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**COMMISSION ON GENETIC RESOURCES FOR FOOD AND
AGRICULTURE
ACTING AS
INTERIM COMMITTEE FOR THE INTERNATIONAL TREATY
ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE**

**OPTIONS FOR NON-MONETARY BENEFIT-SHARING - AN
INVENTORY**

by

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This document was prepared at the request of the Secretariat of the Commission on Genetic Resources for Food and Agriculture acting as Interim Committee for the International Treaty on Plant Genetic Resources for Food and Agriculture, in order to provide background information on options for non-monetary benefit-sharing to the Open-Ended Working Group on the Rules of Procedure and the Financial Rules of the Governing Body, Compliance, and the Funding Strategy that was established by the Interim Committee at its Second Meeting.

The content of this document is entirely the responsibility of the authors, and does not necessarily represent the views of the FAO, or its Members.

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OPTIONS FOR NON-MONETARY BENEFIT-SHARING - AN INVENTORY

ABSTRACT

1. This paper provides an analysis of existing non-monetary benefit-sharing arrangements and considers if and how such arrangements could be applied in the implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture. The analysis of a range of current benefit-sharing clauses in national laws, and agriculture-related benefit-sharing contracts reveals that all are based on bilateral arrangements, and therefore can provide only limited guidance for the multilateral approach of the Treaty.

2. We have then analysed options for multilateral approaches to the three types of non-monetary benefit-sharing distinguished in the Treaty, i.e. information exchange, capacity building and technology transfer, including possible institutional arrangements, based on existing mechanisms. Our conclusion is that opportunities for multilateral non-monetary benefit-sharing exist, that they can be rooted in current best practices, and that they can be implemented in a way so as to achieve 'quick wins'. At the same time, additional efforts will be needed, including through strengthening and re-focusing of existing activities, to harness such opportunities to optimally contribute to the objectives of the Treaty.

3. Non-monetary benefit-sharing under the Multilateral System is an obligation on Contracting Parties but the realization of such benefit-sharing requires the involvement of a range of stakeholders, who may have comparative advantages in providing certain benefits or may form logical targets for the receipt of such benefits. Ultimately, such benefits should reach farmers, who conserve and utilize plant genetic resources for food and agriculture in a sustainable way. The method of delivery of benefits is also influenced by the fact that, in the Multilateral System, benefit-sharing is decoupled from access at the individual transaction level.

4. Based on these principles we have made a number of recommendations for the Governing Body to consider in its role to promote the conservation and sustainable use of plant genetic resources for food and agriculture including on:

- The development of a Global Information System, including the establishment of a Focal Point for Good Practices.
- The provision of information to agencies that may want to contribute to the implementation of the International Treaty through the provision of non-monetary contributions.
- The strengthening of regional networks and national capacities in developing countries using available expertise in national and international organisations including the CGIAR Centres.
- The strengthening of national capacities for needs assessments regarding the conservation and utilization of plant genetic resources.

OPTIONS FOR NON-MONETARY BENEFIT-SHARING - AN INVENTORY

CHAPTER 1: INTRODUCTION

1.1 Background

5. This study has been performed at the request of the Secretariat of the Commission for Genetic Resources for Food and Agriculture, and has been funded by the Netherlands Ministry of Agriculture, Nature and Food Quality through its research programme on International Cooperation.

6. The International Treaty on Plant Genetic Resources for Food and Agriculture (hereinafter referred to as the Treaty) includes a Multilateral System of Access and Benefit-sharing (hereinafter referred to as the Multilateral System). The benefit-sharing provisions provide for both monetary and non-monetary benefits to be shared. The Commission on Genetic Resources for Food and Agriculture acting as Interim Committee for the International Treaty is in the process of developing a draft Funding Strategy for the Treaty, which includes the use of resources that result from the sharing of monetary benefits arising from the Multilateral System. No work has yet been undertaken on the non-monetary benefit-sharing provisions of the Multilateral System. However, in order to achieve full and proper implementation of the Treaty, in such a way that all Contracting Parties have an equal opportunity to benefit from it, it is essential that there is maximum transparency and efficiency in the delivery of in-kind benefits. To enable the Governing Body to play its part in ensuring full implementation of the Multilateral System, adequate and regular information on non-monetary benefits will be needed.

7. The objectives of this background study are to identify, analyze and make recommendations on:

- Ways in which the information necessary to support the work of the Governing Body in implementing the non-monetary benefit-sharing provisions of the Treaty can be generated.
- Ways in which the achievement of the Treaty's provisions on in-kind benefit-sharing can be promoted that are targeted, efficient, effective, measurable and transparent.

In particular, this study identifies existing practices, models and mechanisms at the national, regional and international levels on information exchange, technology transfer, and capacity-building. Furthermore, it analyzes the extent to which these efforts contribute to the achievement of the Treaty, where improvements may be obtained and gaps may be filled. The study ends with a number of recommendations based on this analysis.

1.2 Terms and their interpretations

8. Benefit-sharing has not been defined in the Treaty². The Treaty addresses non-monetary benefit-sharing according to three main categories. These are³:

- i. **Exchange of information**, which may involve catalogues and inventories, information on technologies, results of research relevant to the plant genetic resources for food and agriculture under the Multilateral System.

² In the specific context of the CBD, document CBD UNEP/CBD/COP/3/Inf.53 states that "What constitutes a 'benefit' that can be shared is limited only by the imagination and ingenuity of the partners involved."

³ The three main categories are elaborated on further in Table 1.

- ii. **Access to and transfer of technology**, including access to materials and access to relevant technologies for the characterisation, evaluation and utilisation of plant genetic resources for food and agriculture.
- iii. **Capacity-building**, which may include programmes for scientific and technical research, education, and training in conservation and sustainable use of plant genetic resources for food and agriculture, and for developing and strengthening relevant facilities.

This study accordingly compiles and analyses information on these elements of non-monetary benefits from major representative sources. It understands models as coherent approaches and mechanisms to arrive at the anticipated objectives of benefit-sharing.

Table 1. Benefits by type

Exchange of information	<p>Information on collaborative efforts Sharing of research and development results Access to databases General sharing of information relevant for conservation and use Access to scientific information relevant to conservation and use of plant genetic resources for food and agriculture Improved knowledge of plant genetic resources for food and agriculture Improved knowledge of natural environment</p>
Access to and transfer of technology	<p>Access to materials Access to collections Access to products Access to commercially released varieties for further research and breeding Access to relevant technologies Transfer of knowledge and technology Transfer of equipment, software, know-how Joint ventures for the creation of technological foundations Participation in product development Participation in planning and decision-making Undertaking commercial production, processing or manufacture Creation of alternative industries or crops Partnership in the economic exploitation of processes and products Sharing of rights Joint ownership or sole ownership of intellectual property rights Free licensing for the utilization of patented processes and products</p>
Capacity building	<p>Cooperation in scientific research and development programmes Facilitation of research partnerships Formation of collaborative agreements with local institutions Co-operative scientific research and technological development Consolidation of scientific research infrastructure Providing institution conducting field trials Research directed to priority needs, such as food security Participation of source country scientists in research Cooperation in conservation efforts In-kind support for conservation (e.g. genebank facilities) Benefits in kind e.g. augmentation of national collections Increased opportunities for developing multilateral strategies for conservation and use Voucher specimens to be left in national institutions Cooperation in education and training Training in bio-prospecting methods etc. Training in science, in situ and ex situ conservation and management, information technology and management/administration of ABS Institutional capacity-building Increased scientific capacity Strengthening capacities for technology transfer Investment in research and development infrastructure Investment in the capacity of local industry Undertaking commercial production, processing or manufacture</p>

	Resources for the implementation of access regulations Institutional and professional relationships Exchange of staff
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1.3 Treaty requirements regarding non-monetary benefit-sharing

9. With the exception of the monetary benefit-sharing provisions of Article 13.2d(ii), the Treaty makes no link between access to genetic resources under the Multilateral System and benefit-sharing. It is important to note that the non-monetary benefit-sharing obligations are placed on Contracting Parties, not on stakeholders that access plant genetic resources for food and agriculture from the Multilateral System. However, while the obligation for realising the benefit-sharing arrangements rests with Contracting Parties, they will have to rely on various stakeholders in developing, financing and implementing mechanisms for non-monetary benefit-sharing in order to meet this obligation.

10. The main provisions on non-monetary benefit-sharing are contained in Article 13.

- The chapeau to Article 13.2 describes the scope of benefit-sharing and proposes some mechanisms for non-monetary benefit-sharing.⁴
- Article 13.2(a) establishes the obligation regarding exchange of information, and refers to the global information system, described in Article 17 of the Treaty, as a possible mechanism.
- Article 13.2(b) establishes the obligation regarding access to and transfer of technology. A set of measures is proposed, *i.e.*, “*the establishment and maintenance of, and participation in, crop-based thematic groups on utilization of plant genetic resources for food and agriculture, all types of partnerships in research and development and in commercial joint ventures [.....], human resource development, and effective access to research facilities*”. Some of these measures could be provided directly by the Contracting Parties, while others would require the cooperation of the private and academic sectors.
- Article 13.2(c) provides for capacity-building.⁵ Priority is given to establishing and/or strengthening programmes for scientific and technical education and training, as well as facilities, for conservation and sustainable use, and to carrying out and developing capacity for scientific research.

11. The Funding Strategy of the Treaty (Article 18) will also be crucial for non-monetary benefit-sharing. The Funding Strategy will seek to mobilise a wide range of resources, from multilateral and bilateral bodies, including international mechanisms, funds and bodies, technical assistance resources, the private sector, non-governmental organisations and other sources, for priority activities, plans and programmes.

12. Other articles of the Treaty that are relevant to non-monetary benefit-sharing include:

⁴ Article 13.2 “The Contracting Parties agree that benefits arising from the use, including commercial, of plant genetic resources for food and agriculture under the Multilateral System shall be shared fairly and equitably through the following mechanisms: the exchange of information, access to and transfer of technology, capacity-building, and the sharing of the benefits arising from “commercialization, taking into account the priority activity areas in the rolling Global Plan of Action, under the guidance of the Governing Body:”

⁵ Article 13.2(c) “Taking into account the needs of developing countries and countries with economies in transition, as expressed through the priority they accord to building capacity in plant genetic resources for food and agriculture in their plans and programmes, when in place, in respect of those plant genetic resources for food and agriculture covered by the Multilateral System, the Contracting Parties agree to give priority to (i) establishing and/or strengthening programmes for scientific and technical education and training in conservation and sustainable use of plant genetic resources for food and agriculture, (ii) developing and strengthening facilities for conservation and sustainable use of plant genetic resources for food and agriculture, in particular in developing countries, and countries with economies in transition, and (iii) carrying out scientific research preferably, and where possible, in developing countries and countries with economies in transition, in cooperation with institutions of such countries, and developing capacity for such research in fields where they are needed.”

- Article 9, which contains the provisions on Farmers' Rights, including the right of farmers to equitably participate in sharing benefits. This right is reinforced by Article 13.3 in relation to benefit-sharing under the Multilateral System and Article 18 in relation to the Funding Strategy.
 - Article 10.2, which specifies that the Multilateral System should be efficient, effective and transparent.
 - Article 13.6, which calls on the Contracting Parties to consider modalities of a strategy of voluntary benefit-sharing contributions whereby Food Processing Industries that benefit from plant genetic resources for food and agriculture shall contribute to the Multilateral System.
 - Article 16, which refers to the important role to be played by networks, including crop-based thematic groups.
 - Article 17, which refers to the contribution of a global information system in sharing benefits by making information on plant genetic resources for food and agriculture available to Contracting Parties.⁶
13. Four conclusions can be drawn from the provisions listed above:
- i. The Multilateral System does *not* link benefit-sharing directly to access, or to individual genetic resources accessed from the Multilateral System. In other words, the flow of benefits to providers of plant genetic resources for food and agriculture to the Multilateral System will not be based on specific individual germplasm transfers.
 - ii. Whereas the Contracting Parties are responsible for the implementation of the Treaty, including the non-monetary benefit-sharing aspects, they will not be able to deliver all aspects of non-monetary benefit-sharing themselves. They will need to consider ways and means of ensuring the involvement of other stakeholders, as appropriate.
 - iii. Non-monetary benefit-sharing arrangements under the Treaty focus on three mechanisms: information exchange, technology transfer, and capacity-building. Benefits for farmers are thus likely to be indirect and derived from these mechanisms.
 - iv. The Funding Strategy will be essential for the provision of the financial resources needed to deliver some of the non-monetary benefits.

1.4 A context for the analysis of benefit-sharing arrangements

14. A number of studies have described or analyzed benefit-sharing arrangements regarding plant genetic resources, but exclusively in the context of bilateral benefit-sharing arrangements. In this study "bilateral" is used to indicate individual contracts between a supplier and a recipient, with individual benefits linked to these specific resources to which access is accorded. As analysed in 1.3 above, benefit-sharing under the Multilateral System, does not provide for such specific linkage and the primary responsibility for the realization of non-monetary benefit-sharing lies with the Contracting Parties.

15. The number of reported implemented bilateral arrangements is still very limited, and they mostly concern the collecting and analysis of genetic materials and associated knowledge for drug development, where the benefits involved tend to be of a higher order of magnitude to those that can

⁶ Article 17.1 "The Contracting Parties shall cooperate to develop and strengthen a global information system to facilitate the exchange of information, based on existing information systems, on scientific, technical and environmental matters related to plant genetic resources for food and agriculture, with the expectation that such exchange of information will contribute to the sharing of benefits by making information on plant genetic resources for food and agriculture available to all Contracting Parties. In developing the Global Information System, cooperation will be sought with the Clearing House Mechanism of the Convention on Biological Diversity."

be expected in the agricultural sector. Reported benefit-sharing arrangements that are explicitly related to agricultural biodiversity are few.

16. Other reports analyze options and the potential impact of benefit-sharing schemes that have not yet been realized. Examples of benefit-sharing arrangements in the framework of bilateral cooperation (i.e. not linked to bilateral access agreements) have also been identified. Whereas, again, these may be of general interest, it should be stressed that the implementation of the Treaty calls for benefit-sharing in a multilateral context, and thus examples cited need to be interpreted with care, and are likely to need adaptation to render them applicable within the framework of the Treaty.

17. The multilateral nature of non-monetary benefit-sharing under the Treaty is based on the following main considerations:

- i. Facilitated access to plant genetic resources in the Multilateral System should be seen as a benefit in itself. The Multilateral System contributes to the creation of a rational system for the conservation and sustainable use of plant genetic resources for food and agriculture, as called for by the Global Plan of Action. *“Countries contribute what they have to the global larder and get access to the diversity everyone else has provided, while retaining their own plant genetic resources for food and agriculture.”*⁷
- ii. Many (although not all) non-monetary benefits entail costs for those parties providing them. The distinction between monetary and non-monetary benefit-sharing is that the former concern the transfer of money and the latter the provision of goods and services. Non-monetary does not mean without financial costs.
- iii. What may be monetary at the international level (transferring money to a fund), might become non-monetary at the national or local level in the form of goods and services paid for with those funds.
- iv. Non-monetary benefits should contribute directly to the conservation and sustainable use of plant genetic resources for food and agriculture; but may also result indirectly in other outcomes, to the benefit of a wider group of stakeholders, including
 - a. social outcomes, such as improved quality of life, food security, health and recognition for cultural values,
 - b. economic outcomes, such as lower food costs, increased productivity, expanded market opportunities, and
 - c. environmental outcomes, such as sustainable production methods, protection of habitats and the reduction of genetic erosion.
- v. Benefit-sharing should be fair and equitable. Equity is a relative term and can be determined only by the participants in the process (including, in this case, the Governing Body). It means not only equitable compensation, but also equal weight among participants in making decisions about what form benefits should take.⁸
- vi. While sovereign states constitute the Contracting Parties to the Treaty, the Treaty also implicitly recognises the role of natural and legal persons within the jurisdiction of the Contracting Parties, including in the provisions on benefit-sharing and the Funding Strategy (Articles 13 and 18 respectively). At least the following categories of stakeholders can be distinguished:
 - a. National governments.
 - b. Research and breeding institutes, including genebanks.

⁷ Fowler, C., 2003. Diversity and Protectionism. Use of Genebanks: Trends and Interpretations. Workshop Lecture Syngenta, Basel.

⁸ Moran, K., 2000. Bioprospecting: lessons from benefit-sharing experiences. Int. J. Biotechnology, 2, p.132-144; OECD, 2003. Economic issues in access and benefit-sharing of genetic resources: a framework for analysis. Paris, France.

- c. Private industry.
 - d. Local communities and farmers.
 - e. Non-governmental organizations.
- vii. In the debate regarding bilateral access and benefit-sharing, a distinction is made between provider countries and user countries. In the case of genetic resources for food and agriculture, the overall interdependence means that all countries are users and providers. Therefore, the terms, “user” and “provider” apply to all countries, making the terms misleading as a generic distinction. In this report we shall therefore use the term user and provider, on the understanding that every country or Contracting Party might alternately take the role of provider and user, and no country or Contracting Party can be regarded as a provider country or a recipient country solely.

CHAPTER 2: ASSESSMENT OF EXISTING PRACTICES, MODELS AND MECHANISMS

2.1 Introduction

18. In this section, we have reviewed the provisions on non-monetary benefit-sharing as provided in twenty seven different access and benefit-sharing laws (7), regulations (13) and agreements (7). While it must be stressed that the information thus obtained relates to benefit-sharing under bilateral agreements, it may provide some elements of relevance to benefit-sharing in general, and illustrate different types of benefit-sharing.

19. Different categories can be distinguished, according to their scope, the parties involved, and their level of detail:

- Access and benefit-sharing laws and regulations developed and adopted by national governments, often in relation to the implementation of the provisions of the Convention on Biological Diversity, and providing a context for the following two categories.
- General ‘framework agreements’ between institutions, established as collaborative agreements with wide object coverage.
- ‘Transaction-specific agreements’ between institutions.

20. From the analysis of all 27 cases the following conclusions can be drawn:

- No single approach exists on how to specify and agree on non-monetary benefits.
- Technology transfer, capacity-building and information exchange are often mentioned but usually without detailed provisions.
- The level of detail of non-monetary benefit-sharing arrangements is highest in transaction-specific agreements and lowest in national laws and regulations.

2.2 National laws and regulations

21. Although many countries have established some form of access and benefit-sharing regulations, explicit references to non-monetary benefit-sharing arrangements were found in the legislation of only seven countries:

- Argentina (Law on Access to Genetic Resources: Article 18).
- Bangladesh (Biodiversity and Community Knowledge Act, Articles 13, 14, 16).
- Bolivia (Supreme Decree No. 24676: Article 40a-d).
- Brazil (Provisional measure No. 2.186-16: Article 25).
- Costa Rica (Decree No. 31514-MINAE: Article 6m).
- India (The Biological Diversity Bill: Article 21:2b-f).
- The Philippines (Executive Order No. 247: Section 5).

22. In contrast to the monetary benefit-sharing clauses, most references to non-monetary benefit-sharing remain relatively unspecific. Brazil and Bolivia mention “*technology access and transfer*”, “*unrestricted licensing*” and “*training of human resources*” without further specifications. Bangladesh and Costa Rica have a broader focus on non-monetary benefit-sharing, and include economic, environmental, scientific-technological, social or cultural benefits.

23. Most specific is the Executive Order of The Philippines, stipulating that collectors must sign either an Academic Research Agreement or a Commercial Research Agreement. As such, the

Philippine legislation well exceeds the average national access and benefit-sharing regulation in providing for highly detailed non-monetary benefit-sharing clauses (Sections 5h,i,l).

24. The laws and regulations cited above provide frameworks and specific points of reference for any implementing arrangement, whether or not involving the government directly as a party to such agreements. In addition to these laws providing for the conclusion of bilateral contracts, none of the investigated national non-monetary benefit-sharing regulations refer to agricultural practice *per se*.

2.3 Agreements

25. The agreements on access and benefit-sharing referred to below precede the entry into force of the Treaty.

2.3.1 Institutional framework agreements

26. Thirteen institutional ‘framework agreements’ were examined. They are more detailed than national access and benefit-sharing regulations, and they provide more room for non-monetary benefit-sharing clauses. However, most framework agreements contain relatively unspecific non-monetary benefit-sharing clauses on the ‘exchange of research results’, the ‘supply of training and trainers’, and other forms of support that help to strengthen collaboration between the parties involved. The supply of equipment and other facilities are the subject of only very few framework agreements (table 2).

Table 2. Institutional framework agreements containing non-monetary benefit-sharing clauses

Country	Sector	Type of model agreement
Nigeria	Pharmaceutical	Model agreement between the National Institute for Pharmaceutical Research and Development (NIPRD), Nigeria and “ <i>consultant herbalists</i> ”
Australia	“Queensland Biodiscovery Industry”	Model Biodiscovery Benefit-Sharing Agreement was prepared by the State of Queensland, Australia to facilitate the development of the Queensland Biodiscovery Industry
USA	Pharmaceutical	Model Letter of Collaboration between the Developmental Therapeutics Program Division of Cancer Treatment/Diagnosis National Cancer Institute, and a Source Country Government/ Source Country Organization(s)
USA	Education	Proprietary Material Transfer Agreement
USA, Cameroon, Nigeria	Pharmaceutical	The ‘Benefit-sharing Plan’ of the International Cooperative Biodiversity Group (ICBG)
Nigeria	Pharmaceutical	Fund for Integrated Rural Development and Traditional Medicine (FIRD-TM)
Nigeria	Pharmaceutical	Agreement of Principles
India	Pharmaceutical	Know How Licensing Agreement between The Tropical Botanic Garden and Research Institute, Kerala, and The Arya Vaidya Pharmacy (Coimbatore) Ltd.
Sri Lanka	Agricultural	Agreement for the Testing of Plant Extracts between the Company and the University
Switzerland, China	Agricultural	Research Agreement between Syngenta Crop Protection AG, Basel, Switzerland and HUBEL Academy of Agricultural Science, Wuhan, China
Philippines, USA	Pharmaceutical	MSI anti-cancer agreement (based on the Philippine Presidential Order 247, see under National ABS regulations)
Costa Rica	Pharmaceutical	INBio-Merck agreement
Lebanon, United Kingdom	Agricultural	Access and Benefit-Sharing Agreement between the Lebanese Agricultural Research Institute, Tal Amara, Rayak, Lebanon and The Board of Trustees of the Royal Botanic Gardens, Kew, United Kingdom

2.3.2 Transaction-specific agreements

27. All seven specific transaction agreements examined contained explicit provisions on exchange of information, training, research, the supply of collection and research facilities, and the dissemination of research results. It is to be noted that only two of the agreements were linked to agricultural source materials:

- (a) In 1997 an agreement was concluded between UC Davis (USA), the University of Mali and the Bela community (Mali) on the access to and benefits from the wild rice gene *Xa21* (derived from *O.longistaminata*). A special Genetic Resources Recognition Fund was founded to finance fellowships at UC Davis for students from source countries, giving priority to Mali. The agreement specifies that farmers in developing countries will be able to acquire seeds of UC Davis' transgenic lines at the same cost as traditional parental lines⁹.
- (b) The Memorandum of Understanding (1998) between USDA, the Paraguayan National University of Asunción, the Ministry of Agriculture and Livestock, the Instituto Agronómico Nacional (IAN), and IPGRI describes the terms under which the USDA can access chili pepper (*Capsicum*) germplasm in Paraguay. The source country is offered a security backup of the collection in Paraguay at the USDA National Storage Laboratory, training to IAN scientists, an inventory of wild crop relatives native to Paraguay, and an analysis of *in situ* preservation of *Capsicum*¹⁰.

28. It can be concluded from an analysis of these seven agreements that information exchange, technology transfer and capacity building are strongly linked and form elements of benefit-sharing that can not be effectively separated.

2.4 Practices, models and mechanisms for non-monetary benefit-sharing

2.4.1 Information exchange

29. Information exchange is the most basic and simplest form of non-monetary benefit-sharing. It can often be realised without significant cost. Both technology transfer and capacity-building include a strong element of information exchange.

30. Practices. The exchange of results of research under a given access and benefit-sharing agreement is often central to information exchange, and usually takes place on a bilateral basis between the provider and the user. Information exchange might also entail, *inter alia*, the establishment of inventories or local databases, and the production of joint publications.

31. Models and mechanisms. Information exchange can often involve many partners and can be multilateral by default, especially if the internet is used as one of the instruments for the sharing of information. Electronic publications, including electronic journals and web-based databases, form logical instruments for multilateral information exchange. Access to such information in developing countries can be enhanced through financial support towards the cost of hardware and software, and for subscriptions to commercially provided information, such as that contained in scientific journals. The development of compatible software forms is an essential prerequisite for effective information sharing. Investments in open source software development and the distribution of its products could also reduce the recurrent software costs for users in developing countries. In a multilateral context, well-accessible web-based databases on genebank holdings such as the System-Wide Information Network for Genetic Resources (SINGER), the Germplasm Resources Information Network (GRIN) and the European Plant Genetic Resources Search Catalogue (EURISCO) are also highly important

⁹ Ten Kate, K. and M. Collins, 1999. 'The Genetic Resources Recognition Fund of the university of California, Davis'. Submission to the Executive Secretary of the Convention on Biological Diversity by the Royal Botanic Gardens, Kew.

¹⁰ Williams, K.A., 1998. Plant Exchange Office Leads Way in Establishing Non-Monetary Benefit-Sharing Regimes. NPGS Site News, 14 No. 3&4, p. 23-24.

means of information exchange. In this context, it is worth noting that Article 17 of the Treaty foresees that a global information system will be developed “*based on existing information systems*”.

2.4.2 *Technology transfer*

32. Technology transfer, by necessity, encompasses the sharing of information, and, in most cases, relies on concomitant capacity-building in order to be effective.

33. Providing access to products of research and development, such as new crop varieties, may be considered a specific case of technology transfer that does not necessarily imply capacity-building. However, the transfer of knowledge on related production methods (e.g., breeding and selection) will imply capacity-building and enhance the effectiveness and impact of acquired access to technology products.

34. Practices. Technology transfer forms a part of most institutional framework and transaction-specific access and benefit-sharing agreements, including those dealing with agricultural use. Examples include the execution of research, processing and product development in providing countries, with the involvement of collaborating institutions in those countries. The 20 cases of institutional framework agreements and transaction-specific agreements analysed include only collection building, fermentation and pre-screening activities regarding micro-organisms. However, the use of specific molecular markers and of genomics technology, including the use of large-scale high-throughput analytical tools, as well as DNA-sequencing technology and software to analyse DNA sequences on structure and function, are likely to form part of future access and benefit-sharing arrangements for agricultural use as well. The use of genetic modification technology may also be the subject of technology transfer, depending on the national policies and needs of the recipient. Multilateral technology transfer can also take the form of broad licences offered by universities and industry that provide for royalty free use of protected biological tools and products (e.g., the humanitarian licenses on Golden Rice and the rice genome information).

35. Models and mechanisms. The use of genomics and similar technologies (proteomics, metabolomics) imply high investment costs, and elements of these technologies are protected by intellectual property rights. Genetic modification technologies are heavily protected. This implies the need for public-private partnerships in technology transfer involving these types of technology, and the use of licenses, to enable access to such patented processes and instruments. Technology transfer by the private sector under bilateral contracts can involve the transfer of research and product development activities to daughter companies or collaborating national companies in developing countries. This form of transfer does not necessarily imply a change in ownership of the technology, but may bring employment and raises the expertise in those countries. Furthermore, the transfer of crop varieties, and access to breeding materials and molecular marker technology to speed up and improve cross-breeding, may need partnerships with private companies and/or advanced research institutes. The Future Harvest Centres of the CGIAR offer a major mechanism of technology transfer through their policy of developing and distributing new crop varieties and breeding materials to developing countries, and through capacity-building for the use of those materials.

2.4.3 *Capacity building*

36. Capacity-building is probably the most sustainable form of benefit-sharing. Training is a central element of almost all capacity-building arrangements.

37. Practices. The cases analysed include university fellowships, training of personnel (including IPR-related training) either in the source country or at the user institution, and training of other users or persons involved in accessing or maintaining germplasm *in situ*. Furthermore, the establishment of facilities, such as for collection maintenance, and of equipment to enable the application of

technologies transferred, form part of access and benefit-sharing agreements. Long-term capacity-building may take the form of institutional development.

38. Models and mechanisms. Mechanisms may include multi-party programs involving public institutions as well as private companies. Capacity-building involving training is more effective in the long run if it is carried out in developing countries, since it builds on the available resources and has to conform to local infrastructural conditions. Such activities not only result in trained personnel but also in local capacity and facilities to allow proper training. The regular training programs and the Challenge programs of the CGIAR form major vehicles for multilateral capacity development. Strengthening university curricula could also make an important contribution including in a multilateral setting using the internet e.g. the Global Open University initiative of the CGIAR. Bringing new breeding products and production methods to effective use by end-users requires strengthening of extension services and non-governmental organizations and an attitude that is open to participatory approaches that enable the optimal combination of communal knowledge with innovations of the formal sector.

2.5 The inter-relationship between information exchange, technology transfer and capacity-building

39. Information exchange, technology transfer and capacity-building are highly interdependent. As stated above, information exchange is the most basic form of benefit-sharing. It is implied in technology transfer and capacity-building, but can also stand by itself.

40. Technology transfer by necessity encompasses sharing of information, and requires concomitant capacity-building in order to be effective. Access to technology without the human knowledge and infrastructural capacity to use it is meaningless.

41. Capacity building involves hardware and software, infrastructure and knowledge, and is a very open form of enhancing options for development, increasing the potential for future adoption of new technologies. However, capacity-building can often be most effective if it can be immediately applied, but this renders it dependent on access to technology. Thus, a mutual interdependence between technology transfer and capacity-building exists.

42. Institutional arrangements tend to focus more on long-term relations in which capacity-building plays an organic role, and they invariably contain elements of technology transfer as well. Private sector arrangements that contain elements of technology transfer usually include at least a focused effort on capacity-building to enable effective use of the technology transferred.

43. In conclusion, meaningful benefit-sharing arrangements will often contain all three elements of information exchange, technology transfer and capacity-building, and it is only the relative share that will differ according to specific needs and options.

CHAPTER 3: AN ANALYSIS OF MODELS AND MECHANISMS

44. In analysing models and mechanisms it is important to recognize the roles and interests of the various stakeholders involved.

The major stakeholders under the Multilateral System include:

- States as Contracting Parties, acting individually or through the Governing Body.
- States that are not Contracting Parties, as influenced by conservation and utilisation efforts at the global level.
- Farmers as providers of farmers' varieties and users of formal sector varieties, both of which may be included in the Multilateral System.
- Breeders and researchers as users and providers, both in the public and private sector.
- The private sector as a user of plant genetic resources in the form of products and by-products, including the food processing industry (Article 13.6).
- International organisations, governmental as well as non-governmental, with a mandate to contribute to poverty alleviation and to agricultural development.
- Genebanks and other specialized collection holders that operate under a conservation mandate.

3.1 The international level

45. Contracting Parties, individually and through the Governing Body, have committed themselves to benefit-sharing in the context of the Multilateral System. The Funding Strategy, defined in Article 18 of the Treaty, will form a major vehicle for such benefit-sharing under the Treaty.

46. States that are providers of overseas development assistance may have an opportunity to contribute to the success of the Multilateral System by:

- Developing arrangements for non-monetary benefit-sharing for the use of plant genetic resources for food and agriculture in the public domain through institutions under their jurisdiction and control.
- Promoting and facilitating non-monetary benefit-sharing arrangements operated by other stakeholders.
- Identifying intermediaries to channel benefits from stakeholders in their countries to eligible stakeholders in developing countries and countries in transition.
- Supporting existing multilateral organisations in their work related to the realisation of the objectives of the Treaty and the Multilateral System in particular.
- Integrating non-monetary benefit-sharing into their aid programmes.

47. Plant genetic resources networks, either with a regional or with a crop focus, as referred to in Article 16 of the Treaty, and the global information system referred to in Article 17, form important models for multilateral cooperation to conserve and use genetic resources and provide major mechanisms by which information and technology can be shared and by which capacity-building can be organised¹¹. In particular, networks may contribute to the effectiveness of benefit-sharing since they offer a multilateral framework by which many stakeholders can be reached. Networks may involve different partners and include the private sector and non-governmental organisations. In order for these networks to fulfil such roles, they may need to be strengthened institutionally and financially, and, furthermore, they need the political support from the countries participating in those networks.

¹¹ Raymond, R. & C. Fowler, 2001. Sharing the non-monetary benefits of agricultural biodiversity. IPGRI, Issues in Genetic Resources No. 5.

3.2 The national level

48. Activities related to the conservation and sustainable use of genetic resources and the other tasks assigned by the Treaty to which benefit-sharing should be directed have to be implemented by various stakeholders under the jurisdiction of the states that are party to the Treaty. In benefit-sharing we may distinguish between the providers of plant genetic resources for food and agriculture (e.g. local communities that contribute to the development and maintenance of genetic resources in particular in centres of diversity, or genebanks that maintain local stocks) and the users (e.g. public and private plant breeders, researchers and farmers that depend on genebank stocks for restoration). A major challenge for Contracting Parties will be to reach these stakeholders effectively and to motivate and allow them to participate actively in the sharing of benefits. The development of implementation mechanisms for non-monetary benefit-sharing calls for a careful analysis of the current and potential roles of stakeholders.

3.2.1 Linking governments and farmers

49. National Agricultural Research and Extension Services are normally mandated to reach farmers with information and (advice about) plant varieties and agricultural practices. In addition, farmers' associations may play a similar or complementary role. Their effectiveness varies among countries and among client groups within countries, smallholder farmers being not well addressed in many countries. Countries may thus need additional channels for reaching farmers in ecologically diverse conditions where the need for support (and the link to conservation) is strong, as well as farming communities that practice local crop improvement or have the capacity to do so. Some non-governmental organizations are quite effective in this. In participatory plant breeding programmes, the roles of the provider and the user of genetic resources often come together in a single team.

3.2.2 Linking governments and users

50. In most countries, the breeders and seed industry are organised in business (seed) associations, academic associations and seed regulatory institutions. These platforms may be instrumental in stimulating involvement in non-monetary benefit-sharing by their members. Such associations could promote the need for non-monetary benefit-sharing to their members, jointly develop partner networks, and identify good-practice arrangements. Support measures to facilitate benefit-sharing by users may be taken by promoting best practice or code of conduct for industry including information sharing. Countries may take additional measures, such as tax benefits on technology transfer or other privileges based on good conduct in the field of benefit-sharing.

3.2.3 Genebanks as intermediaries

51. Given the diversity of intermediaries Contracting Parties could consider delegating specific roles to institutions under their jurisdiction. Genebanks are brokers in genetic resources and have a direct function in information supply. In addition, they often have well developed networks, including with National Agricultural Research and Extension Services, non-governmental organizations and private sector breeders, and they are therefore well placed to expand their brokerage function to include benefit-sharing arrangements.

3.3 Need for further analysis

52. An analysis of technology transfer in the context of plant genetic resources for food and agriculture could be carried out to further inform the development of useful mechanisms to ensure full implementation of the benefit-sharing provisions of the Treaty. Such an analysis could seek to answer the following questions:

- Where do genetic resource related technologies occur and where have they been transferred?

- What is the extent of recipient capacity to use and further develop such technologies? Where has transfer been sustainable and where not?
 - What are the reasons of success and failure in transfer of technologies?
53. On wider issues, the following questions might be usefully addressed by the Governing Body:
- Are benefits to be identified and defined by the Governing Body or are they to be determined on the basis of guidance to be prepared by the Governing Body?
 - Can the Governing Body provide an assessment regarding which variables affect the value of benefits to be shared?
 - Are benefits distributed to a range of stakeholders?
 - Do arrangements under the Multilateral System address and promote a package of different benefits?¹²

3.4 Timing of benefit-sharing

54. Since the Multilateral System has decoupled access and benefit-sharing, the issue of the timing of benefit-sharing in relation to access is not relevant. However, establishment of examples of effective implementation of benefit-sharing under the Multilateral System in the initial period of its implementation is highly important in order to foster the commitment of Contracting Parties and other stakeholders to the Multilateral System. Acknowledging that different stakeholders have different interests and different needs, the availability of a range of benefits at various points in time is also important. The Funding Strategy of the Treaty, including the Global Crop Diversity Trust, will play a critical role in addressing these needs.

¹² Adapted from K. Ten Kate and S.A. Laird, 1999. *The Commercial Use of Biodiversity: Access to Resources and Benefit-Sharing*. Earthscan Publishers. Ltd.: London.

CHAPTER 4: PRACTICAL APPROACHES TOWARDS NON-MONETARY BENEFIT-SHARING IN THE MULTILATERAL SYSTEM

4.1 Introduction

55. This chapter analyses the different examples, ideas and suggestions for non-monetary benefit-sharing identified in Chapters 2 and 3 above to assess their usefulness in the context of the Multilateral System. We have also attempted to identify those stakeholders that might participate in the implementation of the different types of non-monetary benefit-sharing.

4.2 Information exchange

56. International databases that are easily accessible to all interested parties, actively managed, regularly updated, and compatible with different data source management systems, could form a major instrument for information exchange. The CGIAR has developed the database system SINGER, and the European region has recently built the SINGER-derived database system EURISCO. Both are truly multilateral in nature. Although a national database, the USA database GRIN, incorporating data from a substantial number of individual collections may be regarded as another example. In the context of non-monetary benefit-sharing, it might be appropriate to develop database systems in other regions that are analogous to these examples. Such databases could hold information on all plant genetic resources placed in the Multilateral System in that region. This information should encompass both the passport and characterization data provided by the party that placed the plant genetic resources in the Multilateral System and the characterization and evaluation data obtained by users. This would offer a convenient mechanism for feed-back by recipients on the use of plant genetic resources to the Multilateral System. Other systems are operational that bring together information on projects dealing with plant genetic resources (e.g. the Web-based Information Services for Agricultural Research for Development¹³). If suitable search modalities are provided to search such databases, project information relevant to conservation and sustainable utilization can be made available.

57. The Governing Body may wish to consider how such regional databases could be established. Consideration could be given to funding their establishment, maintenance and development through the Funding Strategy of the Treaty. Stakeholders, including the Centres of the CGIAR and developed country genebanks could provide technical support. Consideration could also be given to how existing databases could be more effectively used. Issues such as compatibility and the development of a database of databases could also be examined. Such action would meet some of the objectives of Articles 13.2a and 17 of the Treaty.

58. Actively supported crop-based working groups could form another mechanism by which information is exchanged. The crop-based strategies of the Global Crop Diversity Trust that are currently being developed are likely to result in consortia of collection holders for particular crops that will effectively function as crop-based working groups. Crop-based working groups have also formed the major vehicle for cooperation in the European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR)¹⁴. Its working groups have focused on building common databases and in establishing regional core collections of unique and most-valued germplasm. Such core collections help the interested user to select appropriate accessions from large holdings. In this way, the exchange of information is facilitated and the use of the crop collections promoted. Some crop working groups have also developed at the global level, e.g. for barley and potato. The global consortium of major potato collection holders (APIC) has developed two databases accessible through the Internet, on cultivated potatoes and wild relatives respectively. Regional networks, now operational in all regions, could form platforms for the exchange of information on conservation and utilization of plant genetic resources at the regional level.

¹³ <http://www.wisard.org/>.

¹⁴ <http://www.ecpgr.cgiar.org/>.

59. The Governing Body might wish to consider means by which funds could be secured for the functioning of these networks, many of which are heavily under funded, taking into account their contribution to information exchange and their potential role in furthering utilization of the plant genetic resources involved. Stakeholders that have built experience with the effective functioning of such crop-based networks may help to establish effective crop networks for additional crops, which the Governing Body may wish to consider promoting.

60. In conclusion, database systems, regional networks and crop-based working groups at the regional or global level are instruments that can meet the requirements for multilateral information exchange under the Treaty. Establishment and maintenance of such instruments could form an important part of the non-monetary benefit-sharing arrangements under the Multilateral System.

4.3 Technology transfer

61. Many public institutions, in following and competing with the private sector, increasingly tend to protect their research results, at the expense of the public domain. Reversing this trend may strongly facilitate technology transfer. The further development of intellectual property rights policies and strategies will heavily influence the options and conditions for technology transfer.

62. Putting partly or fully developed products derived from plant genetic resources obtained from the Multilateral System into the Multilateral System could be a major contribution to technology transfer. This would broaden access to such products to a wider stakeholder group, e.g. to users in countries other than the country where the products were developed. It would also widen the total diversity of plant genetic resources available for further plant breeding. Some experience with this approach has been gained by the centres of the CGIAR, which are now including finished new varieties as well as partly developed materials in their pro-active distribution policies. Information on such partly developed materials could be entered in the databases proposed in section 4.2 above by any user. The initiative to include such products in the Multilateral System would rest with the developer of the product in accordance with Article 12.3e of the Treaty, but Contracting Parties could promote such initiatives.

63. The development of a clear policy on broad licences would be another major contribution to technology transfer, complementary to the initiative proposed above. Such licenses could cover genetic resources under plant breeders' rights and patents, including processes protected by patents. For this to work, it would be necessary to:

- Establish criteria to identify parties that might benefit from such licensing practice.
- Identify materials and processes that might be most appropriate for sustainable utilization in developing countries and countries with economies in transition.
- Frame broad licenses in the context of capacity building, so that intended users could benefit from the processes or material made available under such a license.

64. There is currently limited experience with humanitarian licensing, mostly in the context of first generation genetic modification technology made available by individual private sector companies to developing country National Agricultural Research and Extension Services. Currently, the Challenge programmes of the CGIAR, in particular the GENERATION programme, are developing such humanitarian licensing policies for its Consortium of technology providers. The Governing Body might wish to consider ways in which this experience can be captured in order to support this approach to technology transfer in the context of the Treaty and especially consider possibilities to develop the multilateral application of such licenses.

65. In addition to, or alternative to, broad licensing, an open source system of technology development and transfer might be developed. Open source systems differ from the humanitarian licensing approach in that they use intellectual property rights to create unrestricted access, and as such this approach is multilateral by nature. This strategy is in its infancy and its feasibility is still

being researched, e.g. by the Australia-based Center for the Application of Molecular Biology to International Agriculture (CAMBIA).

66. Initiatives towards broad licenses and open source systems of technology transfer must come from cooperation between public and private stakeholders. However, Contracting Parties, in particular in developed countries, could facilitate such initiatives and the Governing Body may wish to consider ways to promote the development of common systems and approaches.

4.4 Capacity building

67. Capacity building includes the development and improvement of physical and human resources and a facilitating institutional context, including the capability to maintain and further develop such resources.

68. Capacity building efforts in the field of plant genetic resources conservation often concern the establishment of long-term storage facilities, assuming they can be provided in a form appropriate to local infrastructure conditions. A good example is the South African Development Community Plant Genetic Resources Centre in Lusaka, Zambia, which operates as a facility for the plant genetic resources base collections of the Southern Africa region. In other sub-regions of Africa the appropriateness of this model and other forms of regional collaboration are being considered. The development of common database systems and (sub) regional centres for the use of technology are also important areas for capacity building. The Governing Body and Contracting Parties may wish to consider how they might contribute to the establishment of such facilities. Regional networks may also play a role in preparing and coordinating such efforts. In addition, the Global Crop Diversity Trust may wish to consider whether support for the establishment of such (sub) regional facilities would fit its objectives and priorities.

69. Training is an essential component of capacity building. Increasingly, web-based approaches have become feasible, and didactic and logistical experience in establishing and running web-based training programmes has been gained over the last few years. The concept for such training systems would be to develop global course materials and other learning tools that can be directly applied in or readily adapted to local situations. Such training might take different forms and involve long-distance training with tutors and participants at different locations, or alternatively provide for ready and free access to training materials developed and managed at central locations but available for local use and freely accessible through the Internet. Such types of training directly contribute to information exchange as well.

70. More traditional forms of training based on courses provided in central locations may form an alternative to or complement Internet-based approaches. Where central locations are used, this should preferably be situated in a developing country and involve staff from the region, thus enlarging the effects of capacity building. Various institutions in the public and private sector knowledgeable in the area of plant genetic resources have accumulated ample experience in the delivery of training. In-kind contributions from public sector institutions could be promoted and facilitated by Contracting Parties.

71. The Centres of the CGIAR have for many years played a major role in capacity building, providing support to many developing countries for many of the crops included in Annex 1 of the Treaty. Further initiatives encompassing a number of countries collaborating in the management of plant genetic resources of specific crops would contribute significantly to the Multilateral System. Initially, such initiatives could take on a regional focus and regional networks in collaboration with CGIAR Centres could contribute to the development of such programmes, contributing to the conservation and utilization of the crops included in Annex 1 of the Treaty.

72. Finally, internationally organized stakeholders active at the local level and involved in on-farm management of plant genetic resources could be useful elements of capacity building in the framework of the Multilateral System. Examples of such activities include work by the International Federation of

Organic Agriculture Movements¹⁵ relating to the special needs of the organic produce sector under which they provide appropriate germplasm; and the activities of Via Campesina (the international organisation of small-scale farmers) in supporting on-going on-farm management of underutilized and neglected crops.

4.5 Final remarks

73. There is significant past experience in multilateral initiatives for the management of plant genetic resources. Many of these initiatives could be strengthened and further developed through non-monetary benefit-sharing in the framework of the Multilateral System.

74. This chapter has not taken into account the many initiatives undertaken in the framework of overseas development assistance. The Governing Body may wish to provide suitable information to donor countries so that their initiatives and programmes fit the objectives of the non-monetary benefit-sharing objectives of the Multilateral System. Reporting by donors and/or providing information to the Governing Body of their activities of relevance to these efforts would add to transparency regarding the implementation of the Multilateral System of the Treaty.

75. In addition, monitoring the impact of the various initiatives could help Contracting Parties in developing their direct role in the delivery of non-monetary benefit-sharing and their indirect role in facilitating the contributions by their citizens.

¹⁵ <http://www.ifoam.org/>.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1. Towards benefit-sharing models under the Multilateral System: some conclusions

76. The non-monetary benefit-sharing arrangements under the Multilateral System are an obligation on Contracting Parties but should involve a range of stakeholders in their implementation.
77. Although the multilateral nature of the Multilateral System results in a decoupling of access and benefit-sharing at the individual transaction level, stakeholders benefiting from access should be encouraged by their governments, at the national level or organised at the international level, to participate in the benefit-sharing arrangements.
78. One of the more efficient ways to promote non-monetary benefit-sharing would be to build on the elements identified in the Treaty itself, i.e. the CGIAR (Article 15), international networks of genebanks (Article 16) and crop-based thematic groups (Article 13.2(b)), and the global information system (Article 17). These elements are multilateral by design.
79. Models for non-monetary benefit-sharing arrangements should be rooted in the best elements of current practice. Current practice involves governments, public entities such as universities, research organisations and genebanks, private industry, community-based organisations and other NGOs.
80. Different models should accommodate different stakeholder groups. Industry tends to favour arrangements focussing at information exchange, training and direct support for provider activities, whereas arrangements involving the public sector tend to focus more on capacity-building such as the establishment of collections and facilities, as well as training and local development.
81. Models should specifically allow or focus on the participation of farmers and local communities, and their involvement should not be taken for granted. Likewise, specific attention is needed to secure a positive effect of agreed benefit-sharing arrangements on the conservation and sustainable use of genetic resources, whether direct or indirect.
82. The involvement of local communities and farmers, and certain other stakeholders at the national level, can be complex. This complexity could be reduced if the non-monetary benefit-sharing arrangements under the Treaty were complemented by relevant agreements between stakeholders at the national level. This would also allow a broader impact of the arrangements, e.g. enabling a combination of capacity-building with community development.
83. The benefit-sharing arrangements should promote a structural and long-lasting relationship between stakeholders with the aim of increasing their impact on conservation and sustainable use of plant genetic resources for food and agriculture.
84. Contracting Parties should establish mechanisms promoting and facilitating the involvement of stakeholders that use plant genetic resources from the Multilateral System in non-monetary benefit-sharing arrangements, in particular stakeholders directly benefiting from access.
85. Contracting Parties that are developing countries, or countries with economies in transition, should perform an analysis of their capacity building needs, involving all relevant stakeholders, and, if appropriate, develop their ability to contribute to decision-making in relation to the benefit-sharing arrangements.
86. An information system designed to monitor the benefit-sharing arrangements and their impact is important for the future success of the Multilateral System.

87. The non-monetary benefit-sharing arrangements under the Multilateral System should focus on proven concepts, and Contracting Parties may wish to promote and facilitate such proven concepts. Amongst such concepts, some can be identified as potential quick wins. Early establishment of such arrangements would increase the commitment of Contracting Parties and stakeholders to the Treaty and its Multilateral System. This could be further enhanced if Contracting Parties were to develop new policies and regulatory provisions promoting the establishment of voluntary non-monetary benefit-sharing arrangements under the Multilateral System. Below we have listed some strong points and potential quick wins, including, where relevant, the identification of areas where better fits are needed or where gaps need to be filled. These recommendations have been grouped according to the major stakeholders that might be involved in their implementation.

5.2 Recommendations

5.2.1 Strong points and quick wins

88. Recommendation 1. Development of a global information system to promote information exchange as proposed in Article 13.2a should be urgently and actively pursued. This could take on a clearing house function. The database that has been developed under the aegis of the World Intellectual Property Organization¹⁶ may complement such a global information system. The Governing Body may also wish to support the development of regional databases, readily accessible through the Internet. Promoting information exchange should be seen as a major task for the Governing Body. As part of, or complementary to, a global information system, a Focal Point for Good Practices under the Multilateral System, accruing and distributing information of any arrangements that work well, should be established by the Governing Body.

89. Recommendation 2. The Governing Body should, as part of the Funding Strategy, develop a mechanism to provide the relevant information to governmental international cooperation agencies, charities and industrial foundations as well as to the Global Environment Facility to allow them to use their resources in support of the implementation of the Treaty. The operation of the Global Crop Diversity Trust would be instrumental in this in the field of *ex situ* conservation efforts.

90. Recommendation 3. Regional networks and crop networks should play a major role in establishing multilateral collaboration towards conservation and use of genetic resources. Mechanisms should be developed to involve both networks designed to support conservation and those developed to support utilization, and to involve non-governmental and private sector partners where they are not yet involved in existing crop-based networks. Governments should be invited to actively support such networks, which are often under-funded and thus lacking sustainability. This should be a joint commitment of the Governing Body, and Contracting Parties and stakeholders under their jurisdiction. Technical stakeholders, such as genebanks and professional breeder organizations, should be encouraged to take related initiatives.

91. Recommendation 4. Increasing the capacity of countries to maintain and utilise their genetic resources is vital. Training and staff exchange are key elements of a capacity-building strategy. The development of training capacity within developing countries should be given priority. In addition, joint explorations resulting in new national collections, maintained in the country of collecting, are also important. Easy-to-maintain and reliable storage facilities for plant genetic resources collections should be provided for, that fit into the local infrastructure. Existing arrangements can be used as models to build upon. These forms of capacity building are relatively easy to implement and would form a strong point in the delivery of the non-monetary benefit-sharing arrangements. This task should be the responsibility of various stakeholders, including Contracting Parties and organizations under their jurisdiction, whereas the Governing Body should provide guidance and monitor impact.

¹⁶ <http://www.wipo.int/tk/en/databases/contracts/>.

92. Recommendation 5. Given their experience in working with National Agricultural Research and Extension Services, the Future Harvest Centres should contribute to technology transfer and to capacity-building of the National Agricultural Research and Extension Services and other developing country stakeholders in the framework of the Multilateral System. The CGIAR plant genetic resources database SINGER as well as national and regional databases such as GRIN and EURISCO should play a major role in information exchange.

5.2.2 *Better fits and filling gaps*

93. Recommendation 6. Benefit-sharing arrangements should be need-driven and not supply-driven. Contracting Parties that are developing countries, and countries with economies in transition, should perform a needs analysis involving all relevant stakeholders, including farmers. Such needs analyses should be the basis for discussing and engaging in benefit-sharing arrangements that are effective and optimally fit the needs of the country and its various stakeholder groups. National regulations should facilitate and promote, and not discourage, development of benefit-sharing arrangements between stakeholders of countries that are Parties to the Treaty. The Governing Body should promote such national needs assessments, which may be linked to the priority activities of the Global Plan of Action.

94. Recommendation 7. Implementation of the Multilateral System would be helped if entities willing to initiate benefit-sharing arrangements, in addition to the Contracting Parties themselves, were identified. The Governing Body should establish an appropriate mechanism to facilitate, *inter alia*, the involvement of the private sector of developed and developing countries. In this context, the use of broad licenses and open source technology should be further developed and strengthened as a contribution to the technology transfer objectives of the Treaty.

95. Recommendation 8. The Governing Body should monitor implementation of the non-monetary benefit-sharing arrangements to enable it to continuously develop its strategy.

96. Recommendation 9. Implementation of benefit-sharing arrangements at the national level is largely the responsibility of national governments. Governments should be encouraged to ensure that benefits reach all stakeholders, in particular small-scale farmers who are contributing to the conservation and utilisation of genetic resources. This should involve, where appropriate community-based and/or non-governmental organisations. Small seed enterprises in developing countries and countries with economies in transition should be supported in the development and marketing of diverse crop varieties, thus contributing directly to the objectives of the Treaty. This recommendation is targeted at the Contracting Parties, possibly with guidance prepared by the Governing Body.

ANNEX 1: VIEWS IN LITERATURE ON CURRENT PRACTICES

This annex provides major views encountered in literature on the features of agreed and implemented arrangements regarding access and benefit-sharing. Many of the views focus on bilateral access and benefit-sharing arrangements and should be interpreted in this light.

A. Types of non-monetary benefit-sharing

Many non-monetary benefits have routinely accrued to countries hosting plant explorations, including the strengthening of professional ties between scientists, training in germplasm exploration methods, transfer in information and technology, and establishment of national germplasm collections with backups in international genebanks.

To cite some examples, bio-prospecting activities can theoretically contribute to sustainable development by providing incentives for conservation while developing technological capabilities that enhance long-term opportunities for economic growth¹⁷. Follow-up research has been initiated to multiply and characterize collected germplasm by providers, replacing work that would ordinarily have been done at distant locations¹⁸.

Technology transfer may include new better-yielding varieties, new crops and varieties with different market opportunities, varieties with improved resistances, cleaned-up varieties free from viruses, and restoration of traditional varieties lost or destroyed by disaster¹⁹.

Capacity building has, amongst other things, included support for collaborative research and conservation efforts by building laboratory infrastructure and information handling capabilities, and by promoting exchange of resources, information and ideas through formal links between the collaborating institutions. Capacity building has involved public sector participation and government funding in developed countries²⁰, but also extends to the private sector. Moran²¹ argues that training increases the capacity of biodiversity-rich countries to assess and evaluate their resources, to generate biological databases and to enter into the natural products industry if they choose to do so.

Brush²² states that because of the need to address income and production, the tasks of agricultural development and conservation cannot be fruitfully separated. Moreover, because an important goal is to conserve resources on-site, farmers must be directly included in research. The objective of this research is not to replace local crops or farmer knowledge but to use these more effectively to increase income and production. Some benefits increase opportunities for the poor, whereas others contribute to their empowerment²³. Opportunities include increasing the value added to genetic resources and providing employment for the maintainers of this diversity.

¹⁷ Artuso, A., 2002. Bioprospecting, Benefit-sharing, and Biotechnological Capacity Building. *World Development* 30 No. 8, p. 1355-1368.

¹⁸ Williams, K.A., 1998. Plant Exchange Office Leads Way in Establishing Non-Monetary Benefit-Sharing Regimes. *NPGS Site News*, 14 No. 3&4, p. 23-24.

¹⁹ Bennet, A., 2003. Savings genes through improved access and benefit-sharing. Workshop Lecture Syngenta, Basel.

²⁰ Timmermann, B.N., G. Wachter, S. Valcic, B. Hutchinson, C. Casler, J. Henzel, S. Ram, F. Currim, R. Manak, S. Franzblau, W. Maiese, D. Galanis, E. Suarez, R. Fortunato, E. Saavedra, R. Bye, R. Mata, & G. Montenegro. The Latin American ICBG: the first five years. *Pharm Biol.* 2000;37(Suppl.):35-54.

²¹ Moran, K., 2000. Bioprospecting: lessons from benefitsharing experiences. *Int. J. Biotechnology*, 2, p.132-144.

²² Brush, S.B., 1998. Bio-cooperation and the Benefits of Crop Genetic Resources: the Case of Mexican Maize. *World Development* 26 No. 5, p. 755-766.

²³ Henne, G., K. Liebig, A. Drews & T. Plän, (2003). Access and Benefit-Sharing (ABS): An Instrument for Poverty Alleviation. Proposals for an International ABS Regime, discussion paper, German Development Institute (GDI), Bonn, Germany.

In commenting on capacity-building Henne *et al.*²⁴ stress, among other aspects, the need to stimulate the flow of information on innovative and successful community practices that include biodiversity conservation and poverty alleviation; to use microfinance programmes; and to facilitate easier market access.

The development of community registers of biodiversity and related knowledge in close collaboration with local communities documenting their knowledge of plants and animals can help the local communities conserve their biological resources and facilitate community participation in access and benefit-sharing partnerships²⁵.

According to a survey carried out in 2001 among the International Seed Federation (ISF; then ASSINSEL) members, technology transfer, as it relates to the maintenance of plant genetic resources for food and agriculture (plant genetic resources), is an important commitment for many ISF members. About two thirds of the respondents assist national programs in maintaining, evaluating and characterising plant genetic resources, either technically or financially, and one third provide assistance to international programs. More than 40% of ISF members grant licenses free of charge to developing countries²⁶, although it is not clear whether such licenses come without further obligations for the user. The Africa-based African Agricultural Technology Foundation²⁷ is an example of a non-governmental organization that has been specifically established to facilitate technology transfer through negotiating such royalty-free licences. Company willingness to share non-monetary benefits is mainly focussed on collaborative research relationships²⁸.

Considerable experience in both the public and the private sector with information exchange and technology transfer appears to exist and may be harnessed to strengthen the Multilateral System.

According to the OECD²⁹, two types of benefit-sharing projects may be distinguished. Integrated projects may cover a wide range of benefits. These cases involve many kinds of process benefits, capacity-building and other benefits contributing directly or indirectly to the development of local communities, including training related to genetic resources conservation, scientific information about conservation and sustainable use, and contributions to the local economy. Non-Integrated Projects deal primarily with process benefits (sharing of research and development results, collaboration in scientific research and development programmes, participation in products development etc.).

B. Beneficiaries

Many factors influence the determination of benefit-sharing mechanisms, such as the aim of projects, and the role of each stakeholder. Project aims may result in differences in project type and size, as well as its main actors. A project may have cooperative characteristics as well as product development and commercialization objectives. Each stakeholder may have several roles in a project. The role of each stakeholder determines the scope of benefits.

²⁴ Henne, G., K. Liebig, A. Drews & T. Plän, (2003). Access and Benefit-Sharing (ABS): An Instrument for Poverty Alleviation. Proposals for an International ABS Regime, discussion paper, German Development Institute (GDI), Bonn, Germany.

²⁵ Swiderska, K., 2001. Stakeholder participation in policy on access to genetic resources, traditional knowledge and benefit-sharing. Case studies and recommendations. Biodiversity and livelihoods Issues No. 4. And unpublished ABS Case Studies from Africa and Asia, 2004

²⁶ ISF, 2004. What is "Benefit-sharing"? <http://www.worldseed.org/FAQbs.htm>.

²⁷ www.aatf-africa.org

²⁸ Ten Kate, K., & S.A. Laird, 1999. The Commercial Use of Biodiversity: Access to Resources and Benefit-Sharing. Earthscan Pubs. Ltd.: London.

²⁹ OECD, 2003. Economic issues in access and benefit-sharing of genetic resources: a framework for analysis. Paris, France.

According to Virchow³⁰, in the political discussion, it has been implied that the private breeding sector is the predominant beneficiary of plant genetic resources utilization. The spread of benefits across society is however much broader.

The OECD³¹ performed a stakeholder analysis in benefit-sharing arrangements covering drug development and agricultural use. From an analysis of a large number of cases it appeared that country government organizations often share in the research and development results. Academic organizations share employment related to research work, process benefits, and capacity-building for technology transfer. They may play a role as supporters of collection activities, executors of scientific research and development, and sometimes collaborators in product development, and the benefits they shared were mainly related to technology, information and training regarding conservation of biodiversity from the scientific point of view. Local communities received salaries for their collecting work, support for biodiversity conservation and contributions to the local economy. Local companies seemed to share mostly in research and development and product development. For local non-governmental organizations, training and contributions to the local economy might be considered as their main benefits.

Since many of the transactions are conducted not by the governments which are Parties to the Treaty, but by institutions such as genebanks, universities, companies, farmers and botanic gardens, it is regarded crucial to involve these actors in the further development and implementation of the Multilateral System³². It will be the responsibility of governments to comply with Article 9 of the Treaty and to develop effective ways to include stakeholders in designing benefit-sharing arrangements that are optimal for all stakeholders.

C. Relationship between access provided and benefits shared

According to Berg³³, apart from the practical difficulties in finding the proper recipients for benefit-sharing, the ethical case for financial compensation to specific individuals or communities may be weak. In a stronger statement, Brush³⁴ argues that *“Two general approaches have been proposed to increase the private value of plant genetic resources for farmers, to provide equity and to promote conservation. The first approach is direct – to economically and legally connect farmers who produced plant genetic resources with companies or countries who use them. Direct methods include contracting and intellectual property rights. The second approach is indirect – to increase the general value of plant genetic resources through various research and development programmes managed by NGOs and/or governmental agencies charged with agricultural development and resource conservation, e.g. through educational and marketing programmes and by better use of local plant genetic resources to achieve agricultural development.”*

The motives for the indirect approach closely resemble those for the Multilateral System as they recognize the degree of interdependency in access to plant genetic resources for food and agriculture, the variety in origin of plant genetic resources utilised in research and development, and the complexity of benefit-sharing arrangements due to the large number of stakeholders involved.

In some commercial arrangements the user has committed to return a portion of the profits to all of the communities and countries in which the company has worked, regardless where in the world the plant

³⁰ Virchow, D., 2002. Is the conservation of agrobiodiversity affordable? Agriculture + rural development No. 1, p. 32-34.

³¹ OECD, 2003. Economic issues in access and benefit-sharing of genetic resources: a framework for analysis. Paris, France.

³² Ten Kate, K. & S.A. Laird, 1999. The Commercial Use of Biodiversity: Access to Resources and Benefit-Sharing. Earthscan Pubs. Ltd.: London.

³³ Berg, K., 2001. The ethics of benefit-sharing. Clin. Gen. 59, p. 240-243.

³⁴ Brush, S.B., 1998. Bio-cooperation and the Benefits of Crop Genetic Resources: the Case of Mexican Maize. World Development 26 No. 5, p. 755-766.

or information used for product development, originated. This policy was adopted with a view of risk reduction³⁵.

In the seed sector, benefit-sharing is often not directly linked to individual access transactions. Rather, companies may make looser arrangements designed to maintain partnerships with universities and public research institutes that conduct basic research and supply them with improved germplasm, often for testing. Such arrangements commonly take the form of funding research projects that are disassociated from access.³⁶

Given observations about low profit margins, high transaction costs and the complex network of actors, the decoupling of access and benefit-sharing in the seed sector makes sense, provided the Multilateral System can provide a framework that all participating actors regard as fair. The decoupling of access and benefit-sharing at the level of the individual arrangement is a logical consequence of the flow of seeds and the contributions of a complex set of stakeholders.

D. Relationship between benefit-sharing and conservation

Depending on the type of benefit-sharing, benefit-sharing may either directly, indirectly or not per se contribute to conservation of genetic resources, one of the objectives of the Treaty. Hence, one of the logical criteria in judging the appropriateness of a benefit-sharing arrangement might be its contribution to conservation.

According to the OECD report³⁷, since it is local groups who often bear much of the cost to conserve genetic resources, the goal of building and maintaining coalitions in favour of conservation would lead to the conclusion that local groups should be compensated for participating in the process to provide them with a strong incentive to continue sustainable use. In this way the Multilateral System may strongly contribute to the conservation objective of the Treaty.

E. Provider context

This and the following paragraph look at providers and users as a category in a multilateral context. According to Virchow³⁸, in many developing countries, on-farm conservation has high opportunity costs at the national level. Many countries are interested and forced to continue and increase integration of resource-poor farmers into the market to increase national food production and food security. This renders traditional farming systems threatened. Therefore, the potential of participatory plant breeding needs to be included in further considerations and suitable participatory breeding procedures should be developed to incorporate farmers' seed systems in the pre-breeding work of National Agricultural Research and Extension Services, and vice-versa National Agricultural Research and Extension Services in participatory farmer-led selection and breeding.

According to several analyses³⁹, in order to benefit from the utilisation of the genetic resources from the Multilateral System developing countries need to:

³⁵ Seiler, A. & G. Dutfield, 2002. Regulating Access and Benefit-sharing. *Biotechnology and Development Monitor*, No. 49, p. 3-7.

³⁶ Ten Kate, K. & S.A.d Laird, 1999. *The Commercial Use of Biodiversity: Access to Resources and Benefit-Sharing*. Earthscan Pubs. Ltd.: London.

³⁷ OECD, 2003. *Economic issues in access and benefit-sharing of genetic resources: a framework for analysis*. Paris, France.

³⁸ Virchow, 2002. Is the conservation of agrobiodiversity affordable? *Agriculture + rural development* No. 1, p. 32-34.

³⁹ Seiler, A. & G. Dutfield, 2002. *Regulating Access and Benefit-sharing*. *Biotechnology and Development Monitor*, No. 49, p. 3-7 ; Artuso, A., 2002. *Bioprospecting, Benefit-sharing, and Biotechnological Capacity Building*. *World Development* 30 No. 8, p. 1355-1368 ; Caillaux, J. & M. Ruiz, 2002. *Legislative Experience on Access to Genetic Resources and Options for Megadiverse Countries*. Meeting of Likeminded Megadiverse Countries, Cancun, Mexico, February 16-18.

- Perform a comprehensive market and demand analysis for genetic resources at the national level.
- Identify the technology field or industrial and market segments in which they are competitive, and acquire and/or focus the material and human capital required to develop high quality products.
- Develop arrangements ensuring that the utilization of genetic resources supports rather than impairs the conservation of biological diversity.
- Develop a critical mass of properly trained scientists and technicians.

The sustainability of benefit-sharing efforts determines the longer-term impact on conservation and use of genetic resources and on national or communal development.

F. User context

Guidelines and Codes of Conduct may be encouraged to be adapted by professional associations in order to create awareness and acceptance for the need of benefit-sharing.