INTRODUCTION

In line with the Millennium Development Goals (MDGs), the overall objective of the Food and Agriculture Organization of the United Nations (FAO) is to enhance long-term food and livelihood security through sustainable and environment-friendly increases in the quantity and quality of agricultural produce.

Modern biotechnology[3], when appropriately integrated with other agricultural production methods, has the significant potential to contribute towards meeting the food needs of an expanding and increasingly urbanized population and to offer opportunities for diversification into value-added production, improved processing systems and trade in food and agriculture. Furthermore, it provides powerful tools for the sustainable development of agriculture, fisheries and forestry by releasing pressure on natural resources and reducing their degradation.

However, with the portfolio of modern biotechnology applications increasing at a very rapid pace, there is a crucial need to ensure that these tools are used judiciously, that benefits are shared more equitably within developing countries and resource-poor farmers, and that the race towards progress

[3] "Modern biotechnology" means the application of: a. *In vitro* nucleic acid techniques, including recombinant deoxyribonucleic acid (DNA) and direct injection of nucleic acid into cells or organelles; or b. fusion of cells beyond the taxonomic family that overcome natural physiological reproductive or recombination barriers and that are not techniques used in traditional breeding and selection (Cartagena Protocol on Biosafety)

does not overlook potential risks for the environment and human health. Agriculture and food production are indeed one of the main fields of modern biotechnologies application, to which FAO attaches strategic importance in order to ensure the conservation and sustainable use of genetic resources, namely *"the great diversity of plants... and animals... farmers, livestock keepers, and other agriculturalists now and in the future may draw upon"*[4].

FAO's corporate strategy on biosafety recognizes the potential benefits of biotechnology in ensuring:

- access of all people at all times to sufficient nutritionally adequate and safe food, ensuring that the number of chronically undernourished people is reduced by half by no later than 2015;
- the continued contribution of sustainable agriculture and rural development, including fisheries and forestry, to economic and social progress and the well-being of all; and
- the conservation, improvement and sustainable utilization of natural resources, including land, water, forests, fisheries and genetic resources for food and agriculture.

It is acknowledged that the relationship between sustainable agriculture[5] and biological diversity is complex, in terms of management of biological resources, and that agriculture may have a significant potential impact on biological diversity, including that associated with the use and release of Living Modified Organisms (LMOs) resulting from modern biotechnologies. This complex relation and reciprocal dependency are summarized in Box 1.

[4] *Biodiversity and Agriculture: Safeguarding Biodiversity and Securing Food for the World, Secretariat of the Convention on Biological Diversity*, CBD, Montreal, 2008, page 12

[5] Agriculture is taken to include the management of fisheries and forestry

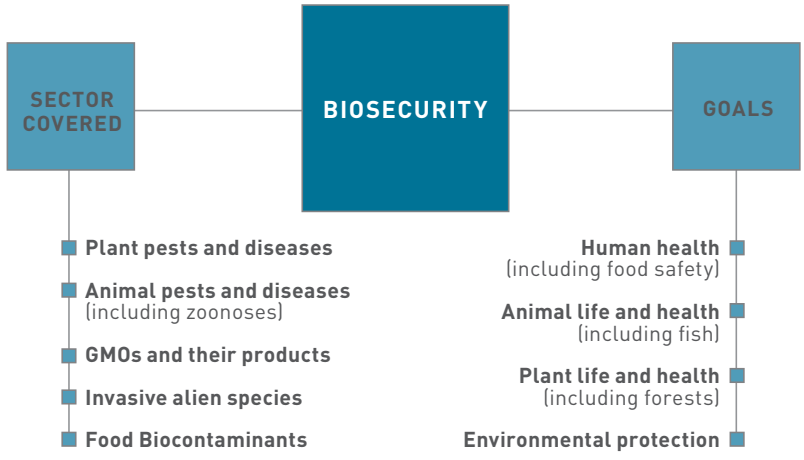
BOX 1 // AGRICULTURE AND BIODIVERSITY

(Secretariat of the Convention on Biological Diversity, Biodiversity and Agriculture: Safeguarding Biodiversity and Securing Food for the World, Montreal, 2008)

- **Biodiversity is the basis of agriculture. Its maintenance is essential for the production of food and other agricultural goods and the benefits these provide to humanity, including food security, nutrition and livelihoods.**
- **Biodiversity is the origin of all crops and domesticated livestock and the variety within them. Biodiversity in agricultural and associated landscapes provides and maintains ecosystem services essential to agriculture.**
- **Agriculture contributes to conservation and sustainable use of biodiversity but is also a major driver of biodiversity loss. Farmers and agricultural producers are custodians of agricultural biodiversity and possess the knowledge needed to manage and sustain it.**
- **Sustainable agriculture both promotes and is enhanced by biodiversity. Sustainable agriculture uses water, land and nutrients efficiently, while producing lasting economic and social benefits. Barriers inhibiting its widespread adoption need to be reduced.**
- **Agricultural producers respond to consumer demands and government policies. To ensure food security, adequate nutrition and stable livelihoods for all, now and in the future, food production must be increased while adopting sustainable and efficient agriculture, sustainable consumption, and landscape level planning that ensure the preservation of biodiversity.**

The Biosecurity Framework[6] was adopted by FAO's governing bodies to promote a strategic and integrated approach that encompasses the policies and regulatory frameworks that analyse and manage risks in the sectors of food safety, animal and plant life and health, including associated environmental risk. It is a holistic concept of direct relevance to the sustainability of agriculture and food production, food safety and the protection of the environment, including biodiversity. The framework covers the introduction of plant pests, animal pests and diseases, and zoonoses, the introduction and release of Genetically Modified Organisms (GMOs) and their products, and the introduction and management of invasive alien species and genotype. Biosafety (Box 2) is an integral part of the FAO Biosecurity Framework (Figure 1).

FIGURE 1 // SECTORS AND GOALS



[6] For more information, please refer to the *FAO Biosecurity Toolkit*, 2007

BOX 2 // BIOSAFETY WITHIN BIOSECURITY

(Report of the Expert Consultation on Biosafety within a Biosecurity Framework, FAO, Rome, 28 February - 3 March 2006)

Biosafety is a term generally used to describe frameworks encompassing the policy, regulation and management to control potential risks associated with the use of modern biotechnologies. This includes the use, release and transboundary movements of LMOs resulting from modern biotechnology. Such "biosafety" frameworks may occur at international, regional or national levels. Biosafety frameworks may also address risk communication issues, or even more generic impacts such as potential positive or negative economic or social impacts.

Biosafety within the biosecurity framework refers to safe use of new biotechnologies within the framework of managing, in a holistic manner, biological risks associated with food and agriculture (which is understood to include fisheries and forestry). FAO's mandate requires it to address the safe use of such new technologies, in order to contribute to sustainable agriculture and food production.

FAO has been addressing biosafety and related aspects since the late 1990s, before the Cartagena Protocol came into force. As the subject has evolved, many environment, trade and food related aspects of biosafety and its impact on agriculture have been considered by FAO's intergovernmental bodies, including its Committee on Agriculture (COAG), regional conferences, the Commission on Genetic Resources for Food and Agriculture (CGRFA), as well as the Secretariat of the International Treaty on Plant Genetic Resources (ITPGRFA). In order to facilitate a consistent approach, FAO has established a Working Group on Biosafety

comprising members from its various technical divisions. Through this group, FAO promotes its corporate strategy on biosafety and regularly participates in the Conference of the Parties serving as the Meeting of the Parties to the Cartagena Protocol on Biosafety and working groups on biotechnology, risk assessment, capacity building and communication.

Capacity building represents the main challenge in the safe application of modern biotechnologies in developing countries, as well as in the implementation of the related biosafety frameworks. As highlighted in the United Nations University-Institute of Advanced Studies (UNU-IAS) study, 'capacity building in biotechnology and biosafety differs from other areas as it poses unique challenges to existing morals, ethics, norms and policies, therefore making this area of activity of particular sensitivity'[7].

Together with other UN agencies and relevant stakeholders, and in line with Article 22 of the Cartagena Protocol on Biosafety, FAO has carried out numerous capacity building initiatives in biosafety as it relates to food and agriculture. Since 2002, FAO has launched a series of projects to assist countries and regions in building strong technical, institutional and information sharing capacities to ensure the safe use of modern biotechnologies and enhance sustainable agriculture and food production. This has been done through interdisciplinary expertise combined with normative and operational experience in policy and development of regulatory frameworks on modern biotechnology.

To date, the total funding of biosafety capacity building projects amounts to approximately USD 7.5 million.

Out of these 26 projects (Figure 2):

[7] "Sam Johnston, Catherine Monagle, Jessica Green with Ruth Mackenzie (2008) *Internationally Funded Training in Biotechnology and Biosafety: Is it Bridging the Biotech Divide?* United Nations University – Institute of Advanced Studies, Yokohama, Japan.

FIGURE 2 // FAO BIOSAFETY ACTIVITIES UP TO 2009

Africa:
Benin, Kenya, Swaziland, Uganda, the United Republic of Tanzania

Asia:
Bangladesh, Malaysia, Sri Lanka

Eastern Europe:
Croatia

Latin America and the Caribbean:
Argentina, Bolivia, the Dominican Republic, Grenada, Nicaragua, Paraguay

Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam

Armenia, Georgia, the Republic of Moldova

Argentina, Bolivia, Brazil, Chile, Paraguay, Uruguay

Jordan, Lebanon, the Sudan, Syria, United Arab Emirates, Yemen

Training and policy development workshops in the Caribbean; Near East; Central and Eastern Europe; Central Asia and Latin America

Training programmes in:

- GMO detection in seed samples and variety verification (80 countries)
- GM Food safety assessment (28 countries)

- *eighteen projects* have a *national* focus, and aim at supporting countries in meeting the obligations arising from the Cartagena Protocol on Biosafety as well as establishing effective linkages among all relevant stakeholders. Capacity building activities include the development and implementation of regulations, training personnel of regulatory bodies in risk assessment and detection of GMOs, upgrading infrastructure and improving communication, public awareness and participation in biosafety decision-making;
- *four projects* are carried out at *subregional* level, and assist countries by establishing biosafety networks, delivering issue-specific training (GMO detection and GM food safety assessment, etc.) and organizing technical meetings for subregional harmonization of rules and regulations. Furthermore, within an *interregional* project, training in various aspects of biosafety is provided to Eastern Europe and Central Asia. A series of *workshops* were also carried out in the Caribbean, Central and Eastern Europe, Central Asia, the Near East and Latin America on topics ranging from the establishment of a common biosafety policy to more specific technical and managerial issues, such as risk analysis and appropriate communication approaches;
- *two global projects* consist of training programmes targeting the enhancement of specific technical capacities in:
  1) GMO detection and monitoring; and
  2) GM food safety assessment.

FAO has also taken the lead in expanding the knowledge base in areas such as public communication, post–release monitoring, socio-economic issues and consumer concerns arising from the use of modern biotechnology through expert workshops, consultations and technical publications. All these activities are being carried out in full partnership with national agencies, international agricultural research centres, donors, other UN bodies and civil society organizations.

INTRODUCTION

This paper intends to illustrate the main findings and lessons learned from the past and ongoing biosafety capacity building initiatives, in order to improve future interventions and better shape strategic planning, so as to maximize results and fully meet countries' needs.