



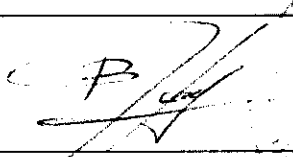
**LEBANON THEMATIC REPORT ON
TRANSFER OF TECHNOLOGY AND TECHNOLOGY COOPERATION
2005**

**TOP-UP BIODIVERSITY ENABLING ACTIVITY PROJECT
LEB/03/010 & LEB/97/G31**



Thematic Report on Transfer of Technology and Technology Cooperation

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ABBREVIATIONS AND ACRONYMS

AREC	Agricultural Research and Education Center
AUB	American University of Beirut
CBD	Convention on Biological Diversity
CGIAR	Consultative Group on International Agricultural Research
EC	European Commission
EIA	Environmental Impact Assessment
GEF	Global Environment Facility
IBSAR	Initiative for Biodiversity Studies in Arid Regions
IPR	Intellectual Property Rights
LARI	Lebanese Agriculture Research Institute
LIFE	The Financial Instrument for the Environment
MedWetCoast	Conservation of Wetlands and Coastal Zones in the Mediterranean
MoE	Ministry of Environment
MSB	Millennium Seed Bank
NAS	National Academy of Sciences
NGO	Non-governmental Organization
SEA	Strategic Environment Assessment
UNDP	United Nations Development Program
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development

Please provide summary information on the process by which this report has been prepared, including information on the types of stakeholders who have been actively involved in its preparation and on material which was used as a basis for the report.

A partnership between the Ministry of Environment, a private academic institution “the Initiative for Biodiversity Studies in Arid Regions (IBSAR)” at the American University of Beirut, and the United Nations Development Program was established to implement the Top-Up Biodiversity Enabling Activity project for Lebanon [LEB/97/G31] through funds from the Global Environment Facility (GEF). The overall objective of the project is to assess national capacity building needs and priorities in the field of biodiversity.

This thematic report was prepared through the Top- Up Biodiversity Enabling Activity Project among other activities developed within the project.

The report was prepared mainly by Dr. Riad Baalbaki, Associate Professor (Plant Sciences Department at the American University of Beirut) from IBSAR team in collaboration with other IBSAR members and the Ministry of Environment. Because of the nature of the report and the fact that technology transfer is a very broad subject, a wide range of information sources were used. These include consultation with stakeholders representing identifiable institutes representing the public and private sectors (Appendix 1), published reports and individuals who were not affiliated to a specific organization, but nevertheless could contribute through their knowledge to this report.

The main print sources that were consulted include, but not limited to, the following:

1. Biological Diversity-First National Report to the Conference of Parties. 1998.
2. Biological Diversity - Second National Report to the Conference of Parties. 2002.
3. National Biodiversity Strategy and Action Plan of Lebanon. 1998.
4. Lebanon Thematic reports on Protected Areas, Mountain Ecosystems, Alien Invasive Species and Forests submitted to the CBD Secretariat.
5. State of the Environment report. 2001.
6. Legislative measures pertaining to biodiversity and use of biotechnology.
7. Information dissemination materials including manuals, booklets, posters and brochures. These were mainly produced by the Ministry of Environments and NGOs.

Transfer of Technology and Technology Cooperation

Inventory and assessment

1. Has your country developed an inventory of existing technologies or category of technologies, including from indigenous and local communities, for the conservation and sustainable use of biological diversity and its components, in all the thematic areas and cross-cutting issues addressed by the Convention?
 - a) no
 - b) an inventory under development X
 - c) an inventory of some technologies available (please provide some details)
 - d) yes, a comprehensive inventory available (please provide details)

2. Has your country assessed the potential impacts of relevant technologies on biological diversity and their requirements for successful application?
 - a) no
 - b) yes, please give some examples X

3. Has your country carried out an assessment of the needs for relevant technologies?
 - a) no (please specify the reasons) X
 - b) yes, and please specify the needs met and the needs not met for existing technologies and for new technologies

Implementation of some relevant articles of the Convention, relevant decisions adopted at the previous meetings of the Conference of the Parties and recommendations of SBSTTA

4. In implementing the thematic programmes of work adopted by previous meetings of COP, has your country achieved the outcomes identified in these programmes of work through technology transfer and technology cooperation? (Decisions II/10, III/11, IV/6, IV/7 and V/4)	
a) no	X
b) yes, but only a few activities in some programmes	
c) yes, and a wide range of activities in many programmes of work	
d) if yes, please specify these activities and programmes of work	
5. Has your country undertaken technology cooperation with other Contracting Parties that lack the expertise and resources to assess the risks and minimize the negative impacts of introducing alien species? (Decision V/8)	
a) no	X
b) yes – please give details below (including types of technology transferred, actors involved, terms for transfer and means of access to technology)	

6. Has your country taken any steps or measures to facilitate transfer of technology to and technology cooperation with other Parties to develop and/or strengthen their capacity to implement the policy, program and practice for sustainable use of biological diversity? (Decision V/24)	
a) no	
b) yes, please specify detailed measures and steps	X
7. Could you provide examples or illustrations of benefit-sharing contractual agreements which have included technology cooperation and technology transfer as benefits to be shared? (Article 15)	
a) no	
b) Yes	X
8. Has your Government taken measures, as appropriate, to ensure, as set out in the Article 16(3) that Contracting Parties providing genetic resources are provided access to and transfer of technology which makes use of those genetic resources? (Article 16)	
a) no	
b) yes, please provide some details	X
9. Have the taxonomic institutions in your country taken any initiatives in developing national priorities, both individually and regionally, in new technology? (Decision IV/1)	
a) no	X
b) yes, in early stages of development	
c) yes, in advanced stages of development	
d) yes, some initiatives in place and some priorities identified	
e) yes, comprehensive priorities identified	
10. Has your country been involved in technology development and/or transfer for the maintenance and utilization of ex situ collections? (Decision V/26)	
a) no	
b) yes – please give details below (including types of technology transferred, actors involved, terms for transfer and means of access to technology)	X
11. Has the clearing-house mechanism in your country been further developed in order to assist in obtaining access to information concerning access to and transfer of technologies? (Decision V/14)	
a) no	
b) yes, please provide some examples	X

Role of public and private sectors in technology transfer and technology

12. Do you know of any examples of technology partnerships between public R&D institutions from developing countries and private-sector firms from industrialized countries? If so, to what extent have these partnerships involved	
a) the training of developing country scientists in the application of new technologies for the conservation and utilization of genetic resources	X
b) information exchange on new scientific exchange and technological advances	X
c) providing various technology components to developing country partner institutions	X
d) engaging in joint R&D?	X
13. Has your country taken any measures or developed any programmes to encourage the private sector or the public-private partnership to develop and transfer technologies for the benefit of governments and institutions of developing countries, including South-South cooperation?	
a) no	X
b) yes, please give details	
14. Have any type of incentives been established in your country to encourage the participation of the private sector in conservation and sustainable use activities as sources of new technologies and potential financiers of conservation programmes?	
a) no	
b) yes, please give details	X

Impact of intellectual property rights on technology transfer and technology cooperation

15. Are the technologies your country has accessed or wishes to access in the public domain or covered by intellectual property rights?	
a) public domain	X
b) intellectual property rights	
c) both	
16. Have intellectual property rights been a limiting factor in acquiring technologies for the conservation and sustainable use of biological diversity?	
a) No	X
b) yes, please provide an example and specify the following: the type of technology sought (hard or soft technology); the area to which it is to be applied (e.g. forest, marine, inland waters, agriculture, etc.)	

Capacity-building for technology transfer and technology cooperation

17. Have adequate institutional structures been established and/or is adequate human capacity available to access relevant technologies, in your country?	
a) no	
b) yes	X
18. What, if any, have been the limiting factors in implementing relevant technologies?	
a) institutional capacity	X
b) human capacity	
c) others - please specify	X
19. Does your country consider that access to information and training or lack thereof has been a limiting factor in access to and transfer of technology?	
a) no	
b) yes, please provide some examples	X
20. Has your country been able to identify relevant technologies in specific areas for the conservation and sustainable use of biological diversity in your country?	
a) no	X
b) yes, please give details	
21. Has your country developed national policy and established international and national institutions to promote technology cooperation, including through the development and strengthening of technical, human and institutional capabilities?	
a) no (please specify the reasons)	X
b) yes, please give some details or examples	
22. Has your country established joint research programmes and joint ventures for the development of technologies relevant to the objectives of the Convention?	
a) no	
b) yes, please give some details or examples	X

Measures for facilitating access to and transfer of technology

23. Has your country established the mechanisms and/or measures to encourage and facilitate the transfer of technology to and technology cooperation with other Contracting Parties?	
a) no	X
b) yes, please provide some details	
24. Has your country established channels for access to the technologies developed and applied for attaining the objectives of the Convention?	
a) no	
b) yes, please provide detailed information	X

Success stories of and constraints to technology transfer and technology cooperation

25. Has your country identified any success stories and opportunities of and constraints to transfer of technology and technology cooperation?	
a) no	
b) yes, please provide detailed information	X

Further comments

Additional text relating to specific questions:

Q1. No inventory of existing technologies has been developed, neither were measures taken to document indigenous knowledge. One attempt was made to collect existing traditional knowledge through a survey carried out under the Conservation and Sustainable Use of Dryland Agrobiodiversity project (executed by LARI/UNDP and funded by GEF) to document the use of wild herbaceous and woody plant species by the local communities in the villages of Ham, Maaraboun, Aarsal, Nabha and its surroundings (villages located in the Beqa'a district). The Agrobiodiversity project has also developed and often demonstrated several technologies for agrobiodiversity conservation identified by experts at the national and regional levels through thematic meetings in areas such as rangeland management, genetic resources of fruit trees and landraces yield improvement. Demonstration sites were established by the project in Nabha and Aarsal to show the effect of certain simple water harvesting techniques on rangeland rehabilitation, and methodologies were developed for monitoring the status of targeted wild herbaceous and fruit trees species in the project sites. Other than the Agrobiodiversity project activities, a national biosafety unit is being established and will develop an inventory of existing biotechnologies.

Q2. The EIA concept was endorsed through the Law for the Protection of the Environment (Law no. 444/02), and details related to various steps of EIA (such as screening, scoping, review and monitoring) have been included in a draft decree prepared by the MoE and currently under review at the Council of Ministers. The EIA draft decree will establish the legal framework by which all major development, infrastructure, industrial and agriculture projects will have to undergo an EIA in order to promote conservation activities before receiving approval. Although the EIA decree has not yet been issued, EIA is frequently conducted and reported, especially that the MoE requests such assessments before approving various projects. Around 60 EIAs have been conducted over the past two years, mostly for wastewater treatment systems, soil waste, marinas, quarries, building centers, and hospital waste treatment projects. In the first year, EIAs received by the MoE were not sufficiently analytical. Improvements have been made over the past year and the reports have become more professional, transparent and comprehensive. In addition, the MoE has issued a ministerial decision whereby different committees will be established to review various EIA reports and make recommendations and decisions relevant to the nature of the project

In addition to the EIA, in late 2002, the MoE started the implementation of a project, the "Strategic Environment Assessment" (SEA), as a tool to mainstream environmental sustainability in public planning and decision making and to mainstream environmental considerations into sectoral plans and programs. The project is funded by EC LIFE-Third Countries and managed by UNDP and will last till end of 2005. The SEA project prepared a draft decree for the implementation of SEA at the national level based on the definition set in the Law for the Protection of the Environment (Law no. 444/02), stating that "any program, study, investment or planning proposal covering a Lebanese region or an entire production sector [and] likely to affect

the environment due to their size, nature, impacts, or types of activities” will have to be assessed for potential environmental impacts prior to approval. This also applies to “any amendment, addition, expansion or review” of such proposals (Articles 21 and 22). Accordingly, initiatives related to water and wastewater management, energy, transport, solid waste management, land use planning as well as industrial and agricultural development will be potentially subjected to the SEA process. The only exceptions are plans and programs pertaining to national defense and civil security, emergency response to natural disasters or any other *force majeure*. The draft decree is currently under review before its submission to the Council of Ministers. In addition to the legal framework, the project proposed the relevant institutional and procedural frameworks for the implementation of SEA at the national level. SEA comes in line with the Millennium Development Goal No.7 on enhancing environmental sustainability.

Impact assessment required by both SEA and EIA draft decrees for the different proposed projects, plans and programmes cover- among other environment components- the impacts on biodiversity.

Q3. No general assessment of needs for technology transfer have been carried out, neither are the benefits of such an assessment apparent since technology transfer needs tend to be case specific. Many studies have been carried out to characterize plant and animal diversity, especially in marine habitats, and based on those studies the need for importing relevant technologies seems of low priority.

Q5. One of the threats to biodiversity had been recognized as the introduction of alien flora and fauna (First Biodiversity National report), and one of the goals according to the National Biodiversity Strategy and Action Plan is to protect natural ecosystems from invading species. However, other than general recommendations to apply strict conditions on introducing new species and apply regulations on imported germplasm, no specific actions were recommended, neither was there any recommendations to cooperate with other contracting parties. Before any cooperation with other parties is possible, Lebanon needs to formulate adequate regulations dealing with introduction and monitoring of alien species. So far, only one decision was taken by the Ministry of Agriculture UNDP that forbids the import of any live cedar seeds and plants (Decision 108/1; 12-9-1995).

Q6. Lebanon has participated in many regional projects involving technology cooperation and exchange and related to biodiversity conservation. One of the outcomes of such cooperation should be capacity build-up of all parties to improve sustainable use of biodiversity.

- a. Along with Jordan, Syria and the Palestinian Authority, Lebanon is a partner in ‘The Conservation and Sustainable Use of Dryland Agrobiodiversity in the Near East project’. This five-year project (1999-2004) is funded by the GEF and implemented by the Lebanese Agriculture Research Institute (LARI) and UNDP and brings together several international organizations. Implementing partners include several local academic and research institutions and NGOs. Many experts were involved in this project to characterize the floristic richness and study the genetic diversity and potential uses of selected species.

The project aims at promoting the conservation and preservation of important wild relatives and landraces of agricultural species by introducing and testing *in-situ* and on-farm mechanisms and techniques of conservation and sustainable use of agro-biodiversity in three pilot sites located in the Beqa'a plain in Lebanon. The four participating countries exchange technologies, methodologies and information towards sustainable use of biological diversity. Several training sessions, workshops and thematic meetings were conducted at the regional level.

- b. Lebanon is a partner in the MedWetCoast, a regional project that also includes Albania, Egypt, Morocco, the Palestinian Authority and Tunisia, and aims towards biodiversity conservation and proper management of coastal areas and wetlands. The regional component is managed and coordinated by the Regional Facilitation Unit (RFU) based in Tour du Valat in France. The MedWetCoast Lebanon project's overall development objective is to conserve globally endangered species and their habitats, recognizing nature conservation as an integral part of sustainable human development while improving the capacity of governmental and non-governmental agencies to address biodiversity conservation issues in two main sites, the Tyre Coast Nature Reserve and the Wetlands of Aamiq. The project in Lebanon is funded by the FFEM (Fonds Francais pour l'Environment Mondial), managed by UNDP and the national executing agency is the MoE.
- c. The 'Integrated Management of Cedar Forests in Lebanon in collaboration with other Mediterranean countries' covers Algeria, Cyprus, Lebanon, Morocco, Syria and Turkey. The project started in Lebanon in July 2004, is funded by the GEF, implemented by UNEP and executed by the MoE with the collaboration of the American University of Beirut. This three-year project aims at addressing the serious threat affecting 70% of the Tannourine –Haddath El-Jebbeh forest trees, one of the 12 surviving stands of cedar forests in Lebanon and also the largest. The main objective of this project is not only to identify the root causes of this environmental threat but also to elaborate an action plan for integrated management of this important site.

Q7. A collaborative agreement between Lebanon and the Royal Botanic Gardens Kew provides grants to promote conservation and sustainable use of biodiversity and includes an element of technology transfer to partner countries. This partnership between Royal Botanic Gardens Kew and Lebanon/LARI, one of 15 partnerships of the Millennium Seed Bank (MSB) project, is based on a legally binding Access and Benefit Sharing Agreement. Benefits are provided by the MSB project, KEW to LARI in the form of small seed equipment and training of staff in seed technology. The five-year agreement will expire in July 2005 but will be renewed for another 5 years if both sides agree.

Q8. The MoE is currently collaborating with AUB/IBSAR to draft legislation regulating access to local genetic resources and benefit sharing .

Q9. The need for taxonomists and taxonomic institutes has been recognized at least since 1998 (First National Report to Conference of Parties). Additionally, the Top-Up Biodiversity Enabling Activity project funded by the GEF, executed by the MoE and UNDP in collaboration with IBSAR lists as one of its priorities the assessment of capacity building requirements to determine national taxonomic priorities and needs, accordingly the MoE has completed a taxonomic needs assessment questionnaire which was circulated to concerned national parties and institutions. Based on questionnaire results, IBSAR has prepared the Taxonomy assessment report on national capacities and needs. At the present time, Lebanon does not have any independent or autonomous taxonomic institutions, in either the public or private sectors, although many individual studies have been carried out to survey and characterize plant and animal diversity.

Q10. Most efforts in Lebanon have concentrated on *in situ* conservation, with few activities involving technology transfer for maintenance of *ex situ* collections, and no technology development. One notable *ex situ* conservation activity is carried out under the LARI/MSB, KEW agreement, where wild plants are being conserved as seeds and as herbaria in trust for Lebanon within the MSB facility in Sussex, UK. Negotiations with the newly established AUB/AREC (Agricultural Research and Education Center) gene bank in Beqa'a were initiated in order to transfer the 50% share of this material to Lebanon.

Technology transfer was one of the motives behind joint collections carried out since 1996 by LARI and Kew's seed bank, under the MSB project. Seed technology transfer to LARI is an ongoing activity involving the training of few LARI staff on seed technology and providing some seed-related equipment to LARI's seed laboratory such as a seed blower, magnifier lenses, seed storage freezers and supplies needed for seed storage and herbarium establishment. Another activity is the establishment of fruit tree nurseries for production of around 10,000 seedlings per year of wild and local varieties aiming at their conservation and sustainable use. This activity is supported by the Conservation and Sustainable Use of Dryland Agrobiodiversity project (LARI/UNDP/GEF), and the nurseries are operated by a local NGO, the Aarsal Rural Development Association. The project also financed a regional training course conducted at the International Center for Agricultural Research in the Dry Areas (ICARDA) on establishment and management of a seed bank, attended by a national staff from LARI. Finally, a seed bank has just been completed at the AREC of AUB that will house collections from the region, with one of its functions being transfer of knowledge and technology between academic and local communities.

Q11. The biodiversity and biosafety clearing-house mechanism are currently under development.

Q12. The examples refer to the experience of USAID's agricultural biotechnology program. In the last decade, USAID supported several public-private collaborative research programs, largely through the ABSP (Agricultural Biotechnology Support Program). Some of these projects include:

1. Monsanto company and the Kenyan Agricultural Research Institute (KARI)
2. ICI Seeds and Central Research Institute for Food Crops (CRIFC)/Indonesia
3. Pioneer Hi-Bred and Egyptian Agricultural Genetic Engineering Research Institute (AGERI)

(Lewis, Josette. 1999. Leveraging partnerships between the public and private sector-experience of USAID's Agricultural Biotechnology program. CGIAR/NAS Biotechnology Conference. Pp 196-200.

Q14. The Law for the Protection of the Environment (Law no. 444/02) provides incentives for environmental protection and rational use of resources. These incentives include up to 50% reduction on import or customs taxes for any technology or equipment used for eliminating, reducing or avoiding pollution, or for the treatment and recycling of wastes. The law also affords individuals and organizations a tax reduction of up to 50% on activities aimed at the preservation of the environment. Incentives have also been possible through involving stakeholders, such as municipalities, NGOs, local communities and businesses in management, supervision and rational use of many Lebanese protected areas, and this has proven to be a successful model. Memoranda of understanding with major tour operators benefited both parties and allowed them to support their activities through material gains, while maintaining the integrity of protected zones. The number of ecotourism operators is believed to be on the increase. Some municipalities have also invested some of the funds in promoting ecotourism by improving infrastructure and facilities in the protected areas. In addition to ecotourism, other potential sources of income are being investigated, as benefit sharing mechanisms. These include apiculture, processing of local (traditional) foods and fruit processing from wild species.

Q15 and Q16. Considering the present level of research and development activities related to biotechnology and conservation, all needed technologies are in the public domain. Therefore, IPR have not so far been a limiting factor in acquiring conservation technologies.

Q17 and Q18. Lebanon has adequate human resources, but institutional resources, in terms of both existence and capacity have lagged behind. A direct reason for the deficiencies in institutional capacity has been financial resources. Another reason is the low priority placed by many national authorities on technology transfer and cooperation and their perceived lack of significant benefits.

Q19. While access to information has not been a limiting factor, lack of training in specialized fields has been a factor that limits access to and transfer of technology. The need for trained taxonomists has already been mentioned (see Q9). Bioinformatics, IPR and data base management are other fields with few trained experts in Lebanon.

Q20. Other than existent and known technologies, no country-specific technologies have been identified for the conservation and sustainable use of biological diversity.

Q21. Lebanon has not developed a national policy or established institutions to specifically promote technology cooperation, although many national activities have resulted in international cooperation and strengthening of Lebanese human and institutional capabilities. Lebanon has signed and is in the process of ratifying the majority of conventions related to biodiversity. One of the Lebanese National Strategy and Action Plan objectives is to promote participation in international and regional conventions, protocols, agreements and technical programs related to biodiversity. Establishing a National Biodiversity unit as well as development of agrobiodiversity extension programs and training centers has been recommended. The French and Lebanese governments signed an agreement in 1993 to promote technical and scientific cooperation, and many other collaborative programs, as discussed earlier, have resulted in improving human and institutional capabilities even though specific policies or institutions have not been the vehicle for such collaborations.

Q22. Examples of joint research programs and ventures have already been described in Q6 and Q7.

Q23. While no set mechanisms have been established, technology cooperation and transfer is a prominent feature of many collaborative projects with international parties, as described in other sections of this report.

Q24. Well defined channels for access to different technologies for attaining the objectives of the convention are not currently present. However, open access channels will be one outcome from the National Clearing House Mechanism, which is currently under development.

Q25. Under the umbrella of nationwide project entitled "Strengthening of National Capacity and Grassroots in situ Conservation for Sustainable Biodiversity Protection", techniques for Flora identification and monitoring through a multifaceted cooperation were transferred to the Management teams in three reserves.

The project started in November 1996 and was executed by the Ministry of Environment, managed by the United Nations Development Programme (UNDP) with the financial support of the Global Environmental Facility (GEF) and with the technical support of the World Conservation Union (IUCN). The funds were allocated for 5 years with an additional two year extension. The project, which covered two cedar forests (Al-shouf cedar reserve and the Ehden nature reserve) and one marine reserve (Palm Islands Nature Reserve) focused on the integration of biodiversity conservation and sustainable human development, and was designed to safeguard endemic and endangered species of flora and fauna and to conserve their habitats (Anonymous, 1996; Abu-Izzeddin, 2000). The project initially intended to involve local communities in the management plan of the reserve. At later stages sustainability constituted the main aim.

The uniqueness of this project was the proposed partnership model whereby the MOE, local and international NGOs and 'in-country' scientific institutions cooperated and coordinated their activities to promote both long-term ecological and short-term economic objectives of wildlife conservation and sustainable use of natural resources. The MOE as the government counterpart institution was responsible for providing oversight and guidance to the project (Anonymous, 1996; Abu-Izzeddin, 2000).

The cooperation between academic institution (The American University of Beirut), Non-Governmental Organization (GreenLine-A Scientific Association for Conservation) and the management teams in the nature reserves (Al-Shouf, Ehden and Palm Island) have initiated the preparation of local herbaria for the each reserve where the basic techniques and practices for their establishment were given through training workshop, weekly follow up visits to the reserves and to some point proceeding with participatory practices to identify flora species at the Post Herbarium at the American University of Beirut. The approach was successful, what was needed after the project ended was a serious follow up from the Management teams. The transfer of techniques and knowledge has been successful in Al-shouf nature reserve where the specimen

identified and other knowledge transferred has helped to an important extent to establish an educational centre for scholars with several programmes related to flora and environmental education.

The monitoring programme designed in participation with members of the management teams was foreseen to be applied by defined members of the management teams. This was controversial to what has been planned at the beginning of the project. It was decided that the NGO sub-contracted on Flora and Fauna Monitoring will conduct the monitoring programme. To ensure sustainability of the monitoring related activities and a serious follow up on the designed programmes, it was proposed that the techniques and practices must be transferred to the management team with a short and intense follow up by the experts and then the management team of the reserve take the lead on these tasks. The main concern was that management teams and/or local communities involved are the principal key persons to follow up and implement the monitoring program, and they are present all the time. The transfer of techniques was successful but the sustainability of these activities were pending, this latter point underpins the importance of availability of funds and for the consideration of monitoring programmes as essential and priori tools for good natural resources management on the long terms.

Appendix I

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