INTRODUCTION TO THE BIOSAFETY CONSENSUS DOCUMENTS

1. About OECD's Working Group

OECD's Working Group comprises delegates from the 30 Member countries of OECD and the European Commission. Typically, delegates are from those government ministries and agencies, which have responsibility for the environmental risk/safety assessment of products of modern biotechnology. The Working Group also includes a number of observer delegations and invited experts who participate in its work. They include: Argentina; Russia; Slovenia; the United Nations Environment Programme (UNEP); the Secretariat of the Convention on Biological Diversity (SCBD); the United Nations Industrial Development Organisation (UNIDO); and the Business and Industry Advisory Committee to OECD (BIAC).

2. Regulatory Harmonisation

The Working Group was established in 1995[2] at a time when the first commercial transgenic crops were being considered for regulatory approval in a number of OECD Member countries. From the beginning, one of its primary goals was to promote international regulatory harmonisation in biotechnology among member countries. Regulatory harmonisation is the attempt to ensure that the information used in risk/safety assessments, as well as the methods used to collect such information, are as similar as possible. It could lead to countries recognising or even accepting information from one anothers' assessments. The benefits of harmonisation are clear. It increases mutual understanding among member countries, which avoids duplication, saves on scarce resources and increases the efficiency of the risk/safety assessment process. This in turn improves safety, while reducing unnecessary barriers to trade (OECD 2000). Many delegates have said that the process of working towards harmonisation, and the resulting discussions among member countries, is almost as important as the products produced.

3. The Need for Harmonisation Activities at OECD

The establishment of the Working Group and its programme of work followed a detailed analysis by member countries of whether there was a need to continue work on harmonisation in biotechnology at OECD, and if so, what that work should entail. This analysis was undertaken by the Ad Hoc Group for Environmental Aspects of Biotechnology (established by the Joint Meeting[3]), which was active, mainly during 1994.

The Ad Hoc Group took into consideration, and built upon, the earlier work at OECD, which began in the mid-1980s. Initially, these previous activities at OECD concentrated on the environmental and agricultural implications of field trials of transgenic organisms, but this was soon followed by a consideration of their large-scale use and commercialisation. (A summary of this extensive body of work is found in Annex I.)

4. Key Background Concepts and Principles

The Ad Hoc Group took into account (amongst other things) previous work on risk analysis that is summarised in *Safety Considerations for Biotechnology: Scale-up of Crop Plants* (OECD 1993a). The following quote gives the flavour: "*Risk/safety analysis is based on the characteristics of the organism, the*

2 . The original title of the Working Group was the Expert Group for the Harmonisation of Regulatory Oversight in Biotechnology. It became an OECD Working Group in 1998.

3 . The Joint Meeting was the supervisory body of the Ad Hoc Group and, as a result of its findings, established the Working Group as a subsidiary body. Today, its full title is the Joint Meeting of the Chemicals Committee and the Working Party on Chemical, Pesticides and Biotechnology.

introduced trait, the environment into which the organism is introduced, the interaction between these, and the intended application." This body of work has formed the basis for environmental risk/safety assessment that is now globally accepted. So in considering the possibilities for harmonisation, the attention of the Ad Hoc Group was drawn to these characteristics and the information used by risk/safety assessors to address them.

This was reinforced by the concept of familiarity, which is also elaborated in the "Scale-up" document (OECD 1993a). This concept "…is based on the fact that most genetically engineered organisms are developed from organisms such as crop plants whose biology is well understood". "Familiarity allows the risk assessor to draw on previous knowledge and experience with the introduction of plants and micro-organisms into the environment..." For plants, familiarity takes account of a wide-range of attributes including, for example, knowledge and experience with "the crop plant, including its flowering/reproductive characteristics, ecological requirements, and past breeding experiences" (OECD 1993a – see also Annex I for a more detailed description). This illustrates the role of information related to the biology of the host organism as a part of an environmental risk/safety assessment.

The Ad Hoc Group also took into account the document "Traditional Crop Breeding Practices: An Historical Review to Serve as a Baseline for Assessing the Role of Modern Biotechnology" (OECD 1993b) which also focuses on host organisms. It presents information on 17 different crop plants, which are used (or are likely to be used) in modern biotechnology. It includes sections on phytosanitary considerations in the movement of germplasm and on current uses of these crop plants. There is also a detailed section on current breeding practices.

5. A Common Approach to Risk/Safety Assessment

An important additional point for the Ad Hoc Group was to identify the extent to which member countries address the same questions and issues during risk/safety assessment. If there are big differences it would mean that attempts to work towards harmonisation would be difficult. On the other hand, a high level of similarity would suggest that harmonisation efforts would be more feasible.

This point was resolved by two studies, which the Ad Hoc Group was able to consider. The first covered crop plants (OECD 1995a, 1995b) while the second concerned micro-organisms (OECD 1995c, 1996). Both studies involved a survey targeted at those national authorities that are responsible for risk/safety assessment. The aim was to identify the questions which are addressed by them during the assessment process (as outlined in national laws/regulations/guidance documents) in order to establish the extent of similarity among national authorities. Both these studies used the information provided in OECD's *"Blue Book"* (OECD 1986) as a reference point, in particular, the sections of the book (appendices b, c and d) which cover: i) General Scientific Considerations; ii) Human Health Considerations; and iii) Environmental and Agricultural Considerations. Both studies identified a remarkably high degree of similarity among member countries in the questions/issues addressed in risk/safety assessment.

6. The Emergence of the Concept of Consensus Documents

So the Working Group was established in the knowledge that national authorities have much in common, in terms of the questions/issues addressed, when undertaking risk/safety assessment. It also took into account those characteristics identified as part of risk/safety assessment (*i.e. the organism*, *the introduced trait* and *the environment*) around which harmonisation activities could focus.

It was further recognised that much of the information used in risk/safety assessment that relates to the biology of organisms (both crop plants and micro-organisms) would be similar or virtually the same in

all assessments involving the same organism. In other words, the questions addressed during risk/safety assessment which relate to the biology of the host organism - for example, the potential for gene transfer within the crop plant species, and among related species, as well as the potential for weediness – remain the same for each application involving the same host species. This also applies to some extent to information related to introduced traits.

Consequently, the Working Group evolved the idea of compiling information common to the risk/safety assessment of a number of transgenic products, and decided to focus on two specific categories: the biology of the host species or crop; and traits used in genetic modifications. The aim of this compilation was to encourage information sharing and prevent duplication of effort among countries by avoiding the need to address the same common issues in each application involving the same organism or trait. It was recognized that biology and trait consensus documents could be agreed upon quickly by the member countries (within one or two years). This compilation process was quickly formalised in the drafting of Consensus Documents.

7. The Purpose of Consensus Documents

The Consensus Documents are not intended to be a substitute for a risk/safety assessment, because they address only a part of the necessary information. Nevertheless, they should make an important contribution to environmental risk/safety assessment.

As originally stated by the Working Group, Consensus Documents are intended to be a "snapshot" of current information, for use during the regulatory assessment of products of biotechnology. They are not intended to be a comprehensive source of information on everything that is known about a specific host organism or trait; but address – on a consensus basis – the key or core set of issues that member countries believe are relevant to risk/safety assessment.

The aim of the documents is to share information on these key components of an environmental safety review in order to prevent duplication of effort among countries. The documents were envisaged as being used: a) by applicants as information in applications to regulatory authorities; b) by regulators as a general guide and reference source in their reviews; and c) by governments for information sharing, research reference and public information.

Originally, it was said that the information in the Consensus Documents is intended to be *mutually recognised* or *mutually acceptable* among OECD Member countries, though the precise meaning of these terms, in practice, is still open for discussion. During the period of the Ad Hoc Group and the early days of the Working Group (1993-1995), the phrase *Mutual Acceptance of Data* was discussed. This is a concept borrowed from OECD's Chemicals Programme which involves a system of OECD Council Decisions that have legally binding implications for member countries. In the case of the Consensus Documents there has never been any legally binding commitment to use the information in the documents, though from time to time, the Working Group has discussed whether and how to increase the level of commitment member countries are willing to make in using the information in the documents. Participation in the development of documents, and the intention by member countries to use the information, is done in "good faith." It is expected, therefore, that reference will be made to relevant consensus documents during risk/safety assessments.

8. The Process through which Consensus Documents are Initiated and Brought to Publication

There are a number of steps in the drafting of a specific consensus documents. The first step occurs when a delegation, in a formal meeting of the Working Group, makes a proposal to draft a document on a new topic, typically a crop species or a trait. If the Working Group agrees to the proposal, a provisional

draft is prepared by either a single country or two or more countries working together. This is often called the "lead country approach". Typically, the lead country(ies) has had experience with the crop or trait which is the subject of the new document and is able to draw on experts to prepare a provisional draft.

The provisional draft is first reviewed by the Bureau of the Working Group[4] to ensure that the document addresses range of issues normally covered by Consensus Documents and is of sufficiently high quality to merit consideration by the Working Group as a whole.

Based on the comments of the Bureau, a first draft is then prepared for consideration by the full Working Group. This is the opportunity for each delegation to review the text and provide comments based on their national experiences. The incorporation of these comments leads to a second draft, which is again circulated for review and comment to the Working Group. At this point, the Working Group may be asked to recommend that the document be declassified. Such a recommendation is only forthcoming when all delegations have come to a consensus that the document is complete and ready for publication. Sometimes, however, the text may need a third or even a fourth discussion in the Working Group before a recommendation for declassification is possible.

When the Working Group has agreed that a document can be recommended for declassification, it is forwarded to the supervisory Committee, the Joint Meeting, which is invited to declassify the document. Following the agreement of the Joint Meeting, the document is then published.

It is important to note that the review of Consensus Documents is not limited to formal meetings of the Working Group. Much discussion also occurs through electronic means, especially via the Working Group's Electronic Discussion Group (EDG). This enables a range of experts to have input into drafts.

For a number of documents, it has also been important to include information from non-member countries. This has been particularly true in the case of crop plants where the centre of origin and diversity occurs in a non-member country(ies). In these cases, UNEP and UNIDO have assisted in the preparation of documents by identifying experts from countries which include the centres of origin and diversity. For example, this occurred with the Consensus Document on the Biology of Rice.

9. Current and Future Trends in the Working Group

The Working Group continues its work, not only on the preparation of specific Consensus Documents, but also on the efficiency of the process by which they are developed. At the present time, an increasingly large number of crops and other host species are being modified, for increasing number of traits.

At the OECD Workshop on Consensus Documents and Future Work in Harmonisation, which was held in Washington DC, 21-23 October 2003, the Working Group was able to consider, amongst other things, how to set priorities for drafting future Consensus Documents among the large number of possibilities. The Working Group is currently considering how best to set priorities in the future.

The Workshop also recognised that published Consensus Documents may be in need of review and updating from time to time, to ensure that they include the most recent information. The Working Group is currently considering how best to organise this in the future.

4 . The Bureau comprises the Chair and vice-Chairs of the Working Group. The Bureau is elected by the Working Group once per year. At the time of writing, the Chair is from Austria and the vice-Chairs are from Canada, Japan the Netherlands and the United States.

For the future drafting of new and updated documents, the Workshop identified the usefulness of developing a standardised structure of Consensus Documents, which is called “Points to Consider”. The Working Group is expected to develop, firstly, a Points to Consider document for the biology Consensus Documents and then that of the trait Consensus Documents.

The Workshop also recognised the importance strengthening the input of non-member countries into the future development of Consensus Documents. Once again, the Working Group is considering how best to implement this recommendation.

APPENDIX I

OECD Biosafety Principles and Concepts Developed Prior to the Working Group 1986-1994

Since the mid-1980s the OECD has been developing harmonised approaches to the risk/safety assessment of products of modern biotechnology. Prior to the establishment of the Working Group, OECD published a number of reports on safety considerations, concepts and principles for risk/safety assessment as well as information on field releases of transgenic crops, and a consideration of traditional crop breeding practices. This Annex notes some of the highlights of these achievements that were background considerations in the establishment of the Working Group and its development of Consensus Documents.

Underlying scientific principles

In 1986, OECD published its first safety considerations for genetically engineered organisms (OECD 1986). These included the issues (relevant to human health, the environment and agriculture) that might be considered in a risk/safety assessment. In its recommendations for agricultural and environmental applications, it suggested that risk/safety assessors:

- "Use the considerable data on the environmental and human health effects of living organisms to guide risk assessments.

- Ensure that recombinant DNA organisms are evaluated for potential risk, prior to application in agriculture and the environment by means of an independent review of potential risks on a case-by-case basis.

- Conduct the development of recombinant DNA organisms for agricultural and environmental applications in a stepwise fashion, moving, where appropriate, from the laboratory to the growth chamber and greenhouse, to limited field testing and finally to large-scale field testing.

- Encourage further research to improve the prediction, evaluation, and monitoring of the outcome of applications of recombinant DNA organisms."

The role of confinement in small scale testing

In 1992, OECD published its Good Developmental Principles (GDP) (OECD 1992) for the design of small-scale field research involving GM plants and GM micro-organisms. This document, amongst other things, describes the use of *confinement* in field tests. Confinement includes measures, to avoid the dissemination or establishment of organisms from a field trial, for example, the use of physical, temporal, or biological isolation (such as the use of sterility).

Scale-up of crop-plants – "risk/safety analysis"

By 1993, the focus of attention had switched to the *scale-up* of crop plants as plant breeders began to move to larger-scale production and commercialisation of GM plants. OECD published general principles for, *scale-up* (OECD 1993a), which re-affirmed that, "*safety in biotechnology is achieved by the appropriate application of risk/safety analysis and risk management. Risk/safety analysis comprises hazard identification and, if a hazard has been identified, risk assessment. Risk/safety analysis is based on*

the characteristics of the organism, the introduced trait, the environment into which the organism is introduced, the interaction between these, and the intended application. Risk/safety analysis is conducted prior to an intended action and is typically a routine component of research, development and testing of new organisms, whether performed in a laboratory or a field setting. Risk/safety analysis is a scientific procedure which does not imply or exclude regulatory oversight or imply that every case will necessarily be reviewed by a national or other authority" (OECD 1993a).

The role of familiarity in risk/safety assessment

The issue of *scale-up* also led to an important concept, *familiarity*, which is one key approach that has been used subsequently to address the environmental safety of transgenic plants.

The concept of familiarity is based on the fact that most genetically engineered organisms are developed from organisms such as crop plants whose biology is well understood. It is not a risk/safety assessment in itself (U.S. NAS 1989). However, the concept facilitates risk/safety assessments, because to be familiar, means having enough information to be able to make a judgement of safety or risk (U.S. NAS 1989). Familiarity can also be used to indicate appropriate management practices including whether standard agricultural practices are adequate or whether other management practices are needed to manage the risk (OECD 1993a). Familiarity allows the risk assessor to draw on previous knowledge and experience with the introduction of plants and micro-organisms into the environment and this indicates appropriate management practices. As familiarity depends also on the knowledge about the environment and its interaction with introduced organisms, the risk/safety assessment in one country may not be applicable in another country. However, as field tests are performed, information will accumulate about the organisms involved, and their interactions with a number of environments.

Familiarity comes from the knowledge and experience available for conducting a risk/safety analysis prior to scale-up of any new plant line or crop cultivar in a particular environment. For plants, for example, familiarity takes account of, but need not be restricted to, knowledge and experience with:

- "The crop plant, including its flowering/reproductive characteristics, ecological requirements, and past breeding experiences.
- The agricultural and surrounding environment of the trial site.
- Specific trait(s) transferred to the plant line(s).
- Results from previous basic research including greenhouse/glasshouse and small-scale field research with the new plant line or with other plant lines having the same trait.
- The scale-up of lines of the plant crop varieties developed by more traditional techniques of plant breeding.
- The scale-up of other plant lines developed by the same technique.
- The presence of related (and sexually compatible) plants in the surrounding natural environment, and knowledge of the potential for gene transfer between crop plant and the relative.
- Interactions between/among the crop plant, environment and trait." (OECD, 1993a).

Risk/safety assessment and risk management

Risk/safety assessment involves the identification of potential environmental adverse effects or hazards, and determining, when a hazard is identified, the probability of it occurring. If a potential hazard or adverse affect is identified, measures may be taken to minimise or mitigate it. This is risk management. Absolute certainty or zero risk in a safety assessment is not achievable, so uncertainty is an inescapable aspect of all risk assessment and risk management (OECD 1993a). For example, there is uncertainty in extrapolating the results of testing in one species to identify potential effects in another. Risk assessors and risk managers thus spend considerable effort to address uncertainty. Many of the activities in intergovernmental organisations, such as the OECD, address ways to handle uncertainty (OECD 2000).

APPENDIX II

References Cited in Chronological Order

Recombinant DNA Safety Considerations. Safety considerations for industrial, agricultural and environmental applications of organisms derived by recombinant DNA techniques ("*The Blue Book*"), OECD, 1986.

Field Testing of Genetically Modified Organisms: Framework for Decisions. U.S. NAS - National Academy of Sciences, National Academy Press, Washington DC. USA 1989.

Good Developmental Principles (GDP), OECD 1992.

Safety Considerations for Biotechnology: Scale-up of Crop Plants, OECD, 1993a.

Traditional Crop Breeding Practices: An Historical Review to serve as a Baseline for Assessing the Role of Modern Biotechnology, OECD 1993b.

Commercialisation of Agricultural Products Derived through Modern Biotechnology: Survey Results, OECD 1995a.

Report of the OECD Workshop on the Commercialisation of Agricultural Products Derived through Modern Biotechnology, OECD 1995b.

Analysis of Information Elements Used in the Assessment of Certain Products of Modern Biotechnology, OECD 1995c.

Industrial Products of Modern Biotechnology Intended for Release to the Environment: The Proceedings of the Fribourg Workshop, OECD 1996.

Report of the Working Group on the Harmonisation of Regulatory Oversight in Biotechnology to the G8 Okinawa Summit, OECD 2000.