

RAFI *Tut-Tuts*

The Unabridged Text - The Unauthorized Translation

“MUSE” or MonoUSE?

Draft “MUSE” (Multilateral System of Exchange) Protocol on Gene Access Could MUSEum Farmers’ Rights & Sanction North’s MonoUSE

- Text::** Accas to Plant Genetic Resources and the Equitable Sharing of Benefits: Options for a Multilateral System for the Exchange of Germplasm (IPGRI, January, 1996)
- Forum:** FAO Commission on Plant Genetic Resources for Food and Agriculture (CPGRFA), Rome, 22-27 April, 1996. The CPGRFA will consider the State of the World Report and Global Plan of Action on PGR then. Yet, a third document for Commission review may be lost in the shuffle as Governments ready themselves for the crucial Leipzig “Technical” Conference this June. The International Plant Genetic Resources Institute (IPGRI) is circulating a *draft* proposal for the political management - and exchange - of crop germplasm collections (held by the CGIAR System) currently beyond the reach of the Biodiversity Convention (CBD). In effect, the IPGRI paper is a protocol for the control of all national and international food crop germplasm.
- Summary:** MUSE is a protocol for a multilateral System for the conservation and development of food crop germplasm, *in situ* and *ex situ*, before and after the coming into force of the Biodiversity Convention and the WTO (GATT) Agreement. MUSE offers a multilateral umbrella under which members could pursue bilateral agreements in the event of commercial product development. The intent is to maintain the most open possible system of crop germplasm exchange on the assumption that a public market is the best route to both food security and benefit-sharing. MUSE would be a protocol under the Biodiversity Convention likely governed by the FAO Commission on PGRFA but allowing membership to all conservers and users of food germplasm. MUSE would provide the simplest possible regulatory framework necessary to ensure the maximum possible sharing of benefits recognizing that gene tracking is not entirely feasible and that neither MUSE nor anything else will work without enlightened self-interest and general good will. Neither Gene Funds nor Farmers’ Rights are secured by the current draft.
- Analysis:** MUSE may be the most important agricultural policy document of 1996. Although the basic concept of MUSE is sound, the current draft offers little of value to the South and further erodes the rights of farming communities.

Unabridged Text

The 6th Session of the Commission on Plant Genetic Resources requested IPGRI to undertake a study on the feasibility of various options for access to plant genetic resources and the equitable sharing of benefits. The following report is the result of that study. It is based on the work of a panel of experts in legal issues, genetic resources and plant breeding, drawn from developing and developed countries. The panel operated with guidance from a task force comprising members of IPGRI's staff and with observers from FAO. As part of the study process, a wide series of consultations was held with all major stakeholder groups.

The main justification for conserving and characterizing PGRFA is their ultimate use in sustainable agricultural systems, particularly through the development of improved crop varieties. Plant breeding involves combining genes from many sources to create a new variety, the characteristics of which are determined by the entire complex combination of genes (the "genome") which it possesses. In many cases the genetic control and the source of the genes determining a particular trait of interest are unknown, and the contribution of any particular source is often impossible to assess even if the pedigree, which may involve parents from very many countries, is known. Many genebank samples are of unknown origin, and many important characteristics are widely dispersed across countries or regions. Most important food crops are widely distributed, and may be major staples in regions far from their origin. Dispersal and exchange of crops have gone on since the early spread of agriculture. For these reasons, the calculation of benefits derived from a particular source is often difficult and time consuming.

Food crop breeders, like farmers, have traditionally relied on an open exchange of materials. Most breeders, however, prefer to work within genepools of elite, adap-

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Origins of Text: At the FAO Commission's invitation, Dr. Geoff Hawtin, Director-General of IPGRI (International Plant Genetic Resources Institute) gave an informal report on current IPGRI thinking as to an equitable system for crop germplasm exchange via CGIAR gene banks. The Commission asked Hawtin to elaborate for its next session (April, 1996).

Lost Genes: It is difficult (*and, perhaps, irrelevant?*) to trace the source of most stored crop germplasm. Regardless, the overwhelming level of food crop interdependence connecting every country and region argues for a more cooperative and collective approach to benefit-sharing. *Note: Close to two-thirds of germplasm (seed) accessions in major genebanks lack basic passport data. Proving the source of any seed sample (whether pre- or post- CBD will be legally unlikely given the abundance of "anonymous" seed available to anyone wishing to pirate germplasm.*

Intellectual Property: The traditional free exchange system common to both farmers and other breeders is now being constrained by intellectual property (IP)

ted material and rarely resort to the use of PGRFA, *sensu strictu*, except to introduce genetic variation not otherwise available. Plant Variety Protection legislation preserves the rights of breeders to build freely upon the advances made by others. However, with the increasing use of patents, especially in relation to biotechnological innovations, the situation is beginning to change. Advances, once patented, are not as freely available for others to further build upon, improve, and tailor to their own needs and circumstances.

Coupled with the trend towards greater privatization of plant breeding and research, and accompanying pressures to enact stricter intellectual property legislation, there is an increasing recognition of the potential value of Biodiversity to sustainable development. With the entry into force of the Convention on Biological Diversity (CBD), not only is the conservation imperative formally recognized, but so are the sovereign rights of nations to control access to their biological diversity and to make it available under terms and conditions that are agreed mutually between the provider and a recipient, and which permit the provider of the original material to negotiate a fair and equitable share of the benefits arising from the exploitation of the resources concerned.

Crop breeders are not the only users of plant genetic resources. And even among breeders, great differences exist with respect to their willingness to freely share materials. In general, breeders concerned with major industrial crops and high value export crops such as coffee and cocoa, have been less willing to share germplasm than those concerned primarily with staple food crops on which the food security of millions depends - crops such as wheat, rice, sorghum and food legumes. Other users of plant genetic resources include the pharmaceutical industry, floriculturalists and those seeking novel essential oils for the perfume and cosmetics industries. In these fields there is much less of a tradition of sharing, with secrecy and intellectual property protection being the norm. These industries may seek to identify a single chemical compound that may ultimately be synthesized in a factory, or a particular floristic trait for flower production in highly specialized controlled environments. They are rarely

systems that allow breeders to achieve a private monopoly over plant varieties or genes. *Note: The study erroneously implies that this is a problem only with patents and not with Plant Breeders' Rights (Plant Variety Protection) under UPOV- ignoring the reality of new restrictions on the right of farmers to exchange seed and the right of breeders to use "protected" seed for research purposes under UPOV's 1991 Convention. PBR laws are becoming more like utility patents everyday.*

Trade & Biodiversity: The pressure to reduce public plant breeding is combining with GATT-TRIPS and the Biodiversity Convention to slow the flow of crop germplasm between breeders and countries. Meanwhile, the South has come to recognize the commercial value of the crop seed it has donated to the North over the past many decades of open exchange.

Types of Germplasm: Understandably, high-value industrial export crop, and medicinal germplasm has always been restricted. However, any constraint to the flow of food crop germplasm could endanger national and global food security. *Note: Short-sighted pressure by the North to force germplasm exchange could also risk long-term food security for everyone.*

involved in the genetic improvement of cultivars for widespread production on millions of farmers' fields throughout the world.

The CBD emphasizes the concept of benefit sharing and recognizes the sovereignty of nations in respect to genetic resources. In devising systems for implementing the CBD, it is important that the complexities of the different means for exploiting plant genetic resources be taken into account. Multilateral approaches, in which countries collectively agree to terms and conditions under which materials and benefits will be shared, are fully consistent with the Convention. Countries have the right to join, or opt out of any such multilateral approach, in the same way as they have the right to negotiate terms and conditions bilaterally. Bilateral arrangements are typically partnerships of two institutions, or even governments, generally formalized through a contract or memorandum of understanding. A separate institutional structure is rarely needed.

Multilateral approaches are likely to be most appropriate in situations where many countries share part of the total genepool of interest, and/or when breeders in many countries need to access these resources. They are also appropriate for crops of major importance to food security, where there is a high social stake in successful improvement and where the pooled efforts of many are likely to be more effective at promoting improvements than the competitive efforts of a few individuals. These conditions prevail for the majority of staple food crops, for which exclusive bilateral arrangements are likely to become inordinately complex given the large number of potential actors (and hence individual agreements) involved, the limited capacity of many partners to be able to negotiate favourable terms and the relatively limited monetary value that might accrue from such arrangements.

Bilateral approaches, however, are perhaps likely to be more appropriate when few countries have, or need access to, genetic diversity, and/or when highly expensive and specialized research gives a strong competitive advantage to a single, or limited number of institutions. Such conditions may prevail, for example, in the case of some industrial crops such as rubber and for certain

Sovereignty: Although the Biodiversity Convention appears to favour bilateralism in germplasm exchange, a multilateral approach is consistent with the CBD and may prove the most efficient way to ensure national food security. Sovereign states can always opt out of multilateral accords. *Note: This point is widely under-recognized. States also have the right to form regional or South-South consortia.*

The Public Good: In plain language, then, crop germplasm important to food security suffers under patent (or *Breeders' Rights*) privatization and society is best served when crop breeding remains in the public sector. *Note: We wouldn't have this paper or these problems were it not for the North's exclusive monopoly intellectual property systems.*

Bilateralism: Bilateral contracts may prove appropriate for high-value industrial or pharmaceutical plant materials. *Note: Although most of this material relates to germplasm found in more than one country and (often) has already spread to more than one region.*

fits if appropriate mechanisms are included within the system

To a considerable extent, an effective multilateral system already exists, delivering benefits such as these. The system comprises the International Agricultural Research Centres (IARCs) of the CGIAR, national agricultural research systems, and many other partner institutions and organizations.

It is argued that for PGRFA an internationally agreed system which combines the advantages of both multilateral and bilateral approaches is perhaps the most appropriate. Such a system would promote wide access to PGRFA while providing a significant range of benefits to all participants on a multilateral basis. In addition, under certain prescribed circumstances, providers of germplasm could enter into bilateral negotiations with users regarding the sharing of benefits arising from the commercialization of products based on the germplasm supplied.

Such a Multilateral System for Exchange (MUSE) of PGRFA and benefits would require agreement among all participants in the system in such areas as:

- the coverage of the system,
- the terms under which access would be provided,
- mechanisms for sharing benefits multilaterally,
- conditions under which participants would enter into bilateral negotiations,
- membership terms and conditions,
- governance and decision-making mechanisms,
- rules of membership and mechanisms for monitoring and enforcement
- mechanisms for interacting with non-members.

With respect to the scope of the system, it is argued that MUSE is appropriate at least for all major staple food crop gene pools. Coverage might be on an inclusive

System Exists Already: *Note: ...And it has not worked satisfactorily to benefit the South or farming communities. What is new in MUSE for poor farmers? Why should the South accept what appears to be little more than the entrenchment of the status quo? MUSE seems dedicated to the placation of some of the problems exacerbated by the North's intellectual property regimes.*

Multi-e-Bi Balance: Best option might be an open, multilateral approach to germplasm exchange coupled with bilateral negotiation mechanisms at the point of commercialization. *Note: If "commercialization" means "patenting" then this is not enough. The South's wheat germplasm, for example, dominates the North's wheat fields but very little of it is patented and most of the value accrues to society in the North in general and not merely to breeding enterprises. Further, while a balance between Multi- and Bi- seems reasonable, in the long term, the most equitable and manageable system might require that MUSE negotiate collectively with individual commercializers and that the benefits be distributed among all MUSE members in the South.*

MUSE Elements: *Note: Read closely. There is no explicit reference to Farmers' Rights. This omission imperils the ability of farming communities to negotiate their place both nationally and internationally.*

MUSE Scope: All staple food crops should be covered through either an inclusive or exclusive list of species. *Note: There are at least 105 food crops vital to the*

sectors, for example pharmaceuticals. There are many intermediate cases, and there are arguments for and against multilateral and bilateral approaches.

While under bilateral arrangements the exact terms and conditions for providing access to materials can be individually negotiated, for large programmes having significant international dimensions, the monitoring of different materials within a genebank or breeding programme, each covered by different terms and conditions, is likely to prove unacceptably complicated. A net result is likely to be a significant slow-down in the use of exogenous genetic resources in breeding.

While parties to a bilateral agreement can operate according to whatever conditions and benefit sharing arrangements they mutually accept, the benefits from joining in any multilateral system must be clear to all participants from the outset, as must the terms and conditions governing participation.

Benefits accruing to participants in a multilateral system might include the following:

- increased opportunities for integrating conservation strategies and sharing responsibilities regionally and/or globally, including the provision of mechanisms for safety duplication
- the pooling of research resources needed to exploit particular genepools effectively,
- access to far greater amounts of germplasm than contributed
- access to improved materials and other technologies developed within the system
- access to information, e.g. special traits or multi-location testing data, on material supplied as well as on material supplied by others
- more cost-effective means of handling information, e.g. through shared databases
- access to training at a range of participating specialized institutions
- a wider exposure of contributed materials to interested parties, increasing the chances that they will be used
- the facilitation of the sharing of financial bene-

Not for Food: Bilateral arrangements for food crop germplasm could be disastrous.

Multilateral Conditions: Bilateral contracts have the advantage of being able to be very precise. Multilateral arrangements are inevitably less precise but have the advantage of group enforcement if clear procedures are established. *Note: Multilateral systems spread the cost of enforcement among members and increase the negative implications for violators. This benefits the South.*

Multi-Benefits:

- Cheap, shared and safe germplasm storage;
- Cheap, shared R&D;
- Easy access to others' germplasm;
- Access to others' improved materials and technologies;
- Access to others' test results;
- Shared databases;
- Training opportunities;
- Increased likelihood that national material will be used by others - with possible benefits coming back to donor of germplasm;
- Potential for collective financial benefit-sharing.

Note: For the South and for farming communities, these are not "benefits" but long overdue "rights" that must be guaranteed and monitored under a multilateral system. There must also be explicit rights attached under Farmers' Rights.

basis (i.e. a list of what is covered) or an exclusive basis (i.e. a list of what is excluded). It is argued that, at least for gene pools of importance to food security, coverage should be as wide as possible.

Should both in situ and ex situ material be included? The distinction is in reality arbitrary, with many genes and genotypes existing both in situ and ex situ. There seems to be no good a priori reason to exclude either. However, their inclusion will depend on the rights of the participant over the materials. Only those materials which a participant has the right, as determined nationally, to bring into the system can be included, whether they be in situ or ex situ.

Would MUSE cover all materials, or only those collected and/or obtained prior to, or alternatively following, the coming into force of the CBD? While it might be easier to negotiate a system based only on pre-CBD materials, this again is likely to lead to anomalies, and to considerable legal and monitoring expense to determine whether a particular genotype or trait is only to be found exclusively in pre- or post-CBD materials. The distinction would differentiate between materials based only on whether or not they happen to have been collected and disseminated before a particular date.

The scope of the system could be limited to specific uses. For example if a species has both food and a pharmaceutical uses, MUSE could apply only to the former. Any other use would be outside the scope of the system and would require bilateral negotiations.

To be effective, it is important that the terms, conditions and benefits of participating in a multilateral system be clear and sufficiently attractive to encourage broad participation of countries and institutions and a wide coverage of germplasm.

While bilateral agreements can provide mechanisms for sharing conservation responsibilities between contracting parties, for species with a wide geographic dispersion multilateral systems such as MUSE are likely to provide greater opportunities for rationalizing efforts. Within multi-partner plant genetic resources networks, participants can agree on the extent to which they wish

security of one or more countries. What of their so-called "wild" or "weedy" relatives?

Farmers' Varieties: Can distinctions be reasonably made between in situ and ex situ collections? *Note: Does a government have the right to force farmers to exchange germplasm under MUSE? Could farmers participate in MUSE without state approval? Although it is unusual for genebanks to deny farmers access to their own seed donations, it does happen.*

Pre & Post-Convention: It is not realistic to develop MUSE solely for pre-Convention collections. MUSE should contain as much material as possible. *Note: This makes sense for food crops.*

Nutraceuticals: Where a plant serves both a food and some other high-value purpose, MUSE need only cover the food uses of the plant. *Note: How could this be monitored in the real world? Neem nibbblets. anyone?*

Wide Participation: For MUSE to work, rules must be clear and participation must be broad. *Note: For MUSE to work, it must be transparently just and equitable.*

Conservation Cost-Sharing: The South might be able to use MUSE membership to reduce gene bank and other conservation costs (*through regional banks under UN control?*) while improving information flows helpful in pre-breeding and breeding work. *Note: There is a growing (and well-justified) concern that the world is paying for too many, too poorly supported*

to consolidate base and active collection responsibilities, provide mechanisms to ensure safety duplication of ex situ materials, develop core sub-sets to facilitate access and use, and develop common databases and information systems.

Within MUSE each participant can contribute according to its ability and comparative advantage, whether germplasm, information, technologies or funds. Specific research partnerships, especially those involving more than two partners, can more easily be developed multilaterally than on a bilateral basis. For example, multi-location evaluation trials can be organized that allow for a comparison of common sets of materials of diverse origin.

The development of comprehensive international germplasm collections can greatly facilitate access to materials and the information on them, as well as enhance their safety. The maintenance of such collections under inter-governmental auspices, as in the case of the collections maintained by the centres of the CGIAR, helps to guarantee their long-term safety and availability. When maintained at a research institute, such as an IARC, these collections provide the basis for plant improvement for the public good, resulting in significant opportunities for the development and transfer of new technologies.

Benefits of participating in MUSE, and of providing access to germplasm, are described in some detail in the report. The multilateral benefits listed above would all be available within the system and mechanisms are described by which they could be delivered in a cost-effective manner.

The multilateral benefits arising from participation in MUSE do not necessarily require the existence of a "fund" as a mechanism for financial compensation in return for access, although this might provide an added incentive for some to join the system. Such a fund could be established as a means of providing compensation for Farmers' Rights. However, some people consider it highly unlikely that significant amounts of funds could be mobilized in this way. If such a fund were agreed to, decisions would be needed on such matters as its estab-

gene banks and that a regional system would save more seed, increase utilization and free up people and money for crop improvement.

Benefit-Sharing: The North provides money - the South provides germplasm. South and North share information and technologies. *Note: But, where is the money?*

CGIAR Banks as Solutions: South could save money and gain benefits from placing faith in IARC gene banks under FAO auspices. *Note: This is a classic case of IARCs that have been part of the problem trying to become part of the solution. First, however, IARCs must clean up their problems - ICRISAT and IITA are in serious difficulties right now - and these banks have allowed a massive haemorrhaging of South germplasm North.*

Mechanisms Available: *Note: Text reads like entrenchment of the status quo of the Seventies rather than a solution for Agenda 21 but IPGRI assures readers that reliable mechanisms for equitable benefit-sharing are discussed later in the text.*

Fund Not Essential: Non-monetary benefit-sharing through information and technology may be all that's possible in current tough financial environment. *Note: In other words, a return to the Seventies without the funds of that halcyon era? Giving up so soon? What about the Common Fund for Commodities? Nest, the Big Rock Candy Mountain?*

ishment, governance, replenishment and disbursement. Special consideration would have to be given to establishing mechanisms and guidelines for allocating such funds, and in particular to mechanisms for ensuring farmers and local communities receive adequate compensation. The issue is under discussion in several fora and is thus not pursued in detail in the report.

As an alternative, or addition, to the creation of a fund, consideration could be given to establishing a service unit or system as a mechanism to help coordinate various aspects of benefit sharing, including the transfer of technology, and funding provided by donor agencies and others for specific projects and activities to be conducted within the framework of MUSE.

It is proposed that within MUSE, in addition to the benefits arising multilaterally, under certain prescribed circumstances, the originator or provider of germplasm would enter into bilateral negotiations with the commercialiser of a product derived from it, for appropriate compensation. This might be in the form of access to the product, or other technology, royalty-free or on special terms; access to facilities, training or other services; or an appropriate share of royalties or profits arising from the product.

It is noted that in the case of commercialized varieties, profit-sharing arrangements are likely to give rise to relatively small amounts of revenue and that in many cases this could easily be consumed by the administrative and legal costs involved. Furthermore, few breeders will be willing to make significant research investments if there are complex regulations governing profit-sharing, and even more so if these arrangements cannot be predicted in advance of making a research investment. Bilateral negotiations within MUSE could be carried out under multilaterally agreed guidelines, and possibly with legal assistance being provided within the system.

Bilateral negotiations might be triggered at the time a recipient believes that further research is likely to lead to a commercial product, at the point when a product is about to be commercialized, or when the recipient files

New CGIAR Role? Rather than a fund, it may prove feasible to establish a Transfer of Technology facility. *Note: Given the earlier emphasis on the role of IARC gene banks, is CGIAR thinking of itself? Yet the CGIAR has been breathtakingly slow to comprehend the policy and practical ramifications of germplasm exchange. This is a bit like putting Santa Clause in charge of the genebank!*

Bilateral Commercial Contracts: MUSE membership would still permit bilateral commercial deals at the point of commercialization. *Note: Although this may not be as beneficial to the South as a collective trade union approach.*

MUSE Support for Contracting Parties: There will be little money arising from the commercialization of food crop germplasm. However, MUSE could help by laying down pre-determined multilateral rules for bilateral negotiations and even offer legal support. Without clear guidelines, neither companies nor countries will pursue agreements. *Note: This is correct and very important.*

Patent Contracts: Royalty-sharing deals should only be sought when utility patents are involved. IPGRI proposal ties benefit-sharing (*inappropriately*) to intellectual property in the North. *Note: No mechanism is*

for IPR protection (whether Plant Variety Protection or a patent). Several complications are discussed with respect to royalty-sharing arrangements and it is concluded that the simplest arrangement to negotiate and administer would be for members of MUSE to only enter into bilateral negotiations in the event a patent is awarded.

In order to avoid the excessive complications and expense of monitoring germplasm movement and use, MUSE could place the onus for initiating bilateral negotiations on recipients who develop a commercial product. A requirement to disclose the source of materials in any application for intellectual property protection would prove one relatively simple mechanism for monitoring.

Stakeholders with an interest in PGRFA include individual farmers, farming and indigenous communities, various government departments and institutions, genebanks, managers of protected areas, university departments, private not-for-profit institutions, for-profit institutions and companies, regional and international research institutions, inter-governmental organizations, non-governmental organizations, etc. All would be entitled to join MUSE, but none would be obliged to do so. Among the members, some would be primarily providers of genetic resources and/or information, others would be primarily users, and yet others, probably the majority, would both provide and receive. Each member has its own objectives and requirements that must be addressed fairly and cost-effectively if the system is to be attractive to all. Providers will require an adequate incentive (i.e. will expect to share in the benefits) and recipients must expect to provide benefits.

The system is envisaged as operating at three levels. The highest of these, (The Policy Level), is set by the CBD under the governance of the Conference of the Parties. For a system such as MUSE to be effective, a formal agreement is needed that would be signed by all members. Thus a second level (The Oversight Level) would exist, ideally an IGO, which would draw up rules and procedures for implementing the main provisions of MUSE, within the terms of the CBD, and would be responsible for its oversight. An obvious candidate is

offered for the South to benefit from the billions of dollars per annum of farmgate commodity value arising from the South's germplasm. The text's starting premise is inequitable.

Mandatory Gene Disclosure: Patent (*and UPOV?*) systems should be amended to require full disclosure of the sources of all germplasm at the point of IP application. This would force bilateral negotiation. *Note: Why confine this to IP Systems? Why not seed certification programmes as well? There is a constant assumption that IP Systems must prevail and be accommodated.*

MUSE Stakeholders: Everyone, Not just the government but also its breeding agencies, farmers and private companies could all be MUSE members. *Note: Within the framework of an intergovernmental protocol under the CBD with a governance structure embedded in FAO's intergovernmental Commission, this makes sense and would be a helpful step forward.*

Membership Levels: There could be three governance levels...

- Level 1 is a legally-binding protocol under the Biodiversity Convention.
- Level 2 would be an intergovernmental organ such as the FAO Commission through its revised International Undertaking.
- Level 3 could include the full range of public and private, formal and informal, germplasm workers.

the FAO-CPGRFA which might adopt the revised International Undertaking as its instrument for this task, with technical and institutional arrangements being worked out in complementary with the Global Plan of Action. At the third level (The Implementation Level), membership would be very flexible, allowing for almost any grouping of crop or regional networks, institutions, NGOs, farmers' organizations, indigenous community groups, universities, international centres and private sector organizations.

Governments would negotiate the MUSE Protocol, and all governments which sign and ratify the Protocol would have a voting role in the governance of the system. Membership of MUSE, however, would be open to all, whether governments, institutions or other organizations.

Each member would undertake to make available to the system all genetic resources within its authority that fall within the scope of the system, on the basis defined in the Protocol. By signing the Protocol, members would agree in advanced to standard terms of prior informed consent (PIC) and would operate on the basis of standard, mutually agreed terms (MAT), in conformity with the CBD. Materials within the system would be available to all members, on the basis of the MUSE terms, i.e. that members would be free to use the materials but in the case of commercialization would be obliged to enter into negotiations with the country of origin or provider, under prescribed circumstances. The multilateral benefits of participating in the system would be available to all members.

The Protocol would contain standard terms and conditions which would be used by all members to obtain the PIC of non-members when bringing new materials into the system, whether through collecting in the field or from ex situ sources. Non-member donors of materials to the system would accept that their materials would be handled in accordance with the MUSE Protocol, but would themselves retain the right to negotiate bilaterally with users of their germplasm in cases permitted under the Protocol. If non-members are unwilling to agree to the MUSE terms, such materials would not enter the system.

Protocol Level: Ratifying States would become the voting members of MUSE. Others would be non-voting members.

Origin: Member states would make all agreed upon germplasm as available as possible. Standards of Prior Informed Consent and rules for Mutually Agreed Terms would apply. The source country of the germplasm retains full rights to *negotiate (or not?) commercial use of the germplasm. Note: Who negotiates and who benefits when (as will usually be the case) the origin of the germplasm is uncertain?*

Non-Members: PIC would apply to non-members who would retain bilateral negotiation rights over their germplasm in the event of potential commercialization. *Note: What if a non-member farming community - opposed to IP Systems - seeks access to ex situ samples of its germplasm donated prior to MUSE from a MUSE member? Could a community (or a country) be denied access to its own material?*

Likewise the Protocol would prescribe the terms and conditions by which materials within MUSE would be made available to non-members. These might be identical to the terms of access by members, or might place added obligations on recipients, such as the requirement to provide materials to the system in exchange, special requirements for the sharing of information, or a requirement to make research products available to members (or a sub-group of members such as developing countries) on concessional terms.

In many countries, the signing of the Protocol would automatically be reflected in national legislation, thus enabling the MUSE terms to be enforced under the laws of that nation. In other cases special legal arrangements would have to be made in order to be able to enforce the terms of the Protocol. These might take a number of forms, from broad umbrella agreements to specific Material Transfer Agreements signed each time materials are transferred. Through creating an obligation on recipients that the MUSE terms must be applied to all subsequent recipients of the material, it is possible to create a chain of agreements that would enable a provider of germplasm to take legal action in the case of non-compliance with the original terms of release.

The proposed MUSE system, a multilateral system permitting the possibility of bilateral agreements, seeks to retain the best of the present relatively open system of access to PGRFA, while at the same time introducing modifications to meet new challenges and opportunities. There would undoubtedly be some difficulties involved in implementing such a system but with good will on all sides these should not be insurmountable.

Non-Member Obligations: Text is clear. If a long-time donor of germplasm (country or community) refuses to join MUSE as a matter of practicality or principle, the non-member might be denied access to their own donations pre-MUSE. *Note: This is unacceptable. States, for example, could volunteer material from farming communities that refuse to join MUSE.*

Legal (Gene) Trail: MUSE agreements could ensure that legally-binding obligations between gene provider and gene recipient would be passed to subsequent recipients in a traceable and accountable manner.

WTO-CBD Pressure: This modest modification on the exchange system of the Seventies would probably not be necessary were it not for IP Systems promulgated by the WTO and further pressed through the Biodiversity Convention. Text argues that with all the (*absent*) good will of every gene war veteran, MUSE should work acceptably.