DONALD N. DUVICK
SENIOR VICE PRESIDENT • RESEARCH

March 22, 1989

Dr. M.S. Swaminathan
Chairman
International Steering Committee
International Union for Conservation
of Nature and Natural Resources
B4/142 Safdarjung Enclave
New Delhi 110029
INDIA

Dear Dr. Swaminathan:

Here are some thoughts regarding the questionnaire in your letter of 7 February.

1. At the national level we certainly need to support the concept of national support of in situ and ex situ germplasm collections. But in the poorer countries, external support in funds and technological expertise will be needed. I think the greatest need will be in scientifically well-trained personnel with good management ability, rather than in funds, per se.

2. At the regional level, cooperation between nations for ex situ conservation probably could best be accomplished if freedom were given to technical people to get the job done. Unfortunately, political rivalries among nations are going to be present and so diplomacy - to settle fears of loss of national power or prestige - must be brought to bear on the question.

3.1. To become thoroughly familiar with the developing field of intellectual property protection for plants is an urgent need for plant breeders and others interested in agriculture in the developing countries. I enclose some comments on this subject, in papers prepared for other fora.

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3.2. "Farmer's Rights" might be better stated as "Farmer's Rights and Obligations" to maintain the world's birthright of indigenous germplasm. In the developed world a self-financing system for protecting advanced germplasm selections is now developed (breeder's rights and patents). But this system cannot be applied, for technical reasons, to indigenous landrace and/or wild germplasm. Another system of financing and management must be devised. Farmers of the developing world must be assisted by the entire world as they fulfill their obligation - put upon them by force of place and circumstance - to preserve the indigenous germplasm developed by our ancestors and now in the hands of developing-world farmers.

3.3. Genetic engineering is a tool with much promise for evaluating and utilizing diverse germplasm sources. It must be developed and used whenever possible. But it is not the only tool available to biologists. I enclose a draft copy of the abstract of a paper prepared for another study group.

3.4. Establishment of a U.N. Commission on Biological Diversity, along with an International Advisory Committee and a Global Funding Facility is a daunting prospect. If these are to be three separate bodies, will they work together as needed? What kind of representation is needed on each body? How can one prevent a particular interest group from seizing control of any of these bodies? What powers will each of them have?

My initial thoughts are that a single body should combine the functions of raising funds, administering them in ways to best support biological diversity and doing so with proper representation from interested and affected parties. This body might be sponsored by the U.N. commission but not administered by it. Its representation ("board of trustees") should include: third world and first world farmers, biologists with special interest and expertise in biological diversity for agriculture, seed companies, economists and sociologists. This board of trustees might be chosen by the U.N. commission; it (the board) would appoint administrative personnel with responsibilities for fund-raising, determination of needs, distribution of funds and audit of use of the funds.

Fund-raising would probably be by some sort of levy (request) on individual countries. I believe the richest countries should pay the most but that all countries should pay something. A sense of responsibility is thus engendered, in each donor. Poor countries might pay in kind - as by dedicating natural areas, or encouraging preservation and use of landraces by indigenous cultures.

3.5. Some people fear that wording in the draft IUCN convention gives possibility to erode existing property rights on germplasm. The passages that are of concern seem to me to not have that purpose, but perhaps the draft could be rephrased in certain places to maintain the original intents but remove questions about additional, unintended interpretations.

I look forward to the upcoming meeting of the steering and working committee in about July, in the U.S.S.R.

Sincerely,

Donald N. Duvick

DND:lks

isnar

21 March, 1989
ISNAR Fax. No. 3170496188

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Dr. D. Duvick
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Dear Dr. Duvick,

I am writing in regard to the biotechnology study, to keep you informed of recent developments.

I very much regret the change in plans that meant you were unable to join the meeting of commissioned authors in Washington in January. However, we shall be having one or two other meetings later in the year to discuss the draft report to the Bank. I hope that you will be able to join us on one of those occasions. I shall advise you of the dates in the near future.

In regard to the commissioned papers, CAB International have agreed to publish the edited papers as chapters in a monograph, tentatively titled "Agricultural Biotechnology: Opportunities for International Development." This should appear in late 1989/early 1990, if all goes well. A summary of the background paper for the study appeared in the first issue of the new CABI journal, AgBiotech News and Information in February 1989. A reprint is enclosed.

Thank you for the return of the contract regarding the paper on biotechnology and genetic improvement of crops. Your draft paper is presently being refereed and edited. I shall forward to you the referees comments and some editorial suggestions in the next few weeks. You may also be interested to see some of the related papers on insect and disease resistance, before finalizing your paper.

In the interim, please find enclosed an abstract of the paper. This will form part of the set of abstracts of the commissioned papers to be circulated in April 1989. I would be grateful for your advice as to whether the abstract correctly reflects the content, main conclusions and recommendations of your paper. If there are any additions or deletions you wish to make, would you mind writing them (in black pen) on a copy of the abstract, and faxing it back to me at ISNAR. It would be helpful if I could receive the comments by 31 March. If I do not receive my comments from you by then, I shall assume that you are happy to have the abstract circulated in its present form.

I look forward to hearing from you soon.
Best wishes for Easter
Yours sincerely,
Gabrielle

Gabrielle Persley
Project Manager
World Bank/ISNAR/Australian Government
Biotechnology Study

Dobrielle - the abstract is fine, with a couple of suggested changes. I look forward to attending subsequent meetings.

BIOTECHNOLOGY IN THE GENETIC IMPROVEMENT OF CROPS IN DEVELOPING COUNTRIES

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ABSTRACT

Because of its relatively small requirement for financial investment, in proportion to value of possible resulting gains in productivity, the development of new varieties of important food plants usually is picked as a first goal of crop improvement. Biotechnology often is looked on as an important way for developing countries quickly to improve their food production capacity, by accelerating the development of new varieties. This essay deals with plant breeding needs and constraints in developing countries, and with ways that biotechnology can help to improve plant breeding contributions to crop improvement.

Recommendations for genetic improvement of crops in developing countries may have small effect when implemented, because of pervasive institutional constraints. Thus, conventional plant breeding, which is essential for the application of modern biotechnology to crop improvement, is held back in many developing countries by institutional and/or infrastructure barriers. Improvements in the productivity of standard plant breeding are a necessary complement to the successful adoption of modern biotechnology in developing countries.

As is well understood, "developing countries", as a class, encompass a very wide range of economic and social conditions. Brazil, Sudan, China and Zimbabwe differ markedly in their agricultural development and in the infrastructures that support their agriculture. Their potentials for further agricultural development vary greatly, also, due to differences in natural resources, country size, geographical diversity, social organization and political institutions.

To implement new technologies, including biotechnology, therefore will be more difficult in some developing countries than in others. Certain preconditions must be met, before successful implantation of any technology; certain other preconditions are required for its successful transfer to the market place - to production of useful products.

Present technologies for plant breeding - sometimes called "traditional technologies" - in theory can be utilized easily in developing countries, since they require little more than trained plant breeders, conscientious manual laborers and space for field

plots, all of which are available in most countries.

In reality, to do a good job of standard plant breeding is difficult in many countries. Quarantine regulations often preclude ~~the rate of importing~~ timely importation of needed new germplasm. Standardized, simple equipment may be unavailable due to import restrictions. Difficulty in travel may restrict the number of places in which trials can be placed and thus limit the predictions that can be made about range of adaptation of selected new varieties. Government regulations about time and number of required official tests may delay introduction of promising new varieties. Poor communications can limit use of computer networking to facilitate data collection and analysis. Local-product laws may prevent use of standardized computer equipment and necessitate special programming - or even preclude use of computers. Fluctuating power supplies may hinder the maintenance of medium and long term cold storage of breeding seeds.

In many countries the most educated scientists are not attracted to the relatively low-paying, unglamorous, rural-sited, jobs in plant breeding. To find sufficient competent scientists to lead plant breeding programs in the field can be very difficult.

A further hindrance to development of standard plant breeding in many countries is the series of problems faced by private industry, seeking to establish research, development, production and seed sales programs in those countries. These problems range from outright prohibition of in-country research and development through difficulties in importation of proprietary germplasm and on to restrictive licensing and pricing practices. Such practices, having the laudable aim of increasing national self-sufficiency in seeds, nevertheless can unnecessarily restrict the options available to the nation's farmers, as they look for seeds of improved varieties at competitive prices. A further problem is the absence of laws for protection of proprietary germplasm. This lack of protection restricts commercial activity to breeding and sale of hybrid crops, whose parental lines, sequestered physically, give a patent-like protection to their owners.

The preceding remarks are intended as a prelude to discussion of the availability, use and implementation of biotechnologies for developing countries. They point to the fact that in countries where standard plant breeding programs now operate with great difficulty, to institute new technologies, such as those encompassed by the term "biotechnology", will be even more difficult.

Recommendations

New biotechnologies, with likely use in developing countries in the short term, include micropropagation, embryo rescue,

anther culture and diagnostic techniques. Micropropagation and diagnostic techniques can be used in countries with limited resources and can have immediate beneficial effects. Embryo rescue can be useful in developing countries but the results normally will not be seen in the short term. Anther culture is not yet efficient enough for wide scale use in countries with limited financial and personnel resources. Short to medium term results can be gained with RFLP technology, as used to identify useful genotypes. However, most countries will need to collaborate with national laboratories in industrialized countries, with laboratories in IARCs, and/or with laboratories in private industry, to obtain benefits from RFLP technology. Somoclonal variation, for production of useful new genotypes, is not efficient enough, at present, to be a profitable use of scarce resources in developing countries.

Genetic transformation will be beneficial to plant breeding in both industrialized and developing countries alike, but its benefits will not be widespread until a decade or more has passed. Furthermore, most developing countries will be able to participate in this technology only through alliances with large laboratories in other countries, either those of public institutions or of large transnational firms. To participate productively in the use of biotechnology, while protecting their important national interests, the developing countries will need to develop skills in making license arrangements and reciprocal research agreements, as well as in devising methods of sharing in jointly developed proprietary products and processes. A major contribution from international development agencies could be to inform and otherwise assist appropriate officials in developing countries as they strive to develop these skills, sorely needed if they are to lead their countries into the age of the new biotechnology, used in aid of genetic improvement of crops. A continuing consideration is the need, in developing countries, for changes in attitudes, regulations and laws concerning proprietary aspects of biological materials.

Recommendations ?

- I think the last 2 paragraphs are recommendations.

Research Collaboration and Technology Transfer: The Public and Private Sectors in Developing Countries, and the International Seed Companies

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Introduction

Developing countries of the world have as a primary goal the improvement of their food-production capabilities. In general, they need economically and efficiently to increase production per unit of land as well as to expand the land areas suitable for agricultural production. All technologies and all agricultural systems that can increase productivity per unit of input therefore are of interest to developing countries. Biotechnology, hailed for the past ten years as uniquely able to give large increases to agricultural productivity, is looked upon with particular interest. Biotechnology sometimes is viewed as a means to bypass, or traverse in shortened time, certain stages in agricultural development. Developing countries are concerned also that delay in adopting this newest aid to agricultural production might put them even further behind the industrial nations in agricultural production capabilities.

I shall speak to these concerns from my position in agribusiness, an employee of an international seed company. I speak only for myself, but it is probable that my views in many points will coincide with those of international seed companies based in the industrial nations.

A preliminary comment: international agribusinesses, the "transnationals", are distrusted by some sectors in the developing countries, as likely to serve business needs for profits at the expense of the people needs of the developing countries. I shall not take up this argument in this forum but will state simply that I do not think needs of the seed companies for profits are incompatible with their ability to serve some of the true agricultural needs of the developing countries. I will point out, in this discussion, areas in which mutually profitable collaborations could be effected.

International seed companies planning to sell improved seeds in developing countries will find that they have been preceded in most countries by national (public) breeding and seed distribution organizations, as well as by the international (public) agricultural research centers, CGIAR-supported

organizations like IRRI, CIMMYT and ICRISAT. The commercial seed firms, if they are to play a useful role in these countries, therefore must find ways to breed superior varieties or varieties for unfilled niches, and/or distribute these varieties in needed new ways or in better condition.

One also should note that absence of breeders rights (plant variety protection) laws in most developing countries means that seed firms' activities in those countries usually will be restricted to research, production and sale of hybrid crops such as maize, sorghum and sunflower. Because self-pollinated crops can be increased and sold by anyone in absence of legal prohibitions, investment of private funds to breed and sell such crops will not provide acceptable return on investment. But the inbred parents of hybrid crops can be protected physically and in effect give a kind of intellectual property protection (specifically, trade secret protection) to their owners.

Complementary Strengths of the Public and Private Sectors

Recognizing areas of potential competition, the private and public sectors then can proceed to explore areas in which they complement each other. (Of course, in many developing countries the need for improved varieties is so great and distribution channels are so undeveloped that there probably will not be much competition between private and public seed supply services for some time to come; products of both sectors will be in demand, to the extent that they meet real needs.)

The greatest strength of international seed companies (ISCs) is in the application (technology transfer) stages of breeding and research: hybrid and variety development and testing, seed production and distribution.

The international agricultural research centers (IARCs) typically will have greater capability than ISCs in development of basic breeding stocks and in the basic research needed to support applied breeding. IARCs have capabilities in biotechnology research as well, although some ISCs also have large capability in the new sciences that support biotechnology.

The national research programs (NRPs) vary greatly in strengths and capabilities. In general they are strongest in variety development but now they are interested also in increasing their capabilities in more basic types of research such as cell biology and molecular genetics. They often are greatly restricted in such efforts, however, because of lack of critical mass of skilled scientists per country, as well as by reason of deficiencies in facilities and infrastructure able to support investigations requiring reliable operation of highly sophisticated equipment.

One other potential player in development of biotechnology in service of agriculture in the developing countries is the class represented by indigenous private firms with interest in such application. In general such firms are few or not present at all, but in countries like India or Argentina entrepreneurial plant biotechnology-based companies (EPBCs) are appearing, to fill niche needs with techniques from cell biology, for example. Some of these companies eventually may look for connections with larger, more highly capitalized firms, as they find need for capital to expand their business or need for broader research and development skills than they can afford to support.

International seed firms can interact beneficially with members of each category in the developing countries: national research programs, indigenous plant biotechnology firms and international agricultural research centers. This discussion initially will deal with ways ISCs and IARCs can interact in complementary fashion, to the benefit of developing nations.

Collaboration Between International Agricultural Research Centers and International Seed Companies

Collaboration between IARCs and ISCs can take place on three levels: research, technology transfer (i.e., commercialization) and joint policy development.

Biotechnology research needs in developing countries are large. Developing countries recognize the problem and are attempting to build up their capabilities but as noted earlier they are limited in what they can do, individually. IARCs therefore could add greatly to the store of biotechnology knowledge useful to developing countries by establishing strong, well-rounded IARC programs in basic studies of cellular and molecular biology of their mandated crops, the same crops the developing countries would want to research.

To some extent IARCs have already begun such programs. For example: CIMMYT has started work on restriction fragment length polymorphisms (RFLPs) for use in locating desirable quantitative trait loci in maize. CIAT has used meristem tip culture for development of an active *in vitro* germplasm bank of cassava. IRRI is looking at somatic variability in rice tissue cultures with hope of selecting salt or cold tolerant lines of rice.

But information available to me indicates that by and large the IARC biotechnology projects are applied rather than basic in nature and involve very little molecular genetics, being more oriented toward the kinds of cell and tissue culture work that can give immediately useful products.

Much needs to be done in molecular genetics of the major food crops, whether for the developing or the developed world. Genetic transformation - transfer of functioning genes from one organism to another via steps involving DNA technology - will not yet work in any major food crop species except rice. Few agronomically important plant genes have yet been identified and cloned for use in transformation once the technology is workable in important food crops. Systems for gene regulation in the major food crops are largely unknown, molecularly. These problems urgently need solution; the bank of knowledge about the molecular biology of the major food crops in developing countries needs major additions of scientific capital.

The IARCs could be world-class centers of expertise and information exchange for the molecular biology of the developing world's major food crops and as such could help the developing countries to reach parity with the rest of the world in this field of basic plant science. They might develop such expertise in the science, and become vital information transfer centers, by collaborating scientifically with world-renowned biotechnology institutes in the developing countries, such as the Max Planck Institute at Cologne (Federal Republic of Germany) or the USDA Plant Gene Expression Center at Albany, California. Having developed and shared such knowledge, IARCs then could work with applied plant breeding organizations (in addition to their own) to transform that basic knowledge into useful plant breeding products; they could be partners in the transfer of technology. The ISCs would be willing collaborators in such transfer.

(Of course, technology transfer from IARCs to the farmers of developing countries should be not only via ISCs. IARC technology should be transferred also through the national research programs and the indigenous seed and/or biotechnology companies. Each class of recipient: NRP, EPBC and ISC, will have its own technology needs in addition to the needs all have in common; consideration of the differing needs, the differing constraints to technology transfer, will stimulate research at the IARCs in ways that could benefit all recipients in the long run.)

One of the best ways to transfer biotechnological knowledge to practical plant breeding and variety development is to form teams of biotechnologists and plant breeders. For example, a team might be formed to use RFLP technology to identify valuable quantitative trait loci in elite maize germplasm and then use that knowledge to breed better inbred lines of maize; or, a team could be formed to identify, with molecular means, important genes for disease resistance and then move them via genetic transformation technology into important crop varieties. Breeders and biotechnologists both would bring essential knowledge and skills to the work and would learn from each other

as well, such that helpful suggestions could be made reciprocally and usefully.

IARCs and ISCs could collaborate to form such teams (as could also IARCs and NRPs or IARCs and EPBCs), with useful commercial products - inbred lines and hybrids - the eventual result of such collaboration. But at this point a problem may develop, that of ownership of any resulting inbreds and hybrids, biotechnological processes or molecular products such as cloned genes. It will be important for ISCs and IARCs to know what rights accrue to each collaborator in regard to products of joint research. For example, in absence of assurance of exclusive licenses, ISCs could be reluctant to join in such collaborative research and technology transfer. This matter (intellectual property protection) is of equal importance to NRPs and EBCs in the developing countries, as will be pointed out later in this essay.

Intellectual Property Protection and International Seed Companies

The nature of the private seed business requires that companies own or can license, uniquely, their stock in trade (their inbreds, hybrids and/or varieties) and, whenever possible, the processes, genes or plant parts that make their lines unique and hopefully superior to the competition. In the industrial countries, with a highly developed private seed business, a body of laws and customs has evolved - and is still in active evolution - to allow investment in research and development of improved varieties to be repaid through sales of products protected with some combination of proprietary rights. Breeders rights laws (European term) or plant variety protection laws (U.S. term) spell out terms of ownership for varieties and inbred lines; in the United States recent rulings additionally have said that U.S. utility patent laws can be applied to plant varieties and inbreds, and also to hybrids, genes, plant parts and processes connected with plant breeding.

But in most of the developing countries, breeders rights protection is not available, and in fact its establishment often has been resisted, as giving unfair and unwanted advantage to the transnationals: the international seed companies. Further, evaluation of infrastructure and social customs of many of the developing countries leaves doubt as to whether effective administration of breeders rights laws could be accomplished at the present time.

Patent laws in some developing countries might be interpreted as allowing intellectual property rights over such things as processes or products of biotechnology applied to plant breeding,

but to my knowledge investigation of such potentials is hardly started.

Thus a prerequisite for significant amounts of commercial collaboration between IARCs and ISCs (and, as well, with NRPs and EPBCs) is development and implementation, country by country, of policy on intellectual property rights for plant germplasm and for processes connected with its manipulation. Further, in today's global economy an international harmonization of such policy is a critical need. This will not be an easy matter, in fact it will be an extremely difficult series of problems.

Even in the industrial countries strong differences of opinion are developing, particularly over the question of ownership of breeding rights of released varieties and hybrids. Breeders rights laws allow free use of released protected materials for breeding, continuing a custom as old as plant breeding. But the U.S. patent law has been interpreted by some to say that varieties, inbreds and hybrids patented with the U.S. utility patent cannot be used (without the patent owner's permission) for breeding new commercial products during the life of the patent, although they can be used freely for experimentation, with the goal of learning how to make patentable improvements on the original patented product or process (the "experimental use" doctrine).

In general, seed companies without direct access to biotechnology as an aid to plant breeding advocate use of only one type of variety protection, the breeders rights type, saying that this will guarantee free access to released protected materials for breeding. In contrast, seed companies with access to biotechnology (in-house or through their parent company) generally favor dual protection: breeders rights and also the utility patent, saying that either or both methods might be used as appropriate to stimulate progress in plant breeding.

Members of the first group fear that without completely free access to released varieties and hybrids for breeding, the useful germplasm base would be dangerously restricted. Those of the second group say that genetic diversity actually would be increased in a beneficial way by wide-scale utilization of utility patents since each commercial organization would be stimulated to develop its own unique elite breeding populations (as is already done for development of proprietary inbred lines in the hybrid crops: maize, sorghum and sunflower). They say also that cross-licensing would allow a structured interchange of patented breeding materials as needed, so to some extent there would continue to be one large breeding pool per crop as is true today for crops such as soybeans or wheat. (However, the pool would have a broader base of elite materials due to greater diversity among the numerous unique private germplasm pools.)

It is clear that if there is as yet no agreement on ownership questions in the industrial countries with a history of experience in such matters, the matter is even farther from settlement in developing countries. But this is good reason for IARCs to concern themselves with the matter at this time. As parties with interests of the developing countries at heart but also able to look objectively at the possible advantages of involving industry to the benefit of the developing countries, IARCs might provide a useful forum and some of the needed expertise for discussion of the matter, with a goal of helping to provide perspective and knowledge to those responsible for national decisions on application of intellectual property rights to plant germplasm.

Thus, research, commercialization and policy development involving collaboration between IARCs and ISCs in matters of biotechnology and seeds requires (1) involvement of the IARCs in basic research in cellular and molecular biology, with possible joint research with ISC biotechnologists, and (2) formation of biotechnologist/breeder teams, composed of individuals from IARCs and ISCs, to effect technology transfer to the farm (commercialization). But because any involvement with ISCs will need clear understanding about ownership of resulting commercially valuable products and processes, IARC/ISC collaboration also will require (3) efforts to assist developing countries, as asked, to devise workable policies for intellectual property protection of germplasm products and processes, policies with the best possible long term benefit to the developing countries.

And, to repeat, commercialization of biotechnology-supported plant breeding to the benefit of developing countries requires that NRPs and EPBCs also be involved, not only bilaterally with the IARCs but also with the ISCs and with each other. In some instances trilateral or quadrilateral relationships among the four groups will be useful. Such commercial interrelationships adjusted appropriately for each country, although seemingly complicated in concept and perhaps in execution, will in the long run give the most stability to agricultural development of the developing countries. And since commercial relationships require definition of property rights, it is obvious that matters of intellectual property protection applied to plant varieties and hybrids, genes, processes and plant parts are important to all sectors: IARCs, NRPs, EPBCs and ISCs.

Collaboration Between National Research Programs and International Seed Companies

ISCs might collaborate also with NRPs in matters of biotechnology related to plant breeding. Some ISCs have

considerable expertise in cell and molecular biology related to the products or crops they sell or plan to commercialize in some way. But also, during the past 10 years in the U.S., numerous industry-university collaborations in biotechnology research have been crafted to allow the companies to extend their capabilities in biotechnology and its application to agriculture, and the universities to expand their funding base for research.

Typically a company will fund a researcher or laboratory for a mutually agreed-upon area of research for a limited number of years. A pattern has emerged in which interests of both parties are protected - that of the universities for freedom in research and publication, that of the companies for ability to commercialize resulting research products or processes, with protection provided, if needed, by patents.

In general, industry research grants to the universities stipulate that the universities shall have first rights to apply for patents on products of that research, and the grantor - the company - has first rights to licences on the patented items. License fees paid to the university are negotiated to the satisfaction of both parties. Publication is possible once patent applications have been made on discoveries deemed patentable.

Perhaps such arrangements, suitably modified, also could be made between ISCs and NRPs. As noted earlier, patent protection for products and processes of biotechnology would need to be available but I believe that in some developing countries existing patent law may allow such protection. However even if such protection is possible, its extension to varieties and hybrids containing patented genes or processes may not be permitted. So again it is probable that broadening the scope of intellectual property protection applied to plants will be necessary before very much industry/national research collaboration in biotechnology can be instituted in the developing countries.

Industry also occasionally makes unrestricted research grants for quite basic types of plant research. Such grants typically are made to laboratories doing pioneering research that can advance the entire scientific field. Since individual developing countries rarely are able financially to build up their laboratories to world leader class they may find it difficult to attract grants of this category. However, they may be able to secure unrestricted training grants, occasionally supplied by industry for individual researchers, in order to improve their human resource capacity in advanced biological research.

Trade secrets are used by industry to protect technologies and/or other proprietary products. Sometimes, as partners or

through a joint venture, two firms will share knowledge or jointly use trade secrets. Conceivably such arrangements could be made also between ISCs and NRP centers. In eastern Europe, ISCs and national or regional research institutes have made exclusive agreements of such a nature. For example, an institute can use an ISCs' proprietary maize inbreds for production and sale of hybrid seed, with appropriate financial arrangements for both parties. Such agreements require a large degree of personal trust in addition to legal safeguards. They also require that the research institutes operate as quasi-businesses, often in commercial competition with other institutes in the same country. Clearly, research centers in the national programs of developing countries would need to rethink their role and mission if they were to enter into similar partnership or joint-venture agreements with ISCs.

But since in some cases nationally-sponsored and/or subsidized research and development companies - fully commercial in intent - have been set up in developing countries, it may not take too great a stretch of imagination to see some of them in partnership with an ISC. The prime goal would need to be expeditious delivery of agricultural technology (in this case seeds or biotechnology, in support of seed breeding, production and sales) to those in need of that technology. The developing nations would need safeguards to protect their economic and technological independence. The ISCs would need safeguards to ensure that their investments would not be unreasonably confiscated or rendered worthless by other means.

To review: collaboration between NRPs and ISCs, more or less like that between IARCs and ISCs, could involve (1) collaboration at the research level (perhaps through research grants), (2) collaboration at the commercialization level (perhaps through partnership or joint venture arrangements), and also would require (3) policy development in regard to intellectual property protection.

The Need for IARCs to Serve All Clients Impartially

One might - with a large stretch of imagination - also picture a trade secret-based IARC/ISC commercial partnership to effect technology transfer in seeds, including that from biotechnology. But this would seem to be very difficult to do without destroying the IARC's status as an impartial assistant or partner to the national programs of its client nations, and as an unbiased respondent with EPBCs and ISCs.

In general the most uncomplicated and yet most productive way for IARCs to aid in technology transfer at the applied level is the method they already employ - to release elite breeding

materials (produced with or without aid of biotechnology) to all qualified organizations and individuals. Such material can be at all levels of selection, from improved populations and F2s on through several generations of selfing and selection. In those crops that can be grown as hybrids, such as maize, sorghum and sunflower, finished inbred lines could be released also, along with information as to their best heterotic combinations.

Once again, the question of ownership can arise, even with this practise of unrestricted release. In order to ensure that the general public has equal and unrestricted access to such materials, it would be well for IARCs to publically disclose the origin and characteristics of each release in such a way as to preclude any unauthorized claims to them. An alternative is for IARCs themselves to obtain plant variety protection certificates or patents on the finished materials in countries where such is possible, following which unrestricted use of the protected lines is granted, by the IARCs. However, this seems to me to be excessively burdensome, it generally cannot be done in those countries of most concern to IARCs, and at any rate I doubt if it would be more effective than simple public disclosure, to ensure free and equal availability of materials.

Collaboration Between Indigenous Plant Biotechnology Companies and International Seed Companies

I mentioned earlier the possibility that indigenous entrepreneuring plant biotechnology companies sometimes might welcome arrangements with ISCs. In the U.S., large agrichemical firms and to a lesser extent independent seed firms have made arrangements with entrepreneurial plant biotechnology companies. Types of association vary. They include: research contracts, licensing agreements, equity investments and joint ventures. Such arrangements might be feasible in developing countries, depending on local possibilities for foreign investment and control, and (as usual) on local possibilities for intellectual property protection. Indigenous plant biotechnology firms could offer knowledge of the territory, local customs and the intricacies of government bureaucracy, in addition to their specialized scientific knowledge and trained personnel. ISCs could contribute capital, a broader marketing potential and a broader research base.

The Bases for Commercialization

Looking at all the possible commercial interactions among ISCs, IARCs, NRPs and indigenous EPBCs, it seems to me one needs always to keep two salient points in mind: 1) developing countries need access to a solid base of basic plant science

(including cellular and molecular biology) centered on their important food crops as grown in the their local environments; 2) developing countries need technology transfer from basic and applied plant science to the farm, via plant breeding, seed multiplication and sales. This conference is exploring ways in which public and private institutions can collaborate to provide the science and expedite the technology transfer. I have listed some ways in which it might be done, with particular reference to the international seed companies.

Two Caveats, and Concluding Remarks

I think however that we must remember that influential individuals and organizations, networked in a worldwide coalition for social action, believe that for international seed companies - "transnationals" - to have any part in the seed business of developing countries will be harmful to the people and the economies of those countries.[1] Biotechnology in the hands of the ISCs is regarded as undesirable also.[1] And finally, any connection between IARCs and ISCs is looked upon with suspicion.[2] This is not the forum to review in detail the coalition's arguments nor to comment on them, but it is imperative that their criticisms and suggestions be kept clearly in mind during all considerations of technology transfer via commercial activities. The goal of The International Coalition for Development Action and allied individuals and organizations is the same as that of those assembled in this forum: to advance the agricultural capacity of developing nations to the benefit of all of their people. Differences of opinion as to how best to reach that goal should not be an excuse for fruitless disputation but rather should be a basis for re-examination of proposed options, looking for previously unrecognized strengths or weaknesses, following which plans can be modified as needed and then put into action.

1"For almost a decade now, ICDA has been drawing attention to the dangerous narrowing of our food base and the impact of the increasingly monopolistic control of genetic resources in the hands of a few transnational corporations....Biotechnology could be a powerful force for change in agricultural production. But it also could be the means by which monopolistic control over agriculture is increased." In New Hope Or False Promise? Biotechnology and Third World Agriculture, by Henk Hobbelink, p. 6. The International Coalition for Development Action, April 1987.

2"...use of the IARC system might yet prove to be one of the few mechanisms that could reverse the privatization of biotechnology and challenge the direction of current research....In the case of the Green Revolution, the TNCs acted "merely" as suppliers of the inputs for seeds that the IARCs had developed; for the bio-revolution, the TNCs are direct competitors of the IARCs in bringing the technology to the farmers' fields." ibid. p. 54.

A second caveat also must be stated: biotechnology applied to plant breeding and other facets of agriculture will not bring about startling rapid advances in productivity on the farm nor windfall profits to agribusinesses. The superbly successful new sciences that are the basis for biotechnology will be invaluable aids to plant breeding, and all successful plant breeders will use biotechnology as one of their important tools in the future, but its contributions will be evolutionary, not revolutionary, in nature.

This prediction is at variance with most of the public expectations for biotechnology, but many of its practitioners are in agreement with it. An important consequence of such knowledge is that planners in the developing countries should not place unwarranted reliance on biotechnology as a short-cut, as a way to bypass the slow, hard and persistent work of standard plant breeding, seed multiplication and distribution, integrated with improved agronomic practises. All of these processes still are needed, to deliver the products of seed technology to the people of the developing nations.

But the planners' task - the task of those in charge of planning and implementing food strategies for developing nations - is to be sure that biotechnology is properly encouraged and smoothly integrated into plant breeding for the developing countries and that broadly based systems of technology transfer, utilizing all appropriate institutions, are instituted promptly and efficaciously. International seed companies eventually may play a useful and significant role in this process as they interact, scientifically and commercially, with public and private institutions in the developing world.

Presented to the forum, "Strengthening Collaboration in Biotechnology: International Agricultural Research and the Private Sector," April 17-21, Arlington, Virginia, as sponsored by the Agency for International Development, Washington, DC 20523.

Plant Germplasm And The Economics Of Agriculture

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Abstract

Modern agriculture, particularly as practiced in the developed world, is largely dependent upon highly select sources of germplasm. The present germplasm base of some important U.S. crops is briefly described herein. Sources of new germplasm and methods of most appropriate germplasm use are discussed. Modern methods for using genetic diversity to increase yields and production stability are described and compared to earlier methods and strategies. New concepts are briefly explored, of protection of intellectual property as applied to plant germplasm, and implications for genetic diversity. Also examined are the influence of farmer and grower preferences on genetic diversity and subsequent consequences of those preferences for developed and developing countries. A serious need exists today for research on germplasm management, use and introgression into existing cultivars.

Key Words

Germplasm preservation, germplasm sources, genetic diversity, variability, selection, plant breeding, production stability, patents, intellectual property protection.

Introduction

The economic success of crop agriculture depends on two fundamentals: the availability of appropriate germplasm and its appropriate deployment. Appropriate germplasm is that which reliably provides the greatest amount of product with the smallest expenditure of energy and land. Appropriate deployment of germplasm entails use of ecologically sound crop-growing practices to ensure maximum profitable production, within the limits of agricultural sustainability and with proper regard for human health. Available sources of useful germplasm and techniques for its manipulation have determined the nature of agriculture and its varying degrees of success through the millennia; they do so today and will continue to do so in the future.

Sources of plant germplasm and ways of manipulating it have changed markedly during the past century. Prior to the practical application of Mendelian genetics and expanded use of synthetic fertilizers, increases in production usually were dependent upon expansion of land areas under cultivation. Needed genetic variability was provided by the nature of the heterogeneous cultivars and numerous species cultivated by individual farmers. In modern agriculture, increases in crop production have come about largely through manipulation of germplasm by use of appropriate breeding techniques and through use of fertilizer, agricultural chemicals, and intensive monocultural practices [1]. Needed germplasm diversity is provided by extensive global interchange of basic and advanced breeding stocks and a rapid turnover, on the farm, of leading cultivars as provided by plant breeders [2].

To be successful, modern plant breeding thus must have access to genetic variability in the form of highly select germplasm. In the absence of genetic variability, selection cannot progress, whereas in the absence of elite sources of variability, selection cannot move populations in the direction of higher productivity. Thus breeders in their efforts to improve plants usually rely on select cultivars as sources of new traits. Primitive cultivars and wild relatives are chosen as donors of new genes only when they are thought to be unique sources of such genes. The use of elite germplasm in preference to unselected sources results from the close linkages frequently observed between desirable and undesirable traits in unimproved germplasm. The use of unimproved (i.e. unadapted) germplasm requires additional generations of segregating progeny to achieve the desired results and thus decreases breeding efficiency.

Despite the advantages of the continued use of elite rather than exotic germplasm sources in plant improvement, the use of such material tends to narrow more rapidly the genetic base on the farm, thereby increasing potential genetic vulnerability. To counter this risk, it is essential to maintain and use global germplasm resources and to deploy rapidly and extensively the new products of breeding to the farm. The principle of "genetic diversity in time" thus is practiced [2].

Today's practice of utilizing genetic diversity in time (genotype replacement) is more or less equivalent to the older agricultural practice of utilizing genetic diversity in place (use of heterogeneous cultivars and numerous species). But on a slower time scale, genetic diversity in time also occurred in primitive agriculture, and in nature as well. Charles Darwin noted this in his remarks on variation under domestication (remarks made as part of the foundation for his theory of evolution, "Descent with Modification"). Darwin stated, "Our oldest cultivated plants, such as wheat, still yield new varieties..."[3]. He also said, "With our domestic productions, when an improved variety has been raised, it first supplants the less improved varieties in the same neighborhood; when much improved it is taken far and near, like our short-horn cattle, and takes the place of other breeds in other countries. Thus, the appearance of new forms and the disappearance of old are bound together."

Sources of Useful Genetic Variation, and Ways of Using It

The chief task of plant breeders therefore is to find and efficiently use desired genetic variation as they strive to improve humankind's economic well-being. Various strategies have been employed toward this goal.

Over the years, breeders have sought and sometimes identified heterotic patterns in some crops that have been useful in augmenting performance. Corn belt maize arose from crosses of southern dents and northern flints [4]. Increased yield and other advantages associated with combining these two diverse sources of germplasm have been recognized since colonial times. Even today, maize breeders continue to exploit, via first-generation hybrids, the heterotic responses derived from combining segments of these two germplasms, which still exist in corn belt maize.

In breeding maize for the tropics and subtropics, a similar heterotic combination, of Tuxpeno dent and Coastal Tropical Flint, has been used successfully, worldwide. Maize breeders now are finding ways to combine elite U.S. corn belt dents with elite tropical and subtropical strains.

In grain sorghum, 'Milo' and 'Kafir' are two distinct races that have been converted to dwarf stature and early maturity, thereby permitting their use in modern mechanized agriculture in temperate zones, such as the U.S. high plains. Considerable heterosis results from the hybridization of these two races. Thus, most modern grain sorghums in use today are first-generation hybrids of lines derived from Milo and Kafir. Fortunately, cytoplasmic male sterility and male fertility restoration - conditions necessary for the exploitation of commercial hybrids in sorghum - are found in these two races. Milo provides the cytoplasmic factors necessary for male sterility, as well as nuclear fertility restorer genes; nuclear genes needed for expression of cytoplasmic male sterility are present in Kafir [5].

As is usually the case, this breeding success has resulted in concentration by farmers on a few highly successful genotypes and a consequent reduction in on-farm genetic diversity. All sorghum hybrids have Milo cytoplasm and thus its mitochondrial and chloroplastic genotype. U.S. sorghum hybrids also have a narrow base of nuclear genotypes; as just noted, inbred parents typically have had either Milo or Kafir nuclear background, with only rare additions of germplasm from other races.

The challenge to sorghum breeders is to use other sources of cytoplasmic sterility and other sources of nuclear variability. Exotic strains often can contribute useful disease-, insect- and stress-tolerance traits, but they usually present them in tight linkage with undesirable traits such as those that reduce yield under modern agronomic practices. Other sources of cytoplasmic sterility now are known, but they are less convenient to use than is the Milo type.

Prior to the emergence of interest in growing hybrid wheat, which arose in the U.S. some twenty years ago but now appears to be waning, wheat breeders seemed to be of the opinion that the heterotic response in crosses of wheat cultivars was minimal. Field experience with hybrid breeding has demonstrated conclusively that significant amounts of heterosis are exhibited by some wheat hybrids [6].

Unfortunately, the most significant heterotic responses were obtained in crosses between different classes of wheat rather than within classes. Such differentiation, of course, would be expected on the basis of empirical knowledge that stringent selection for grain quality traits has greatly narrowed the genetic base of each class of wheat, and that the greatest amounts of heterosis typically are exhibited by crosses of genotypes derived from distinctly different germplasm pools.

Soybean breeding in the U.S. has been based upon a few original accessions from the Orient. Many accessions were examined during the initial introduction period, but eventual commercial success derived from only about a dozen cultivars of similar phenotype, obtained largely from a small area of northeastern China. These original selections have been sequentially hybridized and reselected to give rise to successive generations of improved new pureline cultivars [7].

In the U.S., two more or less separate soybean germplasm pools have arisen. Cultivars in one pool (northern) have indeterminate plant habit with flowering adapted to the relatively long day lengths of the U.S. corn belt. Cultivars in the other pool (southern) have determinate plant habit with flowering adapted to the shorter days of the U.S. midsouthern, southeastern, and Mississippi delta regions.

Although basic sources of germplasm for all U.S. soybean breeding are narrowly derived, breeders from time to time have introduced germplasm from exotic cultivars, using the exotics as essential sources of new genes for disease and nematode resistance. Backcross techniques have been used, however, to

eliminate, as much as possible, all exotic genes except those with desired resistance or tolerance traits.

On the other hand, during the past 10 years a cooperative university/industry program systematically has explored previously untested exotic soybean cultivars for the presence of desirable agronomic traits, especially yield. Selected exotic cultivars then have been introgressed into elite U.S. stocks [C. Jennings, pers. comm.]. The aim is to introduce maximum amounts of exotic germplasm while maintaining sufficient proportions of elite germplasm to provide agronomic suitability of the new breeding stocks.

Additionally, soybean breeders now are hybridizing determinate with indeterminate U.S. soybean lines, and are selecting new cultivars adapted either to the north or the south, with useful traits from the opposing gene pool.

Sunflower now is grown commercially as first-generation hybrids in most parts of the world. This crop in the U.S., although derived from a species native to North America and with a wealth of available genetic variability in its wild relatives, nevertheless has been dependent upon a relatively narrow germplasm base. The crop was greatly improved agronomically in the area that is now the Soviet Union. A few cultivars from that country were the basis for development of a small number of inbred lines that were used in the first successful U.S. hybrids, in the 1970s and early 1980s. A very few hybrid combinations, often involving closely related sister lines, were used at first to plant most U.S. hybrid acreage. (Also, as with sorghum, all hybrids have been developed with a single source of male sterility-inducing cytoplasm.) Now, however, breeders are introgressing selections from related species into elite germplasm stocks. Such introgression will bring in needed new sources of disease and insect tolerance, useful additions to hybrid vigor, and potentially useful new forms of cytoplasmic male sterility. It is likely that results of this introgressive breeding will expand the useful genetic base of sunflower hybrids grown in the U.S. and in the rest of the world as well [T Heaton, pers. comm.;8].

Hybrid grain sorghum has gone through a similar narrowing and broadening cycle. The first hybrid, of a commercial Milo cultivar and a commercial Kafir cultivar, dominated the U.S. sorghum belt in the early years (the early 1960s). For many years thereafter, the sorghum germplasm base remained remarkably narrow; hybrid parents were hardly more than variations on the original two parents. But in recent years, purposeful introgression with tropical-adapted germplasm of several races of sorghum has given rise to productive, adapted, but genetically different hybrids with new levels of yield stability as well as greatly broadened tolerance to diseases and insects. Successful development of the tropical-introgressed lines owes much to pioneering genetic studies of the 1950s that clarified the genetics of flowering date and plant height in sorghum [9]. Such knowledge has made it relatively easy to transform (via backcrossing techniques) tall, late-flowering tropical cultivars

into short, early-flowering types without much change in their other traits. The converted cultivars then can be evaluated in temperate regions of the U.S. without distortion caused by excessively late flowering and very tall stature; the best of the conversions are used as parents for introgression into adapted elite germplasm.

Wheats provide another example of the enhancing powers of exotic germplasm and the inter-related nature of breeding programs worldwide. The semi-dwarf wheats, famous as one of the two crops involved in the Green Revolution, attracted worldwide notice when CIMMYT semi-dwarf wheats, developed in Mexico with funding from the Rockefeller Foundation, transformed the food production capacities of India and Pakistan. The CIMMYT wheats were bred from crosses involving U.S. selections out of hybrids between U.S. standard-height cultivars and Japanese semi-dwarfs. The Japanese wheats, in turn, traced back to Korean and 19th-century U.S. cultivars of quite different lineage and adaptation [10].

The importance, therefore, of sources of genetic diversity and wide ranging germplasm exchange in the development of new cultivars is evident. Genetic diversity not only promotes stability of production by helping growers to avoid epidemic catastrophe, but it also is essential for genetic improvements in cultivar performance, including yield. These two topics, 1) genetic diversity for promotion of stable production and 2) genetic diversity for promotion of increased yields, merit further discussion.

Genetic Diversity, Production Stability, and Yield

Stability of production is desired by all producers of crop plants; even those with maximum yield as their primary goal must achieve such yields on a regular basis, for their high costs of production will force them out of business if crops fail or yields are abnormally low too frequently.

As noted previously, the early agriculturalists and the peasant farmers of today have depended on in-field or between-field genetic diversity to provide a significant portion of needed production stability. The underlying principle is that at least some genotypes will withstand or escape each year's crop of disease, insect, and weather-stress problems.

But modern breeding, intended to provide cultivars for intensive farming in industrial countries, tends increasingly to work on the principle that all possible genetic sources of tolerance and resistance are built into one or a small number of high performance genotypes. Pyramiding of genes for rust resistance in individual wheat cultivars is one example of this principle in action. Individual maize hybrids with bred-in ability to produce the best possible yields with either insufficient or maximal amounts of soil nitrogen are another example. (Modern maize hybrids commonly are of this broadly-adapted dual purpose type, although knowledge is not widespread

that they have this capability.) Sorghum hybrids likewise now combine resistance to heat and drought with the ability to make high grain yields where water is plentiful.

Individual modern cultivars thus are more stable in performance than were their landrace forebears - if one defines stability as ability to avoid disastrous yield failures combined with ability to make very high yields when environments are maximally favorable. One also can define stability as ability to avoid disastrous yield failures combined with lack of ability to make very high yields in favorable environments. In some societies, this second kind of stability has been sufficient and even desirable, but such a goal now is unsatisfactory to agriculturalists in most parts of the world because of an increase in crop production for cash (or for subsistence plus cash) instead of for subsistence alone.

The key to bred-in stability (of the first type) is incorporation of large amounts of ancestral genetic diversity, carefully chosen and sequentially bred into increasingly stable high-yield cultivars that are tested repeatedly - proven to be reliable - across a wide range of environments.

A peculiar notion that is now widespread is that modern cultivars are less stable than their ancestors. This belief seems to be based on the logic that because high value inputs such as commercial fertilizers and pesticides are used on modern cultivars, the old cultivars, obviously sufficiently productive and successful before such inputs were used, must have been tougher than today's "pampered" cultivars. Additionally, disease or insect epidemics or broad-scale adverse reactions to weather stresses are sometimes cited as proof of the increased delicacy of modern cultivars.

The facts do not bear out either conclusion, however. Epidemic- or weather-based famines were common in ancient agriculture. The early Romans sacrificed a red dog to the grain god, Robigus, hoping that he then would hold back the red rust, an ever-present danger to their life-supporting wheat crop.

Usually lacking are side-by-side comparisons of new cultivars with old ones, under identical growing conditions. When such side-by-side comparisons are made, it is seen that new cultivars are much more stable and much more stress tolerant, than were their fondly remembered predecessors [11]. This is because modern high input agriculture, monocultural in nature, introduces greater danger of certain kinds of biological stress than did the older, low input types of agronomic practice; modern agriculture requires use of cultivars with high levels of stress resistance. The new cultivars, therefore, are bred to stand up to the rigors of modern high input/high output agriculture. Old cultivars, when subjected to modern high input stresses, actually are much more tender than the new ones, showing stress symptoms such as excessive lodging, heat-induced grain abortion, and susceptibility to disease and/or insect damage. And even under the old style of farming, with its less stressful growing conditions (thinner sowing rates, less

excessive use of nitrogen, use of polycultures), the old cultivars still are less productive than the new ones in most comparisons. Under the old style, however, the disadvantages of old cultivars typically are considerably less than when comparisons are made in which old cultivars are grown under modern cultural practices.

It should be clear from this discussion that breeding for stable production and breeding for improvement in yielding ability are in many respects the same process, and that steady progress in such breeding depends on a continuing supply of genetically diverse parents, adequately characterized for desirable traits of agronomic importance. Biotic diversity and its preservation and characterization are vital to the economic health of plant-based agriculture.

Needed sources of new germplasm traditionally have included primitive landraces (or wild relatives) and also elite cultivars, as noted earlier. New techniques involving in vitro DNA manipulation have extended potentially useful sources of germplasm to include not only plants of all degrees of relationship but also bacteria and animals. A Bacillus thuringiensis toxin, virulent to lepidopterous insects, is now produced by transgenic tobacco and tomato plants; an anti-microbial polypeptide produced by frog skin might, in theory, be produced in plants containing the frog genetic system responsible for production of the anti-microbial product. Biotechnology - the all-inclusive term for the new technologies centered around in vitro DNA manipulation - is giving new perspective to plant breeding and genetic diversity. It gives new perspective to the ownership of plant germplasm and its relationship to genetic diversity as well.

Genetic Diversity and Ownership of Plant Germplasm

The concept of ownership of plant products is as old as trade in seeds or in clonally reproduced plants such as tulips, fruit trees or, roses. Certain native American cultures were developed with a concept of seed stock ownership. Increasingly precise definitions of ownership of proprietary plant materials have been devised in the industrial countries, especially during approximately the past 50 years.

In the U.S., starting with plant patents on clonally reproduced materials in 1930, then with the specially crafted Plant Variety Protection Act of 1970, and most recently with the 1980 Chakrabarty decision, proprietary rights to whole organisms increasingly and undirectionally have been enlarged and strengthened. Even more recently, the 1985 ex parte Hibberd et al. ruling by the U.S. Patent Office Board of Patent Appeals and Interferences sanctioned use of utility patents to protect ownership of appropriately derived plant parts and processes, self-reproducing cultivars, and hybrids. Products of biotechnology were the basis of the application on which this ruling was made.

Although court cases may bring about refinement or even reversal of some of the most recent decisions or rulings, it seems probable that in the U.S. and other industrial nations, the scope and effectiveness of intellectual property protection applied to plant germplasm will increase and will bring about changes in the ways in which germplasm is exchanged for breeding purposes. Since the subject of intellectual property protection applied to plant breeding is covered in another paper in this symposium, we do not need to treat it in depth, but we do need to comment on one aspect: the prospect that utility patents can prevent unauthorized individuals or organizations from freely using patented, released commercial cultivars as germplasm resources for breeding new lines during the life of the patent. This protection, afforded in the U.S. by utility patents as affirmed by the ex parte Hibberd decision, differs from that given by the U.S. Plant Variety Protection Act, which stipulates that protected items may be used for breeding once they are released.

We have noted several times herein that elite cultivars are a prime source of useful genetic variation. If breeders can no longer use such cultivars at will, must genetic progress in plant breeding come to a standstill?

We think not, for the following reasons. The example of maize breeding - specifically, development of inbred lines - in the U.S. will illustrate what probably can happen if the utility patent is widely used.

Private seed companies, each with their own proprietary maize inbred lines (lines maintained as trade secrets and therefore not legally available to others), have made considerable progress in maize breeding over the past 50 years. Each of the major companies has developed its own in-house breeding pools, divergent from those of the others. They have based their breeding, in part, on different open-pollinated maize varieties and different key inbred progenitor families. Amounts and breadth of useful genetic diversity, therefore, have been increased overall.

But the seed companies have not been completely dependent on their own in-house gene pools. The universities and the USDA also have developed elite maize inbreds and/or germplasm lines and released them to the public. Public and private breeders alike have met at this common well of useful germplasm, introgressing its products into their divergent private pools, invigorating and broadening them.

Additionally, smaller companies without the means to maintain full-sized breeding operations have shared proprietary germplasm in several ways, usually though contract arrangements with foundation seed companies. This method also has increased genetic diversity in maize hybrids deployed on the farm, throughout the U.S.

It seems likely that if large scale use of utility patents should restrict unauthorized use for breeding of released

patented cultivars of self-pollinated crops such as wheat and soybeans, strategies like those used in U.S. maize breeding might be developed for such self-pollinated crops, as follows:

1) Public opinion would encourage continued release of open-licensed products of public breeding, either as finished cultivars or as elite breeding germplasm selected for specific attributes.

2) Numerous privately developed cultivars still would be protected solely with plant variety protection as the only method applicable to them. They would be freely available, upon release, for use as breeding germplasm.

3) Because some future cultivars also would merit and need the added protection of utility patents, companies additionally would create their own distinctive proprietary germplasm pools, thereby creating several divergent, new germplasm pools, in place of a single relatively narrow panmictic pool (per class or region) for each crop.

4) Smaller companies would cooperate in various ways to create additional proprietary pools useful for them.

5) From time to time, cross-licensing arrangements - structured, legal exchange of patented germplasm stocks - would be devised among owners of the various germplasm pools, allowing infusions of divergent, elite germplasm to reinvigorate the isolated germplasm pools. (Some evolutionists point to genetic isolation of populations, followed by limited hybridization, as likely to initiate far-reaching kinds of evolutionary change. Maybe this method is also good for progress in plant breeding!)

6) Other licensing arrangements would be arranged to allow non-patent holders legally to use patented materials for breeding new lines.

The twin needs, for germplasm diversity and germplasm exchange, thus would force constructive accommodations to be made in the new game (new to plant breeders) of utility patents for intellectual property protection, a game which allows privately funded plant breeding research to be compensated through sale of proprietary products and processes but which also allows--in fact, is intended to encourage--continued progress in research and development.

Another concern about intellectual property protection for plants, plant parts, and plant processes is the effect such protection would have if it were to become generally available in third-world countries.

To date, little or no protection of any sort is available in developing countries. For this reason, commercial breeding and seed sales in these countries generally is restricted to the self-protecting hybrid crops such as maize, sorghum, and sunflower. (The inbred parental lines of hybrid crops

physically can be protected, giving trade secret protection to hybrids made from those proprietary parents.)

Some individuals and organizations believe that plant variety protection and/or utility patent protection for cultivars in developing countries would be harmful to agriculture in those countries since it would attract monopolistically inclined international seed firms interested only in profits [12,13]. Others say, on the contrary, that to attract private capital to breeding and sale of seeds in developing countries actually would increase the amounts of useful genetic diversity deployed on the farm in those countries, to the advantage of their agriculture and thus to their total economy [14].

To further complicate the matter, some of those who dislike intellectual property protection for modern cultivars nevertheless espouse some sort of ownership and control of indigenous landraces by those developing countries having such materials, with the goal of charging something akin to a royalty to those who use them for breeding [15]. Workable methods of control and of assessing charges have not yet been devised; indeed, to do so rationally and equitably seems to be a very difficult task. For example, how does one settle on the ultimate originator country of Asian or African landraces of maize that certainly came originally from multiple locations in the Caribbean or the U.S., and before that from what is now Mexico?

Regardless of the eventual outcome of these conflicting ideas about germplasm ownership in the developing countries, it does seem that if the developing countries are to join the industrial nations as equals in use of genetic diversity, they will need to do so within the general framework of current concepts and laws regarding intellectual property protection.

The challenge for plant scientists who are interested, as they must be, in the economics of agriculture is to learn how to operate with maximal effectiveness as scientists in a world economy increasingly interrelated and therefore increasingly governed by laws and regulations relating to property matters, a world increasingly concerned with matters of justice and social well being and increasingly concerned, as well, with the ecological health of the planet. Proper balance perhaps can be reached in these matters if they are kept in perspective, that is, if the principle of constructively striving towards common final goals is followed and if, above all, one realizes that the struggle to accommodate is never-ending because change begets change: time goes only forward.

Genetic Diversity and Farmer Preference

We have referred to the trend toward the use of a small number of cultivars, each with broadly based genetic protection against pest damage and environmental stress. This trend seems to run counter to the often expressed belief that genetic

uniformity brings on danger of genetic vulnerability, danger of epidemics or environmentally induced crop failure. The 1970 southern corn leaf blight epidemic is cited repeatedly as an example of the danger of genetic uniformity [16]. Most U.S. maize hybrids in 1970 had one cytoplasm--T--that proved to have genetic susceptibility to a previously unidentified race--race T--of southern corn leaf blight. The logical inference then is made that to grow heterogeneous cultivars, or to grow many genetically different cultivars of any given crop, is the best or even the only way to ensure safety from disastrous yield loss resulting from epidemics or weather stress.

Yet U.S. farmers, and those of industrial countries in general, persistently plant most of their acreage to only a few of the scores or hundreds of cultivars of wheat, soybeans, maize, and sorghum that are available. Nor have they demanded more highly heterogeneous cultivars. In fact, individual U.S. maize hybrids are more uniform today than they were in 1970. In 1970, most maize hybrids were double-cross (four parents); today they are single-cross (two parents).

Some critics have said that U.S. farmers are forced by monopolistic, commercial seed firms to accept small numbers of highly uniform cultivars. But until recently, wheat and soybean cultivars were bred only by state and federal institutions. Yet farmers, even in earlier times, concentrated on the few cultivars they believed to be most productive for them. The number of soybean and wheat cultivars now in use on the farm actually has increased over the past 15 years as a result of increased activity in commercial soybean and wheat breeding following passage of the 1970 Plant Variety Protection Act [17].

And the swing from double-cross to single-cross maize hybrids was initiated by the desires of farmers and led by entrepreneuring small seed companies. The large companies introduced single-cross hybrids to meet competition from energetic small firms, which had discovered that farmers were willing to pay more for seed of high yielding single-cross hybrids. Commercial single cross hybrids yielded about 10% more than the double-cross hybrids they replaced.

The empirical facts, as compared to the theories about genetic diversity and protection from disaster are that: a) the genetics of a cultivar, not its degree of uniformity, is the major determinant of its ability to withstand pest attack or environmental stress; b) uniform genotypes (either self pollinated or first-generation hybrid cultivars) can contain a broad array of genetic protective mechanisms and thus internally can be genetically diverse (buffered); c) plant breeders continually can add internal genetic diversity (additional protective systems) to successive new cultivars; and d) rapid turnover of cultivars (replacement by new cultivars of different genotype) helps prevent build-up of pests able to attack a specific, widely grown, uniform cultivar. Even the best protected cultivars cannot last forever. "Genetic diversity in time" thus is afforded to today's farmers at reasonably efficient levels.

One should note that cultivars can be replaced rapidly with improved ones only when breeders have sufficient numbers of superior new cultivars and numerous elite pools of breeding materials under development, that is, when breeders have sufficient "genetic diversity in reserve". Thus, genetic diversity in time requires genetic diversity in reserve, to properly support modern plant breeding.

Farmers who have chosen individually those cultivars that best satisfied their needs have affirmed collectively these statements of empirical fact. It is true that farmers have based their annual decisions on short-term experiences, but for 50 or 60 years, in the industrial nations at any rate, their collective decisions seem to have proven wise since few really broad-scale epidemics have occurred.

Even in 1970, the year of the southern corn leaf blight epidemic, U.S. maize yields were reduced by not more than 15% from trend. Some researchers think that poor maize-growing weather in 1970 actually was responsible for half of the loss; thus southern corn leaf blight race T may have reduced yield by only about 7%. In 1971, the problem was largely corrected by widespread substitution of hybrids with normal (non-T) cytoplasm. By 1972, all U.S. maize had normal (or at least non-T) cytoplasm [18].

Genetic diversity in time, combined with genetic diversity within genomes (or within zygotes), seems to be working reasonably well in the industrial countries, most of which lie in temperate zones. But solutions for avoiding catastrophic yield loss in temperate zones in industrial countries will not necessarily work in the tropical and subtropical environments in which most developing countries are located. In the lower latitudes, a combination of continuous plantings, no wintertime break in pest reproduction, and limited access to chemical pest controls increases the possibility of pest epidemics. These factors also increase the possibility that any very widely grown cultivar, even if fortified with genes for multiple pest resistance, soon will be overcome by a new disease or insect biotype for which it has no genetic defense.

The Green Revolution nevertheless has turned third-world crop agriculture firmly toward the industrial nations' practice of growing a very small number of cultivars on most of the production acres [10,19]. For example, in 1984 Indonesia planted 66% of its rice land to two cultivars. And in 1984 Bangladesh planted 70% of its wheat lands to one cultivar.

If turnover of widely used cultivars were significant and rapid in the third-world countries, one might be satisfied that "genetic diversity in time" could contain the potential problem. But it appears that the international agricultural research centers (the original sources of early high yield cultivars) cannot by themselves supply the needs of all countries. The developing countries traditionally have only rarely turned out significant numbers of elite replacement cultivars, annually. More investment in breeding and more rapid production of "good"

new cultivars is needed in the developing countries to maintain a steady and rapid flow of elite new cultivars of those crops most important to the developing countries [20]. Until that happens, there may not be enough "genetic diversity in time" to control or mitigate problems from cultivar-specific disease and/or insect pests in those regions.

Concluding Remarks

The greatest need in the use of plant germplasm today is for its preservation: for development and maintenance of worldwide standards of germplasm storage, management, and use, including introgression of exotic germplasm into existing cultivars. Current disputes about location and ownership of plant germplasm collections tend to distract attention from the very poor state of most of those collections. Many of them are losing viability, are uncataloged in any useful sense, and largely are unavailable to qualified workers [21]. These problems usually arise not for political reasons but rather because of a simple lack of funds.

Knowledge of the practical utility of germplasm in the collections--identification of useful traits in individual cultivars--also is nonexistent in most instances, in part because of a lack of funding but also because of a lack of agreement or knowledge among breeders about what really should be known and recorded.

Finally, and most importantly, we plant breeders have done virtually nothing to develop efficient and effective ways of introgressing large blocks of exotic germplasm into elite adapted breeding pools. We have a world of work in store: work to fund and work to do.

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The World Conservation Union

Le Président
The President

MSS/sd/1

Dr Dalmo Giocometti
EMPRAPA/CENARGEN
Central Nacional de Recursos Geneticos
S.A.I.N. Parque Rural
Cx. Postal 10, 2372
70 770 Brasilia
Brazil

14.5.1989

Dear Dr Giocometti,

You will have been informed by Dr Michael Lesnick that at the invitation of Professor Vladimir I. Krivchenko, Director of the N.I. Vavilov Institute of Plant Industry, Leningrad, our meetings in the USSR will be held from 7-16 August 1989. During these meetings, I hope we can find time to discuss the following:

1. Draft articles prepared by IUCN for inclusion in a proposed Convention on the Conservation of Biological Diversity (paper enclosed).

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3. Follow-up of the progress made at the FAO Commission's meeting on giving meaning and content to the concept of Farmers Rights (paper enclosed).

Looking forward to meeting you and with warm regards,

Yours sincerely,

M.S. Swaminathan

cc: Dr Michael Lesnick

Encl.

Réponse à:/Reply to:
11 Rathna Nagar, Teynampet, Madras 600018, India
Tel. (44) 455339 Telex: 4121077 annu in

IUCN Headquarters:
Avenue du Mont-Blanc, CH-1196 Gland, Suisse/Switzerland
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Le Président
The President

MSS/sd/1

Dr Jaap Hardon
Director
Center for Genetic Resources
P.O. Box 224
6700 AE Wageningen
The Netherlands

14.6.1989

Dear Dr Hardon,

You will have been informed by Dr Michael Lesnick that at the invitation of Professor Vladimir I. Krivchenko, Director of the N.I. Vavilov Institute of Plant Industry, Leningrad, our meetings in the USSR will be held from 7-16 August 1989. During these meetings, I hope we can find time to discuss the following:

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The President

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.

Dr Ebbe Kjellqvist
Director
Nordic Gene Bank
P.O. Box 41
Smedjegatan #2
23053 Alnarp
Sweden

14.6.1989

Dear Dr Kjellqvist,

You will have been informed by Dr Michael Lesnick that at the invitation of Professor Vladimir I. Krivchenko, Director of the N.I. Vavilov Institute of Plant Industry, Leningrad, our meetings in the USSR will be held from 7-16 August 1989. During these meetings, I hope we can find time to discuss the following:

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The President

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Mr Pat Mooney
Rural Advancement Fund International
RR1 (Beresford)
Brandon, Manitoba
Canada R715Y1

14.6.1989

Dear Mr Mooney,

You will have been informed by Dr Michael Lesnick that at the invitation of Professor Vladimir I. Krivchenko, Director of the N.I. Vavilov Institute of Plant Industry, Leningrad, our meetings in the USSR will be held from 7-16 August 1989. During these meetings, I hope we can find time to discuss the following:

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Yours sincerely,

M.S. Swaminathan

cc: Dr Michael Lesnick

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The President

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Dr John A. Pino
National Research Council
Board on Agriculture
2101 Constitution Avenue, N.W.
Washington D.C. 20418
USA

14.6.1989

Dear Dr Pino,

You will have been informed by Dr Michael Lesnick that at the invitation of Professor Vladimir I. Krivchenko, Director of the N.I. Vavilov Institute of Plant Industry, Leningrad, our meetings in the USSR will be held from 7-16 August 1989. During these meetings, I hope we can find time to discuss the following:

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cc: Dr Michael Lesnick

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Dr Donald N. Duvick
Senior Vice-President, Research
Pioneer Hi-Bred International, Inc.
700 Capital Square, 400 Locust Street
Des Moines, Iowa 50309
USA

14.6.1989

Dear Dr Duvick,

You will have been informed by Dr Michael Lesnick that at the invitation of Professor Vladimir I. Krivchenko, Director of the N.I. Vavilov Institute of Plant Industry, Leningrad, our meetings in the USSR will be held from 7-16 August 1989. During these meetings, I hope we can find time to discuss the following:

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M.S. Swaminathan

cc: Dr Michael Lesnick

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Le Président
The President

MSS/sd/1

Dr Melaku Worede
Director
Plant Genetic Resources Center
P.O. Box 30726
Addis Ababa
Ethiopia

14.6.1989

Dear Dr Worede,

You will have been informed by Dr Michael Lesnick that at the invitation of Professor Vladimir I. Krivchenko, Director of the N.I. Vavilov Institute of Plant Industry, Leningrad, our meetings in the USSR will be held from 7-16 August 1989. During these meetings, I hope we can find time to discuss the following:

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M.S. Swaminathan

cc: Dr Michael Lesnick

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Dr Setijati Sastrapradja
DIRBIONAS
Centre for Research in Biotechnology
Jalan Raya Juanda 18
Bogor 16122
Indonesia

14.6.1989

Dear Dr Sastrapradja,

You will have been informed by Dr Michael Lesnick that at the invitation of Professor Vladimir I. Krivchenko, Director of the N.I. Vavilov Institute of Plant Industry, Leningrad, our meetings in the USSR will be held from 7-16 August 1989. During these meetings, I hope we can find time to discuss the following:

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Looking forward to meeting you and with warm regards,

Yours sincerely,

M.S. Swaminathan

cc: Dr Michael Lesnick

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April 21, 1989

Dr. Michael T. Lesnick
Vice President
The Keystone Centre
Box : 606
Keystone
Colorado 80435, USA

Dear

I thank you very much for your letter of March 31st and for the enclosures. I shall shortly send the reports to a number of persons. Right now I am busy with the arrangements of my shifting to Madras. My wife and I will take residence in Madras from May 8th. Hereafter, you can send your letters to the address given in this letter.

I plan to visit New York from June 27-30, 1989 to attend a meeting of the Trustees of the Ford Foundation, in case you will be in a position to come to New York at that time we can review the situation. I wish you a very profitable visit to Europe early in June.

With warm regards,

Yours sincerely,

(M.S. Swaminathan)

March 31, 1989

Dr. M.S. Swaminathan
President, International Union
for the Conservation of
Nature and Natural Resources
B/4/142 SAFDARJANG ENCLAVE
New Delhi 110029
India

Dear M.S.:

Greetings from the Colorado Rockies!

At long last the reports have come back in satisfactory condition from the printers. I am very sorry for the delay. We typically do not have this kind of delay since we generate so many reports.

Enclosed are 10 reports and under separate cover I will be sending 50 reports. I have also enclosed letterhead for the Dialogue and a draft letter that might accompany the report. (Per your request.)

We are very excited about the continuation of the Dialogue. It continues to receive attention. I was very pleased that the Minister of Lands and Agriculture in Zimbabwe announced the creation of a national committee as recommended in the report and that the ministers and deputies recommended that a regional committee on genetic resources be created at the annual SADCE Ministers Conference.

I assume you have received Krivchenko's communication by now. However, I enclosed a copy just in case. We have approached several small foundations with no success thus far to support the USSR trip. We have included that component of the project in the overall

proposal to the Tinker Foundation and the Alton Jones Foundation. Dr. Olembo, Deputy Assistant Executive Director of UNEP met Bob Craig, our president, in Washington, D. C. recently, and indicated that UNEP had excess rubles they would like to spend and were very interested in supporting the exchange visit. Bob has written and requested assistance (see attached) in hope that they will act favorably.

I recently sent personal letters to the Ford and Rockefeller Foundations and Rockefeller Brothers Fund (see attached) in preparation for the full proposals. They had all indicated that their support is contingent upon two things: your participation and adequate documentation (i.e. letters; articles) of some impact of the dialogue and report. On the first matter, I think that a letter of support from you to the individuals on the attached list would be of enormous help. On the second matter, we have only received a few letters from participants although many have recently promised correspondence. We have attempted to make the best of what is available. I think a letter from you outlining individuals/organizations you might have briefed on the Dialogue/Report; indication of conferences/meetings where the Dialogue/Report have been discussed; and any other useful, tangible documentation you think relevant would make quite a difference.

Based upon the response to the letters to Ford, Rockefeller and Rockefeller Brothers Fund we will follow-up with tailored proposals. Naturally, those supporting the first plenary (e.g. agencies, foundations, corporations) will be approached to assist in supporting the meeting in India. We will also be approaching new sources as well (e.g. [see Phy.] foundation; corporate support and USAID). I will keep you abreast of these efforts as they develop. Frankly, the biggest hold-up in proceeding sooner has been inadequate/insufficient documentation (i.e., letters from participants). The foundation people feel that their boards do not fully understand the consensus process and the informal as well as formal impacts of such an effort.

The Keystone Center is very committed to this effort. We have expended over $25,000 of The Center's resources to the Dialogue in 1988 alone. Our top priority is to make sure we have sufficient funding for the next plenary in India. Our second priority is to secure adequate funding for the USSR trip. There will be eleven participating. As you will see in Krivchenko's letter, he has promised to cover the costs of the participants. Jaap Hardon and Don Duvick have indicated that their organizations will cover their costs. Krivchenko estimates that the expenses will average $1,000 rubles per day per participant

over the proposed twelve day itinerary. (Approximately $3,600 per participant.) If you have further suggestions regarding the trip or possible funding sources for the Dialogue, please let me know.

Now that all the business is out of the way, I hope you are being successful in setting up your research institute. We are all pleased you will be able to participate in the Food and Nutrition In The 21st Century meeting. As you know, it is not a typical Keystone consensus dialogue, but can have a real impact given the participants.

I am sure you have been very busy. I hope you will keep us informed about your schedule, and possible visits to the U.S. We are in Washington, D.C. once each week. I will be in Europe (Switzerland, West Germany and Denmark) from June 3-10 this summer on a hazardous waste project.

M.S., we are all very pleased with the Dialogue on Plant Genetic Resources and hope you are as well. There is great potential in the next session. Almost all of the participants have expressed real satisfaction with the report and a desire to see the effort proceed.

I hope this letter finds you and your family in good health and good spirits. I look forward to seeing you again.

With warmest regards,

Sincerely,

Michael T. Lesnick

Michael T. Lesnick, Ph.D.
Vice President

Dear

I am writing to make you aware of the first consensus report of The Keystone International Dialogue Series on Plant Genetic Resources. This report focuses on ex situ conservation of corporations, agencies, research institutions and non-governmental organizations. The Dialogue, which I chair, involves over forty representatives from developed and developing countries. The Series will continue through 1991.

The next plenary is scheduled for January 1990 in India. At that session participants will conclude their deliberations on ex situ conservation and begin discussing local participation in in situ conservation of global plant genetic resources. A third plenary will be held in 1991 in either Latin America or Africa and will conclude discussions on in situ issues.

The document has received considerable international attention and, I believe, contains several useful recommendations that will result in the conservation, use and exchange of global plant genetic resources.

The Dialogue Series is convened and facilitated by The Keystone Center, a fourteen year old neutral non-profit organization located in the Colorado Rocky Mountains in the United States. The Center is well recognized for its ability to bring together and mediate representatives of diverse interest groups on issues of policy conflict associated with science, technology, health and the environment. The Center, for example, is involved in mediating negotiations on the AIDS vaccine liability; climate change and energy policy; Food and Nutrition in the 21st Century; and hazardous waste management.

I hope you find the report useful and of interest. If you or your staff would like a personal briefing, The Keystone Center or I would be happy to coordinate such an effort.

Thank you for your interest in and support of global environmental issues and plant genetic resources in particular.

Sincerely,

sms\germ\27m9

March 21, 1989

Mr. Bill Moody
Rockefeller Brothers Fund
1290 Avenue of the Americas
Room 3450
New York, New York 10104

Dear Bill:

I spoke with you last summer about the start-up of the Keystone International Dialogue on Plant Genetic Resources chaired by M.S. Swaminathan. I am pleased to report to you that in August we held an exceptionally successful first session with over 40 participants from the U.S.S.R., Peoples Republic of China, Ethiopia, Brazil and 14 other countries. The Dialogue involved scientists, policy makers, academicians and representatives from non-governmental organizations. This initial session focused exclusively on ex situ conservation of plant genetic resources and resulted in a consensus report of the dialogue group with recommendations for action.

The Dialogue and the final report document from the first session have already begun to have an impact at the national, regional and international levels. I know, for example, that the Dialogue has had an impact on the re-examination of U.S. participation in the FAO Undertaking and the Commission for Plant Genetic Resources, largely because several members of the National Plant Genetic Resources Board as well as the chief staff person for the FAO Commission participated in the Dialogue and have been looking for ways to begin to accommodate mutual interests.

Also, at the national level, I was invited to brief a meeting of the SADCC Ministers and Deputy Ministers of Agriculture as well as Agricultural Research Station Directors in Harare, Zimbabwe in January 1989 on the results of the first Keystone meeting. While in Zimbabwe, I also conducted special private briefings for the USAID Director, American Ambassador, Minister of Lands and Agriculture, and Permanent Secretary of

that Ministry about the Dialogue. At that time, the Minister announced that Zimbabwe would be forming a national committee on genetic resources (as suggested in the Keystone document) and he urged his colleagues to pursue a regional committee (also as recommended in the Keystone document). The Ministers did pass a resolution at their session calling for the development of such a regional group and indicated it would be passed along for ratification to the SADCC Ministers' meeting in February.

I understand that the Keystone document will be one of the topics of discussion at the FAO Commission meeting in April 1989 and that Dr. Swaminathan has been briefing Ministers in other countries (e.g., India, USSR) as well as some of the directors of relevant U.N. agencies.

At the conclusion of the August session, Dialogue participants indicated they would like to meet at least two more times. They will be meeting again in January of 1990 in India to complete their recommendations on ex situ conservation and to begin discussion of local participation in in situ conservation of plant genetic resources. They have indicated they would like to meet a third time, either in Latin America or Africa, in 1991 to complete their discussions of and recommendations on in situ conservation.

As you will see in the list of participants located in the Report, Dr. V.I. Krivchenko, Director of the Vavilov Institute in the U.S.S.R., participated in the first Dialogue session. He was an especially active and enthusiastic participant in the meetings. While Dr. Krivchenko was here, he invited The Keystone Center to bring the Steering Committee and any other appropriate participants to the Vavilov Institute in the summer of 1989 to: 1) learn more about the Institute and its work; 2) involve key Soviet officials in discussions with the visiting group about plant genetic resources and biological diversity activities in the U.S.S.R. and worldwide; and, 3) involve Institute and other Soviet officials in discussions about future Dialogue activities.

As a result of the last Dialogue session, Keystone and the Steering Committee formed a larger working committee (see attached) that included the Steering Committee members and several other key Dialogue participants. The purpose of this group is to pursue some of the ideas presented in the first report in greater detail, developing background papers and discussing some of the implications of the issues raised. This would not be to develop consensus as much as to develop working

papers heading into the next full plenary in India so that the next session begins with momentum.

After several telephone conversations with Dr. Krivchenko, he has invited the full working committee to the Soviet Union to visit the Institute and other facilities and to engage in a series of discussions with Institute and U.S.S.R. leaders (see my letter to Krivchenko and his invitation letter).

I am writing at this time for two reasons. First, my top priority is to continue the Dialogue. The project is having a far greater impact than we had originally envisioned. The greatest costs involved are for transportation and food and lodging for many of the participants (especially the NGO's and participants from developing countries who could not otherwise afford to participate), and the printing and distribution costs of final reports. In the last dialogue we were not able to recover our direct costs for facilitation time, secretarial, and other administrative expenses. We estimate that Keystone has already committed over $25,000 to the Dialogue from its unrestricted funds. However, we are committed to this effort and, I think, have demonstrated so. My first priority, then, is to secure adequate funding for the next dialogue session in India and all of the associated costs. I would like to call you next week to discuss possible assistance from the Rockefeller Brothers Fund to help continue this effort.

Second, the opportunity presented by the invitation to the Vavilov Institute is one I would like to pursue very seriously. I believe it furthers the overall efforts of the Dialogue but, perhaps more important, it can result in a critical international exchange of ideas and information about plant genetic resources and biological diversity, and lead to greater bilateral and multilateral exchange with the U.S.S.R. Mr. Krivchenko indicated to me that we would be free to document any part of the trip we wish (e.g., articles, film).

I am looking for help to secure the approximately $30,000 necessary for the trip. Mr. Krivchenko, in the spirit of cooperation, has offered to cover the costs for two of those attending the meetings. I would very much like to talk to you about possibly assisting with the costs of the visit, or perhaps have your suggestions on who else might be interested in such an endeavor. I sincerely hope this unique international exchange might be of interest.

I have enclosed a copy of the report from the first four day session held at Keystone. We are particularly pleased that

all of the interest groups came away satisfied with the process and committed to its continuation. I will call in a few days to discuss the project with you and answer any questions you might have.

In the meantime, thank you for your consideration.

Sincerely,

Michael T. Lesnick, Ph.D.
Vice President

MTL:pm
Enclosures

March 21, 1989

Mr. Gary H. Toenniessen
Associate Director
Agricultural Sciences
The Rockefeller Foundation
1133 Avenue of the Americas
New York, New York 10036

Dear Gary:

I spoke with you last summer about the start-up of the Keystone International Dialogue on Plant Genetic Resources chaired by M.S. Swaminathan. I am pleased to report to you that in August we held an exceptionally successful first session with over 40 participants from the U.S.S.R., Peoples Republic of China, Ethiopia, Brazil and 14 other countries. The Dialogue involved scientists, policy makers, academicians and representatives from non-governmental organizations. This initial session focused exclusively on ex situ conservation of plant genetic resources and resulted in a consensus report of the dialogue group with recommendations for action.

The Dialogue and the final report document from the first session have already begun to have an impact at the national, regional and international levels. I know, for example, that the Dialogue has had an impact on the re-examination of U.S. participation in the FAO Undertaking and the Commission for Plant Genetic Resources, largely because several members of the National Plant Genetic Resources Board as well as the chief staff person for the FAO Commission participated in the Dialogue and have been looking for ways to begin to accommodate mutual interests.

Also, at the national level, I was invited to brief a meeting of the SADCC Ministers and Deputy Ministers of Agriculture as well as Agricultural Research Station Directors in Harare, Zimbabwe in January 1989 on the results of the first Keystone meeting. While in Zimbabwe, I also conducted special private briefings for the USAID Director, American Ambassador, Minister

of Lands and Agriculture, and Permanent Secretary of that Ministry about the Dialogue. At that time, the Minister announced that Zimbabwe would be forming a national committee on genetic resources (as suggested in the Keystone document) and he urged his colleagues to pursue a regional committee (also as recommended in the Keystone document). The Ministers did pass a resolution at their session calling for the development of such a regional group and indicated it would be passed along for ratification to the SADCC Ministers' meeting in February.

I understand that the Keystone document will be one of the topics of discussion at the FAO Commission meeting in April 1989 and that Dr. Swaminathan has been briefing Ministers in other countries (e.g., India, USSR) as well as some of the directors of relevant U.N. agencies.

At the conclusion of the August session, Dialogue participants indicated they would like to meet at least two more times. They will be meeting again in January of 1990 in India to complete their recommendations on ex situ conservation and to begin discussion of local participation in in situ conservation of plant genetic resources. They have indicated they would like to meet a third time, either in Latin America or Africa, in 1991 to complete their discussions of and recommendations on in situ conservation.

As you will see in the list of participants located in the Report, Dr. V.I. Krivchenko, Director of the Vavilov Institute in the U.S.S.R., participated in the first Dialogue session. He was an especially active and enthusiastic participant in the meetings. While Dr. Krivchenko was here, he invited The Keystone Center to bring the Steering Committee and any other appropriate participants to the Vavilov Institute in the summer of 1989 to: 1) learn more about the Institute and its work; 2) involve key Soviet officials in discussions with the visiting group about plant genetic resources and biological diversity activities in the U.S.S.R. and worldwide; and, 3) involve Institute and other Soviet officials in discussions about future Dialogue activities.

As a result of the last Dialogue session, Keystone and the Steering Committee formed a larger working committee (see attached) that included the Steering Committee members and several other key Dialogue participants. The purpose of this group is to pursue some of the ideas presented in the first report in greater detail, developing background papers and discussing some of the implications of the issues raised. This

would not be to develop consensus as much as to develop working papers heading into the next full plenary in India so that the next session begins with momentum.

After several telephone conversations with Dr. Krivchenko, he has invited the full working committee to the Soviet Union to visit the Institute and other facilities and to engage in a series of discussions with Institute and U.S.S.R. leaders (see my letter to Krivchenko and his invitation letter).

I am writing at this time for two reasons. First, my top priority is to continue the Dialogue. The project is having a far greater impact than we had originally envisioned. The greatest costs involved are for transportation and food and lodging for many of the participants (especially the NGO's and participants from developing countries who could not otherwise afford to participate), and the printing and distribution costs of final reports. In the last dialogue we were not able to recover our direct costs for facilitation time, secretarial, and other administrative expenses. We estimate that Keystone has already committed over $25,000 to the Dialogue from its unrestricted funds. However, we are committed to this effort and, I think, have demonstrated so. My first priority, then, is to secure adequate funding for the next dialogue session in India and all of the associated costs. I would like to call you next week to discuss possible assistance from The Rockefeller Foundation to help continue this effort.

Second, the opportunity presented by the invitation to the Vavilov Institute is one I would like to pursue very seriously. I believe it furthers the overall efforts of the Dialogue but, perhaps more important, it can result in a critical international exchange of ideas and information about plant genetic resources and biological diversity, and lead to greater bilateral and multilateral exchange with the U.S.S.R. Mr. Krivchenko indicated to me that we would be free to document any part of the trip we wish (e.g., articles, film).

I am looking for help to secure the approximately $30,000 necessary for the trip. Mr. Krivchenko, in the spirit of cooperation, has offered to cover the costs for two of those attending the meetings. I would very much like to talk to you about possibly assisting with the costs of the visit, or perhaps have your suggestions on who else might be interested in such an endeavor. I sincerely hope this unique international exchange might be of interest.

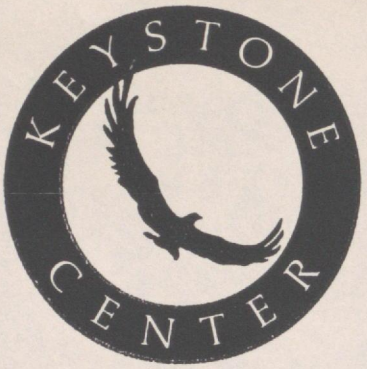
I have enclosed a copy of the report from the first four day session held at Keystone. We are particularly pleased that all of the interest groups came away satisfied with the process and committed to its continuation. I will call in a few days to discuss the project with you and answer any questions you might have.

In the meantime, thank you for your consideration.

Sincerely,

Michael T. Lesnick, Ph.D.
Vice President

MTL:pm
Enclosures



March 21, 1989

Mr. Norman W. Collins
Program Officer in Charge
Rural Poverty and Resources Program
The Ford Foundation
320 East 43rd Street
New York, New York 10017

Dear Norm:

I would like to thank you once again for your kind assistance in helping to make the first plenary session of the Keystone International Dialogue on Plant Genetic Resources possible. Funding from The Ford Foundation enabled several NGO representatives to participate in the August session here at Keystone. Now that the printing of the Final Report has been completed, I wanted to send you a copy and discuss next steps of the effort. As I indicated in our phone conversation over the Christmas holidays, I would like to follow up with you regarding our need for support in order to continue to Dialogue.

The Dialogue and the final report document from the first session have already begun to have an impact at the national, regional and international levels. I know, for example, that the Dialogue has had an impact on the re-examination of U.S. participation in the FAO Undertaking and the Commission for Plant Genetic Resources, largely because several members of the National Plant Genetic Resources Board as well as the chief staff person for the FAO Commission participated in the Dialogue and have been looking for ways to begin to accommodate mutual interests.

Also, at the national level, I was invited to brief a meeting of the SADCC Ministers and Deputy Ministers of Agriculture as well as Agricultural Research Station Directors in Harare, Zimbabwe in January 1989 on the results of the first Keystone meeting. While in Zimbabwe, I also conducted special private briefings for the USAID Director, American Ambassador, Minister of Lands and Agriculture, and Permanent Secretary of

that Ministry about the Dialogue. At that time, the Minister announced that Zimbabwe would be forming a national committee on genetic resources (as suggested in the Keystone document) and he urged his colleagues to pursue a regional committee (also as recommended in the Keystone document). The Ministers did pass a resolution at their session calling for the development of such a regional group and indicated it would be passed along for ratification to the SADCC Ministers' meeting in February.

I understand that the Keystone document will be one of the topics of discussion at the FAO Commission meeting in April 1989 and that Dr. Swaminathan has been briefing Ministers in other countries (e.g., India, USSR) as well as some of the directors of relevant U.N. agencies.

At the conclusion of the August session, Dialogue participants indicated they would like to meet at least two more times. They will be meeting again in January of 1990 in India to complete their recommendations on ex situ conservation and to begin discussion of local participation in in situ conservation of plant genetic resources. They have indicated they would like to meet a third time, either in Latin America or Africa, in 1991 to complete their discussions of and recommendations on in situ conservation.

As you will see in the list of participants located in the Report, Dr. V.I. Krivchenko, Director of the Vavilov Institute in the U.S.S.R., participated in the first Dialogue session. He was an especially active and enthusiastic participant in the meetings. While Dr. Krivchenko was here, he invited The Keystone Center to bring the Steering Committee and any other appropriate participants to the Vavilov Institute in the summer of 1989 to: 1) learn more about the Institute and its work; 2) involve key Soviet officials in discussions with the visiting group about plant genetic resources and biological diversity activities in the U.S.S.R. and worldwide; and, 3) involve Institute and other Soviet officials in discussions about future Dialogue activities.

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working papers heading into the next full plenary in India so that the next session begins with momentum.

After several telephone conversations with Dr. Krivchenko, he has invited the full working committee to the Soviet Union to visit the Institute and other facilities and to engage in a series of discussions with Institute and U.S.S.R. leaders (see my letter to Krivchenko and his invitation letter).

I am writing at this time for two reasons. First, my top priority is to continue the Dialogue. The project is having a far greater impact than we had originally envisioned. The greatest costs involved are for transportation and food and lodging for many of the participants (especially the NGO's and participants from developing countries who could not otherwise afford to participate), and the printing and distribution costs of final reports. In the last dialogue we were not able to recover our direct costs for facilitation time, secretarial, and other administrative expenses. We estimate that Keystone has already committed over $25,000 to the Dialogue from its unrestricted funds. However, we aré committed to this effort and, I think, have demonstrated so. My first priority, then, is to secure adequate funding for the next dialogue session in India and all of the associated costs. I would like to call you next week to discuss possible assistance from The Ford Foundation to help continue this effort.

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I am looking for help to secure the approximately $30,000 necessary for the trip. Mr. Krivchenko, in the spirit of cooperation, has offered to cover the costs for two of those attending the meetings. I would very much like to talk to you about possibly assisting with the costs of the visit, or perhaps have your suggestions on who else might be interested in such an endeavor. I sincerely hope this unique international exchange might be of interest.

I have enclosed a copy of the report from the first four day session held at Keystone. We are particularly pleased that all of the interest groups came away satisfied with the process and committed to its continuation. I will call in a few days to discuss the project with you and answer any questions you might have.

In the meantime, thank you for your consideration.

Sincerely,

Michael T. Lesnick, Ph.D.
Vice President

MTL:pm
Enclosures

ВСЕСОЮЗНЫЙ ИНСТИТУТ
РАСТЕНИЕВОДСТВА
им. Н. И. ВАВИЛОВА

190000, Ленинград, ул. Герцена, 44
СССР
Тел.: 314-48-48; 315-50-93

THE N. I. VAVILOV INSTITUTE
OF PLANT INDUSTRY

44, Herzen str., Leningrad, 190000
USSR
Tel.: 314-48-48; 315-50-93

№ 13/188 „20" February 1989 г.

Dr. Michael T.Lesnick
THE KEYSTONE CENTER
0166 Summit County Road 8
Argentine Building
Keystone, CO 80435
U.S.A.

Dear Dr. M.Lesnick,

Mr.S.Shuvalov has informed me about your phone call on February 14, 1989, and I would like to confirm our invitation to the group of the Dialogue participants. All our previous agreements remain valid.

Enclosed please find the official invitation to the group of approximately 11 people (in compliance with your letter of December 16, 1989). As we have promised, the Institute is ready to fund two participants. Two programs, for 7 and 12 days have been developed. These programs are subjects for the final approval either by correspondence or by telephone. We really want this meeting with the leading specialists from the Institute to be efficient and useful both for the members of the delegation and for us. In my opinion, it would be quite expidient, if our guests prepared short (for 15-20 minutes) reports on the situation in the sphere of PGR and on the activities at their national levels. The agenda for the discussion of the plenary session of the Dialogue in India can be thoroughly developed to meet your requests.

We have calculated the approximate cost of the stay in the USSR. It amounts to 1000 roubles per 12 days per 1 person (the prices are as follows: Hotel: 50 R (single room) or 35 R (double room) per night, Meals: approx. 15-20 R per day, Air tickets on the route Leningrad-Krasnodar-Tashkent-Leningrad: 150 R). Of course, we'll do our best to cut down the expenditures at the experiment stations, so the sum of 1000 roubles may appear to be substantially reduced.

Тип. ВИР. Зак. 1053. Тир. 1000. 16.10.86.

From our point of view, a visit for 12 days would suit the best our mutual interests, as it would provide a possibility to get acquainted in more detail with the Institute and its scientific activities, and to establish closer scientific relations between our organizations.

Please keep in touch with Mr.Sergey M.Alexanyan (Head, Foreign Relations) or with Mr.Shuvalov on all organizational questions. I would be grateful if you provided me with a complete list of the members of the delegation.

With best wishes and hoping to see you soon,

Vladimir I.Krivchenko
VIR Director.

CC: Prof. M.S.Swaminathan

ВСЕСОЮЗНЫЙ ИНСТИТУТ
РАСТЕНИЕВОДСТВА
им. Н. И. ВАВИЛОВА

190000, Ленинград, ул. Герцена, 44
СССР
Тел.: 314-48-48; 315-50-93

THE N. I. VAVILOV INSTITUTE
OF PLANT INDUSTRY

44, Herzen str., Leningrad, 190000
USSR
Tel.: 314-48-48; 315-50-93

№ 13/ „20" February 1989 г.

Dr. Michael T.Lesnick
THE KEYSTONE CENTER
0166 Summit County Road 8
Argentine Building
Keystone, CO 80435
U.S.A.

The N.I.Vavilov All-Union Research Institute of Plant Industry has the honour to invite the delegation of participants of the Keystone International Dialogue on Plant Genetic Resources to meet with the leading specialists of the Institute in July, 1989. The meeting provides for the discussion of international cooperation in the sphere of PGR, as well as of the plenary session of the Dialogue in India.

Prof. Vladimir I.Krivchenko,
VIR Director.

Тип. ВИР. Зак. 1053. Тир. 1000. 16.10.86.

DRAFT 7 DAY AND 12 DAY AGENDA .

July 16 Sunday	Arrival at Leningrad.
July 17 Monday	Visit at VIR, acquaintance with the history, structure and scientific activities of the Institute. Reports by leading specialists on aspects of research work at VIR. Visit to N.I.Vavilov museum. Visits to departments of the Institute.
July 18 Tuesday	Short reports by representatives of National Programs on PGR (15-20 min.) Discussion of problems of mutual interest for specialists on PGR.
July 19 Wednesday	Discussion of international cooperation on PGR. Discussion of the plenary session in India.
July 20 Thursday	Visit to VIR laboratories in the town of Pushkin (40 km S of Leningrad)
July 21 Friday	Summing up the results. Visit to the Komarov Botanical Institute (Botanical Gardens).
July 22 Saturday	Sightseeing tour.
July 23 Sunday	Departure from the USSR.

In case of a 12 day stay in the USSR the Leningrad stage from July 16 through 19 remains unchanged.

July 20 Thursday	Flight to Krasnodar.
July 21 Friday	Acquaintance with the Kuban Experiment Station of VIR.
July 22 Saturday	Flight to Tashkent
July 23 Sunday	Sightseeing tour
July 24-25 Monday, Tuesday	Acquaintance with the Tashkent Experiment Station (the Central Asia Branch of VIR).

DRAFT AGENDA (Continued)

July 26 Wednesday	Return flight to Leningrad
July 27 Thursday	Departure from the USSR.

March 21, 1989

Dr. Rueben Olembo
Deputy Assistant Executive Director
of United National Environment Programme
P.O. Box 30552
Nairobi, Kenya
Telex: 96322068
Fax: 011-2542-520711

Dear Dr. Olembo:

I was greatly honored and pleased to meet you in Washington, D.C. at the National Wildlife Federation Corporate Conservation Council. I enjoyed speaking with you and learning more about UNEP. It seems there are several areas where Keystone efforts and UNEP's interest overlap. I look forward to greater potential for collaboration between our organizations in the near future.

When we spoke in Washington, D.C., I briefly described the work of The Center and our International Dialogue on Plant Genetic Resources. I believe I indicated that a first plenary was held here in Keystone, Colorado, in August, 1988, which focused on ex situ conservation. A consensus report has been issued by the Dialogue and is now receiving substantial international attention. A second plenary is now planned for January 29 - February 1, 1990 in India to complete the discussions on ex situ and begin focusing on local participation in in situ conservation of plant genetic resources. A third plenary will be held in 1991, either in Africa or Latin America to conclude the in situ discussions.*

As I indicated in Washington, D.C., Dr. Krivchenko, Director of the Vavilov Institute in the U.S.S.R., participated very actively in the Dialogue and extended an invitation to Keystone to bring the Steering Committee and Working Committee to the Institute in July of 1989 to: 1) learn more about the Institute and its work, 2) involve key Soviet officials in

*We would, of course, hope that you would consider taking part in the Dehli meeting as well as the other prospective dialogue sessions to be held in 1991.

discussions with the visiting group about plant genetic resources and biological diversity activities in the U.S.S.R. and worldwide; and 3) involve Institute and other Soviet officials in discussions about future Dialogue activities.

You indicated in Washington that UNEP might, because of surplus rubles in the U.S.S.R. which can only be expended there, be interested in funding all or part of that trip. According to Dr Krivchenko, the estimated cost for the twelve day trip will be 1,000 rubles per person/day. That is 12,000 rubles per person for the trip. Do you still have an interest in this exchange? We currently plan on eleven individuals participating. As you will see from Krivchenko's letter to our office, he has committed to cover the cost of two individuals involved in the exchange (July 26 - August 6, 1989). So, we have a need for 12,000 rubles x 9 participants, or 118,000 rubles in total. Can I impose upon you to consider the possibility that UNEP might consider opportunities where UNEP might be able to help sponsor this effort?

I have enclosed a copy of the first consensus report, and copies of other Keystone reports *that might be of interest, as well as general information about The Center.

I look forward to talking with you further about the Plant Genetic Resources Dialogue as well as other areas of potential collaboration.

I hope we have an opportunity to meet again in the near future.

Sincerely,

Robert W. Craig
President

Note: I am faxing this letter and sending the enclosures air mail to you today. Our telex number is 403098; our fax number is (303) 262-0152. My telephone line is (303) 468-5822.

*In particular those dealing with the Keystone Biotechnology Forum.

das50m72

4121077 ANNU IN
EASYLINK 80907350001 4MAY89 18:24/18:25 EST
FROM: 403098 KEYSTONE UD
KEYSTONE CENTER THE
TO: 9534121077

TO: DR. M.S. SWAMINATHAN

FROM: MIKE LESNICK, THE KEYSTONE CENTER
TELEX: 403098 KEYSTONE UD
FAX: (303) 262-0152

DATE: MAY 4, 1989

August is better
Discussed on
the phone.
M.S. Swaminathan
11/5

THE TRIP TO USSR NOW LOOKS VERY SOLID. WILL BE FINALIZING ARRANGEMENTS WITH KRIVCHENKO NEXT WEEK. PLEASE HOLD JULY 16-20. ALSO, IF KRIVCHENKO NEEDS TO CHANGE DATES, ARE THE FIRST TWO WEEKS IN AUGUST AVAILABLE? PLEASE LET ME KNOW AS SOON AS POSSIBLE.

FUNDING WILL COME FROM UNEP, FORD AND ROCKEFELLER FOUNDATIONS. IT APPEARS UNEP WILL BE SUPPORTING YOUR COSTS FOR THE VISIT. I NEED A SHORT BIOGRAPHY FOR UNEP RIGHT AWAY. PLEASE FAX OR TELEX.

WE ARE SENDING YOU ADDITIONAL FINAL REPORTS. RECEIVED VERY POSITIVE REPORT ON THE IMPACT OF KEYSTONE REPORT AT FAO COMMISSION MEETING.

NEED TO TALK TO YOU SOON. WILL TELEPHONE IN THE NEXT SEVERAL DAYS.

REGARDS.

MMMM

WU+
4121077 ANNU IN

May 18, 1989

Dr. M.S. Swaminathan
Honorary Director
Centre for Research on Sustainable
Agricultural and Rural Development
11, Rathna Nagar
Teynampet
Madras 60018, INDIA

Dear M.S.:

On behalf of the Board of Trustees of The Keystone Center, I am pleased to invite you to membership on the Center's Board. If you are willing to serve, we would like to nominate and confirm you as a Trustee at our next Board meeting, on Saturday, June 17, 1989, at Keystone.

Needless to say, M.S., we would be honored to have you serve on the Board of The Keystone Center. Your views and wisdom would bring a new and eminent perspective to our membership. I think, too, that you would find your involvement in our work positive and rewarding. The Center's Board has become increasingly supportive and active and has added strength and fresh ideas to the Center's activities. They represent a fairly unusual cross-section of corporate, environmental, scientific, labor and public policy leaders. I would be personally most grateful if you would accept our invitation and become part of the Keystone family.

Another facet of the Center's work with which I would like to introduce you is the Keystone Science School, in which we teach field biology, geology, meteorology and ecology to children from the 6th grade through college level. It is a national effort for us and we have been very pleased with its impacts.

The terms of Keystone Center trustees are three years; trustees may serve two consecutive terms, after which a minimum one year absence from the Board is required.

Our Board meets in full session twice a year; the Executive Committee meets four times a year.

At your convenience, please call or drop a note to let me know your thoughts on Board membership. I shall hope to hear from you and perhaps see you in June.

Sincerely,

and warmest regards

Robert W. Craig
President

PAD:pm

2 June 1989

Dear

I thank you very much for your letter dated May 18 inviting me to join your Board.

It will certainly be an honour to join your distinguished Board. I have also the greatest admiration for the aims of the Keystone Center and for you personally. It is therefore with great regret I have to seek your apologies for not being able to accept your kind invitation.

I have joined the Board of the Ford Foundation this year and the Ford Board meets 4 times in an year. I am now busy setting up a small research centre and it would be very difficult for me to take up additional assignments which involve long travel at this time.

With warm personal regards,

Yours sincerely,

M.S. SWAMINATHAN

Mr. Robert W. Craig
President
The Keystone Center
Box 606, Keystone
COLORADO 80435

KEYSTONE INTERNATIONAL DIALOGUE SERIES ON
PLANT GENETIC RESOURCES

WORKING COMMITTEE MEMBERS

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Dr. Melaku Worede
Director
Plant Genetic Resources Center
P.O. Box 30726
Addis Ababa, Ethiopia
Telephone: 251 11 80381 (h)
444414 (w)
Telex: 21361 GTZ

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* Member of the International Steering Committee

May 26, 1989

Dr. M.S. Swaminathan
Honorary Director
Center for Research on Sustainable
Agricultural and Rural Development
11, Rathna Nagar
Teynampet
Madras 600018
India

Dear M.S.:

We have settled on the dates with Krivchenko, our visit will be from 6-16 August. We will need to be in Leningrad on Sunday, 6 August. I am currently finalizing the funding arrangements with Ford and Rockefeller Foundations and with UNEP. I have invited Olembo and am awaiting a reply.

Thank you for your letter and biography. I am looking forward to seeing you June 28 in New York at 8:30 a.m. I will also be staying at the U.N. Plaza the evening of the 27th and the evening of the 28th. How long can we meet? Shall I ask John Pino to fly up and join us?

Do you need additional Dialogue Final Reports? If so, we can mail reports and additional letterhead as needed. Also, what title and association would you like us to use for you in the coming year?

You might recall that the W. Alton Jones Foundation was the initiating and enabling funder for this Dialogue. We currently have a proposal into that Foundation (see attached) for $100,000 to support this second phase. The environmental program officer from the Jones Foundation called me this past Tuesday, 23 May; asked if he could meet with me Wednesday, 24 May at the Denver Airport on his way to California; and indicated it was important that we speak about the Dialogue and proposal.

This fellow, Dick Johnson, has been, and continues to be, very supportive of the effort. However, in my meeting with him yesterday, he indicated that he is concerned about the proposal at the next Board meeting (in mid-July). He said that his Board does not fully understand or appreciate either the importance of the issue or the role of the Dialogue. He indicated that they do not like to fund conferences, and he felt they might confuse the Dialogue with a typical conference. Mr. Johnson said that he has realized that the Dialogue has brought together many of the leading scientists, policy-makers and NGO's who have differed historically and has used an action orientation to achieve a consensus on many key issues. However, he believes that we need to more fully document any impacts of the effort to date (e.g., briefings, discussions/presentations at major meetings; effects on the FAO Commission; use of the recommendations by nations). I have some of that in hand. However, Johnson urged me quite strongly to pursue the following before July 1:

1. a letter from you to the Foundation urging their support and indicating the importance of the issues and Dialogue;

2. a letter from you to me outlining any activities you have pursued/observed regarding the impacts of the Dialogue;

3. a letter from Seti Sastrapradja to the Foundation urging its support and indicating the importance of the issues and Dialogue (Seti met many of the Jones Foundation Board on a recent visit to Indonesia); and

4. letters from Jaap Hardon and Pat Mooney to me reviewing the FAO Commission meeting and any relationship to the Dialogue.

I have communicated with Jaap, Pat and Seti asking for their assistance.

I know you are very, very busy. If you can draft a letter to the Foundation, the appropriate individual and address is:

R. Jeffrey Kelleher
Director
W. Alton Jones, Inc.
433 Park Street
Charlottesville, Virginia 22901
(804) 295-2134
Fax: (804) 295-1648

We continue to receive letters from around the world requesting copies of the Report or thanking us for their receipt of the Report.

M.S., it appears several of the recommendations from the first report have captured the attention of many individuals and organizations. We are currently in discussions with the majority and minority staff directors of the U.S. Congressional House Agriculture Committee about the Dialogue. They are interested in putting together a briefing by a few Dialogue members for key members of Congress on the issues. This is still something being worked on.

I sincerely hope you decide to join Keystone's Board of Trustees. As you know, the Center focuses on two areas: The Keystone Science School (which has provided environmental and science education to over 20,000 children and science teachers in its history) and the Science and Public Policy Program which manages conflicts at the local, national and international level in three major areas: natural resources; biotechnology and genetic resources; and environmental quality and health. The Center continues to grow each year and apply its expertise to increasingly exciting and important areas, many of global importance. I hope the evolution of new programs to educate children and teachers in a global environmental context and new Dialogues to resolve critical emerging conflicts will be of interest to you.

I look forward to seeing you in June.

With warmest regards,

Michael

Michael T. Lesnick, Ph.D.
Senior Vice President

Enclosures

cf12m35

May 18, 1989

Dr. M.S. Swaminathan
Honorary Director
Centre for Research on Sustainable
Agricultural and Rural Development
11, Rathna Nagar
Teynampet
Madras 60018, INDIA

Dear M.S.:

On behalf of the Board of Trustees of The Keystone Center, I am pleased to invite you to membership on the Center's Board. If you are willing to serve, we would like to nominate and confirm you as a Trustee at our next Board meeting, on Saturday, June 17, 1989, at Keystone.

Needless to say, M.S., we would be honored to have you serve on the Board of The Keystone Center. Your views and wisdom would bring a new and eminent perspective to our membership. I think, too, that you would find your involvement in our work positive and rewarding. The Center's Board has become increasingly supportive and active and has added strength and fresh ideas to the Center's activities. They represent a fairly unusual cross-section of corporate, environmental, scientific, labor and public policy leaders. I would be personally most grateful if you would accept our invitation and become part of the Keystone family.

Another facet of the Center's work with which I would like to introduce you is the Keystone Science School, in which we teach field biology, geology, meteorology and ecology to children from the 6th grade through college level. It is a national effort for us and we have been very pleased with its impacts.

The terms of Keystone Center trustees are three years; trustees may serve two consecutive terms, after which a minimum one year absence from the Board is required.

Our Board meets in full session twice a year; the Executive Committee meets four times a year.

At your convenience, please call or drop a note to let me know your thoughts on Board membership. I shall hope to hear from you and perhaps see you in June.

Sincerely,

Robert W. Craig
President

PAD:pm

l'Alliance mondiale pour la nature
The World Conservation Union

Le Président
The President

Dr Michael T. Lesnick, Ph.D.
Senior Vice President
The Keystone Center
Box 606
Keystone, Colorado 80435
USA

June 13, 1989

Dear Mike,

Thank you very much for your letter of May 26. I am looking forward to meeting you at breakfast on June 28. I have sent a fax to W. Alton Jones Foundation.

We are starting in India a Community Biodiversity Conservation Programme on the lines recommended at the first Keystone Dialogue. I enclose a brochure relating to this Programme.

I am sorry I am unable to join the Board of Keystone Center at this time due to very heavy commitments. I however hope such an opportunity will come again in a year or two. Please convey my sincere apologies to Bob.

With warm personal regards,

Yours sincerely,

(M.S. Swaminathan)

Encl.

Réponse à:/Reply to:
11 Rathna Nagar, Teynampet, Madras 600018, India
Tel. (44) 455339 Telex: 4121077 annu in

For M.S. Swaminathan

-3136-

Wed 28 June
4:30 p.m

M.S.

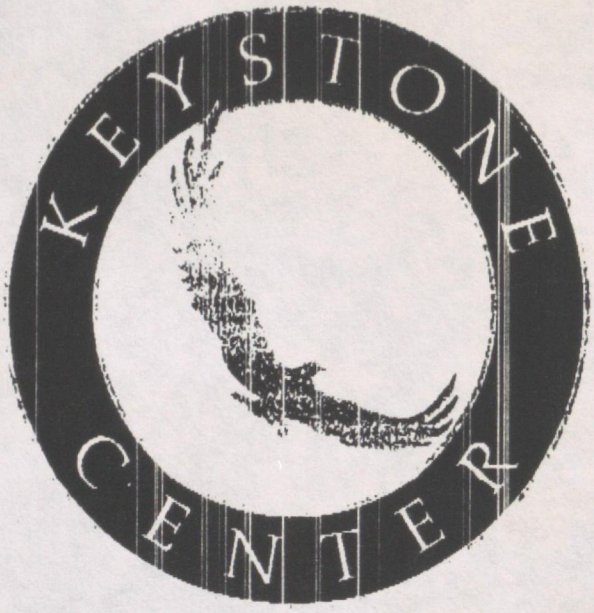
I had a very good meeting with Bob Hewlett at Rock. Foundation. He indicated that we would receive the $20,000 for USSR and $30,000 for Madras meeting. He said he would call me within 24 hrs to verify guarantee of the funding so that we may plan both sessions appropriately and finalize USSR visit OR non-visit by Friday of this week. He seemed like a very intelligent and nice man - a man of his word.

I would like to talk with you this evening about my conversation, and, more importantly, plan what we want to accomplish in the USSR and what to communicate to Krivchenko on Friday. Would you please ring my room # 3102. I will be up at least until 11:00 p.m.

I thought I sent you copies of Henry Shaw's memo and my letter, but in case I forgot you need to have copies of the documents.

Hope you had a good day

Michael Lesnick



DATE 28 JUN

OF PAGES INCLUDING COVER SHEET 3

FACSIMILE TRANSMISSION

TO: Mike Lisnick - Room 3102

FROM: Cindy Fisk

PROJECT: Gun CODE # 12

If you have problems with this transmission, contact The Keystone Center at (303) 468-5822.

Fax #: (303) 262-0152

MESSAGES:

ВСЕСОЮЗНЫЙ ИНСТИТУТ
РАСТЕНИЕВОДСТВА
им. Н. И. ВАВИЛОВА

190000, Ленинград, ул. Герцена, 44
СССР
Тел.: 314-48-48; 315-50-93

THE N. I. VAVILOV INSTITUTE
OF PLANT INDUSTRY

44, Herzen str., Leningrad, 190000
USSR
Tel.: 314-48-48; 315-50-93

№ 13/188 „20. February 1989 г.

Dr. Michael T.Lesnick

THE KEYSTONE CENTER
C166 Summit County Road 8
Argentine Building
Keystone, CO 80435

U.S.A.

Dear Dr. M.Lesnick,

Mr.S.Shuvalov has informed me about your phone call on February 14, 1989, and I would like to confirm our invitation to the group of the Dialogue participants. All our previous agreements remain valid.

Enclosed please find the official invitation to the group of approximately 11 people (in compliance with your letter of December 16, 1988). As we have promised, the Institute is ready to fund two participants. Two programs, for 7 and 12 days have been developed. These programs are subjects for the final approval either by correspondence or by telephone. We really want this meeting with the leading specialists from the Institute to be efficient and useful both for the members of the delegation and for us. In my opinion, it would be quite expidient, if our guests prepared short (for 15-20 minutes) reports on the situation in the sphere of PGR and on the activities at their national levels. The agenda for the discussion of the plenary session of the Dialogue in India can be thoroughly developed to meet your requests.

We have calculated the approximate cost of the stay in the USSR. It amounts to 1000 roubles per 12 days per 1 person (the prices are as follows: Hotel: 50 R (single room) or 35 R (double room) per night, Meals: approx. 15-20 R per day, Air tickets on the route Leningrad-Krasnodar-Tashkent-Leningrad: 150 R). Of course, we'll do our best to cut down the expenditures at the experiment stations, so the sum of 1000 roubles may appear to be substantially reduced.

From our point of view, a visit for 12 days would suit the best our mutual interests, as it would provide a possibility to get acquainted in more detail with the Institute and its scientific activities, and to establish closer scientific relations between our organizations.

Please keep in touch with Mr.Sergey M.Alexanyan (Head, Foreign Relations) or with Mr.Shuvalov on all organizational questions. I would be grateful if you provided me with a complete list of the members of the delegation.

With best wishes and hoping to see you soon,

Vladimir I.Krivchenko
VIR Director.

CC: Prof. M.S.Swaminathan

ВСЕСОЮЗНЫЙ ИНСТИТУТ
РАСТЕНИЕВОДСТВА
им. Н. И. ВАВИЛОВА

190000, Ленинград, ул. Герцена 44
СССР
Тел.: 314-48-48; 315-50-93

THE N. I. VAVILOV INSTITUTE
OF PLANT INDUSTRY

44, Herzen str., Leningrad, 190000
USSR
Tel.: 314-48-48; 315 50 93

№ 131 . 20 . February 1989 г.

Dr. Michael T.Lesnick

THE KEYSTONE CENTER
0165 Summit County Road 8
Argentine Building
Keystone, CO 80435

U.S.A.

The N.I.Vavilov All-Union Research Institute of Plant Industry has the honour to invite the delegation of participants of the Keystone International Dialogue on Plant Genetic Resources to meet with the leading specialists of the Institute in July, 1989. The meeting provides for the discussion of international cooperation in the sphere of PGR, as well as of the plenary session of the Dialogue in India.

Prof. Vladimir I.Krivchenko,
VIR Director.

DRAFT 7 DAY AND 12 DAY AGENDA .

July 16 Sunday	Arrival at Leningrad.
July 17 Monday	Visit at VIR, acquaintance with the history, structure and scientific activities of the Institute. Reports by leading specialists on aspects of research work at VIR. Visit to N.I.Vavilov museum. Visits to departments of the Institute.
July 18 Tuesday	Short reports by representatives of National Programs on PGR (15-20 min.) Discussion of problems of mutual interest for specialists on PGR.
July 19 Wednesday	Discussion of international cooperation on PGR. Discussion of the plenary session in India.
July 20 Thursday	Visit to VIR laboratories in the town of Pushkin (40 km S of Leningrad)
July 21 Friday	Summing up the results. Visit to the Komarov Botanical Institute (Botanical Gardens).
July 22 Saturday	Sightseeing tour.
July 23 Sunday	Departure from the USSR.

In case of a 12 day stay in the USSR the Leningrad stage from July 16 through 19 remains unchanged.

July 20 Thursday	Flight to Krasnodar.
July 21 Friday	Acquaintance with the Kuban Experiment Station of VIR.
July 22 Saturday	Flight to Tashkent
July 23 Sunday	Sightseeing tour
July 24-25 Monday, Tuesday	Acquaintance with the Tashkent Experiment Station (the Central Asia Branch of VIR).

DRAFT AGENDA (Continued)

July 26 Wednesday — Return flight to Leningrad

July 27 Thursday — Departure from the USSR.

United States Department of Agriculture | Agricultural Research Service | National Program Staff | Beltsville, Maryland 20705

April 27, 1989

MAY 1 1989

SUBJECT: Impact of Keystone Conference on the Third Session of the FAO Commission of Plant Genetic Resources

TO: The Files

FROM: H. L. Shands
National Program Leader, Germplasm

The First International Keystone Dialogue on Plant Gene Resources held in Keystone, Colorado, in August 1988 brought together key leaders (as individuals) to develop a consensus paper on contentious issues. It was thought that such a consensus would lower the rhetoric internationally on plant genetic resources issues.

This report attempts to evaluate the dialogue and its report's impact on the Third Session of the FAO Commission. From the Keystone Dialogue, Dr. Worede (Ethiopia), Dr. Hardon (Netherlands), Mr. Mooney and Mr. Salazar (RAFI), Dr. Esquinas-Alcazar (FAO Commission), and I were present. Only Drs. Worede and Hardon were delegates in voting position with the Commission meeting. The above-mentioned and several others had an informal Keystone reunion together but mainly bi-lateral substance was discussed due to the circumstances prevailing. The delegates from India, UNEP and ICDA were present and aware of the Keystone agreements. But, at best, only 3 delegates were surely aware of the action taken. As an observer, the U.S. was unable to participate in the Working Group or serve on the Drafting Committee. Hence, all reflections concern the central Commission meeting.

This writer is not certain of the extent of circulation of the Keystone final report of the first session. The printed version has not been sent to me though it was to have been sent approximately 3 months ago. The Executive Summary was printed verbatum in DIVERSITY but that distribution was of questionable value since its distribution is limited and is only in the English language. Future editions of the Executive Summary should be translated to each of the standard FAO languages (minimum French, Spanish and English).

I can, in fact, make comments about the distribution of the final report based upon the activities at Rome. Key people of the Keystone Corporation and of the Steering Committee should have seen to it that each FAO Commission member's delegation as well as FAO Secretariat had copies and, if possible, was personally visited about the recommendations. Although the few who attended both were logically influenced, that is insignificant to the problem where nations were involved in Rome. Certainly the issue on farmers' rights and perhaps the issue on biotechnology would have taken a different twist had the Keystone Management and Steering Committee done their complete jobs.

On the other hand, the IBPGR-FAO issue was one which is of recent volcanic origin, February 1989, well after Keystone and mostly unrelated to the basic scientific theme underlying the Keystone Dialogue. It is doubtful that any of the above could have kept the lid on the fervent emotions of the developing countries. In this case, it may be an unfair test of the power of the Dialogue but the comments relative to the distribution of the document still hold. This is a political issue of significance and no stone should be left unturned to resolve it best as possible.

By means of this file document, I challenge the Keystone leaders and Steering Committee to take the Keystone Report to the international community and not rely on happenstance circulation of documents. To that end, I attach a copy of the membership list of the recent FAO Commission meeting and urge that personal visits be made wherever possible for delivery of the past and future documents. Perhaps the key technical leaders should be identified for each country and that they, too, receive copies along with a letter of explanation in their own language.

Enclosure

cc:
J. Pino
M. Lesnick ✓
O. Bentley
C. Hess
D. Duvick

May 5, 1989

Dr. Henry L. Shands
National Program Leader
Germplasm
Agricultural Research Service
U.S. Department of Agriculture
Building 005, Room 140
BARC-West
Beltsville, Maryland 20705

Dear Henry:

I received a copy of your "Memo to Files" regarding your perceptions of the FAO Commission meeting and distribution of the first plenary session report of the Keystone International Dialogue on Plant Genetic Resources.

Bob Craig, President of the Center, and I have reviewed your Memo and would like to respond. I think, more than anything else, we felt unfairly judged by comments in your Memo. There are several issues raised by your Memo that we would like to specifically address. First, we are concerned that you may not fully understand the purpose of the Keystone Dialogue, the impacts of the first plenary session, and the potential of future meetings.

The purpose of the Dialogue is to promote direct and off-the-record communication between interested parties in the international community on key controversial issues involving plant genetic resources and to develop a product from each session that outlines areas of consensus, with associated recommendations, as well as to clarify areas of continuing disagreement. The first session only began to break down some of the barriers. Based on letters and conversations with many of the participants after the first meeting, it was clear to us that they felt the plenary was most productive and wanted to continue the Dialogue with hopes of furthering mutual understanding. Participants also

seemed anxious to continue to explore opportunities for consensus. In fact, at the final plenary session, which unfortunately you were not able to attend, many Dialogue participants stated that this effort provided a unique opportunity to explore common ground and develop a new agenda for plant genetic resources. They also indicated, very realistically I believe, that that opportunity must be pursued carefully and diligently.

In reading your Memo we are concerned that you may have either expected many members of the international community to publicly shift positions at the FAO Commission meeting as a consequence of the four day initial Dialogue session in August, 1988, or that you anticipated attendees to articulate a U.S.-oriented position at the Commission meeting as a consequence of the first Dialogue session held in Colorado. I believe it is somewhat unrealistic to anticipate that drastic a shift based on an initial meeting. I would agree that great progress was made (more than any of us anticipated) and that several doors were opened. However, we expect it will take additional meetings which hopefully will build on the momentum generated at the initial session to continue to impact the formal positions taken in FAO gatherings by all sides. I should also say that we have been in contact with several individuals from diverse perspectives who attended the FAO Commission meeting. They indicated that the Keystone Dialogue and Report clearly had an impact on the discussions. They noted that several key recommendations from the Keystone Final Report had been integrated into Commission documents and decisions.

Second, I wanted to respond to your comments regarding the dissemination of the Keystone Final Report. I must say that the tone and implications are disturbing to us. You might not recall that the Dialogue group asked Keystone to produce and disseminate "The Statement of Participants", which was a summary of the Final Report, in order to achieve some immediate impact from the session. That Statement was sent to the media and to all of those suggested by Dialogue participants during the first week of September, 1988. That Statement, which was reprinted verbatim in Diversity Magazine, served as more of an "early announcement" to the international community and the media about the Final Report for which there was great interest.

As you know, achieving consensus in the Final Report took

some time given the broad scop of international partcipation. However, the Report was finalized in November, 1988 and mailed to all participants on November 28th. At that time, I wrote to all Dialogue participants and:

1. indicated that the Report was final and public and could be freely copied and distributed;

2. requested that all Dialogue participants to suggest potential recipients of the document; and

3. asked participants to send Keystone relevant documentation of impacts of the Dialogue (e.g., articles, discussion at relevant conferences, advisory committee meetings).

It was made quite clear that photocopies could be made and that Keystone would distribute these "interim" versions to others as requested by the Steering Committee and other Dialogue participants. Also, at that time, I worked very closely with several news organizations to ensure the Report (not the Statement) received some attention. In this regard, Nature Magazine, New Scientist and Seedling carried articles shortly after release of the Report (Nature covered the Report the week of the release). I also worked with the Associated Press and the Los Angeles Times. In my Memo to Dialogue participants of November, 1988, I indicated that we would be sending the Report for final printing and production, and we anticipated the report might be ready in early 1989. Keystone produced at our cost, over a thousand Reports as soon as the "polished" version was available. The print quality and resulting delay was unfortunate, but in no way delayed actual dissemination of the Report.

During this period, I began to receive letters from Dialogue participants suggesting possible recipients of the Report and noting impacts of the Dialogue and Report. These impacts included briefings participants conducted in their countries and with appropriate government officials. Participants have commented that these briefings have generated a real enthusiasm for the Dialogue and documents generated to date, as well as a keen interest around the world in seeing the effort continue.

Also during this period, I was in touch with IBPGR and FAO as soon as the report was finalized so that they could make timely

use of the document and distribute them as appropriate. I was also in contact with IBPGR and FAO to document discussions about the Dialogue at conferences sponsored by those two organizations. Additionally, at the invitation of the President's Research Council of Zimbabwe and ENDA Zimbabwe, I flew (at Keystone's expense) to Harare to discuss the Report (and disseminate it) with the Ministers and Deputy Ministers of Agriculture and Agricultural Research Center Directors from the SADCC countries. I also conducted private briefings with the Minister and Permanent Secretary of Lands and Agriculture of Zimbabwe, Chairman of the President's Research Council of Zimbabwe, the UNEP delegate in charge of biotechnology, the U.S. Ambassador to Zimbabwe, and the USAID Director and new Agriculture Director while in Harare.

Dr. Swaminathan, Chairman of the Dialogue, has conducted briefings with key Soviet and Indian officials and has met with FAO and other UN officials. He also is sending personal letters to Heads of State with a copy of the Final Report.

Also during this period, The Keystone Center briefed key Congressional staff, including the majority and minority staff directors of the House Agriculture Committee. In fact, we currently are discussing with Congressional staff the possibility of inviting several key members of Congress to Keystone this summer to discuss domestic and international germplasm issues with the Dialogue Steering Committee and selected others.

Henry, as you already know, the cost of the August 1988 session exceeded the funding committed by foundations, corporations, and agencies. The Keystone Center has proceeded to produce and disseminate the Final Report at our own expense pending the anticipated receipt of adequate funding. In fact, part of the delay in funding has included USDA/ARS. Funding was supposed to be received in the fall of 1988 but was not actually received until May 1, 1989. Your suggestion of translating the Report into other international languages is an excellent one and we hope that this will occur. However, without additional funding specifically for this purpose, The Center must direct the limited budget to furthering the discussion through means such as those listed above.

To date, we have mailed several hundred reports world-wide not including Dialogue participants (see the enclosed list of the most recent mailing). These names have been suggested by

Dialogue participants and include International Center board members and directors, government officials, NGO's, academics, and others. Many Dialogue participants called and asked if they could photocopy and distribute the Report immediately, and if we would send them a prescribed number of finished documents. Several hundred of them also have been distributed.

In sum, Henry, we believe we have been and continue to carry through with our responsibility regarding this Dialogue. The dialogue process is an ongoing one, and we anticipate that the impacts also will be ongoing and continue to grow as participants further their discussions on these tough issues and take consensus ideas back to their respective countries and to other forums.

Regarding the responsibility of Keystone and/or Steering Committee members to personally meet with FAO delegation members, I think it is important to note that, when the Steering Committee met after the August 1988 Plenary, they indicated that it might be more appropriate to allow the momentum, trust and level of specificity of recommendations evolve at future Dialogue sessions. They did endorse broad dissemination of the Report, but seemed inclined to back away from more forceful "lobbying" regarding the Report given the emergent nature of the discussions.

From the tone of your Memo, we detect some real frustration with the FAO meeting. However, that frustration and any associated concern that Commission members should have received information about the Dialogue are separate issues. Esquinas was sent copies of the Report in preparation of the Commission meeting. He has indicated to me that the Keystone Report was an integral part of the preparation of the Commission meeting. I could only assume, and still do, that he not only briefed key FAO staff and Commission members, but that they reviewed the Keystone Report.

I would have hoped that if you had concerns about dissemination or distribution, or if you wanted the Report sent to specific individuals, you would have called. Certainly, that is still possible. If you had called, I would have briefed you on the activities which have been taking place since you received the Report in November, 1988.

As you know, the second plenary is scheduled for January 29-February 1, 1990 in Madras, India. You should also be aware that

our plans for a visit to the Vavilov Institute this summer are shaping up quite well.

I hope this begins to clarify and respond to some of your concerns. I very much appreciated your efforts at the Dialogue session and afterwords in finalizing the consensus in the Report, and look forward to your future participation and support.

Please call if you have questions or problems. We have nothing but the highest personal and professional regard for you and the Agricultural Research Service. I hope at least part of the tenor of your Memo was due to other forces.

If the Keystone Dialogue becomes another political tool, it will negatively impact the momentum and trust achieved at the first session, and, possibly, undermine potential progress at future meetings.

I cordially request that you attach a copy of this letter to your Memo in the Files to explain and clarify our perspective on the issues you raised.

Either I or Bob Craig will be calling to follow up on this letter.

Sincerely,

Michael T. Lesnick, Ph.D.
Senior Vice President

Enclosures

cc: Dr. John Pino
Dr. Orville Bentley
Dr. Charles Hess
Dr. Donald Duvick

cf12m26

United States Department of Agriculture
Agricultural Research Service
National Program Staff
Beltsville, Maryland 20705

April 27, 1989

MAY 1 1989

SUBJECT: Impact of Keystone Conference on the Third Session of the FAO Commission of Plant Genetic Resources

TO: The Files

FROM: H. L. Shands
National Program Leader, Germplasm

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l'Alliance mondiale pour la nature
The World Conservation Union

Le Président
The President

T E L E F A X

one page

To: Dr Jeffrey Kelleher

From: Dr M.S. Swaminathan

Date: 13 June 1989

I strongly support request from Michael Lesnick for grant for Keystone Dialogue on Plant Genetic Resources. The first Keystone Dialogue on this topic has led to a major breakthrough in resolving the conflict between Breeders' Rights and Farmers' Rights at a recent FAO Meeting. Also, we are launching a Community Biodiversity Conservation Programme in India on the lines recommended at Keystone last August. I am confident that this Dialogue series will lead to significant international co-operation in conserving biological diversity for the lasting benefit of humankind. It therefore merits your generous support.

Warm regards.

M.S. Swaminathan

Réponse à:/Reply to:
11 Rathna Nagar, Teynampet, Madras 600018, India
Tel. (44) 455339 Telex: 4121077 annu in

IUCN Headquarters :
Avenue du Mont-Blanc, CH-1196 Gland, Suisse/Switzerland
Tel. (022) 64 91 14 Telex: 419 605 iucn ch Telefax: (022) 64 29 26 Telegrams: IUCNATURE Gland

W. ALTON JONES FOUNDATION, INC.
433 PARK STREET
CHARLOTTESVILLE, VIRGINIA 22901
(804) 295-2134

April 27, 1989

Michael T. Lesnick
Senior Vice President
Keystone Center
Box 606
Keystone, CO 80435

Dear Mr. Lesnick:

This is to acknowledge receipt of your proposal for continued support of the Plant Genetic Resources series. Our staff and board of trustees will review this carefully. We expect a decision to be made by the board at its July, 1989 meeting. If we need further information, we will contact you.

Very truly yours,

R. J. Kelleher

R. Jeffrey Kelleher
Director

RJK/lml

April 13, 1989

Mr. R. Jeffrey Kelleher
Director
W. Alton Jones Foundation
433 Park Street
Charlottesville, Virginia 22901

Dear Mr. Kelleher:

I am pleased to submit the enclosed proposal on behalf of The Keystone Center for support of the second phase of the Keystone International Dialogue Series for Plant Genetic Resources. I hope the Foundation will consider a one-year grant toward this continuing effort in the amount of $100,000.

As you know, the initial session of this multi-year Dialogue Series was held in Keystone, Colorado last August. The session brought together 40 world-class scientists, policy makers and organizational leader from 18 countries to examine and develop detailed recommendations on the issue of ex situ conservation. Because of the complexity of the subject and diversity of perspectives, The Keystone Center was unsure of how successfully the Dialogue would proceed. However, the first plenary session and final report document have had far greater impacts than we had originally envisioned. Participants in the project have enthusiastically recommended that the project be made a continuing Dialogue series.

We are all very encouraged about the tremendous progress the Dialogue effort has made and the opportunities it presents for contributing toward world-wide efforts to conserve plant genetic resources. A critical priority at this time is to secure adequate funding for planned activities over the next 12 months, which will include a Steering Committee meeting and information exchange at the Vavilov Institute in Leningrad and a second plenary session in Madras, India.

The past support provided by the W. Alton Jones Foundation for this effort has been a key element in the project's success to date. The initial grant of $40,000 from the Foundation assured a timely start-up for the project and enabled us to bring to the table many key participants and perspectives from non-governmental organizations and developing countries. I sincerely hope W. Alton Jones will find the ongoing activities of the Keystone International Dialogue Series for Plant Genetic Resources to be of enough interest to continue involvement with this undertaking. Needless to say, we would feel very pleased and fortunate to have renewed support for the project and to continue our association with the Foundation.

I hope you will call me if there is any additional information I might provide. In the meantime, thank you for your consideration.

Sincerely,

Michael T. Lesnick, Ph.D.
Senior Vice President

MTL:pm
Enclosures

PROPOSAL TO THE W. ALTON JONES FOUNDATION

FOR THE

KEYSTONE INTERNATIONAL DIALOGUE SERIES

ON PLANT GENETIC RESOURCES

April, 1989

THE KEYSTONE CENTER, BOX 606, KEYSTONE, COLORADO 80435 303 • 468 • 5822

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PROPOSAL TO THE W. ALTON JONES FOUNDATION

FOR THE

KEYSTONE INTERNATIONAL DIALOGUE SERIES

ON PLANT GENETIC RESOURCES

Proposal Summary

The Keystone Center seeks support from the W. Alton Jones Foundation for the second phase of the Keystone International Dialogue Series on Plant Genetic Resources. This project brings together scientists, policy makers and citizen leaders from around the world to formulate recommendations for the conservation and use of plant germplasm. The initial dialogue session was held in August of 1988 in Keystone, Colorado with 40 participants representing 18 countries. The initial focus of the Dialogue was to examine and develop recommendations on the issue of ex situ conservation. Following the session, a detailed report was issued. This document has been disseminated to over 2,000 policy makers around the world. In addition, briefings on the report have been carried out in Africa, the U.S.S.R., India, for a number of government agencies and private organizations in the United States, and at the United Nations.

Because of the success and positive outcomes of the first session, participants in the Dialogue have urged the Center to continue the Dialogue Series with at least two more four-day plenary sessions. Representatives of the N.I. Vavilov Institute of Plant Industry in the Soviet Union have invited participants of the Internal Dialogue Series to the Institute for an International Steering Committee meeting and information exchange in July of 1989. As part of this meeting, the agenda and work assignments for the next plenary session of the Dialogue Series, to be held in Madras, India in January of 1990, will be finalized. At the Madras session, Dialogue participants will complete their recommendations on ex situ conservation and begin discussion of local participation in in situ conservation.

In December of 1987, the W. Alton Jones Foundation provided seed money in the amount of $40,000 for the Keystone International Dialogue Series on Plant Genetic Resources. This grant supported the participation of representatives from the environmental community, public interest sector, research and academia in International Steering Committee activities as well as in the first plenary session.

The budget for the next phase of the Dialogue Series, to be carried out over the next year (February, 1998 - February, 1990), is $299,350. We hope the W. Alton Jones Foundation will consider support for this continuing effort in the amount of $100,000.

Statement of the Problem

Many centuries of evolution, natural selection, human selection and care have given our generation a rich genetic estate. Wisely conserved and used, this heritage can help us to achieve food and nutrition security as well as livelihood security for the current global population of 5 billion people and the projected global population of about 10 billion by the year 2050.

Since the 1920's, when the Soviet geneticist N.I. Vavilov initiated well organized programs for the collection, conservation and utilization of plant genetic resources, many important institutional structures have come into existence at the national, regional and global levels to deal with plant genetic resources conservation and utilization. A number of international organizations have developed key programs to address evolving global needs regarding the use, exchange, and conservation of plant genetic resources. Since its inception in 1945, the Food and Agriculture Organization of the United Nations (FAO) has played an important role in this area. The establishment in 1960 of the first international agricultural research center - the International Rice Research Institute - in the Philippines, was a another significant event. The creation of the Consultative Group on International Agricultural Research (CGIAR) in 1971 was a landmark in the evolutionary history of plant genetic resources activities and the formation of the International Board for Plant Genetic Resources (IBPGR) in 1974 established a lead agency in the coordination of efforts to present crop germplasm around the world.

The International Union for the Conservation of Nature and Natural Resources (IUCN), World Wildlife Fund (WWF) and other global, regional and national professional organizations have been rendering valuable service in arousing global awareness of the need for genetic resources conservation. The World Conservation Strategy developed by IUCN in 1980 in partnership with UNEP, WWF, FAO, UNESCO and the international conservation community was an important step in promoting conservation consciousness and in helping national governments develop policies and strategies for the sustainable use of their natural resources.

In spite of these efforts, we are witnessing today considerable loss of genetic diversity in plants due to a variety of reasons-demographic, economic, social, political and ecological. At the global level, there are significant and growing challenges to the preservation, use and exchange of plant genetic resources. Although there is increased awareness and concern, it is becoming clear that significant plant genetic resources are still being lost to humankind. Scientific questions of what and how to collect, conserve, and utilize these resources continue to emerge. Social, political and legal questions persist regarding the ownership, exchange and availability of plant germplasm. There is a

significant need for a continuing dialogue involving scientists, policy makers, representatives of non-governmental organizations, and other interested parties, from developing and developed countries, which will promote understanding and action on the development of plant genetic resource conservation policies and strategies.

Project Background

In the winter of 1987, The Keystone Center assembled an International Steering Committee comprising scientists and policy makers from developed and developing countries to initiate and guide the Keystone International Dialogue Series on Plant Genetic Resources. This committee, chaired by Dr. M.S. Swaminathan (the First General Foods World Food Prize Laureate and President of the International Union for the Conservation of Nature and Natural Resources) includes Dr. Dalmo Giacometti, The Republic of Brazil; Dr. Jaap Hardon, The Netherlands; Dr. Calestous Juma, Kenya; Dr. John Pino, United States; and Setijati Sastrapradja, Indonesia.

The Steering Committee met in January of 1988 in Washington, D.C. to finalize plans for the initial plenary session. Based on the Committee's advice, individuals actively involved in global plant genetic resource issues from corporations, non-governmental organizations, government agencies, and research and academic institutions were invited to Keystone, Colorado for the first session of the Keystone International Dialogue Series on Plant Genetic Resources. On August 15-18, 1988, 40 representatives from the international community met for four days at The Keystone Center to discuss ex situ conservation of crop plant genetic resources. Eighteen countries were represented in the first four-day session, among them the Peoples Republic of China, Brazil, Soviet Union, Ethiopia, Zimbabwe, Sweden, The Netherlands, Indonesia, Peru, India, and the Philippines.

The Dialogue group agreed to address three critical areas of ex situ conservation: 1) the scientific and technical aspects of germplasm conservation, including technological, geographic, organizational and communications gaps; 2) equity and ownership issues, including the definition of common Heritage, ownership rights, inter/intra-generational equity and legal aspects; and 3) organizational aspects, including coordination, monitoring, information and finance considerations. In each area, the Dialogue group focused on the local, national, regional and international aspects of the problem and recommendations.

At the conclusion of the four-day session, a Statement of Participants was issued, summarizing the work and recommendations of the dialogue participants. In December of 1988, the detailed final report document was finalized and released to the public. The report contains specific recommendations for addressing critical needs in conserving plant genetic resources, including:

- more effective methods for measuring genetic diversity to determine priorities in collection and standardization of sampling strategies;

- developing simple, low-tech, low-cost techniques of ex-situ storage adapted to local community needs;

- developing an effective relationship between conventional taxonomy and modern methods, including molecular approaches, of measuring genetic relationships;

- additional support for landrace improvement, utilization of emerging recombinant DNA technology for transferring useful genes and development of efficient screening techniques;

- increased efforts in bringing about beneficial feed-back relationships between genetic resource conservation centers and plant breeding institutions;

- enlarging the composition of the FAO Commission on Plant Genetic Resources to include all non-FAO members, if feasible, or establishing a United Nations-FAO Commission on plant genetic resources which can gradually develop into a Global Commission on Biological Diversity;

- a global funding facility to generate resources of the magnitude required to successfully face the needs of plant genetic resources work; and

- establishing a Global Independent Advisory Committee for Plant Genetic Resources to provide technical advice and explore the issues in a holistic and interactive manner.

In addition to outlining areas of consensus, the final report clarified areas of disagreement, where consensus could not be reached. This report has been distributed to over 2,000 scientists and policy makers involved in plant genetic resource issues at local, national, regional and global levels. For your information, a copy of the final report is included with the attachments to this proposal.

Participants in the project have strongly urged The Keystone Center to continue the Dialogue sessions to further address important issues relating to plant genetic resources conservation, use and management. The Dialogue group has specifically asked that Keystone convene a second four-day plenary session to complete discussion of ex situ conservation and to begin discussing local participation in in situ conservation. Participants have also indicated the need for a third meeting to focus solely on in situ conservation.

Project Description

The Keystone International Dialogue Series on Plant Genetic Resources brings together international scientists and policy makers from diverse interests to examine the current status of global, regional, national and local efforts in the fields of collection, utilization and conservation of plant genetic resources. In its second year of activity, the Dialogue will center its attention on ex situ and local participation in in situ conservation measures.

The overall goal of the Dialogue Series is to strengthen an international commitment to plant germplasm. This goal is accomplished through off-the-record, structured problem-solving sessions among approximately 50 individuals involved in policy and scientific aspects of genetic resource issues. Participants include representatives from national and international government agencies, non-governmental organizations, the private sector, and research and academic institutions.

The International Steering Committee, chaired by Dr. M.S. Swaminathan, provides ongoing and overall guidance for the project and ensures quality control of documents. An invitation from the Director of the Vavilov Institute of Plant Industry in Leningrad, Russia, Dr. V.I. Krivchenko, has been extended to the Steering Committee to meet at the Vavilov Institute in July of 1989. A copy of this invitation and a proposed agenda for the visit is included with the attachments to this proposal.

At the Vavilov meeting, an agenda for the next plenary session will be established, the participant invitation list will be finalized, and work assignments made. In addition, the Steering Committee will assess dissemination and implementation of the first plenary session document and review background papers to maintain momentum and continuity. During this visit, members of the Committee will also tour and learn about the work of the Institute as well as Soviet policies and programs regarding the maintenance of biological diversity. The Institute has pledged to fund the participation of two members of the Steering Committee in the Vavilov exchange.

The second plenary session of the Dialogue is scheduled to be held January 29-February 1, 1990 in Madras, India. While the agenda for this session will be finalized at the July meeting of the Steering Committee, the following topics have been identified for discussion:

- National Level: Strategies and activities to promote and support community biodiversity conservation programs.

- Regional Level: Strategies and activities to promote regional cooperation and development of regional facilities for ex situ conservation.

- Global Level:

  1. Patent rights and their implications for plant breeders and rural communities in the developing countries.

  2. Methods of converting the concept of "Farmers' Rights" into an implementable operational procedure, so that the flow of resources to countries constituting the center of origin and diversity in economic plants can be enhanced and ensured.

  3. Implications of genetic engineering for genetic evaluation and utilization.

  4. Establishment of a UN Commission on Biological Diversity along with an International Advisory Committee and a Global Funding Facility.

  5. In situ conservation and consideration of the draft IUCN convention for the in situ and ex situ conservation of biological diversity.

Throughout the project, The Keystone Center serves as neutral convener and facilitator. While participants establish their own work plan, Keystone's role is as a process facilitator helping participants accomplish their work. Following large group sessions where definitions and terms are examined, participants break into smaller work groups, each comprised of representatives of varied interests, to pursue each topic area. In this way, a large group of 40 or 50 individuals will maximize the human resources available and work on several issues simultaneously.

At the second plenary session, each work group will receive a specific agenda of issues and questions to address. Steering Committee members and authors of background papers will serve as chairpersons of work groups. A Keystone staff person will be assigned to each group to assist with facilitation. Often at a multi-day meeting, there will be a series of interactive plenary sessions so that each small work group can update other participants of its progress and obtain guidance for re-direction, if necessary. Staff of The Keystone Center will draft meeting summaries for distribution to all participants to monitor the progress of all work group activities.

The Keystone Center has found that three key ground rules are critical to the success of the policy negotiation process. The Center insists that these be maintained throughout all discussions:

1. All conversations are off-the-record and not for attribution.

2. Participants attend as individuals, not formal representatives of their organizations.

3. All documents remain internal to the process until the final consensus report. No document can be made public without the agreement of all participants.

Following the plenary session, a final consensus report will be drafted by Keystone Center staff, based on background papers and summaries of the Dialogue work groups. This report will be circulated for comments and corrections to the Dialogue group. Following final approval and sign-off by all participants, the document will be published and distributed. A dissemination strategy will be developed by the Dialogue group for the final report and, if appropriate, a cross-section of the group will conduct special briefings to national and international agencies and organizations on the report and project results.

Background of Organization

The Keystone Center, founded in 1975, is a non-profit organization located in Keystone, Colorado, 75 miles west of Denver. The Center and its staff are dedicated to providing two major services: environmental education to all age groups through the Keystone Science School Program and mediation/facilitation services on issues involving natural resources, environmental health, science and technology through the Keystone Science and Public Policy Program.

The Center has a proven track record for providing a neutral forum for policy formulation which is well-respected and trusted. It has grown into a valuable and trusted resource for environmental conflict resolution with major impacts on regulatory policy, legislation and action plans for international, national and regional decisionmaking.

In all Keystone policy negotiation projects, the Center is committed to identifying and insuring the participation of all key individuals and interest groups. Because of its widely-respected neutrality, the Center has successfully brought experts and leaders of industry together with representatives from government, research and academia, environmental organizations and citizen interest groups. From the outset, the Center has made public involvement in policy formulation a priority and is recognized as a leader in including citizen group representatives, non-governmental organizations and public interests in policy negotiations and decision making.

An important part of each Keystone project is the development of a consensus document which effectively communicates the conclusions and recommendations resulting from the plenary sessions. Because of the diversity of perspectives and expertise involved in Keystone projects, and because final report recommendations represent the consensus reached among dialogue participants, Keystone reports

receive substantial attention. Final reports are widely disseminated and used by key decision makers and interest groups (e.g., Congress, administrative agencies) in designing and implementing legislation, regulatory policies and procedures, and workable solutions to difficult problems.

Regular activities of the Keystone Science and Public Policy Program include policy negotiations, organizational training and development, and facilitation/mediation services. Currently, these activities focus on three substantive subject areas:

1. Biotechnology and Genetic Resources (e.g., Plant Genetic Resources, Biotechnology Regulatory Policy, State and Local Biotechnology Leadership Initiative, Transgenic Plants, Food in the 21st Century)

2. Environmental Quality and Health (e.g., Disposal of Plastics in the Ocean, Air Toxics, Hazardous Waste Management Strategies, AIDS Vaccine Liability, Work-Related Illness and Injury Recordkeeping)

3. Natural Resources (e.g., Biological Diversity, Keystone Energy Project, Surface Mining, Public Access to Public Lands, Global Climate Change)

A more complete description of current Keystone Center programs is contained in the Center's Annual Report, included with this proposal.

Project Impacts

The results of the first four-day plenary session and the Dialogue report have already begun to have an impact on international discussions regarding plant genetic resources. The Keystone Center views its role as not just convening and facilitating the Dialogue sessions but to also provide administrative support and assistance to the Dialogue group regarding implementation and dissemination where appropriate.

Since the August, 1988 meeting and the public release in December, 1988 of the final report, Dialogue participants have been regularly briefing Keystone Center staff on the use of Dialogue recommendations. With the assistance of Dialogue participants, Keystone is developing a mailing list of approximately 2,000 individuals (including CGIAR institute directors, national government officials and research directors, academics, corporations, journalists, and non-governmental organizations, and United Nations agencies) to receive the report in March of 1989.

The Dialogue and Final Report have been widely reviewed and have had impacts in many instances. A selected sample includes:

- The Dialogue was the subject of a Nature Magazine news article in December, 1988.

- At the National Plant Genetic Resources Board (United States), discussion of the Dialogue and report led to a re-examination of the international aspects of germplasm use and conservation as well as a recommendation for further discussion of U.S. interaction with the FAO Commission for Plant Genetic Resources and the FAO Undertaking.

- A presentation by Keystone staff was made at the SADCC (Southern African Development Coordination Conference) Conference on Biotechnology and Plant Genetic Resources in Harare, Zimbabwe in January, 1989. The conference involved Ministers and Deputy Ministers of Agriculture, Agricultural Research Station Directors, and NGO representatives from the nine SADCC countries. Along with the group's discussion of the Dialogue, a private briefing with the Minister of Lands and Agriculture of Zimbabwe and the U.S. Ambassador to Zimbabwe was held regarding Dialogue recommendations for national and regional plant genetic resource committees. At the conference, the Minister announced his intent to form a national committee paralleling the recommendations of the Keystone report. Conference participants prepared a strategy to communicate their recommendations for a SADCC Regional Committee on Plant Genetic Resources at the annual SADCC Ministers Conference in February of 1989.

- The Keystone Dialogue was the cover story in the October issue of Seedling Magazine. References to the project were also made in recent issues of Diversity and Science Magazines.

- The Dialogue and Final Report recommendations were addressed at the IBPGR/UNEP genetic resources conference in Nairobi, Kenya in December, 1988.

- Dr. Swaminathan, the Dialogue Chairman, has conducted briefings on the project with government officials in India and the U.S.S.R., private foundations, the United Nations Environment Programme, and FAO.

- Discussions are now underway between The Keystone Center and the majority and minority staff directors of the U.S. House Committee on Agriculture for a hearing on the Keystone Dialogue and/or a special workshop for Committee leaders with Dr. Swaminathan and key project participants.

The intention of the second plenary session of the Dialogue Series is to develop a final report product. As in the first session, the written product developed will include background papers, work group reports, issues covered, and an overall summary report which

outlines areas where the group achieved consensus recommendations and where consensus could not be reached.

The Center will disseminate the final report from the second session to a diversity of scientists and policy makers involved in national germplasm policy development around the world making as well as those involved in national and international efforts to conserve plant germplasm. Where appropriate, briefings on each report will be held for national and international organizations involved in formulating germplasm conservation policies and strategies.

Project Budget and Funding

The budget for the second phase of the Keystone International Dialogue Series on Plant Genetic Resources Project is $299,350 and is detailed in Attachment 1.

In addition to the W. Alton Jones Foundation, funding for the first phase of the Dialogue Series was received from The Ford Foundation, U.S. Department of Agriculture-Agricultural Research Service, CIBA-GEIGY Corporation, Pioneer Hi-Bred International, Inc., Wallace Genetic Foundation, Inc. DeKalb-Pfizer Genetics, and the German Marshall Fund of the United States.

Support for the second phase of the project in the amount of $100,000 is requested from the W. Alton Jones Foundation. Funds from the Foundation would be used to support the participation in Dialogue activities of representatives from research and academia, non-governmental organizations, and developing countries. Funds would also be used to cover expenses for report development, production and dissemination.

Staff Qualifications

The staff involved in the Keystone International Dialogue on Plant Genetic Resources are individuals well-versed in the fields of environmental, energy and science/technology policy. These staff are experienced and trained facilitators and mediators who have handled highly complex negotiations.

Robert W. Craig, President and Founder of The Keystone Center, has been a facilitator and mediator for over 30 years. Before establishing the Center in 1975, Mr. Craig was Executive Director and Vice President of the Aspen Institute for Humanistic Studies for 12 years. Mr. Craig has B.A.'s in Philosophy and Biology from the University of Washington, and has an M.A. in Philosophy of Science from Columbia University, where he also completed requirements for a Ph.D.

John R. Ehrmann, Senior Vice President and Director of the Science and Public Policy Program of The Keystone Center, has been a facilitator and mediator for over six years. Mr. Ehrmann has a B.A. in Geography and History from Macalester College, and an M.S. in Natural Resource Policy from the University of Michigan. He is in the process of completing his Ph.D. dissertation on public policy dispute resolution at the University of Michigan.

Michael T. Lesnick, Senior Vice President and Director of Training and Organizational Development, has been a facilitator for over 15 years. Before joining the Center in June of 1986, Dr. Lesnick served as Associate Director of the Environmental Conflict Project at the University of Michigan, School of Natural Resources. Dr. Lesnick holds a B.A. in Political Science from Fairfield University, an M.S. in Natural Resource Policy from the University of Michigan, and a Ph.D. in Natural Resource Policy and Environmental Dispute Resolution from the University of Michigan.

Abby P. Dilley, Associate Director of the Science and Public Policy Program, joined the Center in October of 1985. She is a group facilitator and Project Director for the Environmental, Citizen, State and Local Leadership Initiative. She holds a B.S. in Biology from Colorado College and M.S.'s in Biology and Natural Resource Policy, Economics and Management.

John S. Huyler, Jr., Senior Associate of the Science and Public Policy Program, is the most recent addition to The Keystone Center staff. Before joining the Center, Mr. Huyler worked as an independent mediator. He has also served as a process design and public participation consultant, specializing in land use and water issues. He holds a B.A. in Philosophy from Princeton University and a M.P.A. from Harvard University, where his course work emphasized decision analysis and environmental law.

Connie D. Lewis, Coordinator of the Science and Public Policy Program, has been with The Keystone Center as a group facilitator since 1987. She serves as Project Director for the National Policy Dialogue on Biological Diversity. Ms. Lewis received a B.A. in Biology from Southern Oregon State College and an M.S. in Wildland Resource Science from the University of California at Berkeley.

Project Budget

KEYSTONE INTERNATIONAL DIALOGUE
ON PLANT GENETIC RESOURCES

Phase II

February, 1989 - February, 1990

Overview of Activities

Continue implementation/dissemination of
first plenary session results
Plan for second plenary session in India
Hold Steering Committee meeting and technical exchange
at Vavilov Institute
Conduct second plenary session in Madras, India
Implementation/dissemination of second plenary
session results

I. Personnel	
Project Manager: project administration; facilitate Steering Committee and plenary session; coordinate and administer implementation strategy; coordinate preparation of interm and final reports	$ 20,000
Facilitators: 6 facilitators @ $700/day x 2 days preparation/meeting plus 4 days facilitation x 1 session	25,200
Financial Administration: manage accounting, travel reimbursements, stipends, meeting and meals logistics	5,000
Personnel Sub-total	$ 50,200
II. Staff Travel and Expenses	
Transportation, Room and Board for advanced logistical visit to Madras, India for Project Manager	$ 4,000
Air and Ground Transportation to Plenary Session in Madras, India: 6 Facilitators and 1 Administrative Assistant @ $2,500/person	17,500
Room and Board: 7 Staff @ $100/day x 7 days (2 days preparation, 4 days meeting, a day debriefing)	4,900
Staff Expenses Sub-total	$ 26,400

III.	Participant Travel and Expenses for Plenary Session in Madras, India*	
	Air and Ground Transportation: 25 participants @ $2800/participant	$ 70,000
	Room and Board: 25 participants @ $100/day x 6 days	15,000
	Participant Expenses Sub-total	$ 85,000
IV.	Steering Committee Meeting Expenses: Travel, food and lodging for 7 committee members and 2 staff to Vavilov Institute in Leningrad, U.S.S.R. for meeting and technical exchange (Vavilov has agreed to support 2 additional participants)	$ 50,000**
V.	Second Plenary Session Expenses: Room rentals, audio-visual equipment, computer rentals, group functions	$ 6,000
VI.	Final Report Preparation, Printing and Dissemination (2,500 copies) from Second Plenary Session in India	$ 18,000
VII.	National and Regional Briefings Expenses	
	Travel, food and lodging support for 4 dialogue group members x 3 briefings @ $3,000/person	$ 36,000
	Invitations, room rental, equipment rental and supplies, group luncheon expenses	10,000
	National and Regional Briefings Sub-total	$ 46,000
VIII.	Other Direct Costs	
	Secretarial	$ 7,000
	Communications (telephone, fax, telex, cable)	5,000
	Office/Meeting Supplies	750
	Photocopying	2,000
	Postage	3,000
	Other Direct Costs Sub-total	$ 17,750
	GRAND TOTAL - ONE YEAR BUDGET	$299,350

* The Keystone Center will provide support to participants from public interest groups, non-governmental organizations, research and academia.

* Based upon preliminary estimate of costs by Director of Vavilov Institute. In the event the Steering Committee meeting cannot be held in the U.S.S.R., it will be held in either London or Washington, D.C. and this figure will be lowered to $21,000.

SEEDLING

THE SEEDS CAMPAIGN IS A SPECIAL PROGRAMME OF THE INTERNATIONAL COALITION FOR DEVELOPMENT ACTION

OCTOBER 1988, Vol. 5, NO. 5

IN THIS ISSUE....

SEEDLING
is the bi-monthly bulletin of ICDA's Seeds Campaign. It is published for those individuals and groups who are active or interested in the campaign for the conservation and free exchange of plant genetic resources, the fight against monopoly control over those resources and the fight against the erosion of genetic diversity.

SEEDLING
aims to support this struggle and provide a channel for information-exchange among people involved in the campaign. To do this we need your help. Please send us information about your activities in this field, articles, campaign materials, research results, criticism and sug gestions.

SEEDLING
readers are invited to support the FAO Fund for Plant Genetic Resources through a symbolic contribution of 1% of the bulletin's production costs. The Fund aims to promote conservation and utilization of plant genetic resources at the local level in Third World communities. Send a US$ 15,-- check to the ICDA Seeds Campaign Secretariat which will the transfer the money to the FAO.

SEEDLING is edited by Henk Hobbelink and Renée Vellvé
Direct all correspondance to: **ICDA Seeds Campaign**
Apartado 23398, 08080 Barcelona, Spain. Tel: (34-3) 3026495

KEYSTONE DIALOGUE ON GENETIC RESOURCES

Global initiatives to discuss and take action on one of today's most fundamental threats to sustainable development -- genetic erosion -- are multiplying faster than we can count them. While international bodies such as FAO (Food and Agriculture Organization of the United Nations), UNEP (United Nations Environment Program), IUCN (International Union for the Conservation of Nature) and the WWF (World Wildlife Fund), to name but a few, have long been active in the realm of genetic conservation, the recent publishing of the World Commission on the Environment and Development "Brundtland Report" (1987) has provided an incentive for newer and more innovative activities.

Clearly in line with this trend, the US-based Keystone Foundation has initiated a "Dialogue Series" designed to *"bring together the significant constituencies involved with plant genetic resources in a structured, off-the-record process to develop consensus recommendations on the conservation and utilization of global plant genetic resources."*

The first plenary session of this series attracted a selection of industrialists (Ciba-Geigy, Dekalb-Pfizer, Pioneer Hi-Bred), government institutes (China, USSR, Indonesia, USA, Brazil, Sweden, Ethiopia, the Netherlands), nongovernmental organizations (CGIAR, IUCN, IBPGR, RAFI, ENDA, SIBAT), intergovernmental bodies (FAO) and a smattering of American academics to Keystone, Colorado (USA), from 15-18 August 1988. This seminal session, chaired by the ex-Director of IRRI (International Rice Research Institute) Dr. M.S. Swaminathan, was devoted solely to *ex situ* conservation strategies.

While the spirit of the Dialogue Series is to arrive at consensus, with each participant representing himself as an individual, a close reading of the final report shows that NGOs who have long been advocating the role of grass-roots organizations in conservation and breeding of local diversity, the appropriateness of "farmers' rights" and the critical importance of FAO's recent advances in the field of genetic resources management, clearly marked the discussions.

A wide range of issues regarding *ex situ* conservation were discussed, including the following: purposes for plant genetics resources conservation; research activities and gaps; definition and implications of "common heritage" and "common responsibility"; breeders' rights, patents and "farmers' rights"; and finally, organizational aspects of collection, conservation, evaluation and utilization.

The 41-member group came up with some interesting conclusions and recommendations. For "dialogue" purposes, the group based its deliberations on consensus approval of what was to be understood by genetic resources as "common heritage". According to the draft report, participants agreed that the idea of common heritage should be retrospective, i.e. an approach *"that would view genetic resources as borrowed or held in trust by present generations for future generations recognizing the tremendous contribution of past generations of farmers to the domestication and evolution of crops."* It was felt that this link implied "common responsibility" that should take form of financial arrangements to conserve the genetic diversity farmers have provided us for the future.

Several other principles undergird the group's final recommendations for improved conservation and utilization of our planet's plant genetic wealth. The role of women in several activities revolving around seeds was emphasized, as well as the importance of fostering *"symbiotic linkages between the formal conservation system (gene banks, botanical gardens, etc.) and the informal community sector"* for self-sustaining world conservation strategies. The key concept of "farmers rights", the very axis of FAO's current initiatives in genetic resources, was seen as *"a recognition that landraces have value as a result of the labours of many farmers over long periods of time"* . Recognizing the rights of farmers, the participants also considered the rights of breeders. In this respect, concern was expressed about the impact of patenting. It was stressed that more analysis is needed on the different options of intellectual property protection. The participants felt that there is a continuous need for effective public and farmer-based breeding programmes alongside private activities.

Based on these general ideas, the Keystone Dialogue has come up with very specific proposals. Aside from calling for the establishment of national policies and national commissions on plant genetic resources, the group stressed that regional conservation/utilization initiatives should be further strengthened. While the Costa Rican CATIE and Nordic regional genebanks were pointed out as excellent examples of such cooperation, support was voiced for the latest attempt to set up a regional genebank in the SADCC region.

Perhaps the most remarkable and encouraging part of the proposals is the strong emphasis put on the role of farmers and grass-roots NGOs at the local level. With the recognition that *"local communities have played an important role in plant genetic resources conservation since the dawn of agriculture"*, strong support was voiced for grass-roots activities including training programmes, NGO workshops and educational activities.

Regarding activities at the global level, the group identified the most important agencies now active on the issue. Interestingly, also NGO networks such as SAN and IOCU were seen as important actors. FAO was credited for doing an excellent job in creating political will and commitment for conservation and exchange of genetic resources. To strengthen this work, the group recommended two strategies: either that FAO open its doors to non-members into the Commission arena or that the Commission be expanded into a UN-FAO Commission. It was further pointed out that this global body should *"gradually evolve into a Commission on Biological Diversity"*, not limited to plants. These two points are linked, firstly, to the fact that countries like the Soviet Union are holding vast depositories of genetic resources but, not being members of FAO, are excluded from intergovernmental discussions on germplasm conservation and exchange. Secondly, with the rising importance of biotechnologies, all forms of genetic material, from animal cells to bacteria, are being further integrated in the same experiments and products, and suffer the same forms of erosion.

To structure and promote current activities at the global level, the Keystone report calls for the establishment of a "Global Independent Advisory Committee for Plant Genetic Resources" and for the setting up of a "Global Funding Facility". The Committee would have wide representation from all interested parties and be charged with: assessing and reviewing plant genetic resources needs; providing advice to the FAO Commission; helping prepare a biennial report on the *State of the Plant Genetic Resources of the World*; and monitoring and upgrading financial flows for the support of genetic resources activities.

On the Global Funding Facility, the group noted the existence of the FAO Fund for Plant Genetic Resources, but went further by stressing that countries should be obliged to contribute to genetic resources funding. Along the lines of IDA's "1% Campaign" *(See Seedling, Vol 5, No. 3, May 1988)* it was proposed that such funding could be done on the basis of the value of seed usage or sales.

Altogether, the August discussions at Keystone were vast and fruitful. The most encouraging outcome is perhaps the recognition of the rights of farmers, the support for grass-roots activities at the local level and the proposal that countries should be obliged to contribute financially to genetic resources conservation based on national seed sales. The results of the Keystone meeting are important as they reflect a consensus of very different interests. It was, in fact, the first gathering of the sort with wide range representation, from industry hard-liners to Seeds Action Network members. Follow-up work on this meeting will be undertaken to facilitate the implementation of the recommendations through meetings in Leningrad and New Delhi in 1989.

The final report of the first session can be requested from The Keystone Center, Box 606, Keystone, Colorado 80435, USA.)

nature

INTERNATIONAL WEEKLY JOURNAL OF SCIENCE

Volume 336 No.6197 24 November 1988 $5.50

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Washington

Du Pont announced last week that it is to begin selling transgenic mice carrying activated human cancer genes, or oncogenes. The mice were developed by Philip Leder of Harvard University and Timothy Stewart, now at Genentech, and were the first genetically altered animals to be patented. The patent, held by Harvard University, covers any transgenic non-human animal bearing an activated oncogene sequence introduced by genetic-engineering techniques.

The first 'oncomice' will carry the *ras* oncogene, which has been shown to be common in a variety of human cancers, plus a mouse mammary tumour virus promoter which ensures that the oncogene is activated in breast tissue so that the mice develop a human breast cancer within a few months of birth.

Du Pont says that oncomice will help speed the search for new drugs to treat cancer by allowing laboratories to test drugs against a human cancer in a animal. Pharmaceutical companies are likely to be the major purchasers. A price of $50–$100 per mouse seems likely, five to ten times that of an ordinary laboratory mouse. Later next year, Du Pont will offer mice bearing *myc* and *neu* oncogenes which are also found in human cancers.

But the sale of Du Pont's mice may be threatened by changes in government policy. Patent applications for more than twenty genetically engineered animals have been filed with the US Patent Office but animal rights activists are mounting an increasingly vociferous campaign to ban the patenting of genetically engineereed animals. Alun Anderson

Boston nets BASF

Munich

THE chemical and pharmaceutical giant BASF AG announced on 11 November that a genetic engineering laboratory and pilot plant originally planned for West Germany will now be built in Boston. New regulations took effect in West Germany on 1 September, under which any production facility using genetically engineered organisms must be opened to the public for inspection before it can be approved. BASF anticipated objections from environmentalists and did not relish the idea of showing its design to the competition. Furthermore, the "climate for innovation" is better in Boston, said a spokesman, where there is a high concentration of experts in the field.

The complex is expected to cost DM100 million (about $60 million) and to be completed in 1991. It will employ 60 scientists and 170 others in research and development in oncology and immunology. It was meant to be built at BASF headquarters in Ludwigshafen, near Heidelberg in southwest Germany. Steven Dickman

Prospects for agreement on genetic resource issues

Washington

A BLUEPRINT for international action to preserve plant genetic resources emerged this week with the circulation of a draft document from a remarkable four-day international meeting held in Keystone, Colorado, in the summer. Although preservation of plant genetic resources is recognized as vital to the long-term health of the world's agriculture, attempts to coordinate efforts have been thwarted by competing international bureaucracies, and by divisive arguments between developed and developing countries.

The Keystone document represents a consensus that could cut a path through social and political complexities. The meeting organized by the Keystone Center in Colorado drew participants from all major concerned organizations, but encouraged them to speak as individuals. Only results that all could agree on were published.

The root of the problem is the fact that most of the world's naturally occurring genetic diversity for major crops exists in the developing world, but resources for breeding new crop lines or storing crop germplasm are in the developed world.

Proponents of 'farmers' rights' argue that plant breeders who use germplasm taken from primitive cultivated varieties ought to recompense the farmers who nurtered those seed lines for centuries. Developing countries doubt that genetic resources stored in banks in developed countries would be freely available.

Divisions between North and South also make it hard to decide who should be steering the international efforts to preserve plant genetic resources. In 1971, the World Bank established the Consultative Group on International Agriculture Research (CGIAR) which now acts as an umbrella organization for 13 international bodies, including the International Rice Research Organization in the Philippines and the Centro Internacional de Mejoramientio de Maiz y Trigo in Mexico. In 1974, another CGIAR body was established, the International Board on Plant Genetic Resources (IBPGR), with the aim of promoting worldwide conservation and utilization of plant genetic resources. IBPGR, like CGIAR, is run largely by the developed countries.

The Food and Agricultural Organization (FAO) of the United Nations is another major body interested in preserving genetic resources. In 1983, FAO established a new special Commission of Plant Genetic Resources. But several developed countries, notably the United States and Canada, declined to participate.

Several of the misconceptions barring progress may have been cleared away by the Keystone meeting. A key accomplishment, according to Pat Mooney of the Rural Advancement Fund International, an outspoken proponent of farmers' rights, is the new understanding on compensation. Although compensation is owed to farmers, Mooney says, he now believes it is understood that it is not necessary to pay each individual farmer whose seeds are used in the development of a new line.

To resolve the compensation issue, participants in the Keystone dialogue suggest an international fund to be administered by a global independent advisory committee, with members drawn from FAO, IBPGR, the International Union for the Conservation of Nature and Natural Resources (IUCN), non-governmental organizations and industry.

There was also progress on who should guide international resource management. Although the FAO commission was praised for the work it had accomplished, the Commission was urged to expand its membership to include all countries. Barring that, the dialogue paper suggested forming a joint United Nations–FAO body that could report directly to both UN headquarters and FAO.

The report also urged that regional groups should become more involved in protecting resources, and that appropriate technologies be developed to make participation possible for the developing world.

Enthusiasm for the accomplishments of the Keystone dialogue is running high. M. S. Swaminathan, president of IUCN and chairman of the steering committee that organized the dialogue, says that considering the divergent opinions represented by the participants, the meeting went extremely well. Jose Esquinas-Alcazar, secretary of the FAO commission says that the Keystone meeting was the first real opportunity for all the interested parties to work together.

Some have reservations about just how much was accomplished, however. John Holden, a member of the IGBPR board of trustees, says the group's goals were so broad that it may be difficult to implement them. Donald Duvick of Pioneer Hi-Bred International, says that clearing the air is important, but difficult problems of intellectual property rights remain.

The dialogue does at least look set to continue. Swaminathan says there are tentative plans for another meeting in Leningrad next year. **Joseph Palca**

The final report of the Keystone International Dialogue Series on Plant Genetic Resources (August 15–18, 1988), is available from PO Box 606, Keystone, Colorado 80435, USA.