BIOSAFETY FOR LOCAL COMMUNITIES THAT ARE SECURE

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1. INTRODUCTION

I have been given the Right Livelihood 2000 Award for my contribution to Biosafety globally, and to the recognition of Community Rights for the security of communities indigenously, endogenously and locally.

Working with sufficient detail at both local and global levels may, on first hearing, sound overstretching. But I do not feel that it is so. Any global act that is not locally grounded risks becoming insensitive to the local. And yet the person is always locally positioned. By definition, therefore, if the global is to remain also human, it must, at the same time, remain local. If we do not rigorously test global developments for their local friendliness, we risk creating run away dynamics that will rule humanity instead of serving humans. This is not to imply that global dynamics are all bad and have to be avoided. I think that many of the global dynamics and phenomena which are emerging are good for all humans, and hence also for any local community. But one force in the global dynamics which is not locally sensitive is enough to poison the whole process of globalization. That is why all my efforts to contribute at the global level have been locally rooted in Community Rights. That is why I believe that if the world is to remain humane, globalization cannot be pushed for the sake of exercising power by the powerful, i.e. by the United States and Europe, for the sake of controlling more trade by the rich, i.e. by the establishments of the United States and Europe.

In the forum opened by the quest for safety from genetic engineering and in the forum we have been pushing to open for ensuring the security of local communities in order to usher in a humane global village, we have made some progress. But a lot more remains. I will now give some detail on what has been achieved, what has failed to be achieved, and what remains to be attempted globally if genetic engineering is to become useful locally and, thus globally tamed so that it does not do irreparable harm locally, and so that its potentially horrendous local applications are made globally impossible. For fear of running out of time, I shall leave details on Community Rights for another occasion.

2. MY ROLE IN THE BIOSAFETY PROCESS

The Biosafety Protocle is an outcome of the effort of thousands of people who have worked physically together with me, but more so only together with me in intention through being geographically scattered all over the world. My scientific training as an ecologist prepared me to understand the implications of genetic transfer at will across barriers. My peasant background gave me a personal stake in rural safety, in local community security. I could thus speak and write about safety for life, and security for the local and indigenous communities. I did nothing more. Fortunately, I did not have to do anything more. My colleagues in Ethiopia heard me clearly. Their respective villages turned out to be the same as mine. My colleagues in Africa heard me. The Ethiopian village turned out to be the same as every African village. My colleagues in Asia, Latin America, the Caribbean and Oceania also heard me. My village became the universal Southern village. That is not surprising: both the safety of life and the security of the indigenous and local community became issues only because of the homogenous push at any cost of trade and power by the establishments of the United States and Europe. The Southern villages are infinitely variable, infinitely inter-compatible, and all seeking to resist insensitive homogenization.

For these reasons, we, from the South, negotiated more or less with one voice. I was lucky that my voice coincided with everyone else's. I receive this award in the name of all my colleagues. It is a recognition of our joint effort. I have no special qualities that they do not have.

3. SAFETY CONSIDERATIONS IN GENETIC ENGINEERING

I have heard statements to the effect that gene transfer among organisms is as old as life itself, that gene transfer is all that genetic engineering effects and that, therefore, genetic engineering is perfectly safe. I do not agree with this view, and I thus need to express in a summary form my fears of what genetic engineering may do unless we take appropriate precautions.

3.1 Risks Associated with Gene Constructs

Much of genetic engineering has been made possible by combining target genes with vectors, which are usually bacteria, viruses or transposes. All these break the natural barriers to foreign genes so that the target gene can enter cells and be expressed. The use of such contracts could thus produce unwanted effects through:

a) enhancing the natural horizontal transfer of genes;

b) the construct getting out of the transgenic organism and getting into non-target organisms;

c) the vectors, which are usually 'disabled' pathogens, getting new virulence that affects hitherto immune species.

3.2 The impossibility of fully understanding new traits **a priori**

A single gene is responsible for an enzyme, but traits are often an expression of the totality of interactions of the biochemicals in the cell. One can thus never be certain that the trait determined by one gene is going to be the same also when that gene is transferred into another species.

3.3 Implications of changes in concentration of biochemical may not be fully understood

When a transgene starts to function, it either generates a biochemical or biochemicals new to the species, or it changes the concentrations of existing biochemicals, or it may well do both. The net effect of such changes cannot be known a priori. A thorough study of the net effects is thus required before we can know the transgenic organism. And the unknown may turn out to be dangerous.

3.4 Chemicals new to the environment

One of the earliest successes in genetic engineering was the production of human insulin by a genetically modified yeast. One of the great promises of genetic engineering is that green plants will be made to absorb sunlight and produce a whole range of chemicals that are now produced in industrial plants. Naturally, these chemicals will find their way into the ecosystem and may cause pollution. It may also never be possible for a green plant genetically modified for the purpose and allowed to grow in the open to be eliminated, even if it is seen that it must. What may the effect on the food-web be? What problems my be caused to human health or to the environment?

3.5 Reproductive processes may put the gene construct into non-target species

Genetically engineered plants have been shown to transfer their transgenes into wild relatives. What will the impact on these unintended species be?

4. WHAT THE BIOSAFETY PROTOCOL FAILED TO ACHIEVE

In 1993, UNEP established a Panel of Experts (Panel IV) to explore the need for and modalities of a Biosafety Protocol and to make its recommendations. The USA was included. The USA delegation kept insisting that all genetic engineering did was mix genes from different individuals, which is what sexual reproduction does, and which is thus as old and as well tried as life itself. This is the basic thinking behind ‘substantial equivalence’.

In spite of the efforts of the USA to scuttle the process of initiating negotiations for a Biosafety Protocol, and in spite of its non-ratification of the CBD, it was included as a negotiating partner for biosafety by the 1995 decision of the Conference of the Parties of the CBD, which took place in Jakarta.

In the first negotiation session for a Biosafety Protocol, the G-77 and China failed to make any headway because Argentina kept voicing the same position on issues of critical concern to the South as did the USA. But in Cartagena, together with Chile and Uruguay, Argentina joined a newly created group consisting also of the USA, Canada and Australia, called the Miami Group. This made it possible for the members of the G-77 and China to become united again and focus on what is important to the South. The newly united South gave itself the name, the Like-Minded Group.

In 1992 and since then, Europe and the other OECD members have been taking a more sensitive attitude with regards to the use of modern biotechnology, and a more realistic view of the risks involved than the USA did. Nevertheless, the whole of the OECD was motivated to use the power vacuum created

globally by the collapse of the USSR to push globally for their political and socio-economic views, especially their Thatcher-Reagan version of "free trade". That is why they all pushed for the creation of the WTO. But now, Europe seems to be having second thoughts about the suitability of the WTO for fully dictating the norms of trade in GMOs. Thus, Europe supported by all but the Miami group, fought to prevent the subjugation of the Biosafety Protocol to the WTO agreements.

The thinking in the Like-Minded Group is that safety is paramount since most things unsafe tend to be tried out in developing countries. Southern natural environments are hotter and more biodiversity-rich and thus very different from those of the North. Therefore, if biosafety is subsumed by the trade agreements of WTO, this global body would not have adequate sensitivity for safety in the marginalized South.

It is a clash among these trends of thinking that paralysed the negotiations in Cartagena in February 1999. The effort to revive the biosafety negotiations got off to a good start in the informal consultations, which took place in Vienna in September 1999. The debacle of the WTO Ministerial Conference in Seattle and the growing negative public reaction in North America against the Miami group's blatant disregard of human and environmental safety, weakened its stand substantially so that the January-2000 negotiations in Montreal salvaged much of the biosafety system that had been so badly tattered in Cartagena. We now have a Biosafety Protocol that can give a modicum of safety, but one that can evolve to better reliability, given the desire to do so. What are the major failings of this Protocol?

4.1 Free Trade and the WTO

The draft negotiating text that had emerged from the failed negotiations in Cartagena had four draft articles which, to varying degrees, subjugated safety to the rules of trade. The worst of these Articles read as follows:

> *"The provisions of this Protocol shall not affect the rights and obligations of any Party to the Protocol deriving from any existing international agreement to which it is also a Party, except where the exercise of those rights and obligations would cause serious damage or threat to biological diversity."*

This Article [based on Article 22.1 of the CBD] would have effectively subjugated the Biosafety Protocol to the WTO agreements despite the qualifying phrase at the end. Legitimate domestic steps to protect human health and the environment, taken by a Party according to the first part of Article 2.4 of the Biosafety Protocol would then have become liable to reversal by the WTO under the threat of trade sanctions authorized by the Disputes Settlement Mechanism. It could be argued that, since the provision is the same as in Article 22.1 of the CBD, it should be accepted. It should, however, be pointed out that the CBD came before the WTO Agreements and it is thus appropriate that the Biosafety Protocol become updated and deal with the safety problems created by those agreements. In the opposite direction, the Miami Group wanted to make the subjugation absolute by deleting the words "except where … damage or threat to biological threat." Another bad article, originally introduced by the European Group [paragraph 2 of Article 22 of the draft Protocol as it emerged from Cartagena] stated:

> *"The Parties shall also ensure that measures taken to implement this Protocol do not create unnecessary obstacles to international trade."*

This draft article did not invoke "existing international agreements", meaning WTO agreements, to determine what are "unnecessary obstacles to trade" and it was thus softer than the draft Article referred to previously.

The first paragraph of this same draft Article stated:

> *"The Parties shall ensure that measures taken to implement this Protocol, including risk assessment, do not discriminate unjustifiably between or among imported and domestically produced living modified organisms."*

The Miami Group, understandably, saw both paragraphs of this draft Article as a European effort to establish a set of trade rules under the Biosafety Protocol and outside the WTO.

These two draft Articles have now been deleted from the Protocol. In their place we have the following three Preambular paragraphs:

"Recognizing that trade and environment agreements should be mutually supportive with a view to achieving sustainable development,

Emphasizing that the Protocol shall not be interpreted as implying a change in the rights and obligations of a Party under existing international agreements,'

Understanding that the above recital is not intended to subordinated this Protocol to other international agreements."

Articles 2.4 and 26.1 also invoke the need for action taken to be consistent with other international obligations. They thus open room for squabbles on trade issues. This is a major weakness of the Protocol. The extent of this weakness will probably continue to be debated.

4.2 Products of GMOs

The DNA fragments in GMO products can find their way into other organisms through the natural bacteria-mediated processes of horizontal gene transfer. The fact that the genes are combined with vectors increases the likelihood of such horizontal transfer. But the inclusion of the products of GMOs in the Protocol was opposed by all the OECD countries and even by some developing countries. This was done in the name of making trade easier. This creates a serious gap in the Protocol.

4.3 Confidential Information

Technical information which is important for the commercial operations of a firm is often not disclosed, but kept confidential.

In much of the South, the confidentiality of information is not an issue that has to be given priority attention. Article 21.3 requires that each Party has "procedures to protect such [confidential] information ...". Putting such procedures in place and keeping them functioning requires money. A Party's development priorities may, owing to demands from more pressing needs, not yet be the putting of such procedures in place. It may be acceptable, however, that if such procedures are in place, an importing Party should treat information received from an exporter/exporting Party in the same way as it does domestic confidential information. If new procedures are to be put in place while they are still of low development priority, those that insist that this be so must pay the cost.

But, even if cost were not an issue, why should a country focus on, and deploy its meager trained human resources in, a sector which is the priority of only some other countries, and the wealthiest countries at that? Even the Trade Related Aspects of Intellectual Property Rights (TRIPs) Agreement of the WTO (Article 39) does not impose such a requirement.

4.4 Non-Parties

As a country which knew that it would not be Party to the Biosafety Protocol, the United States was foolishly given the undeserved right to negotiate it. Most delegations, especially those of the Like-Minded Group wanted the conditions of trade with non-Parties to be adherence to the substantive provisions of the Protocol. Article 24.1 of the Protocol makes the condition adherence to the objectives and not to the substantive provisions. This leaves much room for argumentation and interpretation. It could also encourage countries to stay out of the Protocol and simply enjoy its rights without carrying out its obligations.

4.5 Scope of the Biosafety Protocol and of the application of its Advance Informed Agreement procedure

When the CBD was negotiated, the participating governments saw the Advance Informed Agreement (AIA) procedure (Article 19.3 of the CBD) as the mechanism for ensuring safety in the transboundary movement of GMOs. This mechanism has the following essential elements:

1. Notification by making available accurate and complete information to the country of import and by taking full responsibility for the completeness and accuracy. This is to be done by the Party of export or to be required by the law of the Party of export that it must be done by the exporter.
2. A risk assessment to evaluate possible consequences in the Party of import together with an evaluation of all information is to be undertaken.

3. An explicitly written consent or refusal is to be given by the National Competent Authority of the Party of import to the National Competent Authority of the Party of export.
4. A regulatory system in each Party is to ensure that the AIA procedure is strictly observed.

The Miami and European groups and the other OECD countries (the Compromise Group) in the Biosafety Protocol did not want the AIA procedure to be followed when dealing with GMOs used as pharmaceuticals, under containment (the term "contained use" itself is broadly defined), and in transit.

They argued that pharmaceuticals are adequately regulated outside the Biosafety Protocol. But this is true only to the extent that pharmaceuticals can be dangerous to human health on an immediate cause-and-effect relationship. It is not so on their impact on changes to the nature of human cells or to the nature of the many associated micro-organisms. These pharmaceuticals will also inevitably come into contact with the open environment. What changes would they induce, for example, on soil bacteria? Article 5 of the Protocol leaves pharmaceutical GMOs covered by other international agreements or organizations outside of the Scope of the Protocol. But, at the moment, no other international agreement or organization deals with the environmental impacts of pharmaceutical GMOs and the responsibility will thus fall on the Protocol when it comes into force. The issue will obviously generate debate in the Meeting of the Parties of the Protocol.

The OECD groups argued that GMOs under containment (i.e. surrounded by barriers meant to prevent contact with the outside world) cannot come in touch with the open environment. But, though it sounds credible to argue that a well-managed laboratory can be safe most of the time, it would be naïve to assume that, for example, a genetically modified yeast will always be confined to the brewery precincts. It is only the desire for trade at any cost that has been the motive behind this insistence on exempting from the AIA procedure GMOs designed for contained use. Article 6.2 of the Protocol exempts GMOs destined for contained use from the AIA procedure but leaves the determination of the standards of containment to the Party of import. This gives national law a wide latitude for defining containment and regulating the transboundary movement, handling, and use of GMOs for research and for industrial application.

The only category of GMOs all countries agreed should go through the AIA procedure are those meant for planting or releasing in the field, or for application on the soil, in the mine, or in open waters (i.e. "intentional introduction into the environment").

Perhaps the most blatant disregard of the interests of the South was shown by the Miami Group who insisted that GMOs meant for food, feed and processing (commodities) move about completely unregulated, completely outside the AIA procedure.

The members of the Miami Group have the commonality of being global grain exporters. Grain travels within a developing country unprocessed. It is cleaned at home and often processed at home, or in a small village mill. All this makes it certain that grain will be spilt, and grow and pollute any genome (genetic make-up) of the same or related species. Worse still, there is nothing to stop farmers from planting the imported seed in their fields. Therefore, for developing countries, commodities have to be fully regulated. The compromise solution adopted by the Protocol goes a long way towards assuring such a full regulation [Articles 7.3, 11, 18.2(a)]. Is this compromise procedure as robust and rigorous as the AIA procedure? This question will obviously be extensively debated in the future.

5 SOCIO-ECONOMIC CONSIDERATIONS

Article 26 does not enable the inclusion of socio-economic considerations in risk assessment.

Even the provision that "Parties, in reaching a decision on import, may take into account, ... socio-economic considerations ..." in Article 26.1 is predicated by the proviso "consistent with their international obligations", which is obviously meant to invoke WTO trade rules and influence decision-taking. The Protocol has left out a provision on import substitution which the South had wanted to keep. The wording was:

> *"A Party that intends to produce, using a living modified organism, a hitherto imported commodity, shall notify the affected Party or the Party likely to be affected sufficiently in advance to enable the affected Party to undertake appropriate measures for conservation of potentially affected biological diversity. The Party substituting such product shall provide financial and technical assistance to the affected Party for undertaking these measures if the affected Party is a developing country."*

If the OECD were to honour its commitments under Agenda 21 and the CBD, this text should not have been deleted. The impact of this deletion will be the failure to act in time to forestall agro-biodiversity loss. Southern biodiversity is as important for the North as for the South, and this is a weakness with global implications.

Possible socio-economic consequences of genetic engineering, in fact, go beyond the loss of markets and commodities. The following are points and related questions aimed at generating discussion.

5.1 R&D in and the application of modern biotechnology are associated with some risk to health and/or biodiversity and the environment. Socio-economic impacts are, on the whole, long term, and our predictions on the likely impacts of the modern biotechnology thus lack empirical data. R&D in, and application of modern biotechnology are not equipment intensive. Thus, modern biotechnology need not be expensive. But it requires large numbers of well-trained scientists. As such, it is within easy reach of developing countries which have low capacity for capital intensive innovations. On the other hand, developing countries have not seriously undertaken the training of biotechnologists, and even less the means for retaining them. Venture capital needed for R&D in modern biotechnology, though not large, requires some time before it yields returns. In developing countries, this means that only public (government) funding can be expected to be available for it as the small, private businesses are unlikely to be able to make such investments;

— What should the role of developing country national governments and local entrepreneurs be with regards to venture capital in biotechnology?
— What should the role of transnational corporations, governments of industrialized countries and the UN system be in making available biotechnology venture capital in developing countries?

5.2 The initial promoters of modern biotechnology in industrialized countries were public (government) institutions and small enterprises. In the industrialized countries, governments have been withdrawing from R&D in modern biotechnology leaving it to the private sector.
— Is it good for the public of the industrialized countries that governments are abandoning modern biotechnology to the private sector?
— What should governments do?
— What should the public do?
— What responsibilities should a transnational corporation accept?

5.3 In industrialized countries, seed, chemical, and biotechnology companies have been merging or being bought up, and now a given transnational corporation tends to have activities in all three sectors.
— Is the creation of monopolies combining the whole process from research laboratory through seed production, distribution, cultivation, industrial use and marketing good?
— If not, should there be antitrust legislation to regulate that?
— Should it be only national or should there be an international legal instrument?

5.4 The seed and chemical industries of developing countries have recently tended more and more towards being controlled by transnational corporations. This means that developments in biotechnology in developing countries will also be controlled by these same corporations.
— Should developing countries allow the same process of monopolization as has tended to occur in industrialized countries to happen?
— Is it conducive for their independence, development and the exercise of their sovereignty to allow transnational monopolies to operate freely?
— If not, what restrictions on monopolization should they place?
— Should this take only national, or also international forms?
— Can this be done while the World Trade Organization is in place, or should we dismantle it first?

5.5 Biotechnology R&D has mostly focused on producing specified commodities for industry and for health through transgenic organisms, or through bioreactors that use enzymes, tissue culture or transgenic micro-organisms.
— Is the focus of modern biotechnology correct?
— Should it be re-oriented?
— If so, into what?
— What should the roles of governments, transnational corporations and the public be to effect the desired re-orientation?

5.6 Some of the transgenic crops have been given the capacity to grow outside the latitudinal ranges of their parents.
— What will the effect of growing crops through genetic engineering outside their latitudinal ranges be on the traditional exporters of the crops and their products? On the society where these crops have been introduced?
— What will its impact be on the agro biodiversity of its original range? On that of its new area?
— What can and should be done about the consequent crop genetic erosion?

5.7 The main focus in transgenic plants has been in the development of herbicide and pest resistance. The herbicide resistance ensures a market for the herbicide produced by the same transnational corporation as the transgenic seed. In either case, the seed company has reduced the farmers' direct control on how he/she should produce crops.
— What will be the effect of complete control of agricultural production by a small number of giant transnational companies on:
global food security?
national food autonomy and food security?
homestead food security?
the maintenance of law and order, and human survival?

5.8 Through the introduction of specific traits, any organism can be engineered to yield any product. This makes plants, animals, micro-organisms, and even human beings interchangeable as producers of biological products for commerce.
— Is the interchangeability of species politically, economically, socially and ethically a good thing?
— What are its economic and social implications in the developing countries? In the industrialized countries?
— What will be the effect on geochemical cycles?
— In particular, how will the microbiota balance be affected?

5.9 Enzyme technology is making it possible to combine products and create in a novel way in the bioreactor commodities that have hitherto been produced through agriculture.
— Since the South's export commodities are mostly agricultural, what will the extent of loss be?
— What impact will this have on jobs?
— Will the exacerbation of poverty bring about greater and greater instability?
— What should the South do to prevent harm?
— What should the North and the UN system do to help?

5.10 On the other hand, it gives developing countries, which have low labour costs, an advantage in producing in their farms as commodities, products which are now being made through complex chemical processes in capital intensive factories in industrialized countries. Much of the chemical industry will, in particular, revert to agriculture.
— Will biotechnology be the agent for clean and painless introduction of a chemical revolution in developing countries?
— Since their citizens are lower paid that those of industrialized countries, will modern biotechnology give developing countries an advantage in chemical and biochemical commodity production over industrialized countries?
— What should the developing and industrialized countries do respectively?
— What should the UN system do?
— What is the risk that a transgenic plant producing a special chemical which stops being useful will go out of control and cause pollution?

5.11 In both developing and industrialized countries, transnational corporations to the exclusion of both governments and national entrepreneurs are getting to control whole systems starting from the laboratory and leading to the retail floor. The impact is greater on developing countries.
— Is it good that governments abdicate in favour or transnational corporations?
— Should the public allow this to happen?
— What should governments do in both the developed and the developing worlds?
— What should the public of the developed world do? That of the developing world do?
— How can they interact to work together?

6. GENETIC ENGINEERING AND ETHNIC SECURITY

With the detailed knowledge of the human genome now being documented, it has become possible to identify ethnic peculiarities in DNA. Even if it looks unlikely that there will be much DNA which is found exclusively in specific ethnic groups, it is likely that there will be DNA sequences which have high frequencies of occurrence only in specific ethnic groups. This, combined with the fact that there is no nation whose establishment has not, at some time or other, tried to destroy specific ethnic groups, could spell our doom.

Specific disease agents, e.g. Anthrax, can be genetically engineered so that their impact is triggered only by a specific DNA sequence. Therefore, ethnic targeting of deadly diseases, can become possible for the first time in history. In light of the present growing nationalistic feelings, e.g. the increase in right wing movements and the growth of racism, is humanity safe? Are those of us who have survived slavery and the holocaust likely to be targeted once again? Or, considering how easy and relatively capital inexpensive acquiring genetic engineering is, are we likely to be tempted to retaliate? What should the UN do to protect humanity against such a possibility? Or do we need another more just and more effective global organization.

7. CONCLUSION

We are now able to modify the construction of life, including that of ourselves. That is a great feat. It is a greater challenge to prevent this feat being abused. As a species, we have never been daunted sufficiently to stay away from dangerous feats. We will probably continue with genetic engineering, whatever some of us might say. Could genetic engineering be our tree of knowledge bearing our apple of banishment?

I hope that we do take the possibility of our own modification of our own construction lightly. If we hate an architectural style of an era, we can demolish buildings and construct again. If we hate our own self-engineering in this era, we will not be able to accept killing ourselves off.

I hope, therefore, that we will refrain from genetically engineering organisms unless we absolutely have to because there is no other alternative. Our knowledge of life is too poor to give us the confidence that we will not make major mistakes; that we will not become sorcerer's apprentices. I hope that when we genetically engineer organisms because we have to, we take all the precautions possible. And I hope that we will never genetically engineer ourselves. For example, if we all engineer ourselves to be white because Europeans dominate and it seems to be advantageous to look like them, we might find that it is, after all, disadvantageous to be white because we become cancer-prone in a world which has depleted its ozone layer. I have no choice but to reaffirm my hope.

However, I have no confidence either that humanity can refrain from its usual Mephistophelian folly.