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Issues in Capacity Building: An Overview

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Capacity building in biosafety of Living Modified Organisms (LMOs) is the topical activity of discussion in effective implementation of Cartagena Biosafety Protocol (CBP). The need for capacity building for the success of protocol was recognized from the beginning of negotiations from Open-ended Ad Hoc Working Group on Biosafety-1 (BSWG-1) in 1996 and was concluded in BSWG-6 held at Cartagena in 1999. In these negotiations, difference of opinion existed with regards to inclusion of capacity development in biotechnology besides biosafety. This general reference to biotechnology and biosafety was amended and included in the final protocol as capacity building in 'biotechnology' to the extent that is required for biosafety. As of now (July 2005), 125 countries have ratified the protocol largely comprising of developing countries.

GM technology innovation chain from laboratory to commercialization through regulatory steps requires varied facilities and expertise. Quite often public researchers shy away from lengthy steps and complex issues related to regulations even though process of producing GMO in laboratories have a direct bearing on safety of product. Involvement of public research scientists in regulatory research and procedures and international agreements and negotiations would bring about much needed scientific outlook as well as addressing public concerns on safety to humans and environment. LMOs are products of modern biotechnology process and are results of theoretical and technical skills of molecular biology such as gene isolation; sequencing and transformation; assessment of effects of promoters, enhancers, introns, terminator sequences and markers; studies on genetic stability and gene expression under different conditions; and analysis of

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molecular data and extent and effect of gene flow, etc. A detailed knowledge about the essential elements of this process relevant to risk assessment of the product (LMO) is required in most of the regulatory steps.

Since the scope of the protocol is to take precaution on trans-boundary movement and use of LMO's that may have adverse effect on conservation and sustainable use of biological diversity, taking also into account risks to human health, and the fact that most of the developing countries in the south are rich in biodiversity, it is essential that adequate capacity for biosafety research need to be developed in public research organizations. To administer handling, transport and utilization of export and import consignments of LMOs, ratified and non-ratified nations are expected to have national regulatory framework and clear guidelines and capacity in dealing with various aspects of biosafety.

The way out is through developing such capacities is international cooperation with countries having capacity or with multilateral institutions/agencies apart from public-private partnerships. A long-term sustainable strategy for developing core group of experts for generating local biosafety data in the local agro-ecological backgrounds should be a priority. In order to effectively address the human resource needs emerging out of this strategy, we need to consider redeployment of researchers working in traditional subjects such as agronomy, botany, microbiology, food toxicology and plant breeding and genetics to take up research on biosafety following focused training programme need to be considered. We also need to take stock of some of the key policy issues emanating from the current debate.

Key Issues

Recognizing the concern that nations differ in their preparedness to implement the protocol, the secretariat of the CBD has formulated a questionnaire to collect information for need assessment. Responses to the questionnaire were received from only 50 countries. The majority of countries (over 85 per cent) expressed a need for capacity-building in the following areas: institutional capacity-building, human resources development and training and capability to undertake risk assessment and risk management. A large number of countries (over 80 per cent) also highlighted the need to promote awareness, education and public participation; build capacity in identification of living modified

organisms; and establish mechanisms to promote information exchange and data management, including participation in the Biosafety Clearing-House. National capacity to develop the LMOs or availability of core group of experts with sound understanding of the science of the process is essential for all steps of technology assessment of LMOs as well as risk assessment, monitoring and management.

Export and import of foods, seeds and research material pass through several laws enacted by governments all over the world to regulate these commodities. The consignments pass through several checks and counter checks before reaching the consumers involving officials of plant quarantine; custom and commerce departments; shipping and transport; export and import councils; certifying agencies and testing laboratories; bulk wholesale and retail traders; food processors; and packers. Further, the removal of Quantitative Restrictions in many WTO countries since the beginning of this century has resulted in import of various food items and flooding of the markets. Creating awareness and providing working knowledge of various multilateral agreements (including requirement of Cartagena protocol, agreement on Technical Barrier to Trade (TBT), agreement on Sanitary and Phytosanitary Measures (SPS), and agreement on Pre-shipment Inspection (PSI)) related to quality and nature of commodities transacted is a challenging task.

In many developing countries including economies in transition, there are hardly any domestic regulatory research initiatives on environmental and food safety aspects. Much of the know how and protocols in risk assessment of GMOs in domestic regulations at large are imported from documents of either USA, Europe, OECD, UNEP without any local modifications for local needs. ICGEB biosafety statistics on risk assessment records divided by country provides evidence. Out of 388 publications, 36 per cent are from Canada, 25 per cent are from USA, 11 per cent each from New Zealand and Australia, 35 per cent are from European countries. Except for 12 records from Argentina, there are no records from other southern countries. (http://www.icgeb.org/~bsafesrv/rasmstat. html).

Initiatives for Capacity Building

Parallel to these efforts many capacity building activities were sponsored by international development agencies. The Global Environment Facility is currently the single largest source of funding for biosafety capacity-

building activities. A number of donor countries, including Belgium, Canada, Germany, Japan, Netherlands, Norway, Switzerland and United States have also provided varying support. To assess the effectiveness of these initiatives, avoid duplications and add value on continuous basis, the protocol provides for a coordination mechanism and Expert Liaison Group besides an elaborate action plan and parameters for assessment of effectiveness.

International organizations like ICGEB, Italy and India provides such training opportunities. Besides hosting a special portal for biosafety information, various short-term and long-term training programmes and scholarships are offered for human resource development in biosafety research and applications. Multi-national companies operating in many developing countries also have adequate international expertise and facilities for biosafety assessment. To effectively utilise services of private sector, nations should formulate a policy framework for public private partnership. Through such framework the nations are benefited not only by introduction of useful LMO's in agriculture and food chain but also engage the private sector in human resource development.

Addressing the Challenges

How the countries should address this challenge to meet international standard and quality? Three important approaches include: i) reviewing and restructuring existing institutional mechanisms through proper coordination and consultation among concerned departments within the governments, ii) implementing bottom-up tailormade human resource development programmes at various levels for handling, transport, processing, packaging and sale of commodities, and iii) setting-up of notified state-of-the-art testing and certification facilities.

Thus, the task of effective implementation of protocol and many other contemporary and related international agreements is complex. Some suggestions are made here based on editor's personal experience to complement or supplement the recommendations of other experts in the field.

(i) There is a need for a thorough fresh SWOT analysis of the current situation in protocol-ratified developing countries with regard to institutional mechanisms for export and import, expertise in both biotechnology and biosafety research as well as in traditional areas of agriculture, health-care and environment.

(ii) Capacity building projects should aim to develop a critical mass of experts at all levels through organized long-term theoretical and practical training both informal and formal rather than short-term workshops and seminars. The increasing demands of ensuring global standards in production, manufacture, and trade of agriculture commodities and complex domestic and international regulations require a continuing system of education. It is desirable to evolve a tailor made special course or diploma for graduates. A web based distance education system could also be evolved on regional basis through international cooperation. The course curriculum should be designed keeping in view of the global and local needs. Such formal education would also provide additional employment opportunities both in public and private sectors in managing commercialization and trade of biotech products.

(iii) Certifying and testing facilities are expensive to set up and require trained and skilled human resource. Designed to the needs of the volume of food trade, the facilities should be established in a cost effective manner. Regional and sub-regional testing facilities and their networking would be a worthwhile proposition.

(iv) The capacity in biotechnology and biosafety are inter-related. Based on the size of the economy and internal resources, each country should have a center of excellence within established universities and public sector research institutions for systematic promotion of local research and education. Bilateral and multilateral collaboration with economies in transition and developed countries as well as multinational and local companies will add value in the activities of such centers.

(v) For exchange of relevant biosafety data, the Biosafety Clearing House (BCH) was established at Cartagena secretariat. The parties of the protocol are expected to register information directly in central database of BCH through the management center. Further, the parties should also develop national or regional databases and also make these databases amenable and compatible with the BCH. However, as on July 2005, on an average Internet is accessible to about 14.6 per cent of world population. The Internet access in regions Africa and Middle East represented by 35 countries ratifying the protocol is about 1.8 per cent and 8.3 per cent respectively. Similarly, Latin America and Caribbean countries with 12.5 per cent Internet access represent 18 countries ratifying the protocol. Therefore, the major challenge for

effective use of BCH for information exchange is development of Information and Communication Technology (ICT) based human resources and infrastructure. Establishment of regional nodes to either post information or provide technical support is an immediate priority. Even in economies in transition (India and China) with ICT strengths, the database development activity has been slow. Therefore, it is desirable to outsource development and maintenance of database with trade councils rather than government ministries taking-up the task.

(vi) Strengthening of research activities on socio- economic aspects of LMOs, having impact on biodiversity and sustainability of agro-ecosystems, may help in technology assessment. The research data can form the basis for priority setting in both biotechnology and biosafety research and assist in public acceptability of LMOs.

(vii) Public awareness programmes in the past have been top-down. It is essential to educate and provide working knowledge to progressive farmers, dealers/retailers of biotech products and agriculture extension workers and consumers and their associations. Massive bottom-up and audience-and-language-friendly communication and training methods and modules need to be developed.

(viii) Finally, the success in implementation of both domestic and international regulations can be achieved through active consultation and involvement of all stakeholders in the government, trade sector, public research institutions, non-governmental organizations and private sector. World trade norms are in transition due to WTO negotiations and different institutions at FAO-WHO, Codex and biosafety protocol. Capacity building in isolation of one-another would not be cost effective. Therefore, integration, coordination and cooperation among all stakeholders are the mantra for future.

This Issue of ABDR

In this special edition of ABDR, authors deliberate upon some of these key issues among others in capacity building on biosafety. Purvi Mehta-Bhatt and co-authors provide an overview of biotechnology research capacity, regulation, perceptions and priorities for GM crops in Asian countries (Malaysia, Pakistan, Philippines, Thailand, Indonesia, China and India). Similarly, John Komen and co-authors analyze the interface between public and private sector organizations in east Africa focusing BIOEARN Countries (Ethiopia, Kenya, Tanzania, Uganda), particularly on policy framework for partnerships and product development. It was

noted that in all countries, securing approvals for advanced biotechnology research and confined trials is a time-consuming and uncertain feat. Areas for capacity building in research, training and policy advocacy have been recommended. Janaki Krishna and Pakki Reddy in their article referring to their experiences with Andhra Pradesh-Netherlands programme argue that social acceptability of biotech products is high when biotech research provides tailor-made solutions to local problems. On the other hand, Piet van der Meer in a short communication goes further in suggesting that involvement of public research scientists in the discussions on international agreements and regulations would add value and strengthen the implementation of biosafety procedures of LMOs.

As discussed earlier, global regulations make it imperative for governments and industry to develop reliable and accurate GMO/LMO detection systems for crops and foodstuffs to ensure compliance to international regulations and maintain international trade. Christopher D. Viljoen deliberates a detailed account of issues involved in detection of LMOs, need for international standards, common methodologies, labelling and traceability and challenges in capacity building. In the context of capacity building ICGEB is playing a major role. The information on various activities of ICGEB is provided in the article by Mark Tepfer and Decio Ripandelli.

To end, as editor of this issue, I thank all the authors for their valuable contributions and hope that the data and discussions captured here would further enrich our current thoughts and ongoing initiatives on capacity building in biosafety.