

Cartagena Protocol on Biosafety

the international treaty governing movements of living modified organisms

Module 3: Public Education on Biosafety

Secretariat of the Convention on Biological Diversity



Convention on
Biological Diversity



Introduction

Welcome to the Module on Public Education on Biosafety. This module was developed within the context of Article 23 of the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, which deals with public awareness, education and participation, including access to information, concerning the safe transfer, handling and use of living modified organisms (LMOs). It highlights emerging experiences, good practices and lessons learned by Parties to the Cartagena Protocol.

Article 23 of the Cartagena Protocol, requires Parties to promote and facilitate public awareness, education and participation concerning the safe transfer, handling and use of LMOs. Article 22 of the Cartagena Protocol, based on the needs of developing country Parties, in particular the least developed and small island developing States, also indicated that cooperation in capacity-building shall, subject to the different situation, capabilities and requirements of each Party, include scientific and technical training in the proper and safe management of biotechnology, and in the use of risk assessment and risk management for biosafety, and the enhancement of technological and institutional capacities in biosafety.

In 2010, the governing body of the Cartagena Protocol – the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol – adopted a programme of work on public awareness, education and participation concerning the safe transfer, handling and use of LMOs for the period 2011-2015. Under element 2 of the programme of work, Parties are invited to promote education concerning the safe transfer, handling and use of LMOs through formal academic institutions. This module is designed to contribute to developing the capacity of Parties to implement the public education requirements under Article 23 and 22 of the Cartagena Protocol as well as programme element 2 of the programme of work on public awareness, education and participation. In 2016, the governing body to the Cartagena Protocol extended the programme of work until 2020 and adopted priority activities/areas of the programme of work. Many priority activities note the importance of training and education to further implement Article 23.

The module will introduce you to, among other things: the basic concepts of public education; characteristics of education; roles of public authorities and other stakeholders in public education; administrative mechanisms and procedures to integrate biosafety; teaching methods and learning theories; resource guide to academic institutions and training strategy to other educators; and the education strategy to be implemented by government. It will also provide links to relevant academic institutions and case studies as well as provide you with interactive exercises, scenarios and quizzes to allow you to test your knowledge of the content presented.

The module is primarily intended for government officials but can also be used in particular by academic institutions and other educators involved in implementing the Cartagena Protocol at the national level, particularly those responsible for managing or promoting public education and training initiatives regarding LMOs. It will be developed in collaboration with the United Nations Environment. It complements other e-learning resources on the Cartagena Protocol, including the "Introductory e-Course to the Cartagena Protocol on Biosafety" developed by UN Environment in collaboration with the Secretariat of the Convention on Biological Diversity, and the e-learning modules on public access to biosafety information and public participation regarding LMOs. The module is suitable for beginners and intermediate level practitioners. On average, it will take you approximately 3 hours to complete the entire module.

Exercise: Worksheet – Expectations

<http://bch.cbd.int/protocol/outreach/modules/expectationseducation.doc>

The Cartagena Protocol on Biosafety: <http://bch.cbd.int/protocol/>

Structure

The module is divided into the following lessons and topics:

Topic 1: Key Public Education Elements

Lesson 1: The concept of public education

Lesson 2: The characteristics of public education

Lesson 3: The importance of public education

Lesson 4: The context of public education

Topic 2: Procedures and practices of public education

Lesson 1: Roles and Responsibilities of Relevant Authorities

Lesson 2: Administrative procedures and mechanisms for public education

Lesson 3: Learning theories and Teaching methods

Lesson 4: Good public education practices and lessons learned

Topic 3: Planning for Public Education

Lesson 1: Key components, steps and monitoring of a resource guide and training strategy

Lesson 2: Key components, steps and monitoring of education strategy for governments

Topic 1: Key Public Education Elements

Introduction

In Topic 1, Key Public Education Elements, you will be introduced to concepts, characteristics, the importance and context of public education.

Learning Objectives

At the end of the topic you should be able to:

- Describe public education concepts based on relevant international instruments and agreements
- Describe the characteristics of public education
- Discuss the importance of public education, including for biosafety issues
- Discuss the context for public education, including external factors and internal factors

Structure

This topic consists of the following lessons:

Lesson 1: The concept of public education

Lesson 2: The characteristics of public education

Lesson 3: The importance of public education

Lesson 4: The context of public education

Topic 1: Key Public Education Elements

Lesson 1: The concept of public education

This lesson covers the concept, including the general and specific definitions, based on legal instruments and other agreements in public education. The concepts provide a basis for rationale and mechanisms to promote public education of biosafety issues, including a reference to mainstreaming biosafety into other areas.

Meaning of public education

The concept of “public education” refers to government education that is entirely or partly funded and overseen. National education systems vary in each country. However, all educational systems promote learning between two or more persons or medium of persons.

Topic 1: Key Public Education Elements

Lesson 1: The concept of public education

General Instruments and Agreements

The right to education is a fundamental human right enshrined in Article 26 of the Universal Declaration of Human Rights, Articles 13 and 14 of the International Covenant on Economic, Social and Cultural Rights and other international agreements and is a component of the broader right to freedom of expression and the “right to know”. In this regard, in most countries, it is compulsory for the public to participate in the national education system to a certain level. This may not include higher education, however, the Declaration notes that higher education shall be “made equally accessible to all, on the basis of capacity, by every appropriate means, and, in particular, by the progressive introduction of free education”. Aside from the level of education, governments regulate the national education system in terms of the resources, content and structure based on national legal frameworks.

Most countries have national frameworks and other agreements on public education drawn on the principles and provisions of relevant international and/or regional conventions and agreements. These instruments promote and develop the right of every person to enjoy access to education and a number of other standards. The United Nations Educational, Scientific and Cultural Organization (UNESCO) sets in place international legal obligations for the right to education. As a result, there are many regional educational agreements. Based on regional and international commitments, most governments then develop and implement specific legal frameworks and other standards.

Some of the key international conventions and agreements from UNESCO on public education include:

- Incheon Declaration and Framework for Action for the implementation of Sustainable Development Goal 4, to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. It promotes effective learning environments and sustainable development.
- Recommendation on the Recognition of Studies and Qualifications in Higher Education, which, on a national level, promotes, among other things, efforts to encourage the competent authorities concerned to give recognition to certificates of secondary education and other diplomas necessary for access to higher education, qualifications in higher education, defining procedures for the recognition of partial studies carried out in higher education institutions, preparation at the higher education level for the practice of a profession. It also promotes countries to evaluate a qualification obtained abroad for the purpose of further studies, alleviation of the difficulties encountered by those returning home after having studied abroad and wishing to pursue their studies or practice a profession.
- Convention on Technical and Vocational Education, which involves all forms and levels of the educational process, including the study of technologies and related sciences and the acquisition of practical skills, know-how, attitudes and understanding relating to occupations in the various sectors of economic and social life. In 2015, the Recommendation concerning Technical and Vocational Education and Training (TVET), which aims to, among other things, empower individuals and promote employment, decent work and lifelong learning and environmental sustainability.
- Recommendation on the Development of Adult Education, which aims to contribute to, among other things, developing a critical understanding of major contemporary problems and social changes and the ability to play an active part in the progress of society with a view to achieving social justice. In 2015, an additional agreement was adopted, the Recommendation on Adult Learning and Education, which aims at, among other things, develop the capacity of individuals to think critically and to act with autonomy and a sense of responsibility, reinforce the capacity to deal with and shape the developments taking place in the economy and the world of work, contribute to the creation of a learning society where every individual has an opportunity to learn and fully participate in sustainable development processes and to enhance solidarity among people and communities and enhance awareness for the protection of the environment.
- Convention against Discrimination in Education, which aims to limit discrimination in education such as based on gender or language.

Topic 1: Key Public Education Elements

Lesson 1: The concept of public education

Sustainable development and environmental education instruments and agreements

In general, environmental education involves learning how the environment functions and the public's relation to ecosystems in order to live sustainably. It is a multi-disciplinary field integrating many topics, such as biology, chemistry, ecology and earth science. The aim is to address the gap in the public's understanding of how to relate to the environment, including participating in resolving environmental challenges. As a result, governments have some experience in developing concepts and other environmental education information for educational institutions. At the same time, educational institutions have some experience in incorporating environmental education having receiving incentives to promote environmental education.

In the field of environment and sustainable development, the most relevant international instruments and other agreements include the following:

- Chapter 36 of Agenda 21, which calls for reorienting education to address sustainable development.
- International Environmental Education Programme (IEEP) of UNESCO/UNEP, which, among other things, provides every person with opportunities to acquire the knowledge, values, attitudes, commitments and skills needed to protect and improve the environment. The key is that it promotes the linking of educational institutions and specialists in a network.
- Article 12 of the Convention on Biological Diversity, which requires Parties to the Convention to establish and maintain programmes for scientific and technical education. Article 13 requires Parties to the Convention to promote and encourage understanding of the importance of, and the measures required for, the conservation of biodiversity, as well as its propagation through media, and the inclusion of these topics in educational programmes.
- Article 23 of the Cartagena Protocol on Biosafety, which requires Parties to the Protocol to promote and facilitate public awareness, education and participation concerning the safe transfer, handling and use of living modified organisms in relation to the conservation and sustainable use of biological diversity, taking also into account risks to human health. In doing so, the Parties shall cooperate, as appropriate, with other States and international bodies. It also requires Parties to endeavor to ensure that public awareness and education encompass access to information on LMOs. In addition, Article 22 of the Protocol, based on the needs of developing country Parties, in particular the least developed and small island developing States, also indicate that cooperation in capacity-building shall, subject to the different situation, capabilities and requirements of each Party, include scientific and technical training in the proper and safe management of biotechnology, and in the use of risk assessment and risk management for biosafety, and the enhancement of technological and institutional capacities in biosafety.

Exercise : Questions based on text from the international agreements and reflection of public education of biosafety needs in your country/situation

http://bch.cbd.int/protocol/outreach/modules/exercise_1 - pubiceducation.doc

Resources: The Universal Declaration of Human Rights, Agenda 21 (<http://www.unep.org/documents.multilingual/default.asp?DocumentID=52&ArticleID=4415&l=en>)

Topic 1: Key Public Education Elements

Lesson 2: The characteristics of public education

This lesson covers the characteristics of public education, including formal and informal education. It is important to understand these features to take note of the best methods to focus on at each level of education. Regarding biosafety, some countries have experience in offering postgraduate level courses and ad hoc informal training activities. However, in general, there are programmes and ongoing initiatives in informal and formal public education.

Formal education

Based on legal frameworks and programmes, governments set up mechanisms and procedures for formal education to be facilitated by educational institutions. Formal education differs between countries regarding the structure and content. However, formal education primarily includes schools, colleges and universities, such as at the secondary and higher educational level. Governments recognize qualifications from these academic institutions as formal degrees, diplomas and other certificates.

Exercise: http://bch.cbd.int/protocol/outreach/modules/formal_education.docx

Topic 1: Key Public Education Elements

Lesson 2: The characteristics of public education

Secondary public education

Secondary public education is basic education that governments provide and oversee. This is usually compulsory at adolescence to prepare the public for higher education or to enter the work force. Secondary education mainly includes high schools, gymnasiums, lyceums and middle schools. To be qualified, governments provide accreditation (e.g. certifying educators, content and certificates) and set other standards on the characteristics.

A few characteristics to consider for secondary education

- Educational materials: If topics are not part of the curricula, educational materials could be made available through other means (e.g. libraries, bulletin boards, guidelines, extra-curricula activities, seminars, lectures)
- Courses and Programmes: Specialized topics are taught as part of courses or a course within a programme such as biosafety taught in a biology course or biosafety taught as part of an environmental degree. The level of integration depends on the national educational system. In general, secondary education teaches theoretical concepts across a broad range of topics and educators usually do not have the opportunity to undergo a pedagogical training to have an in-depth knowledge of all topics.
- Whole-school approach: Some secondary education has a whole-school approach teaching an overarching topic in all programmes. For example, some educational institutions promote sustainable development/environment education in every programme or course. In this regard, the educational institution has developed certain values (e.g. practices and principles) that support sustainable development or the environment.
- Partnerships with communities and civil society: Certain secondary educational institutions promote partnerships with communities and civil society. In this regard, partners promote and influence the topics available in educational institutions.

Topic 1: Key Public Education Elements

Lesson 2: The characteristics of public education

Tertiary public education

Tertiary (higher) level public education is graduate and post-graduate level education that governments provide and oversee. This is usually non-compulsory for adults to enter the work force. The higher education could include universities, colleges, and technical schools. Governments qualify the education through attainments or level of completion (e.g. accredited certificates, diplomas, or academic degrees) and other characteristics.

A few characteristics to consider for higher education

Exchange programmes for individuals:

Exchange programmes are initiatives for individuals to take courses and programmes in an educational institution that is a partner institution to where the participant is enrolled. The aim is to incorporate understanding of and/or skills gained from different topics into further studies or careers in the same area. The exchange time could be on a short or long term basis on a national or international level. Educational institutions make an agreement with each other (e.g. through a memorandum of understanding), for a national or international programme. The educational institutions are selected by governments' decisions on the qualifications (e.g. standards to apply or the grades), duration and other characteristics of education.

Good practices:

- Capacity can be built through financial contributions from developed countries to sponsor participants from developing countries
- Participants can receive scholarships, loans, fellowships or rewards
- Foundations dedicated to exchange programmes and other initiatives may assist in the process to sponsor fellowships
- Courses are offered in a more flexible manner such as during the summer, intensive courses and/or online
- Expertise, based on skills acquired, can be transferred to other developing countries and economies in transition

Topic 1: Key Public Education Elements

Lesson 2: The characteristics of public education

Joint educational initiatives:

- Joint educational initiatives in higher education programmes or courses can be funded by developed countries for developing countries to enhance research and capacity
- Financial, human and technical resources may be shared
- The initiatives promote transfer of technology and support for capacity-building in developing countries and countries with economies in transition
- More stakeholders can and are interested in participating (e.g. government officials, civil society, businesses/industries, unions, non-governmental organizations and/or associations) as education could be taken as a continuing education course
- The quality of related programmes or courses can be enhanced
- Participants could be provided with an entire or partial degree programme recognized internationally under a certain topic (e.g. bridge program)
- Government funding may increase as part of improving the country's international relations
- Scholarships or fellowships are frequently provided
- Networks of experts can be created with ongoing sharing of information, including research, peer-reviews and advice
- Increased monitoring and evaluation of content and structure of information as more experts are involved
- Established academic institutions on a sub-regional, regional and international level and strengthened technical capacities
- Consultative meetings can be organized regularly, including for donors, to discuss and update curricula, programmes and quality assurance
- A standard for comparing attainment and performance of scholars could be utilized (e.g. European Credit Transfer and Accumulation System)

Topic 1: Key Public Education Elements

Lesson 2: The characteristics of public education

Courses or Topics Integrated into Course:

Courses or topics integrated into courses taught in higher education are part of an entire programme or other degree-related attainment. The courses or topics integrated into courses may be integrated by educational institutions in a more flexible manner. For biosafety, these may be included in degrees in biodiversity, sustainable development, biology, biotechnology, legal aspects and science. However, governments approve the integration and other characteristics of the education.

Good practices

- Educational materials are usually standardized to be used in many fields
- Initiatives for integrating topics in to courses result in enhanced public understanding of the importance of the specific topic and partnerships with key stakeholders (e.g. decision-makers and educators)
- The courses or topics integrated into courses are designed and planned for specific programmes (e.g. law, environment, health).
- Educational institutions offering related courses or topics integrated into courses (e.g. biodiversity, sustainable development, science) are more open to integrating courses or topics integrated into courses
- Participants learn the interlinkages between biosafety and other fields
- Participants bring the knowledge and understanding into other areas/topics

Topic 1: Key Public Education Elements

Lesson 2: The characteristics of public education

Stand-alone Programmes:

Stand-alone programmes offer an entire degree on one topic. Educational institutions may decide and/or propose the sub-topics under the programme. These could include a Bachelor's, Master's or PhD level programme. Based on this, the national government qualifies the programmes through degrees or diplomas and other characteristics of the [educational programme](#).

Good practice

- Funding is secured and the sustainability of the education is long-term
- Standards on quality control and assessment can easily be set in place
- Governments can enhance planning and support for job opportunities related to the topic of the programme
- As the duration is longer, the programme is able to provide educational materials in a more impartial manner, such as considering pros and cons in science and technology
- Educational materials in different sub-topics can be developed and taught to more stakeholders
- A balanced curriculum including many sub-topics (e.g. biosafety law, socio-economic considerations) can be taught, enhancing the understanding and skills of participants in many fields
- A mechanism is usually set up to facilitate continued communication, coordination and networking among scholars. For example, an alumni network can be established among participants to improve understanding, promote employment and other support
- There could be permanent resource persons to assist in education and training
- The long duration provides room for flexible teaching methods and use of more learning theories
- An internship programme could be better facilitated with collaboration between governments, business, civil society, farmers and other stakeholders
- Similar programmes are easier to set up in other national and local universities and other educational institutions
- Credentials of educators (e.g. professors) can be set in place
- More background information and preparations for researchers and other scholars can be provided on a regular-basis
- The long-term duration may enhance political will to further support education

[Link to academic-accredited programmes and courses:](http://bch.cbd.int/database/results?searchid=664162) <http://bch.cbd.int/database/results?searchid=664162>

Topic 1: Key Public Education Elements

Lesson 2: The characteristics of public education

Informal education

As a response to promoting education to reach more stakeholders, governments set up procedures or temporary plans for informal education. Informal education differs vastly in countries. However, informal education tends to be initiatives involving participants who have not undergone formal education on certain topics. These could include workshops/conferences or seminars on a national and/or local level (e.g. community centers, in government and in other places). In addition, informal education usually involves vocational and other training activities. In general, governments recognize such initiatives as non-accredited education or training that may lead to a qualification.

A few characteristics to consider for informal education:

- Vocational and practical training promotes work-based learning, including continuous training and professional development
- Educational centers, associations, training institutes and other civil society carry out educational activities to support government
- More stakeholders that are not part of the educational system are trained (e.g. policy-makers, risk assessors, customs officers, consumer groups, NGOs, biosafety staff, technicians, researchers, media)
- There are limited prerequisites for the education (e.g. requirement to have a past science degree)
- Independent decision can be taken as the Ministry of Education and other decision-makers related to education may be less involved in deciding on the qualifications and other requirements
- Enhance direct collaboration between local government and communities
- Innovative forms of informal education may reduce the funding to promote public education (e.g. promoting educational groups, networks/discussion groups, online tools, community education)
- The education and training uses teaching methods that are more practical than theoretical (e.g. apprenticeships and inviting the public to visit fields and/or labs)
- Opportunities to join initiatives with organizations and institutions on regional and international levels

Exercise: http://bch.cbd.int/protocol/outreach/modules/informal_education.docx

Resource: Capacity-building database at <http://bch.cbd.int/database/results?searchid=677098>

Topic 1: Key Public Education Elements

Lesson 3: The importance of public education

This lesson highlights the importance of public education. It is also the rationale and purpose of promoting public education.

In general, public education can lead to:

- Increased public understanding of relevant issues
- Acceptance and trust of final decisions in government
- Increased employment in specific fields. Education is important to national economies, both as an industry in its own right, and as a source of trained and educated personnel for the rest of the economy. A public with higher education tend to have a lower unemployment rate. In this regard, the cost is also less on training for the employer as staff members have better skills.
- Increased understanding of the importance of adopting and implementing national, regional and international instruments and agreements
- Opportunities for women and local communities (e.g. indigenous peoples) to learn about relevant issues
- Effective public participation through informed public inputs on relevant issues
- Reduced funding needed for training at the workplace
- Education is a prerequisite for further information sharing

Specific to biosafety, public education can lead to:

- Nonpartisan and impartial education and training to understand issues related to biosafety
- Impartial analysis and research in biotechnology (e.g. development of biotechnology in a safe manner)
- Enhanced understanding of biosafety by stakeholders in related fields
- Increased collaboration and support of biosafety issues at the international, regional and national levels
- Fostered South-South and North-South cooperation on biosafety issues
- Long-term and comprehensive education and training
- Improved research, studies and/or capacity to conduct risk assessments of LMOs and/or laboratory detection of LMOs
- Enhanced implementation of the National Biosafety Frameworks (NBFs), legal frameworks and biosafety policies and guidelines
- Opportunity to increase the understanding of benefits and concerns of new developments such as synthetic biology
- Strengthened human resource capacities, including biosafety experts (e.g. researchers) in government, academic institutions, civil society and among women, indigenous peoples and local communities and other stakeholders to assist in implementing the Protocol
- Improved access to training materials on biosafety
- Sustainable source of funding for other capacity-building projects
- Improved laboratory equipment and facilities for biosafety field research and training
- Improved funding from regional and international sources of biosafety education and training

Topic 1: Key Public Education Elements

Lesson 4: Context of Public Education

The effectiveness of promoting public education regarding LMOs is often influenced by social, cultural, economic, technological, and political factors and circumstances. Thus, governments need to carefully identify and consider the different contexts when promoting public education. Among other things, they need to analyze the external and internal factors.

External factors:

- The historical context of the development and planning of public education
- The existing national and local government education agencies, including the structures, the legislative or other frameworks such as educational legal frameworks, institutions and international commitments
- The decision-making process, including roles and responsibilities and allocation of budget decisions, of the national educational system. This includes a system of decentralized or centralized decisions.
- The national education systems, such as structures, contents in curricula, practices, as well as the roles and responsibilities of various stakeholders
- The existing social, cultural, economic, technological and political factors that may affect public education (e.g. number of languages, the majority of the public's age group, illiteracy level, urbanization level, gender equality, number of indigenous and local communities, technological availability)
- Educational requirements (e.g. content, teaching methods, structure, class size, school facilities, composition of textbooks, level of gender equality, special programmes of marginalized groups)
- Financial support for education (e.g. level of funded public education, educator-preparation programmes, workshops, vocational training, extra-curricula activity, using new technologies)
- Level of environment and sustainable development integrated in public education
- A system of making available research in science and technology
- Civil society, associations and other stakeholders on a national, regional and international level offering education or training on biosafety

Topic 1: Key Public Education Elements

Lesson 4: Context of Public Education

Internal factors:

- Established educational programmes, courses or other training activities on biosafety
- The skills, competencies and experiences of staff to develop and/or integrate public education in biosafety (e.g. technological skills, developing educational materials)
- Allocated funding for educational projects for biosafety
- Biosafety integrated and harmonized into biodiversity, environment and sustainable development education, including the related frameworks and mechanisms
- Existing relation with stakeholders to adopt and implement legal frameworks on biosafety related to education
- Biosafety educational mechanism and procedure in place (e.g. advisory boards on biosafety education and relations with academia)
- Efforts in training-of-trainers and other similar activities
- The availability of human resources to promote public education
- Existing joint national, regional and international educational initiatives in biosafety
- Number of biosafety experts
- Existing public awareness and education initiatives to various stakeholders (e.g. women, indigenous peoples and local communities, and customs officials, ministries, media and researchers)
- Number of educational materials on biosafety, including their translation into local languages
- Collaboration on professional exchange programmes and fellowships on biosafety
- National and sub-national (local) libraries with biosafety materials and educational events on biosafety
- Collaboration with sub-regional, regional and/or international networks on education and training in biosafety or general education networks