to suit its own needs. The overall purpose identified by almost all countries during the preparatory process for Leipzig is to contribute to national development, food security and sustainable agriculture (FAO 1998:197). This is the purpose shown in Box 1, along with the essential coordination functions of a national programme, examples of programme activities, and potential partners and stakeholders. These latter are examined in more detail in subsequent sections.

In developing countries in particular, sustainable socioeconomic development and poverty eradication should be the overriding objectives of genetic resources work (UN 1992). If decisions and activities at the policy or institutional levels are to have a significant impact on development, it is essential that the users of PGRFA, particularly plant breeders and farmers, be involved in their formulation and implementation. Similarly, PGRFA plans and programmes should be integrated with those for the agricultural sector as a whole, which are usually also oriented toward poverty eradication and development. As noted in the World Food Summit Plan of Action, the conservation and use of plant genetic resources are essential for achieving food security and sustainable increases in agricultural productivity. In particular, the improved management of such resources can improve the livelihoods of resource-poor farmers in marginal areas.

Because plant genetic resources activities span the environment, agriculture and development spheres, they may be pivotal in reconciling environmental concerns with development needs. For example, increased and more strategic use of PGRFA will be necessary for the development of crop varieties suited to marginal lands, while in high-productivity areas, mounting pressure to reduce the use of environmentally harmful agrochemicals implies greater reliance on the use of PGRFA diversity. Such issues are reflected in both the CBD and Agenda 21, both of which call for the integration of biodiversity conservation and use into relevant sectoral or cross-sectoral policies, plans and programmes.³

II. The rationale for multi-stakeholder national PGRFA programmes

Facilitating the involvement of all stakeholder groups

In all countries the conservation and use of PGRFA require action by a wide range of people, including planners, scientists, germplasm curators, breeders, extensionists, rural communities and farmers. Box 2 summarizes some of the advantages of involving all stakeholder groups in planning and implementing national programmes. Many countries may have only a handful of professionals working specifically on plant genetic resources, but a much larger number who are involved in some way in conservation or use. At the same time hundreds of thousands, or even millions, of farmers may be engaged in the management of PGRFA on their farms. Thus involvement of these various stakeholder groups, through adequate representation, may greatly increase national capacity.

The activities of farmers and rural communities are by nature decentralized, with links to formal government or institutional activities that are often weak and sometimes non-existent. Yet it is vital to secure the participation of such people in the national programme because of their direct interest in and day-to-day management of PGRFA. More and more countries are seeking the involvement of farmers in all agricultural research activities, for reasons of both efficiency in technology development and equity in the distribution of the benefits of development. Several cases of the successful participation of farmers in the improvement of PGRFA have been documented (Eyzaguirre and Iwanaga 1996).

Most countries now have non-government organizations (NGOs) that are active in agricultural and rural development. The NGO sector is as distinct from the profit-seeking private sector as it is from the public or government sector, but it interacts

Box 2. Why involve all stakeholders?*

Involving the full range of stakeholders, through adequate representation, in national programmes and planning processes:

- maximizes the number of actors in PGRFA conservation and use, broadens the knowledge base and may reduce costs (through the sharing of tasks) and increase effectiveness
- allows the diversity of needs to be understood and addressed, thereby facilitating the definition of programme objectives
- boosts morale and increases the sense of ownership of the national programme or plan
- builds a constituency for PGRFA conservation and use, which helps generate political and practical support for these activities.

* Based on the conclusions of a workshop on national programmes at the Regional Meeting for Eastern and Southern Africa to Promote Implementation of the Global Plan of Action, Gaborone, Botswana, May 1998.

with both of these (Farrington *et al.* 1993). NGOs are typically group members of a local community, farmers, people with a shared special interest, people committed (or opposed) to a specific development or conservation project, and so on. They increasingly represent an important, though fragmented, contributor to conservation and local-level crop improvement.

Despite their direct livelihood interest in the conservation and use of PGRFA, farmers' groups and other NGOs are still underrepresented in national PGRFA planning processes. The Global Plan of Action

states that links need to be developed and strengthened both within this sector and between it and the formal sector. Nevertheless, the involvement of farmers' groups in on-farm conservation and crop improvement is growing, and there are some outstanding examples in which such groups are not only represented in planning and guiding NARS activities but have actually achieved an impact in redirecting resources toward users' needs (Arnaiz 1995).

Given the almost universal decline in funding for public-sector agricultural research, including PGRFA conservation and use, the active involvement of key stakeholders such as farmers in the planning and execution of activities is now considered to be essential if such activities are to warrant the term 'demand-driven' and are hence to prove politically acceptable over the longer term (Ashby and Sperling 1995).

The public and the private (for-profit) sectors have important and complementary roles in the conservation and sustainable use of PGRFA, as recognized in the CBD, Agenda 21 and the Global Plan of Action.⁴ The private sector may be particularly important in linking conservation and use. However, its activities tend to be limited to those that will realize a profit in the short term. These activities include germplasm characterization and crop improvement (increasingly through biotechnology applications), as well as the production and distribution of seed, mainly for commercial crops.

The improvement of crops that are only regionally or locally important, or that are grown mostly by poorer farmers for subsistence (such as cassava, yams, plantains and millets), is rarely financially viable and is therefore generally of less interest to companies (though there are exceptions). Private-sector involvement in long-term conservation activities is usually limited to vertically integrated industries in which the same companies improve, produce and market the crop (oilpalm, rubber and

sugarcane, for example). Public-sector support is therefore vital for many activities that are socially or economically desirable, including long-term conservation and pre-breeding, the development of minor and underutilized plant species, and crop improvement for resource-poor farmers and marginal environments. It may, however, be possible to promote the dissemination of traditional and improved seeds through the development of small-scale "entrepreneurial" seed production activities among such farmers.⁵ The extent of private-sector involvement in PGRFA activities varies from country to country at present, but current trends suggest that all national PGRFA programmes need to integrate private-sector concerns into their planning processes if they have not already done so.

Improving efficiency through better coordination

The effectiveness of national conservation and use depends greatly on collaboration between ministries, sectors and institutions with differing stakeholder interests. Coordination is needed to promote and sustain this collaboration. Inadequate coordination risks the fragmentation and duplication of efforts, or even the development of separate national strategies, plans and programmes whose objectives may conflict. The increasingly complex nature of PGRFA activities is a further factor implying the need for effective coordination in policy formulation, planning and implementation of PGRFA conservation and use activities. Coordination should also ensure that priorities are correctly identified, that the allocation and use of resources reflects these priorities and that national policies are effectively translated into national activities.

Horizontal coordination is needed across different sectors and ministries and between different institutions and stakeholder groups. However, horizontal coordination alone is unlikely to be adequate; it needs to be complemented by

vertical coordination within each sector or ministry, linking policy formulation and planning with the various levels at which activities are implemented. National programmes should be structured so as to foster the flow of information between these different levels and sectors.

Policy-level coordination. PGRFA activities such as *ex situ* conservation and plant breeding have traditionally been under the remit of the Ministry of Agriculture, while *in situ* conservation usually comes under ministries or departments concerned with forestry, environment, natural resources and, in some cases, tourism (FAO 1998:202). To clarify roles and responsibilities, many countries urgently need better coordination between the different ministries dealing with agricultural development and planning, PGRFA management, biodiversity/wildlife conservation and land-use planning. This policy-level coordination will reap internal benefits to national socioeconomic development. It may also bring secondary benefits in the form of more coherent interaction with public- and private-sector bodies outside the country. For example, it could lead to a common national position at the ministerial level in response to germplasm requests from abroad.

Institutional-level coordination. Policies and legislation are typically translated into concrete plans and activities by numerous types of institutions and organizations. Such institutions can be public, private, formal or non-formal. Examples at the national level include government ministries, NARs, universities, trade associations, labour unions, colleges, NGOs, companies and political parties. Foreign institutions such as donors, NGOs and companies may also be relevant to the translation of national policies and legislation into concrete activities. The institutional level is therefore in essence composed of structures that function to link policies to the operational

level. Many institutions explicitly or implicitly control the distribution of costs and benefits through regulatory and service delivery mechanisms. The institutional level is an important level to actively consider in any national PGRFA programme if tangible benefits are to be realized at the field level.

Since different institutions typically concentrate on different PGRFA activities, each with their own objectives, it is highly desirable to promote links between them, at least to avoid the potential for conflict and, if possible, to create synergism. For example, an institution responsible for the *in situ* conservation of biodiversity might consider agricultural practices in protected areas to be a threat to its conservation objectives, whereas in fact the sustainable harvesting of wild plants could actually contribute to the conservation effort. Effective communication can often overcome such problems. Similarly, stronger links between plant breeders and genebanks can lead to more effective use of collections, thereby increasing the incentive to maintain the genebanks. Improved links between botanic gardens/arboreta and the agricultural sector could reveal opportunities for the development of new or underutilized crops.⁶

Even where institutions are formally linked and operate as part of a broader programme or system, there may still be opportunities for more effective links. Because many NARS are organized as discipline- or commodity-oriented sections or institutions, coordinated cross-institutional planning is a major challenge. For example, NARS usually focus on domesticated crops and trees of major production value, but a number of important or potentially important commodities (or commodity groups) fall outside these categories. Industrial and plantation crops, like medicinal plants, may be under separate ministries or organizations, or else managed primarily by the private sector. Underutilized and wild plants important to rural livelihoods are

frequently neglected by NARS. Better links can be instrumental in efficiently bridging such gaps in a resource-effective manner. Institutions such as universities and colleges, which are not normally considered as part of the core national system, can, given suitable links, play a key role in the generation of knowledge and technologies through research on PGRFA, being active in areas such as germplasm collecting, characterization, evaluation, use, genetic diversity studies and biotechnology. Moreover, such institutions are also active in training to meet future national needs and are often eager to respond to requests to collaborate or to priorities identified in instruments such as national plans (FAO 1998:209).

In many countries, public-sector funding for PGRFA conservation and use, as well as for related agricultural research, has been limited and is currently decreasing (Anderson *et al.* 1993). This resource constraint makes it even more urgent to mobilize and coordinate more efficiently the limited financial, human, institutional, technological and genetic resources that are available.

Field-level coordination. If decisions and activities at the policy and institutional levels are to have a significant impact on development, it is essential that the users of PGRFA at the field level should be involved through adequate representations in national PGRFA programmes. Yet individuals or groups working on PGRFA activities in the field often have little knowledge of the existence of other stakeholders with complementary expertise or activities. Moreover, links between formal-sector researchers and people in the informal sector, notably farmers and NGO workers, are often weak. Many resource-poor farmers and rural communities in developing countries could benefit greatly from access to a wider range of plant genetic resources and related technologies. And many at work in

the formal sector are interested in increasing their access to the landraces and associated indigenous knowledge held by rural communities. Yet farmers' organizations may have little influence over the direction of national agricultural research, often having no links with the formal sector except through extension agents, whose work may not include any plant genetic resources activities (Ashby and Sperling 1995).

The benefits of involving users in research and development have long been recognized by successful private-sector companies (Souder 1980). It is relatively easy for such companies to identify their markets as those who both need their products and can afford to buy them. Public-sector bodies find it much harder, since they may be required to meet the needs of different client groups, which may be difficult to identify precisely. Very few public-sector agricultural research institutes have incentive schemes which tangibly reward those who successfully meet clients' needs or work with them as partners (Collion and Rondot 1998).

National-level coordination of policy objectives in intergovernmental fora

Governments negotiate and develop strategies for international cooperation in PGRFA conservation and use through a range of intergovernmental fora. The two fora most relevant to national PGRFA activities at present are the Conference of the Parties to the Convention on Biological Diversity and the FAO Commission on Genetic Resources for Food and Agriculture.

Many countries are represented at each of these fora by delegates from different ministries. A total of 153 national CBD focal points were listed as participating in the Third Conference of the Parties to the Convention. As far as could be ascertained, 103 were from Ministries of the Environment, Natural Resources or Nature Protection, while most of the others (37) came from Ministries of Foreign Affairs or Permanent Missions to the United Nations (UNEP 1996). In

contrast, many participants at the FAO Commission are from Ministries of Agriculture. Clearly, there is a strong need for inter-ministerial coordination to ensure that complementary objectives are pursued and compatible positions held at the different fora.

Besides the CBD Conference and the FAO Commission, national PGRFA programmes should be aware of the existence of many other intergovernmental fora, such as the conferences of parties to the other conventions concerned with natural resources, the UN Commission on Sustainable Development, and the Trade Related Intellectual Property Rights (TRIPs) Council and the Committee on Trade and the Environment of the World Trade Organization (WTO).

Governments are now confronted with increasingly complex policy, legal and institutional issues relating to agriculture, environment, trade and biological resources. These include issues of ownership, intellectual property rights, access, technology development and trade.

International agreements of importance to the conservation and sustainable use of PGRFA are listed in Box 3. Agreements such as the CBD and the Marrakech Agreement establishing the WTO are binding on those countries that have adopted them. Action plans such as Agenda 21 and the Global Plan of Action also represent the agreed approach of the world's governments in the area of PGRFA. Some instruments still under negotiation, such as the International Undertaking and the Biosafety Protocol to the CBD, are likely to be of great importance, and the active participation of national programmes in these negotiations is necessary to ensure that the agreements reached are satisfactory to the majority of stakeholder groups.

National-level coordination in these processes is necessary for several reasons. First, because of the sheer complexity of many policy, legal and institutional issues, an interdisciplinary approach to their resolution is required. Second, while the conservation and use of different categories

of biological resources may require different technical approaches, many of the policy and management issues they raise are quite similar, such that a coordinated effort brings benefits, both to the knowledge base required for negotiation and to the development of solutions (FAO 1998:199). Third, and perhaps most important, policy-level coordination across different ministries is essential if governments are to develop clear and unambiguous national positions on key issues.

Moreover, stronger coordination between ministries and sectors is also needed for the purposes of feedback, to provide national PGRFA programmes with accurate information on issues under international negotiation and on the state of the negotiations. This feedback will enable national programmes to both influence and assess the impact of international developments and incorporate appropriate provisions into their institutions and practices (FAO 1996). Likewise, government representatives participating in intergovernmental meetings dealing with PGRFA-related issues need to be well informed of the needs and priorities of the country's various stakeholder groups. A well-coordinated national programme can play a catalytic role in developing and expressing a national consensus on relevant issues, acting as an intermediary between the higher echelons of government and the many stakeholders in the country (Levy *et al.* 1992).

Box 3. Relevant international agreements

Food and agriculture

- World Food Summit Plan of Action (1996)
- Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (1996)
- International Undertaking on Plant Genetic Resources for Food and Agriculture (1983, under revision)
- International Plant Protection Convention (1951)

Natural resources and sustainable development

- Convention on Biological Diversity (1992)
- Agenda 21: Programme of Action for Sustainable Development (1992)
- Rio Declaration on Environment and Development (1992)
- Rio Statement of Forest Principles (1992)
- International Tropical Timber Agreement (1983)
- Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitats (1971, 1982)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)
- Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)
- Convention Relative to the Preservation of Fauna and Flora in Their Natural State, London (1933)

Trade and intellectual property rights

- Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations (GATT, 1994), including:
 - World Trade Organization Trade Related Intellectual Property Rights (TRIPs) Agreement (1994)
 - GATT Agreement on the Application of Sanitary and Phytosanitary (SPS) Measures (1994)
 - International Union for the Protection of New Varieties of Plants (UPOV, 1978, 1991)
 - UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (1970)
 - The Patent Cooperation Treaty (1970).

III. Functions and core elements of a national PGRFA programme

Purpose and functions

As noted earlier, the overall purpose of most national PGRFA programmes is to contribute to national development and sustainable agriculture. It is within this context that programmes aim to identify and address national PGRFA priorities. The activities required to meet these priorities will vary between countries depending on factors such as (i) how well-endowed countries are with genetic resources, (ii) their capacity in conservation, crop improvement and seed distribution, (iii) the needs of different groups of farmers and other users, (iv) broader national socioeconomic development priorities, and (v) the size and diversity of the country and its farming systems.

Despite the wide range of possible activities, countries participating in the preparatory process for the Leipzig Conference identified basic functions which all national programmes are likely to be required to perform in order to ensure the efficient implementation of activities of conservation and use of PGRFA:

- developing policies, plans and strategies to meet national objectives for PGRFA conservation and use
- coordinating activities within the country, thereby facilitating participation and cooperation among stakeholders
- facilitating regional and international collaboration, and maximizing national benefits from such collaboration.

Core elements

Just as the activities of a national programme will vary between countries, so also will its structural requirements. However, some basic components or core elements can be identified.

They fall into two groups:

- national PGRFA policies and plans, including policies on access to and exchange of PGRFA
- coordination mechanisms, including a national PGRFA committee (or similar multi-stakeholder coordinating body) and a national focal point and/or coordinator for PGRFA activities, including international cooperation.

National PGRFA plans and policies

Planning processes. Planning is necessary to ensure that national objectives for the conservation and use of PGRFA are met. Box 4 indicates some of the essential steps in developing a national plan.

It is important to get the planning process right, rather than trying to produce a national plan too rapidly. Social and economic needs assessments, involving consultation with stakeholders, are a prerequisite. It is also important to generate a sense of ownership and responsibility for the plan among stakeholders. This can be done most effectively by involving the stakeholders from the very outset of the planning process.

At present, the process of developing a national plan can draw upon the momentum established in the preparatory process for the Leipzig Conference. The country reports, prepared by 158 countries, provide assessments of the current situation in each country and identify priority needs and opportunities.⁷ Some countries (e.g. Canada, Chile, Indonesia, South Africa and Switzerland) are now building on the earlier consultation process by establishing strategic national planning efforts. The Global Plan of Action, unanimously adopted at the Conference, serves as a guiding framework for national planning. While not legally binding, the Plan marks the first time that governments have ad-

Box 4. Essential steps in developing a national plan for PGRFA

- Determination of overall purpose and time-frame
- Identification of stakeholders
- Development of a strategy (shared vision and guiding principles)
- Assessment of needs and opportunities (including identification of available resources and capacity)
- Consideration of relevant regional and international frameworks (e.g. the Global Plan of Action)
- Identification of objectives, goals and targets
- Development of criteria for identifying priorities (e.g. equity, efficiency, food security, etc.)
- Identification (by application of criteria) and detailed description of priorities (i.e. specific projects or programmes)
- Estimation of time-frames for implementation of priorities
- Allocation of responsibilities for implementation
- Identification of funding sources and funding levels
- Monitoring and evaluation of national plan (periodically, using indicators)
- Reporting of the results of implementation.

ressed the conservation and sustainable use of PGRFA comprehensively, on the basis of a careful consideration of their own needs. The Plan is thus akin to an “Agenda 21” specifically for PGRFA. It comprises 20 priority activities (Box 5), under each of which is given a brief assessment of the current global situation, followed by intermediate and long-term objectives and agreed recommendations for action in the areas of policy and strategy, capacity-building, research and technology, and

administration and coordination. It is expected that the Plan will be regularly reviewed and updated by countries through the FAO Commission, for which it will be a rolling planning document.

The Conference of Parties to the Convention on Biological Diversity (in Decision III/11 adopted in November 1996) urged countries to develop national strategies, plans and programmes for agricultural biodiversity conservation and sustainable use.⁸ Thus national PGRFA plans can be developed as components of broader National Biodiversity Strategies and Action Plans (NBSAPs) (Box 6), an approach taken by Germany, Canada, Kuwait, Lebanon, the Philippines and Zambia.⁹ The NBSAPs of the latter three countries include specific sections on PGRFA.¹⁰ Alternatively, separate PGRFA plans can be developed. South Africa, for example, has developed a separate White Paper on genetic resources and is now developing a national medium- to long-term strategic plan for genetic resources with the involvement of all stakeholder groups. Countries may also wish to develop PGRFA plans as part of wider Agricultural Sector Plans. In Zambia, PGRFA planning is taking place in the context of the Agricultural Sector Investment Plans, which are based on priorities and problems identified at the district level (Mwila 1998). All these approaches are in line with the Global Plan of Action, which emphasizes “the need for PGRFA programmes to forge cross-sectoral links with agencies engaged in national planning and other programmes concerning agriculture, land reform and environment protection” (FAO 1996).

The FAO report that summarizes the country reports prepared for the Leipzig Conference, *The State of the World's Plant Genetic Resources for Food and Agriculture*, recognizes the need to place PGRFA programmes firmly in the context of national development plans as well as national plans for the environment, forestry and biodiversity. A wide range of national plans

Box 5. Priority activities of the Global Plan of Action

***In situ* conservation and development**

1. Surveying and inventorying PGRFA
2. Supporting on-farm management and improvement of PGRFA
3. Assisting farmers in disaster situations to restore agricultural systems
4. Promoting *in situ* conservation of wild crop relatives and wild food plants

***Ex situ* conservation**

5. Sustaining existing *ex situ* collections
6. Regenerating threatened *ex situ* accessions
7. Supporting planned and targeted collecting of PGRFA
8. Expanding *ex situ* activities for non-orthodox seeded, and minor crops

Utilization of plant genetic resources

9. Expanding the characterization, evaluation and number of core collections to facilitate use
10. Increasing genetic enhancement and base-broadening efforts
11. Promoting sustainable agriculture through diversification of crop production and broader diversity in crops
12. Promoting development and commercialization of underutilized crops and species
13. Supporting seed production and distribution
14. Developing new markets for local varieties and promoting public awareness of "diversity-rich" products

Institutions and capacity-building

15. Building strong national programmes
16. Promoting networks for PGRFA
17. Constructing comprehensive information systems for PGRFA
18. Developing monitoring and early warning systems
19. Expanding and improving PGRFA education and training
20. Promoting public awareness.

in the areas of agriculture, environment and general socioeconomic development have been used as the context for national PGRFA plans, including national development plans, national conservation strategies, national environment action plans, and national sustainable development strategies, among many others (see Appendix I). The most effective PGRFA activities will be those that meet broader national objectives as set out in such plans. Another advantage of not planning in isolation is that those involved in PGRFA planning can learn from the experience of other national planning processes.¹¹

A national planning process could be structured around several different entities or programme components grouped into different action areas (e.g. management actions, technical actions, research actions, etc.). National strategic plans for PGRFA, biodiversity or agriculture have to take into account the scientific and other resources available, as well as national socioeconomic objectives. The activity areas identified in the Global Plan of Action can be used as a framework for defining a series of projects. Projects may be phased in over time, depending on their relative priority and on the availability of human, technical and financial resources.

Box 6. National biodiversity strategies and action plans

The CBD, in its Article 6(a), recommends that each Party "shall: (a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, *inter alia*, the measures set out in this Convention relevant to the Contracting Party concerned; and (b) Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies."

In fulfilment of this article, countries that are Parties to the CBD are now developing National Biodiversity Strategies and Action Plans (NBSAPs). NBSAPs, which are expected to form the basis of more detailed plans and programmes, should identify options and make specific recommendations for action on conserving biological diversity and sustainably using its components, including the integration of biodiversity considerations into national, sectoral and cross-sectoral plans. NBSAPs are also intended to set priorities for national funding and to inform donors of national needs.

The preparation of NBSAPs has been identified as one of the enabling activities for countries that are eligible for financing by the Global Environment Facility (GEF). The guidelines for preparing an NBSAP suggest that the planning process should establish a national focal point such as a biodiversity unit or multi-stakeholder task force.* National and provincial/district workshops are recommended as a means of reviewing NBSAP drafts.

Following the recommendation of the Conference of the Parties (Decision III/11) that national plans, programmes and strategies covering agricultural biodiversity be developed and that agricultural biodiversity should now be an area of priority funding,[†] the GEF has provided for "enabling funds" to be made available for the incorporation of agrobiodiversity issues into new or ongoing NBSAPs, including, as appropriate, implementation of the Global Plan of Action at national level. Some NBSAPs (e.g. Kuwait's), already include provisions for PGRFA conservation and use activities.[‡] However, for most countries the integration of PGRFA planning with biodiversity planning remains an opportunity yet to be grasped.

* Countries are required to follow the WRI/IUCN/UNEP "Guidelines for National Biodiversity Planning". These guidelines have no specific provisions for PGRFA or agrobiodiversity. However, the CBD's SBSTTA has now been requested to develop a standard format for the future preparation of national reports on the level of implementation of the CBD, including the development of NBSAPs. Whether agricultural biodiversity or plant genetic resources are considered in such formats will be decided by the government representatives at SBSTTA. National plant genetic resources committees could provide inputs to the government decision-making process regarding their recommendations as to the standard formats of reporting on the implementation of the CBD that should be finally decided on by SBSTTA.

[†] Decision III/11 of the Third Conference of the Parties to the Convention on Biological Diversity: Conservation and sustainable use of agricultural biodiversity, <<http://www.biodiv.org/>>.

[‡] Kuwait Country Report (1995) prepared for ITC/PGR.

A national PGRFA planning process should ideally be iterative, with countries periodically assessing the status of their conservation and use activities and identifying an evolving set of priorities and ac-

tions to respond to changing needs over time. A typical process might identify and analyze national strengths, weaknesses, opportunities and threats (SWOT analysis). It should also specify the stakeholders

responsible for implementing each of its recommendations, and make any other provisions needed to ensure implementation.

In developing the national planning process, countries may first need to conduct a dialogue to articulate the overall national vision, goals and objectives for PGRFA conservation and sustainable use. This dialogue, which should involve as many relevant stakeholder groups as possible, may also provide the opportunity to identify representatives from each group to be involved in the planning process proper.

The resources allocated to the planning process should take the need for periodic re-assessment into account (FAO 1996: para. 234). Provisions for monitoring should be built into national plans so that these can be evaluated for their effectiveness (FAO 1996: para. 238). Different sets of indicators may be needed for monitoring at the technical and policy levels. Generic planning tools for those involved in strategic planning are plentiful. For instance, the International Service for National Agricultural Research (ISNAR) disseminates a wide range of training materials, several modules of which would be useful in national PGRFA planning.¹² Detailed "Guidelines for National Biodiversity Planning", jointly published by the United Nations Environment Programme (UNEP), the World Resources Institute (WRI) and the World Conservation Union (IUCN), have been available since 1995 as planning tools to support the implementation of Article 6 of the CBD. However, no guidelines specifically targeted at national agricultural biodiversity or PGRFA planning have yet been developed.

National policies. Countries also need to develop national policies on specific aspects of PGRFA management, such as access, exchange and the sharing of benefits. The realization of benefits from conserved PGRFA depends on their availability for

use. Because of the interdependency of countries with respect to PGRFA, almost all national PGRFA programmes are likely to need access to genetic resources from other countries from time to time, and appropriate national policies will be required to facilitate this. The use by others of a country's sovereign PGRFA can also serve the national good, through reciprocal exchange and other benefit-sharing arrangements. Governments are currently negotiating international norms for access, exchange and benefit-sharing through the revision of the International Undertaking, which is being brought into harmony with the CBD. Like national plans, PGRFA policies are best developed through consultative processes involving all stakeholders.

National coordination mechanisms

PGRFA committees. A multi-stakeholder national PGRFA committee or similar coordinating body can facilitate the development of appropriate policies and plans to meet national PGRFA needs and objectives. It can also promote links among the broad range of actors involved in the conservation and use of genetic resources.

The need for coordination mechanisms of this kind has long been apparent and many countries are now in the process of establishing or strengthening a national committee or similar body (FAO 1998:199). In 1995, during the preparatory process for Leipzig, 59 countries reported the establishment of a national committee. By the end of 1998, this figure had risen to some 95 countries.¹³ In some countries, establishing a national committee was seen as the first step in the development of a national programme in which the committee will be given responsibility for overall strategic coordination, planning and policy guidance (FAO 1998:200). Box 7 describes an example of a well-established national committee.

Ideally, a broadly based national PGRFA committee should have the responsibility for planning, coordinating and facilitating

Box 7. Involvement of stakeholders in national planning and implementation of plant genetic resources activities – the Philippine experience *

In the Philippines, the National Committee on Plant Genetic Resources (NCPGR) recommends policies, rules and regulations, and determines the overall direction of all plant genetic resources activities. Established by the Department of Science and Technology in 1993, the committee consists of representatives from the 15 government and non-government agencies mandated to conduct plant genetic resources activities. It has also developed partnerships with other local and international organizations involved in PGRFA work.

Policies, plans and legislation: Several laws and executive orders concerning protected areas, seed regulations, biosafety, the rights of indigenous peoples and access to genetic resources, as well as plans such as the Philippine Strategy for Biodiversity Conservation, the Philippine Agenda 21 and the Magna Carta for Small Farmers have been developed, often following lengthy consultation among the various stakeholders. Consultations with stakeholders are a standard procedure before defining Philippine positions at international and regional plant genetic resources fora. For instance, in 1998 the committee sponsored a National Consultation on the FAO International Undertaking on Plant Genetic Resources and Farmers' Rights, which brought together representatives of farmers' groups, local, regional and international NGOs, universities and government agencies. The committee has also encouraged coordination among the national agencies responsible for PGRFA, including the Departments of Foreign Affairs, Agriculture, Science and Technology, and Environment and Natural Resources.

Implementation of PGRFA activities: *In situ* conservation is carried out on-farm by farming communities. These communities may form a collective group, such as the Magsasaka at Siyentista Para sa Pagpapaunlad ng Akmang Agricultura (MASIPAG). Regional agencies, such as the Southeast Asian Regional Institute for Community Education (SEARICE) and Genetic Resources Action International (GRAIN), also provide technical and other forms of support. For protected areas, such as wildlife sanctuaries, protected landscapes and seascapes, the Department of Environment and Natural Resources (DENR) devolves management responsibilities to indigenous peoples, with the active support of many NGOs). *Ex situ* conservation and use, in contrast, are handled mainly by government agencies as part of their crop improvement programmes.

* Based on a paper by del Rosario, B.P., C.R. Escaño and S.P. Tababa presented to the Regional Meeting to Promote Implementation of the Global Plan of Action in Asia-Pacific, Manila, the Philippines, December 1998.

all aspects of national PGRFA conservation and use (Box 8). The committee can also act as an interface between national resource planning in different ministries and the more technical and operational aspects of PGRFA management of concern to national institu-

tions and stakeholders. In this way the committee provides the links between the different vertical levels described previously.

When establishing a national committee, it is important to ensure that different stakeholder groups are represented by in-

dividuals with an adequate mandate from their group. The factors affecting decisions as to which stakeholder groups should be represented on the committee are similar to those facing the establishment of any coalition: while the theme may be common, the participants in the coalition can, and frequently do, have different preferences and goals. It will be helpful to ask:

- **Who knows?** This will identify those who have the necessary facts and knowledge to contribute.
- **Who cares?** This will identify those who have the necessary motivation, i.e. those who are committed to the outcome and, often, directly involved in current activities.
- **Who can?** This will identify those with the power to access or mobilize resources, and/or influence events positively (Pfeffer 1981).

Many national PGRFA programmes have developed out of agricultural or other research institutions in the public sector which have traditionally had a hierarchical management style and a relatively narrow range of scientific disciplines. Broadening the range of stakeholders, accepting and valuing the knowledge and needs of less traditional stakeholders and allowing their effective contribution to the planning process can be a significant challenge (Wolfe 1983). An objective facilitator may optimize understanding among committee members and help them succeed by taking advantage of collective skills and knowledge. Also, since the committee will typically be composed of individuals who are extremely busy, the support of a facilitator or group with sufficient resources to specify and implement committee recommendations will be invaluable. Because of the broad range of issues at stake, the day-to-day management of a national programme is often best placed in the hands of individuals whose interests in PGRFA are of a generalist rather than a specialist nature (Mant 1983). Similarly, training in areas such

as strategic management and public administration may be more useful for national programme managers than training in more technical matters (Stacey 1996; Hatch 1997).

The issues of how representatives are nominated or elected and how long they should serve must also be addressed when forming a national committee. How often should re-nomination or re-election take place to ensure continuity of operations and experience, but a "turnover" of viewpoints? And who will review the effectiveness of the committee? These questions should be addressed at an early stage, so as to provide a clear mandate and incentive to committee members.

Clearly worded mandates specifying the committee's responsibilities and powers are essential. Decision-making processes should be as rapid and as non-bureaucratic as possible, to ensure that efforts focus on the implementation of decisions. There are distinct advantages in more participatory styles of management, based on the devolution of responsibilities and the fostering of teamwork.

The relationship between the national committee and higher- and lower-level decision-making bodies should also be transparent, with strong links for reporting purposes in both directions. National PGRFA committees are often asked to advise higher authorities on appropriate policies. Wherever possible, both decisions and their implementation should be delegated to lower-level bodies, particularly as regards operational aspects. This will allow the committee to concentrate on its primary planning and coordination functions.

PGRFA focal points. These provide a central reference point to facilitate cross-sectoral coordination of national PGRFA activities and international cooperation. In particular, they also help provide communication, foster broad-based participation and promote networking. Where governments have to deal with a large number of

Box 8. Potential responsibilities of a national PGRFA committee

- Ensure that national PGRFA conservation and use activities meet national agricultural and socio-economic needs
- Facilitate national PGRFA planning, and implementation of the plan
- Determine the financial and other resources needed by the national programme and help to secure these resources from the relevant public- and private-sector bodies
- Review and monitor the strategy of the national programme and promote its effective implementation
- Provide advice to government on domestic legislation and policy necessary to enhance PGRFA conservation and use in line with national objectives
- Coordinate representation in international and intergovernmental fora.

donors or foreign investment bodies, the focal point can additionally serve as a mechanism for assessing project proposals and externally funded activities to ensure that they meet national needs.

In some countries a designated individual within the government serves as the focal point. For instance, in Angola, Botswana, Indonesia, Lesotho and Namibia, the chairpersons of the existing national committee perform this role.¹⁴ However, a government department, a national agricultural research centre or a high-level task force can also serve as the national focal point. In countries with a highly centralized national programme (see next section), the focal point function can perhaps best be exercised through a designated National Centre for PGRFA.

The focal point can be designated by the head of state, parliament, a planning board, a government ministry or any other deci-

sion-making body. Its responsibilities can be determined either through national legislation and policy guidelines (in the case of a government agency, a national agricultural research institute or a national biodiversity unit, etc.) or by contract (in the case of a university or a private-sector organization).

To be fully effective, a national focal point should be integrally linked to and report regularly to the national committee (or similar advisory and planning body). Focal points should also have strong links with counterparts in other relevant national sectors. Perhaps the most important of these is the focal point for the CBD. The importance of a national biodiversity focal point was explicitly recognized by the organizations responsible for assisting countries in implementing the CBD, when they made establishing such a point the first step in the seven-step biodiversity planning process they developed and promoted (Miller and Lanou 1995). As a result, many countries have already established a National Biodiversity Unit as a focal point for the coordination of national activities related to the CBD. It may be advantageous to establish a PGRFA focal point focusing specifically on agricultural biodiversity, in view of its differing technical needs. Alternatively, the PGRFA focal point could be a component of a larger National Biodiversity Unit.

Focal points can play an important role in identifying funding for PGRFA activities from both domestic and external sources. In countries eligible for GEF funding, it is therefore desirable to establish links between national PGRFA focal points and the GEF National Selection Committees. These committees are responsible for determining national strategies and priorities within thematic areas, choosing projects for GEF awards, and overseeing programme implementation, monitoring and evaluation. Collaboration with such committees in the development of project proposals is essen-

tial, as the GEF project cycle specifies that a letter of endorsement from a country's national GEF focal point must accompany each project proposal.

National focal points will be essential for mobilizing national capacity to participate in, and benefit from, global efforts to conserve and use PGRFA. Because of their practical experience of national PGRFA activities they are well placed to foster regional and international collaboration. Indeed, many intergovernmental agreements on PGRFA access and benefit-sharing have already been developed with the active participation of such national representatives. Given the changing access regimes in many countries, national PGRFA focal points will be important in facilitating the exchange of germplasm and related technologies among a broad range of stakeholders at the international level.¹⁵ They could also play an increasingly important part in overseeing the equitable sharing of benefits arising from the use of PGRFA, in line with the terms of the CBD and other relevant agreements. PGRFA focal points may also facilitate the transfer of technology and, in this respect they should form links with bodies or focal points for this activity, where these have been established.¹⁶

IV. Types of national programme structure: Options and examples

Each national PGRFA programme needs the organizational structure best suited to its country's circumstances. This structure will depend partly on the country's infrastructure and human resources, but should be determined mainly by national PGRFA objectives. There is no single blueprint for structuring a national PGRFA programme (FAO 1998:200).

The status, structure and objectives of PGRFA programmes are often evolutionary in character, reflecting past history as well as anticipated future trends. The relative level of national funding is likely to be a function of the size of the country and its agricultural sector. The FAO Report, *The State of the World's Plant Genetic Resources for Food and Agriculture*, indicates great diversity among national PGRFA programmes, many being restricted in both scope and structure (FAO 1998:200). Some programmes consist of a few under-resourced scientists collecting seeds for storage in domestic freezers. Others involve a large array of crop research centres with hundreds of scientists conserving and improving PGRFA through large plant breeding programmes. For example, the Irish Genetic Resources for Food and Agriculture Programme has one staff member facilitating genetic resources activities among a range of mainly non-governmental stakeholder groups.¹⁷ The Chinese Crop Germplasm Programme, in contrast, includes over 400 institutes and 2000 scientists.¹⁸

National programmes should address more than just genebank operations. They should encompass the conservation and sustainable use of PGRFA in the broadest possible sense, with strong links between these two areas and among all those involved in them. In establishing or strengthening a national programme, every effort should be made to build on existing institutional structures, so as to avoid overlap and the duplication of efforts. All existing national PGRFA

actors should be included in the strategic planning process, being encouraged to work in unison toward common or complementary goals. Recently, several countries, including Kenya, Uganda (Box 9) and South Africa, have established a national interministerial biodiversity and/or environment council authority or agency with the responsibility of coordinating the planning, management of their environment and implementation of biodiversity conservation and use activities. PGRFA activities are an integral part of such efforts. A comparable but more sectoral solution has been implemented in Costa Rica (Box 10).

Different degrees of coordination and centralization may be necessary at different levels of the national programme structure. It is important to highlight the difference between the policy and planning level, at which centralization may be needed to maintain consistency and promote efficiency, and the operational level, where decentralization is necessary to scale up efforts and hence achieve greater impact. In many instances, the successful coordination of PGRFA activities across different ministries, institutions and user groups will depend largely on how "embedded" the PGRFA programme is in the NARS, the structure of the research organization providing the programme's institutional "home", and the nature of funding for the different sectors involved in the programme. However, on an exceptional basis there may be specific national reasons for keeping these sectors separate.

The State of the World's Plant Genetic Resources for Food and Agriculture provides a regional survey of national PGRFA programmes, grouping them according to whether they are predominantly centralized or sectoral, and whether or not they have been formally established.

Box 9. The National Environment Management Agency (NEMA) in Uganda

NEMA is the principal agency in Uganda for the management of the environment. Its mandate is to coordinate, monitor and supervise all activities in the field of the environment. NEMA aims to contribute to:

- Development with minimum negative effects on the environment
- A better quality of life for the Ugandan population
- A pollution-free environment
- Effective management of factors which enhance climate change
- Efficient conservation and utilization of biological diversity
- Sustainable utilization of natural resources

It recognizes that economic value is attached to environmental resources and services. Externalities are included in the social cost benefit analysis of development activities.

Its responsibilities involve three important aspects, which constitute the three operational mechanisms for implementation of its mandate:

- (a) **Coordination**, both horizontally, between NEMA and the Environmental Liaison Units, which were established in line ministries, parastatal enterprises and private sector organizations, and vertically between NEMA and the Districts, subdistricts and communities.
- (b) **Resource and responsibility-sharing**, in which the role of NEMA is to identify resources and make them available to appropriate institutions which have the primary responsibility of implementing environment management programmes and projects.
- (c) **Monitoring, reporting and information-sharing**, whereby NEMA collects, consolidates, analyzes and disseminates information to various implementing agencies, resource users and other stakeholders.

Box 10. Agricultural research and technology transfer coordination in Costa Rica

An interesting example of inter-institutional coordination at the national level in the broader area of agricultural research is provided by Costa Rica, which has established a coordinated system of institutions which voluntarily work together to achieve defined agricultural development objectives (Hobbs *et al.* 1998). A national commission for agricultural research and technology transfer (CONITTA) brings together the 23 most important agricultural institutions, both public and private. CONITTA advised the Costa Rican government on research policy and coordinates the planning of agricultural research and technology transfer. In addition 18 multi-institutional programmes for agricultural research and technology transfer were created to plan and coordinate the activities of all the organizations working on a specific commodity or production factor (e.g. rice or soil). Farmers' groups are reported to be active in many of these programmes.

Centralized programmes

In this type of programme (Box 11), one central institution, such as a national plant genetic resources centre, both coordinates and implements most national PGRFA activities. In 1996, 35 countries were reported to have such centralized programmes (FAO 1998:201). The type of central institution ranges from one solely concerned with PGRFA (e.g. the Indian National Bureau of Plant Genetic Resources, NBPGR) to one whose scope covers all biodiversity within a country (e.g. the Ethiopian National Biodiversity Institute). A major advantage of this approach is that it allows the designation of a single national focal point which has a clear leadership role in the planning and implementation of domestic public-sector PGRFA activities relating to conservation and use, while also serving as the sole point of reference for issues and decisions relating to international access and exchange of PGRFA. Coordination is also centralized. However, if the coordination capacity is inadequate, this may result in activities being dominated by the interests of the Centre, with the exclusion of other stakeholders. There may also be an over-emphasis on *ex situ* conservation at the expense of other activities.

Sectoral programmes

Sectoral programmes are based on the involvement of a range of institutions with separate mandates for different sectors of biodiversity conservation and use (Box 12). This model is based on the principle that specific activities are best carried out by individual institutions (or sectors) according to their different strengths, with policy and planning being governed by an overall coordinating committee or council representing relevant government ministries and departments, universities and NGOs. In 1996, 19 countries reported having such programmes. Sectoral programmes require a clear delegation of responsibilities and

Box 11. Examples of centralized national programmes

- **India:** Decision-makers in India are well aware of the importance of conserving and using PGRFA. The National Bureau of Plant Genetic Resources (NBPGR) is responsible for India's comprehensive national plant genetic resources system and works closely with over 30 institutions and centres. NBPGR is responsible for planning, organizing, conducting, promoting and coordinating all activities related to plant exploration, collection, introduction, conservation, exchange, evaluation and documentation, as well as quarantine. This includes the development of training capabilities (FAO 1998:206).
- **Ethiopia:** In 1994 the Ethiopian Plant Genetic Resources Centre (PGRC/E) was reorganized to form part of a comprehensive national programme under the umbrella of the National Biodiversity Institute, which is now responsible for both *in situ* and *ex situ* conservation of animal and microbial, as well as plant genetic resources.
- **The Netherlands:** The Netherlands Centre for Genetic Resources (CGN), which is the designated national genebank and central organization responsible for the conservation of the country's PGRFA, was overseen by the Ministry of Agriculture, Nature Management and Fisheries (LNV) from 1985 until 1991, when it was reorganized to form part of a larger institution, namely the Centre for Plant Breeding and Reproduction Research (CPRO) of the Agricultural Research Department (DLO). CGN continues to be fully funded by the LNV. As stipulated in its formal charter, it embodies the country's contribution to the overall global effort to conserve PGRFA.

Box 12. Examples of sectoral national programmes

- In **South Africa**, national plant genetic resources activities are decentralized to institutions concerned with specific activities, such as agriculture, forestry and wildlife (FAO 1998:207). Coordination is through a National Plant Genetic Resources Committee.
- **France** and **Switzerland** have decentralized institutional systems for *ex situ* conservation, in which different genebanks organized under formal national programmes hold different categories of germplasm (FAO 1998:200).
- In 1994, the Ministry of Agriculture of the **Czech Republic** established a National Programme on Plant Genetic Resources Conservation and Use. The programme funds 11 institutions and is coordinated by one of them. There is also a Czech Board on Plant Genetic Resources, which acts as an expert panel and scientific coordinating body.*

* Czech Republic Country Report (1995) prepared for ITC/PGR.

strong coordination across government ministries and sectors to ensure that their objectives and activities are complementary.

The genetic resources programme of France contains features of both the centralized and the sectoral models. Most activities are carried out through institutions mandated to work on specific crops or problems. Coordination is provided through a central Bureau des Ressources Génétiques, which is governed by a board comprising representatives of several sectors (see also Box 12).

Some countries that do not have formally established national PGRFA programmes nevertheless have significant conservation and use activities, with coordination provided by a national committee or similar mechanism. Where the coordination mechanisms function well, this approach can be as effective as a formally established national programme. In 1996, 20 countries were reported to have such "coordination only" programmes (e.g. Morocco, Indonesia, Malaysia and Costa Rica). That of Morocco, in particular, is con-

sidered to work well (FAO 1998:204). This approach has disadvantages, however, two of the most serious being a lack of formal recognition by government and lack of a secure budget.

V. Mechanisms for promoting coordination, communication and collaboration

Broad stakeholder participation will strengthen a national programme and enable it to make the best possible use of available human, financial and technical resources. However, many stakeholders may hesitate to become involved in a national programme if they feel that their independence is being compromised. Attempts to broaden participation should therefore explicitly recognize the autonomy and interests of individual stakeholders and seek to strengthen and build on their activities, not to control them. The development of shared goals and visions and the delegation of responsibility for implementing particular activities will be important in this respect.

National programmes require efficient mechanisms for communicating among stakeholder groups and coordinating activities at the operational level. This can be achieved through networks, topic-specific subsidiary bodies or committees, or by organizing workshops and conferences, as discussed below. There are many options that allow communication among the participants of a national programme in general or of a network in particular. Information can be exchanged in person, by sending written material by post, through newsletters or via electronic media. Electronic communication is now becoming increasingly important, enhancing access to information at relatively low cost (Box 13).

A specific example of the application of electronic communications to a PGRFA objective is found in the System-wide Information Network for Genetic Resources (SINGER) managed by the CGIAR System-wide Genetic Resources Programme (SGRP). Through the Internet <<http://www.cgiar.org/singer>> or on CD-ROM, SINGER provides data on the genetic resources collections of the CGIAR centres, making it easier for ge-

Box 13. Electronic communications

The past decade has seen rapid growth in the use of electronic communication to exchange a wide range of information, from simple verbal messages to complex data sets and images. Recently, many developing countries have begun making increasing use of such communication. The most common and effective means of electronic communication is Email (Hart 1994).

The advent of this improved information technology (IT) has much to offer the agricultural sector, and PGRFA work in particular. Email can facilitate communication between the focal point of the national PGRFA programme and national stakeholders, other national PGRFA initiatives, international organizations⁶⁶ and funding bodies. Genebank curators and breeders can make a range of specialized uses of the Internet and Email, including the accessing of distant genebank accession lists. The national programme should ensure that breeders and other stakeholder groups have access to electronic communications infrastructure and software. Because electronic communication also allows a degree of decentralization of activities such as data management, decision-makers need to take its potential into account when considering changes to the structure of the national PGRFA programme.

An increasing number of donors now have programmes that support activities to strengthen IT capacity in developing countries. Examples are the UNESCO African Networking Initiative, the World Bank's Africa Internet Forum and the Pan-Asian Network of the International Development Research Centre (Richardson 1996).

netic resources workers outside the CGIAR to gain access to information on the origin and agronomic characteristics of the material.

National workshops and conferences

Regular national workshops or conferences are a means of reviewing national PGRFA activities to catalyze stronger interaction, understanding and cooperation among national PGRFA stakeholders. They can be arranged as a series of meetings, each focusing on themes of special interest to different stakeholders. National workshops have often been used to launch a new national programme or programme component. This approach has been pursued by several African countries. In Mauritius, a national workshop resulted in the inception of a National Coordinating Committee on PGRFA. In Namibia, the first National PGRFA Workshop developed and formalized national policy guidelines for PGRFA activities.¹⁹ The Ugandan National Committee convened a national workshop in 1992 that marked the beginning of organized national PGRFA activities.²⁰ In Ghana, a workshop was organized in 1994 for users and potential users of PGRFA to inform them of the germplasm available in the country or accessible from elsewhere via the national PGRFA programme.²¹ A survey of 17 countries indicated that similar consultative meetings or workshops had been used in the development of national biodiversity strategies and plans (Miller and Lanou 1995). A participatory planning process for the development of a national PGRFA programme using a series of national, regional and specialist workshops and other consultative mechanisms has been proposed for Chile and, with appropriate modifications, may be applicable to other countries (Box 14).

National networks and other subsidiary bodies

Networks are a means by which parties sharing a common interest can collaborate and share information and technology. They can span a wide range of func-

tions, from local farmer-to-farmer exchanges to international exchanges between governments. If networks are to function efficiently, it is essential that all members are able to participate fully. If they become dominated by a single individual or organization, the collaborative nature of the network is undermined (Nelson and Farrington 1994).

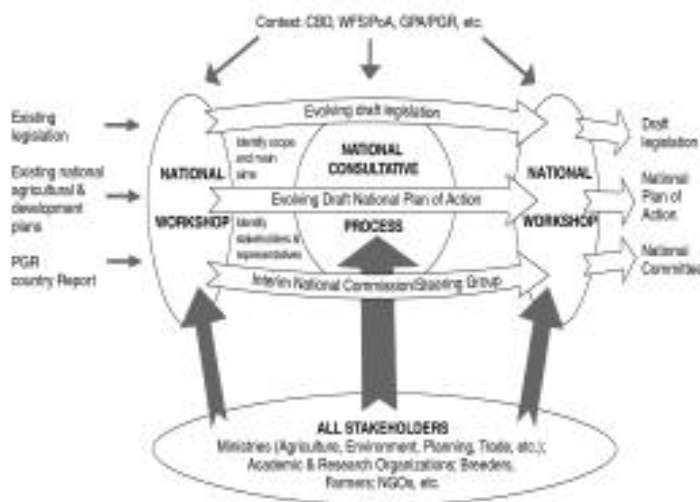
Networks are vital to the PGRFA sector as vehicles for scientific exchange, information-sharing, technology transfer and research collaboration. They promote the identification and allocation of shared responsibilities for such activities as germplasm collecting, conservation, evaluation and enhancement. They also promote the exchange of materials, thereby greatly enhancing use. The French national genetic resources programmes provide a good example of the use of networks for these purposes (Box 15). Networks can, in addition, be used to help set priorities for action, develop new policy initiatives and convey crop-specific and regional perspectives to other organizations, including funding bodies.

For countries with limited national capacity in PGRFA, participation in networks can be especially advantageous. Tunisia has recently restructured its national programme using a network model. This follows an earlier unsuccessful attempt to establish a centralized national programme based round a single national genebank. Poor links with breeders and other researchers led to poor use of the central facility, with a consequent erosion of the political and financial commitment needed to sustain the Centre. In the new approach, a formally established national programme is based on a network of research institutions, each with its own mandate and comparative advantages. A national committee coordinates the activities of these institutions.²²

Networks are the most important type of subsidiary organization found within or interacting with the national PGRFA pro-

Box 14. A participatory process for developing a national programme and plan for PGRFA in Chile*

A participatory process involving all stakeholders is used to develop a national strategy, appropriate draft legislation and a national plan of action, and to put in place a broad-based national committee. A first national workshop sets out the main objectives to be realized, and identifies the main stakeholder groups. A series of regional workshops and seminars are convened to develop the various elements, based on needs assessments. The involvement of NGOs is facilitated, and all proposals are open for wide consultation. On the basis of drafts developed in this way, a second national workshop makes definitive proposals to the authorities. It is envisaged that the various stakeholder groups would be responsible for implementing the plan, once it is approved.



* Cubillos, A. 1998. Participatory development of a national programme. Presentation to the Regional Meeting to Promote Implementation of the Global Plan of Action in Latin America and the Caribbean, Cali, Colombia, 22-25 September 1998. There was wide interest in this approach and it was suggested that a regional seminar might be held on it.

gramme, but they are not the only one. Committees, councils, working groups, task forces or consortia are alternatives. They may be crop-specific, based on a specific zone or region (e.g. ecoregional consortia) or devoted to a specific theme.

Crop-specific bodies. If a crop or group of crops is particularly important to the nation's agriculture, a crop-specific network, commit-

tee or other body can be established. Such a body can provide a logical basis for multi-stakeholder coordinated planning (van Hintum *et al.* 1990). Crop-specific networks, with their relatively narrow focus, are an excellent way of bringing together specialists from different disciplines to set priorities or evaluate impact. Such networks often involve the formation of a database of all germplasm accessions in relevant *ex situ*

Box 15. The crop networks of the French national programme

Genetic resources in France are managed through cooperative networks involving both public- and private-sector partners. Networks have been established for each species (maize, sunflower, melon, etc.) or group of species (fodder crops, fruits, etc.) of importance to the country. Network members agree to disseminate genetic resources and share in their upkeep and evaluation. Each network has its own charter and is supported by a technical committee and a steering committee.

France has decided on this decentralized management system because it regards large centralized genebanks as too cumbersome. Its approach is one in which responsibility is shared among the different parties concerned with the long-term maintenance of genepools. The networks identify and manage a national collection, consisting of material which encompasses as much of the crop's diversity as possible. Access to the collection is free and is based on the principle of reciprocal exchange. In addition, network members can maintain their own working collections, which are not considered of national interest for long-term conservation. A legal statute for the national collections maintained by these networks is being developed. Network members guarantee, jointly or otherwise, to undertake conservation, multiplication, regeneration and evaluation as necessary. *Ex situ* collections may be complemented, for some crops, by *in situ* collections (e.g. of wild relatives) and by the dynamic management of broad-based populations under agricultural conditions.

The national body that coordinates activities concerning animal, plant and microbial genetic resources is the Bureau des Ressources Génétiques, which brings together state bodies, research and academic organizations, private-sector companies and NGOs.

The decentralized programme in France involves partners with widely differing interests. Their active involvement ensures that the networks are sustainable. It also ensures the evaluation of germplasm according to the needs expressed by users and the steady development of collections with the aim of ever wider utilization.

Source: Bureau des Ressources Génétiques 1996.

collections, the strengthening of collaboration in the collecting and evaluation of germplasm, and the promotion of more effective use of the crop's genetic resources. They also ensure that members keep abreast of national and international developments concerning their crop. *The State of the World's Plant Genetic Resources for Food and Agriculture* provides a comprehensive survey of existing networks.

Such bodies may also be used to help:

- assess national germplasm needs for the respective crop(s)
- prepare inventories of existing national collections (*ex situ* and *in situ*)
- identify gaps in research or other activities
- monitor national and international collections for the presence of useful genetic resources
- identify priorities for germplasm collection and introduction
- coordinate and guide national evaluation and breeding efforts
- manage and analyze information
- identify needs for genetic enhancement and base-broadening
- develop and/or suggest appropriate technologies or approaches for national level crop improvement.

Box 16. The role of national crop committees in PGRFA programmes: the USDA's National Plant Germplasm System

The National Plant Germplasm System (NPGS) of the United States Department of Agriculture (USDA) is structured to ensure broad membership and international expertise, both of which are needed for the effective planning of national PGRFA activities:

- **Broad membership:** 40 different Crop Germplasm Committees report to the National Genetic Resources Advisory Council of the NPGS; each committee has 8 to 25 members, including representatives from federal research institutes, universities, botanic gardens and arboreta, as well as the private sector and in some cases NGOs. Together, these constitute the main users of PGRFA.
- **International expertise:** many Crop Germplasm Committees also have members from neighbouring countries (e.g. Canada and Mexico) and from international centres such as the Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT) and the Asian Vegetables Research and Development Centre (AVRDC).

The chairpersons of the Crop Committees meet biennially to exchange information and experience.

Source: Allan Stoner and Mark Widrechner, pers. comm., January 1999.

The National Plant Germplasm System (NPGS) of the United States Department of Agriculture (USDA) is an example of a national programme in which crop-specific germplasm committees are used to review and plan national PGRFA activities (USDA 1995) (Box 16).

Linking the work of such national crop-specific bodies with regional and international networks involved in particular crops can strengthen national efforts and help spread the costs of research. Such links can also promote the more effective use of PGRFA, by increasing the users of specific collections. Good examples of this approach are provided by the networks of the European Cooperative Programme on Genetic Resources (ECP/GR).

Farming system-specific bodies. An option open to countries that have numerous and/or complex farming systems with many crop species is to establish networks or other bodies specific to particular farming systems, agro-ecological zones or regions. The main purpose of these bodies

is to monitor, review and make recommendations on the PGRFA needs of specific areas. This approach may be particularly useful in promoting partnerships between farming communities and the formal scientific or government sector. In Mali, district committees which include farmers' representatives advise on priorities for the NARS (Oumar Niangado, pers. comm., 1998).

Norway has adopted, on an experimental basis, an approach that could be adapted by large countries with heterogeneous agro-ecological zones or farming systems. It has developed local biodiversity action plans as a possible mechanism for implementing the national biodiversity strategy. There are many other countries, especially in the developing world, where species-rich farming systems are associated with indigenous and local communities, embodying traditional lifestyles that are relevant to the conservation and sustainable use of PGRFA. Local-level or farming system-level approaches could well prove more effective than crop-specific ap-

proaches in ensuring the effective participation of such communities in the national PGRFA programme.²³

Theme-specific bodies. These can be used to strengthen national capacity by building critical mass in areas of strategic importance to national needs. Theme-specific bodies can unite those interested in a specific theme in many different sectors, institutions and stakeholder groups. The USDA's NPGS has a New Crops Germplasm Committee, a Germplasm Operations Committee and several Technical Advisory Committees. Indonesia has a National Working Group for Indonesian Medicinal Plants (Shelton 1995), while the Malawi National Plant Genetic Resources Programme has established three thematic working groups (the Food Crops Group, the Industrial and Horticultural Crops Group and the *In situ* and Forestry Group) to propose activities to the national committee.²⁴ Based on the priority areas and recommendations of the Global Plan of Action, some examples of other themes on which bodies could be constituted are:

- agricultural diversification
- PGRFA in IPM strategies
- PGRFA in protected areas
- PGRFA information systems and information management
- gender and PGRFA
- plant biotechnology
- public awareness of PGRFA
- seed production and supply
- neglected and underutilized species.

Local-level fora and farmer participation

Decision III/11 of the Conference of the Parties to the Convention on Biological Diversity recognizes that end-users must be involved through adequate representation in the national PGRFA programme if the programme's decisions and activities are to have a significant impact on development. The Decision calls for the establishment and maintenance of local-level fora in which farmers, researchers, exten-

sion workers and other stakeholders can evolve genuine partnerships.²⁵

Local Agricultural Research Committees (CIALs) of the kind used in Colombia and elsewhere have been successful in institutionalizing farmers' participation in adaptive research, including the testing of new crop varieties (Ashby *et al.* 1995). Seed fairs have been organized in many parts of the world to promote the exchange of varieties and information among farmers and between farmers and the formal sector. Farmer Field Schools (FFS), which have been very successful in promoting IPM by improving farmers' understanding and application of ecological principles to crop management, are now also being used to promote the conservation and improvement of PGRFA (FAO 1994).

National research institutes can play a role in facilitating the involvement of farmers in the planning and implementation of PGRFA activities. For example, the recently reorganized National Center for Agricultural Technology (CENTA) in El Salvador now gives farmers a central role as stakeholders in the new organization (Hobbs *et al.* 1997), based on five critical practices: (i) improving CENTA's access to farmers, (ii) collecting in-depth information about farmers, (iii) involving farmers in research planning, (iv) involving farmers in research implementation, and (v) sharing research information with farmers. The active involvement of a wide range of farmers and rural organizations in as many activities of the national PGRFA programme as possible (e.g. planning, project formulation, technology testing, etc.) will strengthen the programme greatly and help to sharpen its focus on users' needs.

Farmer participatory research and development is unlikely to achieve large-scale impact through isolated mini-projects, especially if these require continuing support from scarce, highly salaried professionals (Farrington and Martin 1988). National programmes adopting a

farmer participatory approach, as envisaged in the Global Plan of Action, will need to address the issues of scale and sustainability. Since extension staff usually outnumber both germplasm curators and plant breeders, their involvement may be key to ensuring links between the field and institutional levels (Bagchee 1993). The Extension Service in Zimbabwe (AGRITEX), for example, is working with NGOs to support seed fairs. Local government authorities may provide an alternative institutional base for ensuring the sustainability of farmer participatory approaches. In the Philippines, for example, they play a key role in supporting FFS (Callo 1998).

Farmer-to-farmer training may be one way around the scaling-up problem (Collinson 1983). This approach was used as early as the 1960s, when Oxfam sponsored farmer-to-farmer visits across Central American countries, and subsequently has been widely tried elsewhere, particularly in Southeast Asia (Farrington 1994). It is the main mechanism used for scaling-up the FFS. Scaling-up may be achieved by organizing many different groups of farmers, or by working with existing farmers' organizations (e.g. Heinrich and Masikara 1992; Mattee and Lasalle 1994; Muchagata *et al.* 1994). A major advantage of this approach is that different farmers' groups in diverse micro-environments will adapt and adopt only the germplasm and other technologies that are best suited to their needs (Okali *et al.* 1994).

Some studies of participatory research and development indicate that such approaches may reduce the costs of applied research in plant breeding (Ashby and Sperling 1994). However, their full potential cannot be realized unless a range of associated problems are adequately addressed (Wuyts-Fivawo 1996). Such problems include, at the institutional level, the continuing lack of a systems perspective, poorly developed links with external us-

ers, and donor-driven development agendas (Eponou 1996). In addition, farmers' organizations typically lack the ability or capacity to participate effectively in the planning of agricultural research and development (Carney 1996).

The success of such local forums as CIALs in Latin America and FFS in Asia suggests that there may already be a number of cost-effective models for national PGRFA programmes to consider as they seek to promote the involvement of farmers in national PGRFA activities (Loevinsohn *et al.* 1998). Local fora-based approaches can contribute to the national programme not only by strengthening community management of PGRFA but also by exerting a "demand pull" on the programme's products and services. This they do by empowering farmers to articulate their needs, such as a wider range of planting materials, more effectively.

Options for collaborative efforts at the regional level

Collaborative regional PGRFA programmes or networks can complement national PGRFA activities, enhancing their cost-effectiveness. They provide a useful forum for planning, including the development of proposals for regional projects or programmes attractive to donors. Planning at the regional level has special advantages for smaller or poorer countries, such as the island states of the South Pacific and the Caribbean or some smaller West African countries, which would otherwise lack a critical mass of staff and resources for both planning and implementation. Regional or subregional networks on aspects of PGRFA work have now been established in most parts of the world. *The State of the World's Plant Genetic Resources for Food and Agriculture* provides a comprehensive survey of them. Many of these networks are organized under the auspices of the relevant regional association of NARS. A Global Forum for Agricultural Research

Box 17. The Global Forum for Agricultural Research

The Global Forum for Agricultural Research (GFAR) was established in 1996 as part of the "renewal" process undergone by the Consultative Group on International Agricultural Research (CGIAR). It consists of the following regional associations of NARS, as well as representatives of the CGIAR, the advanced research institutes of developed countries, NGOs and the private sector.

- The Forum on Agricultural Research in Africa (FARA), which is itself a grouping of three subregional organizations: the Southern Africa Council for Agricultural Research (SACCAR), the Association for Strengthening Agricultural Research Systems in Eastern and Central Africa (ASARECA) and the Conférence des Responsables de la Recherche Agronomique Africaine (CORAF) in Central and West Africa
- The Association of Asia-Pacific Agricultural Research Institutes (APAARI)
- The Association of Agricultural Research Institutes in the Near East and North Africa (AARINENA)
- The Forum on Agricultural Research for Latin America and the Caribbean (FORAGRO).

GFAR meets every 3 years, and most of its work is carried out in the regional or subregional associations. The Forum is served by a secretariat in the World Bank. Additionally, the NARS and their regional/subregional associations are served by a secretariat in FAO. The plan of work for the NARS Secretariat includes support in implementing the Global Plan of Action.

(GFAR) has recently been established, consisting of many of these regional associations together with representatives from other sectors (Box 17).

A good example of a regional PGRFA network is the European Cooperative Programme for Genetic Resources (ECP/GR), which aims to ensure the long-term conservation and increased use of plant genetic resources in Europe. Coordinated by IPGRI, the programme is financed by participating countries and governed by a steering committee of national representatives. It operates through crop-specific working groups in which curators and breeders work together to analyze needs and set priorities. Representatives of NGOs and the private sector also participate.

VI. Building public and political support for national PGRFA activities

Public awareness

Since most PGRFA programmes are funded largely by public money, it is desirable that public and political opinion be supportive of them. Public (and political) awareness programmes are the key to mobilizing this support. Yet, as revealed during the preparatory process for the Leipzig Conference, awareness of the importance of PGRFA for socioeconomic development remains low in most countries.

Public meetings and stakeholder consultations can be used to strengthen awareness. The mandate and objectives of the national PGRFA programme can be publicized using appropriate media, such as national radio and television, the press and so on. However, the widely differing interests and perspectives of different stakeholder groups should be recognized when this is done. Agricultural scientists may value PGRFA mainly for their potential to increase production, while others may appreciate their social, cultural, historical, ecological or aesthetic qualities. The Global Plan of Action recommends that these wider values be recognized in national planning, policies and resource allocations (FAO 1996: para. 227). In the USA, multiple non-governmental stakeholders with widely differing interests in PGRFA have come together in a single alliance, the American Genetic Resources Alliance (AMGRA), to lobby the US Congress for increased funds for the NPGS.

National PGRFA planners should aim to integrate public awareness into all local, national, regional and international programme activities. In countries with many different language groups, consideration should be given to the production of public awareness materials in local languages. Awareness of the value of PGRFA to the nation, and of the role of scientists, plant

breeders, farmers and local communities in maintaining and improving them, can be promoted in schools, as well as in specialized agricultural research and training institutions. NGOs may also have an important role to play in mobilizing public and political support for national PGRFA programmes.

Financing national programmes

Many PGRFA activities, and especially conservation and genetic enhancement or pre-breeding, only deliver benefits in the long term (FAO 1998). In fact, few germplasm-based projects can achieve much in less than 5 years, while increasing production through the development and dissemination of new plant varieties can take a decade or more. For instance, the successful efforts to double or quadruple the yields of wheat in India and China took at least 20 years.

National strategies and plans, and their associated organizational structures, should therefore be considered a long-term investment and afforded a legal status and funding that will be resilient to such shocks as changes in government or recessions (FAO 1996: paras. 227, 228). In many cases a small amount of funding, consistent and guaranteed over 10 to 15 years, can achieve more than the same or a higher level of funding which has to be used within the typical 3 to 5-year project cycle. Continuity of support is an important consideration for any long-term PGRFA activities that are dependent on donor funding. Where possible, public-sector PGRFA activities should avoid competing with or duplicating PGRFA activities that are adequately performed by the domestic or international private sector.

Thus, the conservation and sustainable use of PGRFA should ideally be accorded

budget provisions on an ongoing basis rather than on a once-off or fragmentary basis (FAO 1998). Yet in 1995, only one in five countries reported that they had specific budget lines for PGRFA activities (FAO 1998:207). The Philippines Bureau of Agricultural Research includes guaranteed allocations for PGRFA conservation within the budgets of each of the crop networks it funds (Eliseo Ponce, Director, BAR, pers. comm., December 1998). Without guaranteed long-term baseline funding from domestic sources it will be extremely difficult for any national PGRFA programme to plan and implement activities that will not be vulnerable to donor changes in priorities over time.

Funding for national PGRFA plans and programmes can be provided from both internal and external sources. A complete survey of such sources is beyond the scope of this paper. However, an important function of the national PGRFA programme and its planning process could be to identify and review funding sources on a regular basis. Information on such sources could be distributed widely (e.g. via a newsletter or network) and the national programme could facilitate funding by helping stakeholder groups prepare applications. For many developing countries and countries in transition, external sources of funding will continue to be essential for the implementation of many of their priority activities.

VII. Conclusions

National governments face many issues and options in establishing or strengthening their PGRFA programmes. Because of parallel activities in the overlapping area of biodiversity, one of the first and most important issues is how to organize PGRFA activities. Countries also now face a potentially confusing array of policy and legal issues relating to PGRFA, many of which are still unresolved at the international level. The rapid pace of technological change affecting the use and usefulness of PGRFA adds further complexity to the formulation of policies and plans. To develop the necessary consensus at national or even at government level to respond to these issues will require a high degree of interministerial coordination and consultation with national PGRFA stakeholder groups.

For many countries, there will be clear advantages in having a distinct national PGRFA programme with strong links to activities in the related fields of biodiversity and agriculture. To ensure both efficiency and effectiveness, all national PGRFA programmes need certain essential components, including a national focal point, a national PGRFA committee and a national strategic plan. Details of the programme's structure may vary, according to the emphasis placed on different approaches to conservation or use and the country's existing human, financial and other resources.

A well-coordinated programme with clear priorities at the national level should be complemented by similar efforts at the regional and international levels. International collaboration in PGRFA activities is necessary in a world in which countries are interdependent for plant genetic resources and therefore need to establish mechanisms for facilitating access to these resources and sharing the benefits arising from their use (FAO 1996: paras. 238, 239).

The rapidly changing PGRFA environment implies that a national PGRFA programme should not be too rigid, but should rather consist of small, loosely linked units that can be phased in and out over time as the country's needs change (Senge 1990). Such an "adaptive" PGRFA structure would allow a rapid response to changing sectoral and crop/commodity interests, such as shifts in emphasis from high-potential areas to marginal lands, crop diversification, and so on.

Given the central importance of PGRFA in achieving food security and underpinning national development, improving their national PGRFA programmes presents governments with a formidable challenge. A timely and appropriate response to this challenge can only reap substantial benefits.

Appendix I. Sectoral national plans relevant to integrated PGRFA planning

Governments have adopted a number of approaches to strategic planning for economic development, agriculture, natural resources and other sectors related to PGRFA activities. Some of these plans or strategies focus narrowly on environmental or agricultural issues, while others are broader, dealing with the integration of environmental, agricultural and socioeconomic concerns. The most important types are briefly described below.

National Agricultural Plans

Many countries have national plans for agricultural development, but few emphasize that the conservation and sustainable use of PGRFA are essential to long-term agricultural development. The omission of PGRFA concerns from such plans jeopardizes the funding of important PGRFA activities. Consideration of PGRFA at the early stages of national agricultural planning opens up possibilities for significant economic and social benefits through the strategic use of PGRFA for import substitution, export diversification, increased domestic food production and strengthened national food security.

National Biodiversity Strategies and Action Plans

Many countries have chosen the development of National Biodiversity Strategies and Actions Plans (NBSAPs) as their approach to meeting the requirements of Article 6 of the CBD (see Box 6).

National Environment Action Plans and National Sustainable Development Strategies

Both National Environment Action Plans (NEAPs) and National Sustainable Development Strategies (NSDS) emerged as recommendations from the United Nations Conference on Environment and Development (UNCED). NEAPs are promoted

mainly by the World Bank and UNEP, while NSDS are promoted by UNDP. Both are broader in scope than NBSAPs and, reflecting the significant overlap and similarities between their objectives, a country usually develops only one or the other of them. International donors and environmental NGOs have been helping countries prepare such plans since the 1980s. Many of these initiatives build on earlier experiences with National Tropical Forestry Action Plans, National Conservation Strategies and other environmental planning exercises.

NEAPs describe a country's major environmental concerns, identify the principal causes of environmental problems and formulate policies and actions to address these. The lead ministries involved are usually those of the Environment, Natural Resources or Planning. In 1990, donors of the International Development Association (IDA), a World Bank affiliate that provides interest-free loans to the world's poorest countries, urged borrowers to complete NEAPs. By 1995, most had prepared NEAPs or similar documents, many of which are currently being implemented (World Bank 1995).

NSDS is a generic name for a process by which countries aim to achieve internal consensus at all levels of society on the policies and programmes needed to implement their own national Agenda 21 programme (in response to Chapters 8 and 37 of Agenda 21) (UNCED 1992). This consensus is intended to result from a participatory dialogue of relevant interest groups. The NSDS process should lead to an identification of skill gaps, institutional capacities and capabilities, technological and scientific requirements and resource needs to enhance environmental knowledge and administration and integrate environment

and development concerns. The strategy should cover the definition of policies and action plans, their implementation, monitoring and regular review.

National Conservation Strategies

National Conservation Strategies are intended to provide a comprehensive, cross-sectoral analysis of conservation and resource management issues to help integrate environmental concerns into the development process. They should identify a country's most urgent environmental problems, stimulate national debate, raise public consciousness, assist decision-makers in setting priorities and allocating human and financial resources, and build institutional capacity to handle complex environmental issues (IUCN/UNEP/WWF 1991). Since 1980, over 50 countries have developed National Conservation Strategies, supported mainly by IUCN but with guidance also from UNEP and WWF. Some of these are now evolving into NSDS, in the light of Agenda 21.

National Forestry Action Plans

National Forestry Action Plans (NFAPs) (FAO 1985) involve a multi-sectoral review of relevant issues and definition of national targets and actions in each of five areas: forestry and land use, forestry-based industrial development, fuel wood and energy, conservation of tropical forest ecosystems, and forestry institutions. NFAPs are developed by adapting current policy and planning frameworks, preparing national proposals and securing the financial support needed to put plans into action. They are promoted by the four international organizations that established the Tropical Forestry Action Programme (TFAP) in 1985: FAO (responsible for promoting and coordinating implementation; FAO/WRI/World Bank/UNEP 1987), the World Bank, UNDP and WRI.

As of 1992, 90 developing countries (38 in Africa, 20 in Asia and the Pacific and 32 in Latin America and the Caribbean) were undertaking NFAP planning processes as part of the TFAP (FAO 1992). The TFAP has promoted collaboration at the regional level between some of the countries developing the NFAPs, with particular success in Central America. In a few cases the NFAP process has been successful in forging cross-sectoral links at the national level (e.g. in Nepal, where the NFAP was linked to the National Conservation Action Plan) (Sizer 1994).

The World Bank Country Assistance Strategies, Structural Adjustment Loans and Sectoral Adjustment Loans

The institutions of the World Bank provide loans and credits to many projects in the agricultural sector, some of which are for agricultural research or PGRFA-related activities. Between 1970 and 1991, World Bank assistance to projects that had an agricultural research component was over US\$18 billion, of which US\$1.4 billion was explicitly for agricultural research or for projects to develop national research and extension systems (Tabor and Ballantyne 1995).

The Bank's institutions also provide Structural Adjustment Loans (SALs) and Sectoral Adjustment Loans (SECALs), which consist of non-project or policy-based lending intended to facilitate economic change in a particular direction. SECALs usually govern an entire sector of a country's economy (e.g. agriculture) and carry conditions determining the policies and national priorities for that sector.

The World Bank Group is a very important actor in governmental processes that define national goals and objectives for agriculture, for biodiversity and hence for PGRFA. In most countries that have a policy dialogue with the World Bank, the Ministries of Planning or Finance are the

lead ministries in developing Country Assistance Strategies, in conjunction with World Bank Country Officers and Task Managers. Unless the latter are sensitized to the importance of genetic resources it is unlikely that these resources will figure highly on their long list of planning considerations. It is also important that national PGRFA programmes are aware of and can react to relevant policy changes resulting from Country Assistance Strategies, SALs or SECALs.

Since 1987-88, environmental and agricultural policy has undergone significant change at the World Bank. The Bank now has a new set of environmental policies and priorities, one of which is to "mainstream biodiversity in agriculture" by promoting the concept of sustainable agricultural intensification (Pagiola *et al.* 1997).

Acronyms and abbreviations

AARINENA - Association of Agricultural Research	IT - Information Technology
AARINENA - Association of Agricultural Research Institutions in the Near East and North Africa	IUCN - World Conservation Union
AGRITEX - Agricultural, Technical and Extension Service (Zimbabwe)	MASIPAG - Magsasaka at Siyentista Para sa Pagpapaunlad ng Akmang Agricultura (Philippines)
AMGRA - American Genetic Resources Alliance	NARS - National Agricultural Research System(s)
APAARI - Asia-Pacific Association of Agricultural Research Institutions	NBPGR - National Bureau of Plant Genetic Resources (India)
ASARECA - Association for Strengthening Agricultural Research in Eastern and Central Africa	NBSAPs - National Biodiversity Strategies and Action Plans
AVRDC - Asian Vegetables Research and Development Centre (Taiwan)	NCPGR - National Committee on Plant Genetic Resources (Philippines)
CBD - Convention on Biological Diversity	NEAP - National Environment Action Plan
CENTA - National Center for Agricultural Technology (El Salvador)	NFAP - National Forestry Action Plan
CGIAR - Consultative Group on International Agricultural Research	NGO - Non-governmental organization
CGN - Centre for Genetic Resources (Netherlands)	NPGS - National Plant Germplasm System (USA)
CIAL - Comité de Investigacion Agricola Local	NSDS - National Sustainable Development Strategies
CIMMYT - Centro Internacional de Mejoramiento de Maiz y Trigo (Mexico)	PGRC/E - Ethiopian Plant Genetic Resources Centre
CONITTA - National committee for agricultural research and technology transfer (Costa Rica)	PGRFA - Plant Genetic Resources for Food and Agriculture
CORAF - Conférence des Responsables de la Recherche Agronomique Africaine	SACCAR - Southern African Center for Cooperation in Agricultural and Natural Resources Research and Training
CPRO - Centre for Plant Breeding and Reproduction Research (Netherlands)	SALs - Structural Adjustment Loans
DLO - Agricultural Research Department (Netherlands)	SBSTTA - Subsidiary Body on Scientific, Technical and Technological Advice
ECP/GR - European Cooperative Programme on Genetic Resources	SEARICE - Southeast Asian Regional Institute for Community Education
FAO - Food and Agriculture Organization of the United Nations	SECALs - Sectoral Adjustment Loans
FARA - Forum on Agricultural Research in Africa	SGRP - System-wide Genetic Resources Programme (of the CGIAR)
FFS - Farmer Field Schools	SINGER - System-wide Information Network for Genetic Resources (of the CGIAR)
FORAGRO - Foro Regional de Investigacion y Desarrollo Tecnológico Agropecuario	SWOT - Strengths, weaknesses, opportunities and threats
GATT - General Agreement on Trade and Tariffs	TFAP - Tropical Forestry Action Programme
GEF - Global Environment Facility	TRIPS - Trade Related Intellectual Property Rights
GFAR - Global Forum for Agricultural Research	UNCED - United Nations Conference on Environment and Development
GPA - Global Plan of Action for the Conservation and Sustainable Use of PGRFA	UNDP - United Nations Development Programme
GRAIN - Genetic Resources Action International	UNEP - United Nations Environment Programme
IBPGR - International Board for Plant Genetic Resources [now IPGRI]	UNESCO - United Nations Educational, Scientific and Cultural Organization
IDA - International Development Association	UPOV - Union Internationale pour la Protection des Obtentions Végétales
INRAB - national agricultural research institute (Benin)	USDA - United States Department of Agriculture
IPM - Integrated pest management	WRI - World Resources Institute
ISNAR - International Service for National Agricultural Research	WWF - World Wide Fund for Nature

Authors

Charlie Spillane
Genetic Resources Consultant
Rome
Italy
Email: Spillane@fmi.ch

Jan Engels
Group Director
Genetic Resources Science and
Technology (GRST)
International Plant Genetic Resources
Institute (IPGRI)
Via delle Sette Chiese 142
00145 Rome
Italy
Tel: (+39) 0651892 222
Fax: (+39) 065750309
Email: J.Engels@cgiar.org

Hareya Fassil
Programme Specialist, GRST
IPGRI
Via delle Sette Chiese 142
00145 Rome
Italy
Tel: (+39) 0651892 230
Fax: (+39) 065750309
Email: H.Fassil@cgiar.org

Lyndsey Withers
Assistant Director General
IPGRI
Via delle Sette Chiese 142
00145 Rome
Italy
Tel: (+39) 0651892 239
Fax: (+39) 065750309
Email: L.Withers@cgiar.org

David Cooper
Plant Genetic Resources Officer
Food and Agriculture Organization of
the United Nations (FAO)
Viale delle Terme di Caracalla
00100 Rome
Italy
Tel: (+39) 0657053789
Fax: (+39) 0657053152
Email: david.cooper@fao.org
Present address:
David Cooper
Programme Officer, Agricultural
biodiversity
Secretariat of the Convention on
Biological Diversity
World Trade Centre, 413 St. Jacques
Montreal, Quebec
Canada H2Y 1N9

References

- Anderson, J.R., P.G. Pardey and J. Roseboom. 1993. Sustaining growth in agriculture: a quantitative review of agricultural research investments. *Agric. Econ.* 10:107-123.
- Arnaiz, M.E.O. 1995. Farmers' Organisations in the Technology Change Process: An Annotated Bibliography. Agricultural Research and Extension Network Paper No. 53. ODI, London, UK, 50 p.
- Ashby, J.A. and L. Sperling. 1994. Institutionalizing participatory client-driven research and technology development in agriculture. Agricultural Research and Extension Network Paper No. 49. ODI, London, UK.
- Ashby, J.A. and L. Sperling. 1995. Institutionalising participatory, client-driven research and technology development in agriculture. *Development and Change* 26:753-770.
- Ashby, J.A., T. Garcia, M. Guerrero, C. Quiros, J. Roa and J. Beltran. 1995. Institutionalising farmers' participation in adaptive technology testing with the CIAL. Agricultural Research and Extension Network Paper No. 57. ODI, London, UK.
- Bagchee, A. 1993. Agricultural extension in Africa. Discussion Paper. World Bank, Washington DC, USA.
- Bebbington, A.J., D. Merrill-Sands and J. Farrington. 1994. Farmer and community organisations in agricultural research and extension: functions, impacts and questions. Agricultural Research and Extension Network Paper No. 47. ODI, London, UK.
- Bellon, M. 1994. Key issues for decision-makers in the planning and implementing of plant genetic resources programmes within the context of Agenda 21 and the Convention on Biological Diversity. Paper prepared for IPGRI, Rome, 21p.
- Bureau des Ressources Génétiques 1996. The management of plant genetic resources: integration of conservation, characterization and utilization processes. Paper prepared for the Seeds and Plant Genetic Resources Service, FAO, Rome, Italy.
- Callo, Dmasao, Jr. 1998. Presentation on Farmer Field Schools to the Regional Meeting to Promote Implementation of the Global Plan of Action in Asia-Pacific, Manila, the Philippines, 15-18 December 1998.
- Carney, D. 1996. Formal farmers' organisations in the agricultural technology system: current roles and future challenges. *Natural Resources Perspectives* No.14. ODI, London, UK.
- Collinson, M.P.O. 1983. *Farm Management in Peasant Agriculture* (2nd edition). Westview Press, Boulder, USA.
- Collion, M.-H. and P. Rondot. 1998. Partnership between agricultural services institutions and producers' organizations: myth or reality? Agricultural Research and Extension Network Paper No. 80. ODI, London, UK.
- Cooper, D., J. Engels and E. Frison. 1994. A multi-lateral system for plant genetic resources: imperatives, achievements and challenges. *Issues in Genetic Resources* No. 2. IPGRI, Rome, Italy.
- Eponou, T. 1996. Linkages between research and technology users in Africa: the situation and how to improve it. Briefing paper No. 31. ISNAR, The Hague, Netherlands, 8 p.
- Eyzaguirre, P. and M. Iwanaga. 1996. Participatory Plant Breeding. Proceedings of a Workshop, 26-29 July 1995, Wageningen, The Netherlands. IPGRI, Rome, Italy.
- FAO. 1985. Tropical Forestry Action Plan. Committee on Forest Development in the Tropics, FAO, Rome, Italy.
- FAO. 1992. TFAP Update No. 26. TFAP Coordinating Unit, Forestry Department, FAO, Rome, Italy, p. 22.
- FAO. 1994. Sustainable agriculture through integrated pest management. Document APRC/94/3. FAO, Rome, Italy.
- FAO. 1996. Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture and the Leipzig Declaration adopted by the International Technical Conference on Plant Genetic Resources, Leipzig, Germany, 17-23 June 1996. FAO, Rome, Italy.
- FAO. 1998. The State of the World's Plant Genetic Resources for Food and Agriculture. FAO, Rome, Italy.
- FAO, WRI, World Bank/UNEP. 1987. The Tropical Forestry Action Plan. FAO, Rome, Italy.
- Farrington, J. 1994. Public-sector agricultural extension: is there life after structural adjustment? *Natural Resources Perspectives* No. 2. ODI, London, UK, 4 p.
- Farrington, J. and A. Martin. 1988. Farmer participation in agricultural research: a review of concepts and practices. Occasional Paper No. 9. ODI, London, UK.
- Farrington, J., A. Bebbington, K. Wellard and D.J. Lewis. 1993. Reluctant Partners? Non-governmental Organizations, the State and Sustain-

- able Agricultural Development. Routledge, New York, USA, 222 p.
- Hart, R.D. 1994. Global electronic partnerships. *Outlook on Agriculture* 23:237-241.
- Hatch, M.J. 1997. *Organization Theory*. Oxford University Press, Oxford, UK, 387 p.
- Heinrich, G.M. and S. Masikara. 1992. Trial designs and logistics for farmer-implemented technology assessments with large numbers of farmers: some approaches used in Botswana. *J. Farming Syst. Res. and Extension* 3(2):131-145.
- Hobbs, H., J. Francisco Larios, F. Roberto Arias Milla and J. Eduardo Vides. 1997. A research partnership with farmers: the case of CENTA in El Salvador. Briefing Paper No.35. ISNAR, The Hague, Netherlands, 6 p.
- Hobbs, H., Mojica Bentancour F., Bonilla Bolaños O. and Solís Quirós. 1998. The Creation of a Coordinated National Agricultural Research System: The Case of Costa Rica. Briefing paper #37. ISNAR, The Hague, 8 p.
- IPGRI. 1993. *Diversity for Development: The Strategy of the International Plant Genetic Resources Institute*. IPGRI, Rome.
- IUCN, UNEP and WWF. 1991. *Caring for the Earth*. Gland, Switzerland.
- Jansen, W., P. Perrault and M. Housou. 1997. Developing an integrated agricultural research policy: experiences from Benin. Briefing Paper No. 33. ISNAR, the Hague, Netherlands, 8 p.
- Levy, M.A., P.M. Haas and R.O. Keohane. 1992. Institutions for the earth: promoting international environmental protection. *Environment* 34(4):12-17.
- Loevinsohn, M., G. Meijerink and B. Salasaya. 1998. Enhancing capacity to manage resources: assessing the Farmer Field School approach. Paper presented at the Second Meeting of the Integrated Pest Management Network for the Caribbean, sponsored by CARDI and CTA, Kingston, Jamaica, 4-6 February 1998.
- Mant, A. 1983. *The Leaders We Deserve*. Martin Robertson, Oxford, UK.
- Mattee, A.Z. and T. Lasalle. 1994. Diverse and limited: farmers' organizations in Tanzania. *Agricultural Research and Extension Network Paper No. 50*. ODI, London, UK.
- Muchagata, M.G., V. de Reynal and I.P. Verga (Jr). 1994. Building a dialogue between researchers and small farmers: the Tocantins AgroEcology Centre (CAT) in Brazil. *Agricultural Research and Extension Network Paper No. 50d*. ODI, London, UK.
- Merrill-Sands, D., D. Kaimowitz, K. Sayce and S. Chater. 1990. The technology triangle: linking farmers, technology transfer agents and agricultural researchers. ISNAR, The Hague, Netherlands.
- Miller, K.R. and S. Lanou. 1995. National biodiversity planning: guidelines based on early experiences around the world. WRI, UNEP and WCU, Washington DC, USA, Nairobi, Kenya and Gland, Switzerland.
- Mwila, G. 1998. Strengthening national programmes for PGRFA: the Zambian case. Paper presented to the Regional Meeting to Promote Implementation of the Global Plan of Action in Eastern and Southern Africa, Gaborone, Botswana, May 1998.
- Nelson, J. and J. Farrington. 1994. Information exchange networking for agricultural development: a review of concepts and practices. CTA, Wageningen, Netherlands.
- Okali, C., J. Sumberg and J. Farrington. 1994. Farmer participatory research: rhetoric and reality. *Intermediate Technology*, London, UK, 159 p.
- Pagiola, S., J. Vidaeus and J. Srivastava. 1997. Mainstreaming biodiversity in agricultural development: toward good practice. *Environment Paper No. 15*. World Bank, Washington DC, USA.
- Pfeffer, J. 1981. *Power in Organizations*. Pitman, Boston, USA.
- Richardson, D. 1996. *The Internet and rural development: recommendations for strategy and activity*. FAO, Rome, Italy, 38 p.
- Senge, P.M. 1990. *The Fifth Discipline: The Art and Practice of the Learning Organization*. Century, London, UK.
- Shelton, D. 1995. Fair play, fair pay: laws to preserve traditional knowledge and biological resources. *International Research Report*. WWF, Gland, Switzerland, p. 59.
- Sizer, N. 1994. Opportunities to save and sustainably use the world's forests through international cooperation. *World Resources Institute*, Washington, DC, USA, 28 p.
- Souder, W. 1980. Promoting effective R&D/marketing interfaces. *Int. J. Res. Manage.* 23:10-15.
- Sperling, L., U. Scheidegger and R. Buruchara. 1996. Designing seed systems with small farmers: principles derived from bean research in the Great Lakes region of Africa. *Agricultural Research and Extension Network Paper No. 60*. ODI, London, UK.
- Stacey, R.D. 1996. *Strategic Management and Organizational Dynamics* (2nd edition). Pitman, London, UK.

- Tabor, S.R. and P. Ballantyne. 1995. Policy conditionality in agricultural research projects. Pp. 166-177 *in* *Agricultural Research in an Era of Adjustment: Policies, Institutions and Progress* (S.R. Tabor, ed.). World Bank, Washington DC, USA.
- UNCED. 1992. Agenda 21: Programme of Action for Sustainable Development. UN, New York.
- UNEP. 1996. List of national focal points. Document UNEP/CBD/COP/3/Inf.11. UNEP, Nairobi, Kenya.
- United Nations. 1992. Convention on Biological Diversity. Preamble. UNEP, Geneva, Switzerland.
- USDA. 1995. Directory of national plant germplasm system. USDA, Washington DC, USA, 129 p.
- Van Hintum, T.J.L., L. Frese and P.M. Perret. 1990. Crop networks: searching for new concepts for collaborative genetic resources management. International Crop Network Series 4. IPGRI, Rome, Italy, 125 p.
- Wolfe, T. 1983. *From Bauhaus to Our House*. Abacus, London, UK.
- World Bank. 1995. National environmental strategies: learning from experience. World Bank, Washington DC, USA, 75 p.
- Wuyts-Fivawo, A. 1996. Linkages between research, farmers and farmers' organizations in Kenya: a summary of findings. Briefing paper No. 32. ISNAR, The Hague, Netherlands, 8 p.

Endnotes

¹ In the Americas, the term "national systems" is used, whereas elsewhere, "national programmes" is more common. A "system" may refer to a wider range of activities, of which a "programme" constitutes the core. In either case, a cross-institutional activity is meant. This is discussed further in Section III.

² Article 6(a).

³ CBD Article 6 (b); Agenda 21, 15.5 (b).

⁴ For instance, the CBD requests that nations encourage cooperation between their governmental authorities and their private sector in developing methods for the sustainable use of biological resources (United Nations 1992:Article 10).

⁵ For example, the Global Plan of Action includes among the objectives of Activity 2 "to foster the future emergence of public or private seed companies and cooperative enterprises as an outgrowth of successful on-farm selection and breeding" (para. 32). Included among the objectives of Activity 13 is "to develop and expand viable local-level seed production and distribution mechanisms for varieties and crops important to small-scale farmers" (para. 201).

⁶ The Plant Genetic Resources Centre of Ghana has been successful in developing arboreta covering timber, medicinal, ornamental and fruit tree species of economic importance. Ghana. 1995. Country Report to the International Technical Conference, Leipzig, 1996.

⁷ Other national reports, such as those prepared for UNCED in 1992, and the Country Studies on Biodiversity prepared since then, may also provide useful information.

All countries were invited to submit national reports as part of their preparations for UNCED in June 1992. These reports were prepared by national governments, often in consultation with the private sector and local, regional and international NGOs. Their preparation was promoted as a means of increasing public participation in government decision-making and in the UNCED process. Each report addressed development trends, environmental impacts and responses to environment and development issues through policies, legislation, institutions, programmes, projects and international cooperation. Some UNCED national reports served as a basis for subsequent National Sustainable Development Strategies (NSDS). At least 130 reports had been prepared by April 1992,

about 85 countries having formed national committees composed of government and other national stakeholders to facilitate the preparation of the reports.

With the coming into force of the CBD and the implementation of Agenda 21, many countries have prepared or are preparing studies that assess the national status of biodiversity conservation and sustainable use. These assessments will be useful as inputs to the national PGRFA planning process, particularly to highlight complementarities as well as possible conflicts between the agriculturally driven PGRFA perspective and the more environmentally driven biodiversity perspective. There may be many such conflicts. For instance, there may be a conflict resulting from agricultural activities in protected areas or the effects of agricultural intensification on aquatic biodiversity. Many such biodiversity assessments highlight agriculture as a threat to non-agricultural biodiversity.

⁸ Decision III/11 of the Third Conference of the Parties to the Convention on Biological Diversity: Conservation and sustainable use of agricultural biodiversity, <<http://www.biodiv.org/>>.

⁹ Statement made by the Canadian delegation at the Seventh Session of the FAO Commission.

¹⁰ Presentations and personal communications at the Regional Meetings to Promote Implementation of the Global Plan of Action in Central/West Asia-North Africa, Asia-Pacific and Eastern and Southern Africa respectively.

¹¹ For example, the national agricultural research institute of Benin (INRAB), in collaboration with ISNAR, developed an integrated agricultural research policy for the country. The key lessons learned in the process were to guard against an overoptimistic schedule for finalizing national policy, to facilitate stakeholder involvement through common methodologies and vocabulary, to reconcile scientific and development interests, and to understand the value of empirical evidence for decision-making (Jansen *et al.* 1997).

¹² Strategic planning. (ISNAR, <<http://www.cgiar.org/isnar/training/7str.htm>>).

Strategic planning in agricultural research management (ISNAR, <<http://www.cgiar.org/isnar/training/PME2.htm>>).

Priority-setting for agricultural research programs (ISNAR, <<http://www.cgiar.org/isnar/training/1prio.htm>>).

Strengthening linkages between research and technology users (ISNAR, <<http://www.cgiar.org/isnar/training/9str.htm>>).

Participatory research (ISNAR, <<http://www.cgiar.org/isnar/training/10pa.htm>>).

Planning, monitoring and evaluation of research projects (ISNAR, <<http://www.cgiar.org/isnar/training/2pla.htm>>).

¹³ Estimates from Country Reports (1995) prepared for ITC/PGR and Reports (1998) prepared for the Regional Meetings on GPA implementation.

¹⁴ Various Country Reports (1995) prepared for ITC/PGR.

¹⁵ Agenda 21 (para. 37.6) calls for countries to “designate and strengthen a focal point for technology cooperation with responsibilities including organizing and coordinating technology transfer and linkage with existing priority-setting and resource allocation processes.” National PGRFA programmes may wish to develop strong links between such technology transfer coordinating bodies, where established, and the national PGRFA focal point, to ensure that both PGRFA and related technologies are efficiently exchanged in a complementary manner.

¹⁶ Agenda 21 para. 37.6 recommends the establishment of national focal points for technology transfer.

¹⁷ Ireland Country Report (1995) prepared for ITC/PGR.

¹⁸ China Country Report (1995) prepared for ITC/PGR.

¹⁹ Namibia Country Report (1995) prepared for ITC/PGR.

²⁰ Uganda Country Report (1995) prepared for ITC/PGR.

²¹ Ghana Country Report (1995) prepared for ITC/PGR.

²² Nacuer Hamza. 1998. Presentation to the Regional Meeting to Promote Implementation of the Global Plan of Action in Central/West Asia-North Africa, June 1998, ICARDA, Aleppo, Syria.

²³ CBD Article 8(j).

²⁴ Malawi Country Report (1995) prepared for ITC/PGR.

²⁵ Decision III/11 of the Third Conference of the Parties to the Convention on Biological Diversity: Conservation and sustainable use of agricultural biodiversity, <<http://www.biodiv.org/>>.



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