



Chapter 7
Planning, implementing and evaluating ESD activities
within Biosphere Reserves and other designated areas



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7.1 Introduction

The first stage in designing any **educational intervention / programme**⁵ is to consider the reasoning and philosophy behind it. The programme designer is called upon to answer questions such as: *Why propose a particular programme? What needs does it address? What are its aims? Why is it important for learners (target-group)?* The answers to these questions set the backbone of the programme. Even when the designer's intentions are not strictly educational, but aim rather for a 'loose' experimental approach, (e.g. «Let the visitors experience

the pulse of life in a forest by means of a walk» or «have the students entertained by means of environmental games»), the intended results must be clearly stated. This is helpful to both the programme's design and evaluation (Hungerford & Peyton, 1994; Wilke et al., 1994).

The model presented below can be applicable to any programme (of formal and non-formal education) regardless of the subject, duration and target group. For the last 30 years, it has been applied successfully with minor variations by educators, programme designers, seminar organisers, etc. (Hungerford, 2000).

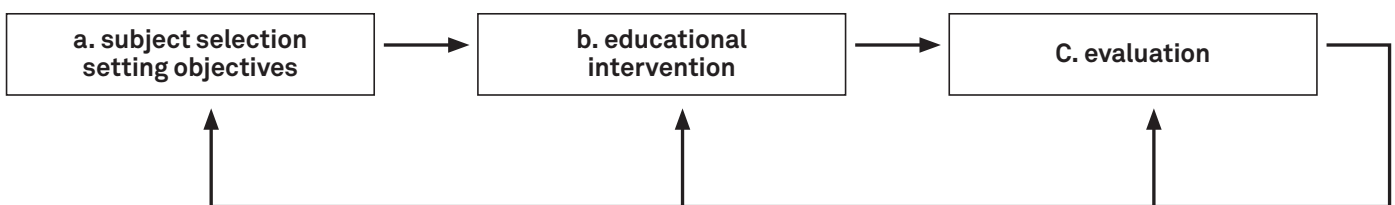


Figure 20
General model for ESD educational/intervention programmes

This model is based on the principle that the goal of any educational intervention is to improve the effectiveness of the target-group to approach the desired objectives. Undoubtedly, it is a helpful tool for beginners, but even those quite familiar with ESD can improve their practices by applying it. **Specifically for multi-stakeholder ESD programmes this model can function as a common reference frame and facilitate communication between everyone involved in the planning or implementation, regardless of their educational or environmental specialization (i.e. ESD officer, administration in PA management bodies, etc.).**

Obviously this model does not propose subjects, objectives or teaching methodologies. It is essentially a series of "blanks" to be "filled in" with the desired results; the methods and the tools to achieve these results; and the means of evaluation. The content of the "blanks" is re-defined following the evaluation process.

The model can be applied even in cases of lack of human resources to carry out the intervention. **For example, for a Biosphere Reserve that includes a forest and a settlement, it is possible to create a programme on biological and cultural diversity, based on explanatory signs**

placed in well-designed learning paths. Thus, the visitors can be informed, e.g. about the status of the ecosystem, the architecture of a bridge, the occupations of residents in the past and their relation with the forest, the endangered endemic plants, the archaeological discoveries etc. In this case, the evaluation can be based on a short "visitors reflection" questionnaire in paper, or electronically.

The three stages of this model are presented in detail hereafter in the following paragraphs.

A. Selecting subjects and setting objectives/goals

The choice of subject is influenced by factors such as: (i) the priority given to it by the designer and the institution he/she represents, (ii) the target-group (age, interests, subject's relevancy to their everyday life, the school curricula for students), (iii) the designer him/herself (studies, interests, hobbies), (iv) the available resources, (v) similar programmes organized by other institutions, etc.

Usually, in ESD programmes the issues addressed vary in dimensions and related concepts. The challenge for the designer is to incorporate multiple dimensions (interdisciplinary approach), in a way that brings forth their

5. The term educational programme/intervention refers to the whole range of activities planned for the learners (target group), that translate the principles of ESD into practice.

1. Oued Khalfa,
Chlef, Algeria
©Olivier Brestin

2. Young boys,
Nedroma, Algeria
©Olivier Brestin

3. Camp
of nomadic herders,
Tiaret, Algeria
©Olivier Brestin



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4. In the beach
villas' area
Tipaza, Algeria
©Olivier Brestin

5. A herder
from Tiaret,
Tiaret region,
Algeria
©Olivier Brestin

6. Sheep
transportation
by a breeder,
Tiaret region, Algeria
©Olivier Brestin

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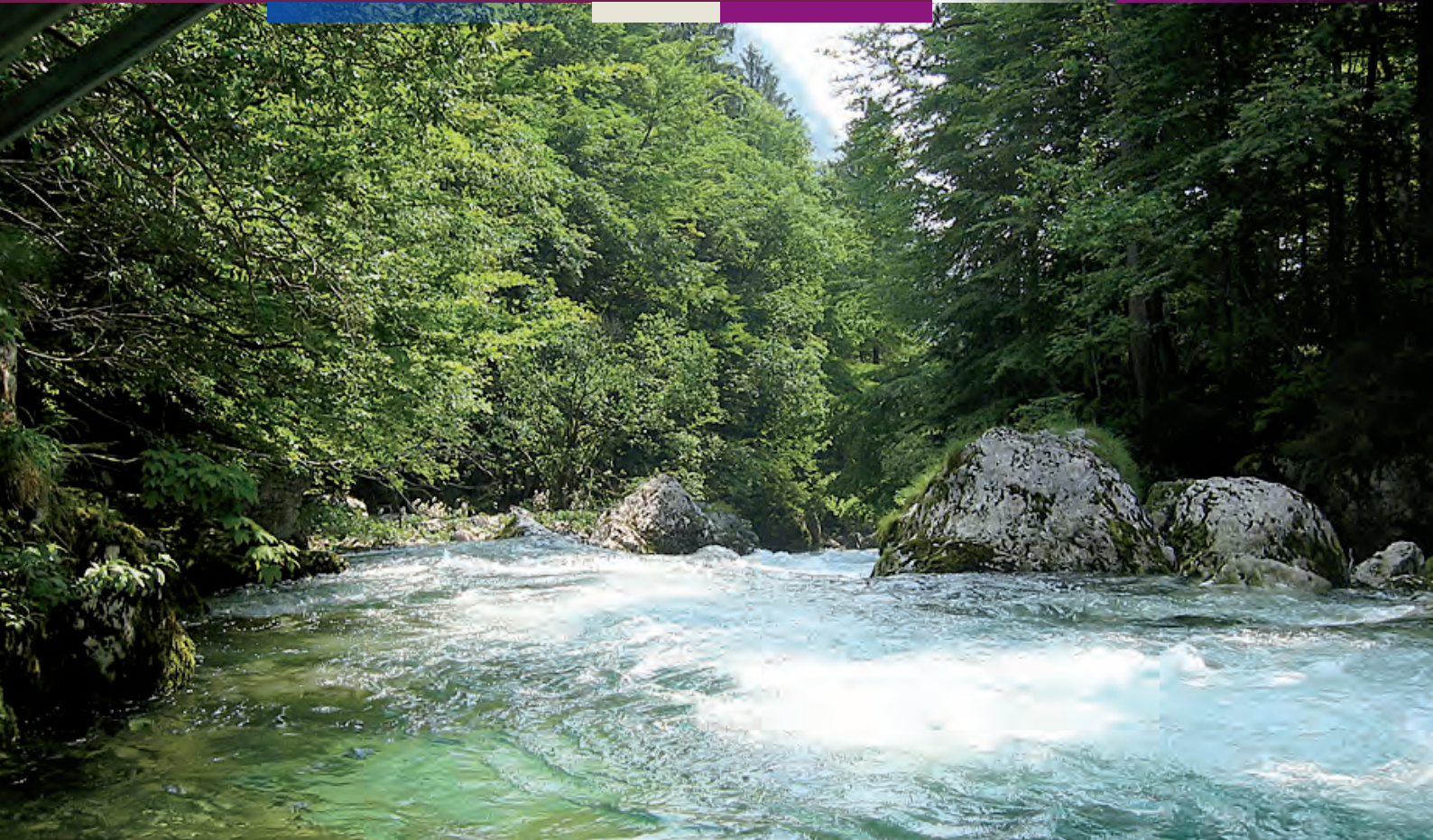
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interconnections and through the analysis of which the learner is guided to their re-construction (holistic approach). Within any designated area its features and characteristics definitely influence the choice of subjects (e.g. whether a wetland, terrestrial land or marine); along with its protection status (whether a MAB BR, a Natura 2000 site etc.); its current state and management plan (if any), the opportunities it provides for the skill development or even action by the target-group, and also any current events. For example, after the devastating fires of 2007 in Greece there was a boost of school programmes on forests. In any case the designer should keep in mind that, concepts like “designated area”, “threatened species” etc. are primarily the vehicles for the transmission of the key ESD messages and principles.

It is advisable to identify potential collaborators during the initial planning stages both for practical and operational reasons but also to secure the greatest possible commitment and continuity to the programme. For example, if a municipality is informed duly, it may be able to offer the transportation means to “the field”, thus decreasing the programme’s budget already from the planning stage, leading the designer to propose many field activities.

At times, the target-group’s level of knowledge and attitudes are weighed in the initial design stages (**formative evaluation**). This can be done in many ways: by studying the literature, a research (through e.g. questionnaires, interviews), through a focus group (intended meeting with experts, scientists etc. to exchange ideas). The results of such an evaluation point to the objectives and the overall planning. For example, if the evaluation shows low awareness of the target-group on the pollution threats in the neighbouring designated area, the intervention should focus on awareness raising, e.g. through visits to the polluted areas. If the evaluation shows high awareness and sensitization on the topic of pollution, the intervention can focus on strategies of public participation and action and so on.

The objectives can be related to knowledge and skills desired to be acquired by the learners; they may refer to attitudes and values, or even desirable behaviours to be adopted, eventually, after the intervention. Further analysis about objectives formulation in ESD is presented in paragraph 7.2.



12. Cinereous vulture (*Aegypius monachus*) and white scavenger vulture (*Neophron percnopterus*), *Dadia National Park, Greece*
© MB of the Dadia National Park/
P.Babakas

13. Rocky peak ideal for the nesting of predatory birds, *Dadia National Park, Greece*,
© MB of the Dadia National Park/
P. Babakas

7. Bohinj Lake, *Triglav BR, Slovenia*
© Giorgio Andrian

8. Traditional house, *Strandja Mountain, Bulgaria*
© Philippe Pypaert

9. Local residents, *Strandja Mountain, Bulgaria*
© Philippe Pypaert

10. Window of a traditional house, *Strandja Mountain, Bulgaria*
© Philippe Pypaert

11. Traditions in *Strandja Mountain, Bulgaria*
© Philippe Pypaert

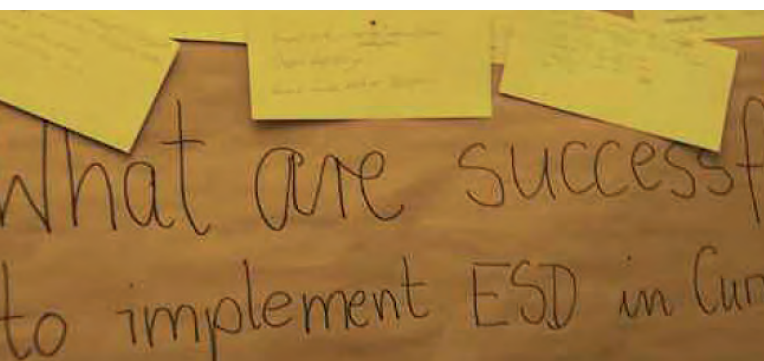


14. Workshop coordinator gathering results, *UNESCO World Conference on ESD*, Bonn, Germany © German Commission for UNESCO/ Kornelia Danetski



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15. Conference poster made from pinned papers, *UNESCO World Conference on ESD*, Bonn, Germany © German Commission for UNESCO/ Kornelia Danetski



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B. Design and implementation of educational programmes

Using objectives as a starting point, the designer lays out the educational intervention by selecting appropriate pedagogical methods and tools. As discussed in paragraph 7.5, the choice of method, technique, and tools is determined by the objective, learners' characteristics, available time and space but also the material and technical infrastructure of the body implementing the programme.

Each proposed ESD programme bears the mark of the designer's background and vision. Even greater is the influence of the educator's character on the programme's implementation. In the same programme for example, a guided tour of an adult group to a wetland, a botanist is expected to emphasize different activities than a management senior or a drama coach in order to achieve the very same objectives. This is, to some extent, not only fair, but also desirable.

Cooperation between different specializations facilitates interdisciplinarity during the design stage and enriches "interpretation" in the implementation stage. The development of an educational programme in a designated area provides an excellent opportunity for designers and educators to apply in practice cooperative learning. The relevant stakeholders that can be involved are discussed in paragraph 7.2.

Table 11
Clarification of the terms "teaching methodology", "method", "techniques" and "tools"

Learning /Pedagogical Methodology:

Refers to the totality of methods and techniques used in an educational programme, as well as the system of principles and rules on which educational intervention is based.

Learning /Pedagogical Method:

Refers to the underlying philosophy that ties teaching and learning activities and to the main reasoning processes involved. It also reflects the role and status of the educator and the learners, their relationship towards each other and towards the learning subject. Examples of such methods are the inductive method (specific to general), the abductive method (general to specific), the proportional method (specific to specific), the experimental method (see 8.7), the group cooperation (see 8.2), the constructive, the exploratory, the project method.

Learning /Pedagogical Practices and Techniques:

Refer to the way in which teaching and learning activities are applied and the relative course they follow. Examples of teaching techniques include open discussions, brainstorming, role-play, creating concept maps, various ice-breaking and team building games.

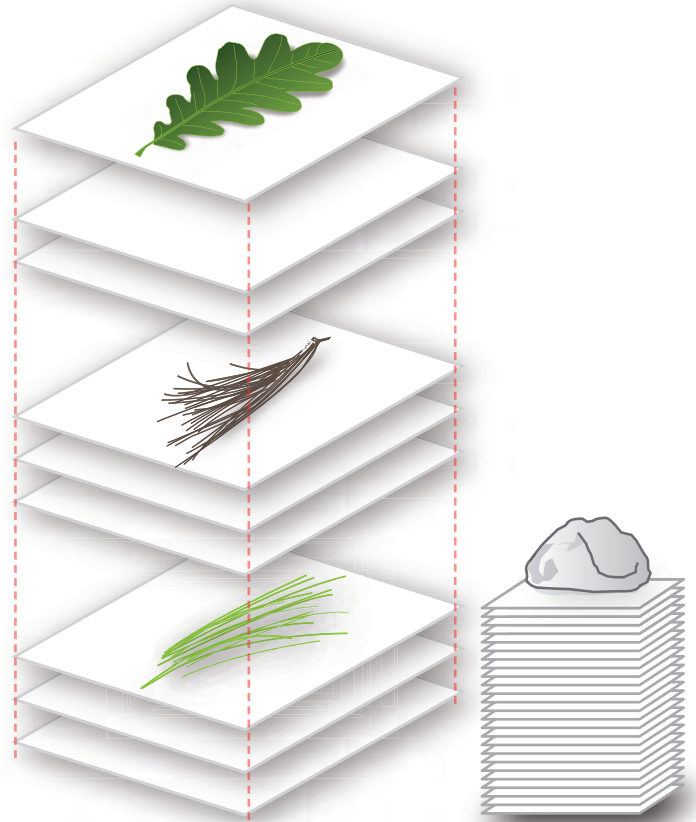
Learning /Pedagogical Tools:

Refer to anything that can be used or taken advantage of by the educator and the learners during the intervention, such as maps (see 8.5), objects, slide shows, CD-ROMs.

C. Evaluation

Evaluation, according to the most simple and general definition, is the attribution of a specific value in a person, object or process based on specific, clear and pre-defined criteria and estimation methods.

Specifically, **educational evaluation** is the sum of techniques that demonstrate whether the educational objectives were achieved and in what way. At the same time, it refers to all the factors involved in the educational process, the methods, those who implement them, the results achieved, etc. (Kossotakis, 1998). Those involved in education know the significance but also the difficulty of the evaluation process. Clear objectives and indicators, already formed in the design stage, make the process easier.



16. Trees in the autumn, Plitvice Lakes National Park, Croatia ©Our Place, the World Heritage Collection



17. Creating scientific herbariums, Botanical Garden, Padua, Italy ©Our Place, the World Heritage Collection

18. Leaf collection pasted on poster board, ©Nina Cooper



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In accordance with the objectives of an intervention, evaluation refers to its results (effectiveness) and/or the process itself. For example, the evaluation of a school annual programme that aims to raise awareness of water conservation can be done in several ways: it can be based on the actual reduction of water consumption in the school (through the water bills) or refer to the changes of the students' attitudes (as declared in a questionnaire). The same programme can also be evaluated in terms of the instructors' performance (how appropriate were the educational tools applied, ability to adjust to unforeseen events, etc.), or the learners' performance (level of participation, interest, commitment, etc.).

Ideally, before a programme's general implementation in a target-group, it is a good idea to run a pilot project observed by an evaluation expert who will be able to provide feedback on areas that need improvement for both the designer and educator. As seen in figure 19 (p.144); evaluation results are "re-fuelled" to all three stages of planning, meaning the objectives, the methods applied and even the evaluation techniques through an ongoing process.

Further discussion on the evaluation process can be found in paragraph 7.6.

7.2 What is to be achieved (setting objectives)

Defining objectives in any ESD programme is a decisive point of planning, as the objectives guide the content and the orientation of the intervention. The objectives must be in agreement with international principles and texts of reference of environmental and educational content (e.g. International Environmental Conventions that a country has ratified, Strategy of UNECE for the UN Decade for ESD etc.) and should be adapted to the level of the target-group.

The dominant model in setting **educational objectives**, even if criticised, is still that of Benjamin Bloom, that categorises them as: cognitive, psychomotor and affective. Please refer to bibliography for further details.

Bloom's taxonomy of educational objectives

In the categorisation of educational objectives, Bloom's model divides them as:

- i. **Cognitive:** refer to the acquisition of knowledge that relates to the surrounding environment and to the comprehension capabilities, application, analysis, composition and evaluation of basic concepts and underlying mechanisms.
- ii. **Psychomotor:** refer to the development of skills for recognising solving problems. Such skills may be kinetic (e.g. using of scientific apparatus), but they can also refer to communication, cooperation, data collection capabilities, etc. (e.g. forming sound arguments, work effectively in pairs, etc.)
- iii. **Affective:** refer to the clarifications of values and the development of attitudes and behaviours that are environmentally friendly.
- iv. Of particular importance in ESD, and closely linked to (ii) and (iii) is an additional category of **Participation and citizenship action:** refer to the decision making and taking action to resolve problems.



In any ESD programme, it is advised that these categories are balanced and of equal importance. One step further, *the likely outcomes* constitute the interpretation of the programme's objectives in concrete and measurable knowledge, behaviours, skills and help in the evaluation process.

In Table 12, a model outlining four goal levels, widely applied during the last decades in EE and subsequently in ESD programmes, with documented positive results is presented. It was developed by Hungerford, Peyton and Wilke based on the Tbilisi criteria. With the proper adaptation, this model of objective setting can be used by ESD programme designers on all levels (international, national, local), for all forms of education (formal and non-formal) and at all educational levels (primary to tertiary).



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Table 12

The four levels of general objectives for EE/ESD programmes as suggested by Hungerford, 1994

Level I: Ecological foundations

Refers to fundamental ecological knowledge on the structure and functions of the natural environment, so that learners are in a position to evaluate environmental issues and make decisions in relation to possible solutions that are ecologically compatible.

Examples for BRs: goals regarding the structure, functions and evolution of ecosystems (species, populations, concepts of succession, homeostasis, adjustment and niche, energy flows, biochemical and geological cycles, etc.) but also the role of humans as a part of the ecosystem, including consequences of human activity and social groups (urban dwellers, farmers, etc.)

Level II: Conceptual awareness: issues and values

Refers to the understanding/awareness of how human activities (individual and collective) influence the relationship between the quality of life and the quality of the environment and how these activities lead to environmental issues which must be resolved through investigation, values clarification, evaluation, decision-making and taking action.

Examples relevant to BRs: appropriate goals are those that give learners the opportunity to consider the meaning of terms like “Biosphere Reserve” and the reasons that led to their establishment as well as the different values, attitudes and beliefs related to a protected or other designated area. Also included are goals that stress the need for investigation of SD issues, such as the need to take action to resolve such issues.

Level III: Investigation and evaluation

Refers to the development of skills necessary to investigate and evaluate environmental issues, and alternative solutions. Specifically, Level III refers to skills necessary to identify an issue, to synthesize data from various sources, to analyze it and recognize solutions. Through this process, the learner’s value perspectives are declared in relation to the issue as well as to its solution.

Examples relevant to BRs: includes goals that refer to the development of the ability to investigate, synthesize, analyse and identify solutions associated to a BR issue, (e.g. the inhabitants’ negative attitude towards the BR), but also includes the goals that refer to the learners’ ability to identify and clarify their own value positions (e.g. personal value positions towards the neighbouring BR).

Level IV: Capability for environmental action

The objectives refer to the development of a learner’s skills necessary to take action towards resolving environmental issues.

Examples relevant to BRs: includes objectives for the development of capabilities provided the learner wishes to take action. Such actions include physical action for the improvement of a situation (e.g. cleaning a stream from garbage), consumer action (e.g. boycotting harmful products, buying local ones), political action (e.g. taking judicial action), or persuasive action (e.g. writing a letter to the Mayor or to a newspaper).

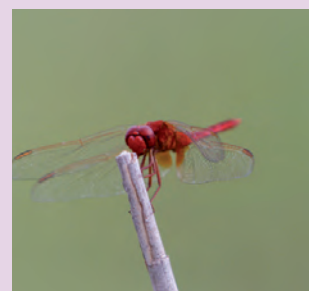


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19-20. Fishermen (and detail), Port-Saint-Louis-du-Rhône, Camargue BR © UNESCO / O. Brestin

21. Little egret (*Egretta garzetta*), near Méjane, Camargue BR, France © UNESCO / O. Brestin

22. Scarlet dragonfly (*Crocothemis erythraea*), near Méjane, Camargue BR, France © UNESCO / O. Brestin



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As regards the organisation of an ESD programme, the authors consider the levels as **hierarchical** (i.e. Level III presupposes Levels II and I and so on) and suggest their spiral approach (the same goal of Level III of i.e. investigating an issue is addressed in primary and again in tertiary level in different depth and complexity). They also emphasize that action objectives for learners should be avoided, but instead the objectives should be oriented to provide learners the opportunity to apply their action-taking skills if they wish so (i.e. **instead of using the objective “by the end of the intervention ... learners should undertake a beach clean-up” it is better to state “... learners should be able to organise a beach clean up”**).

In some cases, it is best for the objectives of a programme to be presented and discussed with the learners, especially with adults. Depending on their experience the learners can modify the goals to more suitable ones. It is only natural for such action to increase their participation and engagement in fulfilling the objectives.

Finally, it should be noted that even well formulated objectives can be understood differently by the educators in the field. This is prominent for affective objectives, such as e.g. «...to sensitise learners towards water protection». The approach towards this objective depends on the personality and the value system of the educators, the relationship he/she develops with the learners, even on his/her mental state during the actual programme. Variety in approaching such objectives adds pluralism which is desirable. Nevertheless, in order to ensure a common code between the designer and the animator, and also to facilitate evaluation (for this objective can be only qualitative) and the feedback process, discussion and reflection between these two should systematically be sought.

7.3 Who will be involved

ESD constitutes a participative process of values identification, concepts clarification, skills and attitudes development -elements essential for the appraisal of the relation of people to their natural and cultural environment. The **participation approach** lies on one hand on the idea that all people have the right to participate in any decision that affects their lives and on the other hand that through fair and constructive ideas exchange, opinions and consciences are shaped, that can contribute to the common

good and hence to the protection of the environment and to sustainable development.

In bibliography, cooperation and participation appear as important factors for the quality and the success of any EE and ESD programme (e.g. Day & Monroe 2000; Castro, et al., 2003; Matsaggouras, 2003), a finding also reported in MIO-ECSDE's research (paragraph 5.5). Despite that, in practice, many programmes are centrally designed, without involving the population groups they address to, and without taking into consideration their needs and particularities (Mills, 1996), often leaving unexploited the precious knowledge and the ideas of local stakeholders.

The participative process is considered to develop autonomy at individual level; collaboration at group level; and, participation at a social or public level (Karakatsani, 2005).

There are many advantages in applying it in any ESD programme (Mills, 1996; Day & Monroe, 2000):

- This process, by nature, reverses the stereotype roles of the “teacher-expert” and the “ignorant-learner”, as it is based on equal participation, recognition of indigenous knowledge, as well as on self-guidance towards the advance of knowledge.

- The process establishes a common communication language between the different groups involved in the stages of planning, implementing and evaluating the ESD programme, as well as coalescence in the different views and attitudes of these.

- According to research, individuals get more involved in actions when they have themselves contributed in their planning, resulting in greater engagement, insistence and ultimately in successful outcomes, as opposed to actions imposed to them.

- Multi-stakeholder participation ensures inter-connection and continuity of programmes that have been already undertaken by the stakeholders (countering repetitions and fragmented initiatives).

The benefits are maximized when the cooperation developed is **multi-scientific** (includes experts from all relevant sciences), **multi-stakeholder** (participated by all interested institutions and relevant stakeholders) and **multi-level** (refers to all levels, including representatives of the programme's target group) (Booth, 1996). **There are many stakeholders that could be involved in a particular ESD programme for a MAB BR or a PA, and many ways to cooperate. An indicative list that can be elongated ad hoc is presented in the Table of page 154.**

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23. Inhabitants of *Chlef*, Algeria
©Olivier Brestin

24. Organized Argan oil trade, Women's cooperative, *Arganaie BR*, Morocco
©MB of the *Arganaie BR*

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25. Studies and tests carried out by scientists of the Institute of Geography, Aral Sea, Kazakhstan © UNESCO / Z. Kulenov

27. Transplanting plants for reforestation, Arganeraie BR, Morocco © MB of the Arganeraie BR

29. Managing team from SUMAMAD country participants, 8th International Workshop, Egypt © MB of Omayed Biosphere Reserve

26. Investigating groundwater wells, field visit to Omayed BR, Egypt SUMAMAD 8th International Workshop ©Thomas Schaaf

28. Local stakeholders sitting in a tent, SUMAMAD 8th International Workshop, Egypt ©Thomas Schaaf

30. Stakeholders' community leader, 8th International Workshop, Egypt © Thomas Schaaf

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Table 13

Stakeholders in a typical ESD programme for a MAB BR or other designated area

Stakeholder	Way of involvement and cooperation
Management Body of the BR or the PA	All staff of the Management Body could be engaged: depending on their expertise they can contribute in issues like ecosystems function, environmental management, educational matters, etc. Moreover, personnel such as keepers, fishermen etc. who know very well the region, can be involved by indicating, i.e. suitable and secure paths for the planned activities, etc.
CEEs and Information Centres	Usually they are very experienced in planning and implementing EE and ESD programmes and can engage also by providing material and technical infrastructure (projection rooms, overnight lodging etc.).
Education Supervisor	Education supervisors and the experienced educators from the region can be involved in the planning, implementation and evaluation of the ESD programmes.
Universities	Professors and/or researchers can act as experts in the field of bibliography research, as well as in planning and implementing the ESD programmes. In addition, undergraduate and postgraduate students who wish to gain experience in education or in PA or BR management in general can participate.
NGOs	Local environmental and cultural NGOs could engage in the planning and implementation (e.g. through their volunteers) of ESD programmes or provide their own information material. Usually, the local associations consist of active citizens with good knowledge and awareness of their region.
Commercial Associations / Chambers	Local commercial associations can act as sponsors (e.g. for a publication) or to promote the programme (e.g. distribution of brochures, etc). Also, local co-operatives (producers, women cooperatives, etc.) can be involved, if the programme is relevant to their areas of action. For example, a programme targeted on the acquaintance of learners with local products and the way these can contribute to the sustainable development of the PA, may include a visit to the local cooperative's facilities, a guided tour and a field activity. Similar action can be organised for an eco-tourist enterprise.
Local Authority	Local Authorities can offer material support (provide e.g. transportation; existing printed material for the BR or the PA, financial support for an event, etc.). The referring municipal and district committees e.g. on education, environment, sports, culture, tourism, etc. can support the ESD programme and its publicity.
Media	The local media such as newspapers and radio, can contribute by providing the necessary publicity, e.g. through special issues on the BR or the PA, etc. and by promoting press releases relevant to the events of the ESD programme.



31. Video production,
Russian federation
©UNESCO/ Alexis
N. Vorontzoff



32. Video production,
Venice, Italy
©UNESCO/ Alexis
N. Vorontzoff

7.4 Who is being addressed (target-group)

The characteristics of the target-group for any EE/ESD intervention in BR or other DA, determine to a large extent the content of the intervention. For example, in a BR where increased pollution in underground waters has been found, the MB (Management Body) may decide to organize an awareness campaign. The approach for the schoolchildren approach will obviously be different from that of local farmers.

The outline of the target-group's "profile", helps the designer to adopt more effective communication methods. This is not always an easy task to accomplish, particularly in cases of population groups unknown to the designer or heterogeneous (e.g. free visitors to the BR). This "profile", can be developed based on bibliography or through research with a questionnaire, interviews, etc.)

Questions that should be addressed in this process (Castro et al., 2003) include:

- Who constitutes the target-group? The designer can analyse characteristics such as age, level of education, profession, interests, relation to the BR, background knowledge concerning the intervention, etc. As far as schoolchildren are concerned, depending on their education level, the planned activities will differ and it would be better if they were related to their curriculum. For example, for the study of a wetland, the concept of eutrophication must be included, the designer should be aware of the ways this concept is developed in the school books and in which classes.

- What is the target of the intervention? Is it a general informative campaign or does it aim for concrete actions (future modification of the target group's behaviour)? In the previous example, the objective can be to change the way we use a product, e.g., detergents for housewives and students and of fertilizers for farmers, in order to decrease the eutrophication levels in the nearby lake.

- What are the incentives and counterincentives of the target-group? These include material (e.g. the reduction of cost constitutes a motive for the farmer) or concern and sentimental values (e.g. love for nature) and social stereotypes (e.g. the ecologist's profile, etc.).

- What type of messages appear to the target-group? What types of messages have to be touched upon and are expected to be effective? For example a poster that brings the title "SOS for birds" and portrays dead birds in a lake will convey a different impression than the same poster with the headline "SOS for our health". The first poster aims mainly at awareness raising for the habitat and its organisms - **ecocentric** orientation- while the second one tries to raise awareness via health threats for the inhabitants - **egocentric/anthropocentric** orientation (see more on these terms in paragraph 2.2). Depending on the target-group, threatening, aggressive or more moderate messages could be chosen.

Most EE/ESD programmes in a DA are addressed to schoolchildren. Apart from them, other specific groups can be free visitors, educators, journalists, businessmen and tradesmen of the region, farmers, fishermen, women, etc., as well as decision makers at national and local level (politicians, local authorities, etc.).

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33. Skadar Lake,
Montenegro
©Giorgio Andrian

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34. Polluted water,
Paúl do Boquilobo
BR, Portugal
© UNESCO / O. Brestin



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35. Student in
agricultural institute,
superior education,
Kufa, Irak
© UNESCO / D. Roger



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36. Residue analysis in water sample, Athens, Greece © UNESCO / N. Burke



37

37. Rice-transplantation by student in agricultural institute, Kufa, Irak © UNESCO / D. Roger



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38. Primary education in Associated School, Budapest, Hungary © UNESCO / D. Roger



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39. Washing clothes in the river, Post-war context, Goražde, Bosnia © UNESCO



40

40. Child drawing for peace, primary school, La-Varenne-Saint-Hilaire, France © UNESCO / D. Roger



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41-42. International drawing competition on Venice, UNESCO, Paris © UNESCO / Michel Claude



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7.5 Choosing a method

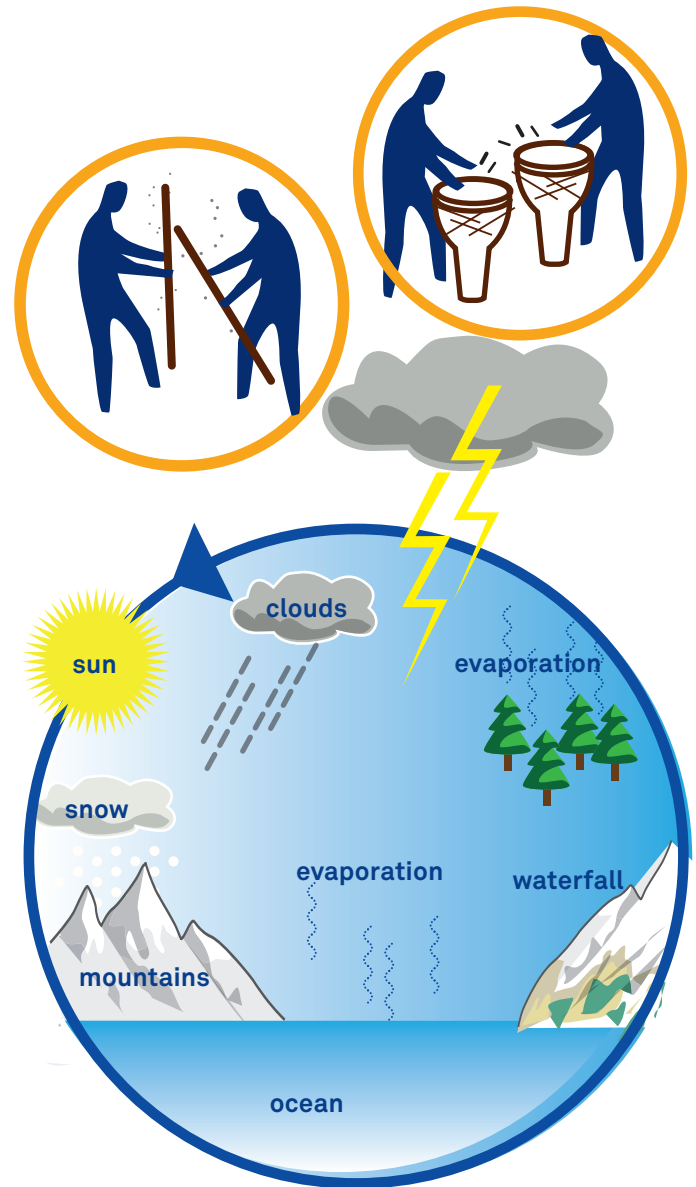
In ESD there is an abundance of methods, techniques and tools, many of which are analysed in chapter 8. The ESD programme designer is called to select the most suitable ones, to make sure that the learners will approach the goals of each programme effectively.

ESD is different from other types of education in that it has a particularly personal component of engagement for the environment and the future. Additionally, apart from knowledge and skills-building it includes an individual and collective devotion as opposed to what Glasgow (1994) calls “love for earth”. Particular emphasis is given to the active, participative and action orientated pedagogic framework. Therefore, the challenge for the designer is to use the available tools that emphasize interdisciplinary, critical (analytical) thinking and problem solving skills based on attitudes and values that inspire learners to undertake action, avoiding “indoctrination” and “propaganda”.

The main **criteria** for choosing an ESD method, as proposed by various authors, are presented here (Lahiry et al., 1988; Glasgow, 1994; Peace Corps, 1999; Kamarinou, 2000; Engleson & Yockers, 2001; Scoullos & Malotidi, 2004):

The subject and objectives of the programme are decisive in the choice of method. As an example, when the subject is “the water circle”, and the objectives emphasize on knowledge, activities with use of analogies and models may be included, such as computer simulations. When the objectives emphasize intuition, then the activities may focus respectively on e.g. role playing games with population groups / water consumers, etc., when the objectives in the same subject are seeking to outline concrete models of behaviour, activities for values clarification may be designed to help clarify values through group discussions on how we consume.

Characteristics of the target-group, such as age, sex, education level, interests, etc., as analysed in paragraph 7.4. As regards school children, designers must keep in mind their stage of development and the school curriculum. The stage of the student’s development is also decisive for the duration of intervention. For example, an intervention in a kindergarten should not exceed 45 min, as children of this age are getting tired easily with subsequent loss of attention (Greek Children’s Museum, 2003).



The available resources, and various procedural issues, can prove decisive in the final (or not) choice of method. For example, even a well designed experimental field study in a wetland (with satisfactory structure and variety of activities) can fail due to insufficient material, such as lenses, thermometers, pH-meters, etc. The available time, space, materials and technical infrastructure are included in this category. For example, paths in the field must meet the necessary criteria in order to design a programme for persons with kinetic disabilities. In this category, the human resources (animators) are included. Specifically, for field activities, one should aim for a small ratio of learners to animators.



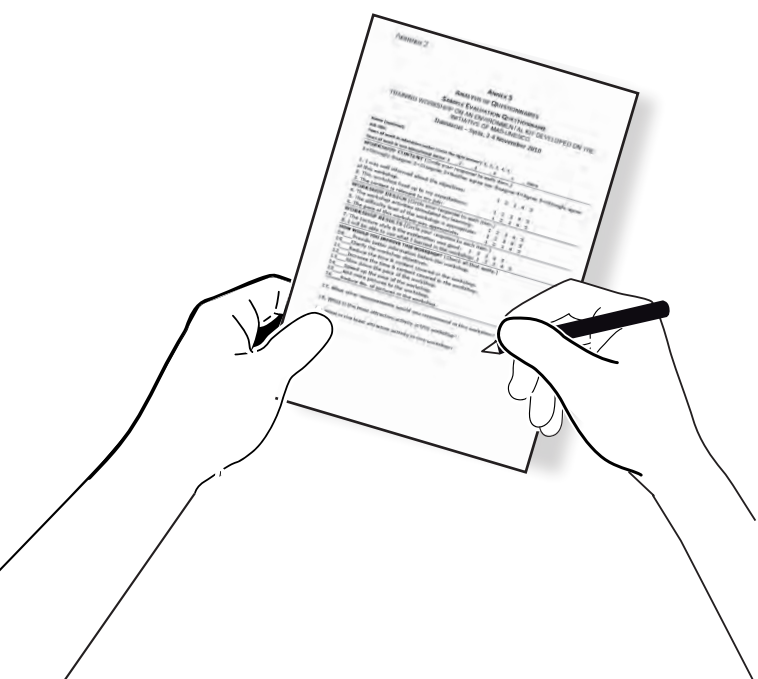
The designer's and educator's characteristics, particularly their scientific expertise, pedagogic sufficiency, personality and "teaching" style. The designer tends to plan programmes on subjects he/she knows well using methods with which he/she is familiar. On the other hand, the realization of the programme cannot always be uniform given the role of the educator. The final outcome is influenced by his/her knowledge, values, capabilities and interests. Clearly, collaboration between designer and educator in the choice of methods ensures better results.

In any case, it is important to know that people do not learn in quite the same way (please refer to the theory of Gardner, paragraph 5.3). Even when we refer to teams of individuals with similar characteristics of development (e.g. a school class) some children learn better by hearing, while others by observation, by working with the hands, by discussing and exchanging arguments, others by reading, and so on. A variety of stimuli is recommended for maximising the effectiveness of the intervention.

The **"evaluation sheet"** should not be confused with the **"worksheet"** that learners are asked to complete through their research during a programme.

The **worksheet** contains questions and exercises that focus on observation and the programme's knowledge objectives (see paragraph 7.2), and may include also some questions open to personal reflections, group discussions.

The **programme evaluation sheet** regards the composite task of evaluating the programme's components such as its duration, its themes, the appropriateness of the material used, the quality of interpretation, its relation to the curriculum, the participation of learners, etc. This is carried out by an impartial external auditor (group escort).



7.6 Evaluation

Evaluation is an integral part of each educational programme and it may focus on its various elements, such as the extent to which the goals have been achieved, the suitability of methods and materials used, the educator's effectiveness, the learner's performance, the programme's organization, the field's appropriateness, etc. The choice of the evaluation plan depends every time on its purpose and to whom it is addressed (Ditsiou 2002).

The evaluation provides feedback, outlines the programme's potential and identifies problems that will have to be considered when re-designing it (figure 19, p.144). The role of evaluation is mainly to shed light on the educational process and the programme itself, and therefore has to be above all useful. Critical questions to be answered are "who needs the evaluation outcome?" and "who will use it?" In some cases, however, evaluation -no matter how thoroughly designed- cannot answer all potential questions (Ditsiou, 2002).

The evaluation may concern the **result** of the programme (e.g. the reduction of litter volume that ends up in waste bins of a school unit and the corresponding increase in the recycling bins, after a recycling project) or the **process** (e.g. students attendance and interest in the project, disposition towards undertaking some action, etc.) or better both. Also, depending on the stage implementation it can be diagnostic (formative) or overall (summative).

The applied approaches of evaluation in ESD focus heavily or lightly on the objectives (Benett, 1984; Kamarinou, 2000). In the first case, the most common, evaluation concentrates on the level of the achievement of predetermined objectives and adopts pre-designed tools (mainly questionnaires), in an attempt to measure the objectives through indicators (quantitative evaluation). The translation of objectives to expected results via measurable indicators may prove a very difficult affair, and therefore their formulation (wording) is particularly important. It is best to avoid using questionnaires as a sole evaluation tool (Ditsiou, 2002): designing and processing/interpreting a questionnaire demands a professional.

An important approach to evaluation is the qualitative one, focusing mainly in description and interpretation, as opposed to measurement or forecast. Qualitative evaluation aims to display how an educational programme works; to describe how the programme is influenced by the conditions of implementation; and to collect participants' views. In other words, it records the experience of attendance of all involved (designer, educator, learners) focusing mainly in the process.

Another important question for the evaluation process is "who is implementing it?" Depending on the nature of the programme, the available time and human resources the following may be applied:

a) Use of an external evaluator, who must have a background in pedagogy and evaluation process and who will comprehend in-depth the content of the programme.

b) Evaluation of the programme from the learners themselves (not advisable for very young ages) through an anonymous evaluation sheet or discussion: A few minutes reflection on questions like “what did you appreciate most in this programme?” or “was there anything missing that you would have liked to focus on more?” etc. can give direct specific feedback.

c) Evaluation by the educator himself/herself, because he/she knows best what is important, and therefore can judge his/her personal contribution to the programme by self-assessment.

It is obvious that there is no optimal evaluation method. Depending on the conditions different techniques and tools can be used, which can combine with collected

data from different viewpoints. There are no ready “recipes” for evaluation that could be relied upon without second thought. It is advised to develop a ‘basket’ of available evaluation tools that the evaluator may adapt and adopt in the field.

Usually in the daily practice of ESD evaluation is not strict or formal, meaning that it is not based on the methods of social research in order to ensure a more systematic or scientifically accurate process. Instead a more informal evaluation approach is used to appraise the overall effort. In any case, it should be avoided to focus on knowledge or results through “tutorial teaching” (teaching to the test) (Ditsiou 2002 and 2005).

Knowledge evaluation tool for learners

- This tool can be used before and after an inquiry programme that focuses on cognitive objectives. Throughout the programme, the group refers to it occasionally in their review sessions. It is formed on a chart paper in three columns entitled a) what we know b) what we want to know, and c) what we have learned.

The steps of the process are:

1. Learner’s background

- The topic is introduced by a learner or the educator. If the learners decide to investigate on a specific issue, they brainstorm in plenary on the facts they know about it (column 1), keeping their statements short and simple.

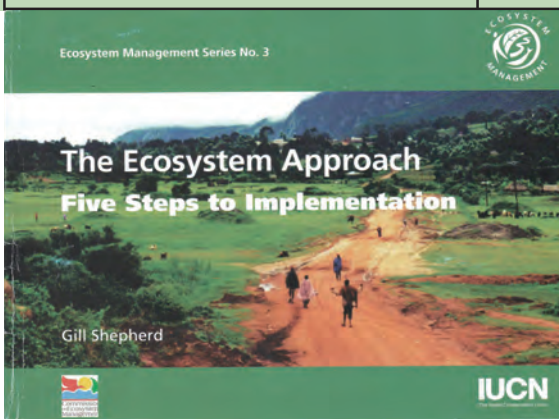
2. Setting targets

- They repeat the listing process for what they want to know on the issue by writing key questions (column 2). Again they need to be specific in their inquiries, some grouping of questions may occur.

- The chart paper can be used by the educator to bring the group back to ‘pace’, in case they divert from their set targets (this disorientation happens particularly in lengthy programmes).

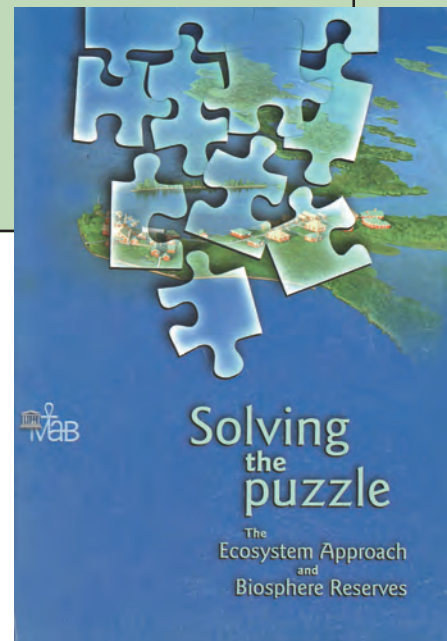
- At the end, the chart is obviously used as a reflection and knowledge evaluation tool (column 3). It may be filled individually, followed by a session in plenary.

An applied example The investigated issue: The Ecosystem Approach		
What we know	What we want to know	What we have learned
<ul style="list-style-type: none"> - This is a principle of sustainable management. - It concerns the integrated management of land, water and living resources. - It equally promotes conservation and sustainable use of an area. 	<ul style="list-style-type: none"> How is it applied in practice? Are there cases of successful implementation? What are the parameters of success? 	...



Cover of *The Ecosystem Approach, Five Steps to Implementation*
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Cover of *Solving the puzzle, The Ecosystem Approach and BRs*
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SWOT Analysis: Strengths, Weaknesses, Opportunities and Threats:

This widely applied evaluation tool encourages input by many people who brainstorm for the following headings, recording in each as many factors as possible. It can be adjusted and applied in various situations.

<p>Strengths: Those things that have worked well in the ESD programme. Things that one is proud to say about the programme.</p>	<p>Weaknesses: Things that have not worked so well, could have gone better.</p>
<p>Opportunities: Ideas how to overcome weaknesses and build on strengths.</p>	<p>Threats: The obstacles that constrain the range of opportunities for change.</p>

Suggested methods for monitoring and evaluating long lasting ESD programmes in a MAB BR or other designated area.

“Programme evaluation sheet”⁶

In the case where learners are students, the programme may include an evaluation sheet for the escort teacher. The sheet should be no longer than one A4 sheet in length and can contain open and closed questions on issues such as organization and the overall presentation of the programme. The educator gives the teacher this sheet at the start of the programme and asks for it to be returned at the end. The collected sheets may also be used in statistical analysis at the end of the year.

With appropriate changes, the evaluation sheet can also be used by learners, especially adults. The evaluation of the programme can even be conducted by young children by using the appropriate means (e.g. drawings, games, circle discussions, etc.).

“30-minutes for evaluation”

At the end of a daily programme, educators and ideally designers, gather together for a brief overview of the day’s activities. They discuss practical issues that have to do with the everyday operation of the programme. For example, they inform on apparatus that is not working and needs to be fixed, markers that need replacing, etc. The discussion also includes pedagogical issues that arise during the programme’s implementation such as the improvement of a team-building technique, a student’s or an escorts comment that enriched an activity, a clue on the better use of time, etc. In the case where an educator faced any difficulty in some area of the programme, his/her colleagues may suggest a solution. In this way, each person’s experience is taken into consideration and taken advantage of by the entire team.

“The educator’s diary”

This is a useful tool for the evaluation and subsequent improvement of a programme. It helps the educator observe the programme’s evolution, record the difficulties of implementation and to self-evaluate. Keeping the diary is a simple task and may include elements from all programme stages - from design, the repeated implementations and the final evaluation.

Every entry in the diary should include, among others (adapted from EADAP, 2008):

- The date, place and subject of the programme (especially if the educator conducts more than one).
- The number of learners, the school, the escort’s name and telephone number.
- Components collected from observation, discussions with learners, escort’s comments, etc.
- Any resulting documentation, such as photographs, learners’ sketches etc.
- Unforeseen events or unexpected developments (from learners, from outside factors, or from the educator himself) that upset the programme.
- Feelings, thoughts and personal interpretation, for example, the “weak” and “strong” spots, “what do I keep” or “what would I change”, information that will help improve the individual elements of the programme.

6. Such evaluation tools are widely implemented in institutions where educational programmes are common such as CEEs, museums, etc. These may be applied independently or in combination.