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**FORMALIZED SCIENCE AND TRADITIONAL KNOWLEDGE:  
FOUNDATIONS OF A PARTNERSHIP WITHIN THE FRAMEWORK OF  
THE CONVENTION ON BIOLOGICAL DIVERSITY**

**SECOND CONFERENCE OF THE PARTIES  
TO THE CONVENTION ON BIOLOGICAL DIVERSITY**

Jakarta, 7- 17 november 1995

## **Introduction**

Within the framework of the CBD we propose to create a qualified Panel at which western scientists and research workers can discuss diversity on equal terms with the representatives and spiritual leaders of indigenous and nomadic peoples and traditional local communities from the developing and the developed countries.

The premise underlying the Panel is the awareness that before strategies for the protection of the ecobiosphere can be implemented we urgently need to launch a dialogue between the formalised and informal sciences. The Panel will be designed as a platform for a free, open, cultural and scientific dialogue capable of making a substantial contribution to the negotiations.

The current negotiations on biodiversity aim to establish co-operation mechanisms leading to the drafting of regional and international research programmes. There is, however, a risk of an impasse arising from the difficulty encountered in getting to grips with the scientific problems inherent in biodiversity. The urgency and importance of initiating a dialogue between the formal and informal sciences is evident when we consider the following:

- The sustainable use of biodiversity occurs primarily in the indigenous areas that exist on the margins of the global economy or in areas that have been managed by local communities for centuries. This is equally true of the developed and the developing countries.
- These populations still keep a tenacious hold onto cultural diversity, often at the cost of fighting hard for it, and use it as a resource to manage and enhance biodiversity.
- While *ex situ* conservation is mostly from the western model, *in situ* conservation largely employs both the practices used by the locals for centuries as well as the scientific and technical know-how of indigenous peoples and traditional local communities.

- In situ conservation is an essential science for the protection of ecosystems. It reflects the indigenous vision of biodiversity which aims primarily to extend knowledge of the relationships between species, including humankind. This aspect of the dynamic of biodiversity has been largely ignored or undervalued by western science, since it is impossible to formalise.

All this leads us to reflect on the particular scientific value and significance of the 'indigenous question' in the context of the CBD. What has to be recognised is that the study of diversity demands an approach that is both interdisciplinary and intercultural. Hence, we cannot do without indigenous science if we are to understand biodiversity and establish strategies of sustainable use.

For this reason, establishing co-operation with indigenous peoples has to be a primary CBD objective. To this end we must assign the knowledge and experience of indigenous peoples, nomadic peoples and traditional local communities the same scientific dignity and respect we attribute to formalised Western science. In order for a dialogue between different sciences to be feasible we need to establish new methods and new laws capable of protecting traditional knowledge on the basis of shared research founded on scientific parity.

It is not a question of launching a process of knowledge integration as some papers claim. ("It was felt that scientific capacity-building and mobilisation of financial resources should be integrated into a general national capacity-building programme and should incorporate the use of indigenous knowledge". UNEP/CBD/COP//1/16, 7 November 1994). On the contrary every effort should be made to promote dialogue on equal terms in recognition of the fact that it is vitally important to maintain cultural diversity in order to protect biological diversity. We need to recognise that the value of indigenous science and traditional knowledge lies precisely in their diversity, in their capacity to retain that diversity over time and in their non-assimilation into the global model.

Seen from this angle, we think it important that this workshop be supported by a european country like Spain. This would help to underline the West's need to rediscover and assess the scientific value and ecological significance of the relationship between environmental and cultural diversity.

As things stand, several delegations in the CBD have recognised the need for the direct participation of indigenous peoples and local communities in the activities undertaken under the aegis of the Conference of the Parties. In addition, some countries have established partnerships with their own indigenous peoples and some intend to include indigenous representatives in their delegations. All this is extremely important. However, such individual initiatives need to be supported by a more general strategy at scientific level in order to overcome the difficulties that may arise in respect of specific political or national problems.

## **Proposals for the implementation of the CBD**

In the light of what emerged from the first meeting of the SBSTTA and as regards the "modus operandi" (UNEP/CBD/SBSTTA/1/ L.1/ Add.2) as well as the provisional agenda for the Second Meeting of the SBSTTA, we wish emphasise the fact that the resolutions passed offer us the concrete opportunity to launch a working programme for the implementation of art.8 and 8(j).

Since this topic will be tackled in 1996 as part of both the Medium-term programme of work of the Conference of the Parties, items 6.5 e 6.5.1., and the Draft Provisional Agenda of the Second Meeting of the SBSTTA, item 3.5 and item 5.1.1 (UNEP/CBD/SBSTTA/1/9/rev.1), it seems vital to develop a basis for scientific and cultural discussions from different view points as soon as possible.

With this in mind we propose:

1. to create an "ad hoc Technical Panel of Experts", as envisaged by the SBSTTA (UNEP/CBD/SBSTTA/1/L.1/Add.2) and be required to offer specialised advice to the Second Meeting of the SBSTTA and to report to the Third Conference of the Parties
2. that the topic for consultation be the "Scientific, cultural, ethical and legal foundations of a partnership between the formalised sciences and traditional knowledge in the Convention on Biological Diversity".
3. to adopt the approach and exploit the potential offered by the ISCD (International Scientific Committee on Diversity) in tackling the question, that approach being based on the use of a qualified international work group of scientists from different disciplines and geographical areas as well as representatives of indigenous peoples and similar groups working together on a basis of parity of scientific esteem.
4. that this Panel be consulted on the following subjects:

- 4.1 - Alternative methods for the identification of the individual aspects of biodiversity as well as appropriate local conservation action and practices (Art.8, in particular 8(j))
- 4.2 - The impact of biotechnology on in situ conservation (art.14 and Biosafety protocol).
- 4.3 - Forms of technical and scientific co-operation (Art.18-4)
- 4.4 - Intellectual property rights and new models for the protection of traditional knowledge (First Conference of the Parties).

**Dialogue between formalized science and traditional knowledge:  
problems and considerations**

The scientific and methodological basis for our proposal is represented by the activities of the ISCD Diversity Project. The following topics were identified as key aspects to be examined in depth on the basis of an interdisciplinary, intercultural confrontation between formalized and non-formalized science.

These include:

- **BIODIVERSITY ANALYSIS:** We need to go beyond the dominant approach based essentially on inventories and to study biodiversity in its relationship with cultural diversity.

At present, the question of biodiversity is faced in hierarchical and sectorial terms and is generally considered to be of interest only to specialists. The prime concern seems to be to create inventories and to enumerate diversities. These classifications may surely have a certain but limited function. The current concept of biodiversity is also limiting because it excludes man who becomes its supreme observer and director. Man, however, is immersed in biodiversity, he is part of it, must be recognised as one of countless agents of infinite environmental manipulations which the planet endures. This explains the necessity to reinterpret in non hierarchical terms the position of mankind in the ecosystem and to rediscover the bond which exists between biodiversity and cultural diversity.

There is a two-way link between biological (or environmental) diversity and cultural diversity. To break it, or to act without taking it into account, is to further the reduction in the number of living species and cultural options -- in other words, homologation. Homologation is the real problem that we must address and fight. Pollution, waste, loss of biodiversity are aspects of the process of homologation.

In fact, the risk of reduction is not limited to biodiversity. This is the tip of the iceberg formed by more general process which can be identified as a decline in ecological differences induced by man-made activities

which introduce massive one dimensional fluxes of material and energy into ecosystems.

This causes a trend towards the levelling of thermodynamic differences (the greenhouse effect, the raising of the temperature of oceans and other macro and micro phenomena). The possible consequence is the simplification of the ecosystems which undergo a progressive reduction of their own capacities to produce useful work in as much as the initial energetic state continuously resembles the final states. The number of components of the system tends to reduce because the request for specialised functions diminishes and with this capacities of exchange and, in final analysis, of regenerations disappear.

Understanding the relationship between cultural diversity and biological diversity means bringing the social dimension back into the environmental question. In this new light, the limitations of the conservationist strategy that has prevailed up to now become clear. In aspiring to safeguard the integrity of nature, people tend, as a matter of concept and fact, to exclude the human presence from targeted ecosystems. Hence the environmental question often takes on absolute or utopian tones that alternate between predictions of global catastrophes and declarations of unconditional faith in the problem-solving capacity of technology, but offer no real way out. Both visions, by severing humans from their environment, tend to foster homologation.

Combining biological and cultural diversity implies acknowledging that there is not just one nature and one science, but many kinds of science and nature, each resulting from the relationship between a given society and its environment. This means that every environment is controlled and manipulated by the rules of the society that inhabits it; in other words, local biological diversity and cultural diversity evolve in the same dynamic context.

Cultural diversity bears witness to the existence of a scientific relationship between a society and its environment. Coexistence between nature and culture is as valid and vital as it is ancient. In this sense a culture may be considered functional vis-à-vis the environment in which it operates if the ensemble of thought, technologies and practices that define it tend to limit the decline in the quality of its

resources and increase its biodiversity. We could say that such a culture tends to limit what appears to be the unhaltable entropy of such a closed and limited system as our planet appears to be.

Seen in this light, our current development model based on cultural and technical indicators which lead us to believe that technology can be infinitely replaced by resources is unable to maintain ecosystems. While historically our current development model is based on a specific and limited cultural and natural environment the survival of the environment has depended on refining methods for the exploitation of all resources, wherever these could be found. The result is a tendency to erode resources i.e. differences in some cases to the point of draining them completely. This process, which we call "homologation" has reduced the number of and relationships between species, that is biological and cultural diversity.

It should be pointed out however, that cultural diversity does not derive automatically from environmental diversity, always and everywhere. If cultural diversity is the conscious manifestation of environmental diversity, then the former contains the latter, not vice versa. Human culture may, in fact, choose to reduce or to fuel environmental diversity. It may, in other words, choose to regard it as a resource or as a waste product. There can, however, be no doubt that whatever we choose to do, diversity remains a resource and that there are peoples who use it as such.

Assuming that environmental diversity is a sub-system of cultural diversity, we may also claim that environmental homologation is a sub-system of cultural homologation. This means that cultural diversity, where manifested and practiced, guarantees environmental diversity by playing an active role in its maintenance and development.

Assimilation, civilization, evangelization and westernization are all processes of homologation that destroy cultural diversity and directly threaten environmental diversity. Conversely, if we think of diversity as a resource, we open a whole new spectrum of options in the relationship between humans and nature, enlarging the possibilities of awareness, of lifestyles, and of environmental management.

- **SCIENCE AND DIVERSITY:** the cognitive limitations of formalism have to be recognised if we are to use the study of diversity to promote the reorganisation of science in interdisciplinary and intercultural terms.

While diversity is at the basis of the thermodynamic and biogeochemical processes that govern life and existence, it also represents a "philosophical" line of research, formation and organisation alien to the model of development which has prevailed ever since Industrial Revolution. While science, which was formalized according to deterministic concepts, aims at finding solutions to specific problems and reaching even ambitious objectives, it has on the other hand sectorized scientific research, disciplines, and technologies with the result that it has become impossible to share, communicate or integrate knowledge. Science is not in a condition to interpret and intervene in the natural environment which has proved to be highly specialised, complex and unpredictable. Furthermore there is a high degree of interrelation between the various phenomena due to this extreme diversification.

There is a need to see whether the basic formal structures that underlie mathematics and physics are appropriate for addressing problems and phenomena that involve vital relationships such as the ones that affect diversity. If not (as we believe), we need to marshal all our intellectual abilities and review the techniques and sciences used to manipulate the environment.

We do not propose to give up formalism, but to recognize its social and cognitive limitations. With formalism as our only guiding principle, we are unlikely to become aware of the diversity and development of a science of relations whose predominance has contributed decisively to the present sectoralization of disciplines.

It is a well-known fact that to describe a phenomenon by mathematical formalities, we necessarily proceed by averaging. Fine details are overridden, and we are left with a relatively rough description of average appearances in a standardized space, applicable almost everywhere. Although formal theories always stem from a concrete need to study a given problem or class of problems, they may result in the construction of models that simplify rather than explain reality.

Models conceived to solve a given problem can be taken to the global level through formalization, but only at the cost of disjoining them from time and space. Conversely, bringing a theory conceived as a theory of remote action (for instance, global change) down to the local scale does not increase awareness and can be dangerous for the effects it may produce as it misleadingly circulates as knowledge.

The formalization of reality does have the advantage of enabling us to address a problem without being distracted by its specific features. To the extent that one can work on a formal theory without knowing its possible applications and ends, the process of formalization contributes to the division of scientific work as well as to the separation of knowledge.

Today the formal approach to biodiversity tends to call for specialized studies of a numerical and hierarchal type, rather than qualitative. This leads on the one hand to inventories, and on the other hand to attempts to measure diversity by the techniques of calculus. Once again, the results ignore relationships among species (including mankind) and the biotic and abiotic environment.

- **PARTNERSHIP BETWEEN DIFFERENT SCIENCES** : the scientific and ecological value of the cultural diversities of peoples and ancient communities should be seen as expressions of different knowledge and techniques of existence.

The fundamental bond between cultural and biological diversity appears to be sounder and conditional for survival wherever the ecological dynamic proves to be more extreme and specialised. And if the complexity of a system is identifiable with its own capacity for self sufficiency, then this really seems to be the most important characteristic of indigenous peoples. These peoples appear deeply immersed in a complicated weaving of relations and influences between their human, technical and productive organisations and that of the local or specific environment. They are so highly involved in participating in and penetrating the ecosystem that they have no evident propensity for expansion and quantitative development.

The same scientific dignity ascribed to formal science should also be recognized in the knowledge and experience accumulated by the indigenous peoples, local communities, ancient cultures and nomadic peoples living in both the industrialized countries and the developing world. Appropriate methodologies need to be devised for dialogue among different kinds of science, ensuring that scientists specialized in the study of diversity and the peoples and communities that are keepers and bearers of diversity have the same freedom of expression. Indigenous knowledge is not only an essential resource per se, but can also suggest methods based on indigenous ability to experiment and invent.

Indigenous peoples and similar groups that have been able to maintain their cultural identity and control their traditional resources offer concrete examples of high technology linked to a profound awareness of ecological dynamics. Outside observers have noted that the integrated systems these peoples have developed for the management of plants and animals work as a way of broadening local gene pools. Accordingly, they constitute a valid alternative to the current costly and destructive monocultural system of environmental management. Indigenous knowledge not only represents a substantial resource, but can also provide methods of discovery based on indigenous ability to experiment and invent.

It is vitally important to ensure that the indigenous and nomadic peoples and the local communities which practice diversity participate in the construction of a new kind of science. If this is to occur, we shall have to abandon the method that has been used up to now and which involves the appropriation, sometimes by violent means, of the know-how, technologies and products generated by those societies. In recognizing the need for reciprocity, we need to work together on the construction of new communication methods for setting up and maintaining dialogue, scientific and cultural relations and new legal regulations.

The creation of interdisciplinary and intercultural groups may be the right vehicle for know-how and technology transfers between different people and is of vital importance, considering that scientific principles are established not only on the basis of evidence brought to bear on a given problem, but also as the result of relations among scientists.

To foster dialogue among different types of science, it is necessary to influence the processes involved in learning and imparting knowledge, and to create social and educational venues that can encourage the emergence of new modes of communication between bearers of indigenous and formal knowledge. Moreover, this is a way to avoid the imposition of so-called modern solutions, which in reality are unilateral prescriptions that lack an understanding of diversity and cannot solve local problems such as the care of key animal species.

- **NEW RIGHTS:** The protection of indigenous science, practices and resources is the essential prerequisite for any partnership based on justice and equality.

The new law, which we have called 'Traditional Resources Rights' should be introduced into all international agencies and negotiations concerned with the environment and in particular into the conventions on biodiversity and climatic changes, into the Commission on Sustainable Development and into the treaties concerned with the Ozone layer, Deserts, Forests etc. It should be viewed as a fundamental instrument for linking cultural and biological diversity to the extent that the existence of the former guarantees the existence of the latter. Furthermore, aside from the full de facto and de jure recognition of indigenous science, it has been proven that up to now the transfer of traditional knowledge and practices has actually taken the form of unilateral appropriations that have tended to degrade, pervert or even destroy their sources.

Know-how relating to the sustainable management of biodiversity, biotechnologies, agricultural and food products, medicines etc., as well as the traditional environmental management techniques developed by indigenous peoples and traditional communities should be considered fully-fledged inventions and the fruit of scientific processes. These are the intellectual property of the communities that produced them. Hence they should be legally protected and constitute a major source of benefits and revenue for their creators.

This type of problem has become a central concern of many sectors and international treaties dealing with human rights, labour laws and

intellectual property. In the Convention on Biological Diversity, in Agenda 21, in ILO Convention 169, in the Declaration of the Rights of Indigenous Peoples passed by the United Nations and in other international fora, this is a highly topical question, not merely because of its many implications, but also because it provides new food for thought and proposals that seek a more adequate approach to the issues.

The greatest difficulty arises when, in drafting juridical machinery for its protection, we are faced with the collective nature of traditional knowledge and with the impossibility of identifying the owner of certain know-how or the creator of specific inventions. This brings us into outright conflict with the western legal approach which is based on the individual and does not formally recognise indigenous knowledge, practice or spirituality as a genuine science capable of producing innovation.

We might overcome this impasse by changing the terms in which the question is posed. In order to grant full rights to traditional knowledge, we need to start from the definitions, rules and models adopted by the indigenous peoples themselves for the recognition and protection of intellectual property. Our aim is to define intellectual property rights as an entirely new concept in order to establish a new 'sui generis' system of laws and non-legal support structures required if we are to support, defend and strengthen the indigenous communities and their science. This process will need to be implemented with the full participation of the indigenous peoples and local traditional communities who should be allowed to make their own direct contribution to the creation and testing of the instruments that best suit them.

Seen from this angle, the fact that even today only governments participate in negotiations on the environment like Parties constitutes a serious drawback. Since the participation of indigenous peoples is deprived of official status there is still no place in the negotiations for their science which nevertheless possesses what the industrialized world is seeking, namely the know-how and techniques required for any sustainable use of resources and for the conservation of biodiversity.

- **INTERNATIONAL COOPERATION AND TECHNOLOGY TRANSFER:** We need to replace the current process of unilateral technology transfer with one based on the concept of mutual consent and reciprocity.

With regards to cooperation on development, joint implementation, transfer of technologies among current programs and modalities, a trend towards technological and economic uniformity is evident. The fundamental idea remains that of helping those countries defined as "developing", while questioning which sort of development is appropriate. If the question remains unanswered unilateral relations among peoples, unidirectional fluxes of resources, technologies and cultures, lack of use and depression of local cultural, scientific, technological resources will continue as they always have to exist. In the light of serious gaps within the model to be exported this process has conspicuously proved to be senseless and often have been justified only as operations for penetrating new markets.

The world of international cooperation needs to switch from the policy of "aid" to "exchange," based on the idea that to overcome present environmental problems, it is essential to build a world in which different technologies, economies, cultures and sciences can coexist. Cooperation should become a mechanism of reciprocal influence and sharing, instead of homologation and the reduction of peoples and territories to that single model of development/no development which continues to be used to classify what is in reality a much more complex and diversified human environment.

A large part of the world's population lives in minimum-survival areas. We need to give a new sense to economic development, reconsidering our concept of wealth and poverty. A greater quantity of things does not mean a better quality of life. To rediscover the sense of an economic logic at the service of living things and human existence, we must reflect deeply on the relationship between economics and living things.

- **RESEARCH APPROACH:** we propose taking a qualitative approach to research on diversity, whereby the world is hypothetically divided into biocultural areas, making it possible to analyze situations in view of relational parameters and plan actions at the local level.

The Earth's ecosystem can be considered as a whole composed of subsystems univocally characterized by the relationship between environmental diversity (biological, climatic, geographic) and cultural diversity. By dividing it into biocultural areas, diversity can be studied in interdisciplinary and intercultural terms, and planning can rely on local experience. The basic idea is that the pursuit of sustainable development on a global scale is a false problem; it is more correct to say that the world has seen myriad cases of sustainable development, and it ought to be possible to establish a correlation between sustainability and diversity. Each bioculturally defined area can give rise to a model of sustainable resource use.

This plan allows us to consider two aspects:

- \* No scientific method, whether formal or not, analytical or experimental, can study the whole of a process or reality. Processes and realities are seamless, but one can mark off a part one intends to study with temporal and geographical boundaries drawn at will. Biodiversity is both a reality and a dynamic process. In order to understand it, we have to break it down according to the criteria we judge most convenient, then we can recompose it by studying cross-boundary flows and exchanges.
- \* The link between environmental diversity and cultural diversity is a local relationship. This assumption is consistent with the fact that no one lives globally, everyone lives and learns locally, and environmental specialization parallels cultural specialization. One may also observe that the more extreme the environmental conditions of human existence, the sharper and more determined the cultural diversity. The human communities that have evolved in extreme environments (deserts, rainforests, snowfast or alpine regions, islands, and so forth) developed highly specialized sciences that joined nature and culture in millenary coexistence. Such regions are considered "wilderness." It makes no sense to call them virgin or uncontaminated environments, because they have been influenced or transformed by human activity. This goes to show that most of the planet's biodiversity is not found in nature reserves or national parks, but in the populated areas of developing countries, on the far edge of the globalized economy. In urban and

economically developed areas, one can see how the relationship between cultural and environmental diversity influences rural land use and the relationships between cities, old towns and rural areas.

To sum up, a partnership between formalized science and traditional knowledge implemented within the framework of the Convention on Biological Diversity, should aim specifically :

- to progress from specialized research on biodiversity to interdisciplinary research on diversity conducted in partnership with indigenous peoples, nomadic peoples and traditional local communities;
- to develop an appropriate methodology for carrying on a dialogue and building a partnership between the formalized and non-formalized sciences;
- to contribute to develop new mods of international cooperation and define new concepts of entitlement to resources and new models of intellectual property.
- to develop interdisciplinary, interscientific and intercultural research projects in the areas of environmental management, economics and the use of technologies and resources for the purposes of reversing the trend towards homologation and to identify sound strategies for preserving diversity.
- to develop interdisciplinary, interscientific and intercultural training programmes taught in part by representatives of indigenous peoples, with the aim of broadening and devising new models for the transfer of knowledge.