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Sectoral and Cross-Sectoral Integration of Biodiversity in Israel

Contents

1. Introduction

Israel reported[1] that numerous activities relevant to different CBD articles are continuously being implemented in Israel. Nevertheless, not all these activities may necessarily be under the exact title of "biodiversity conservation", as this term has not been widespread in different Israeli sectors and among the general public, and they mainly refer to nature conservation efforts, though some of them also consider specific protection of ecosystem services, their sustainable use and equitable distribution.

The NBS was drafted as a complementary measure to the Government decision on SD of 2003, aiming to promote the implementation of the CBD. It points out the key means for the conservation of biodiversity and of ecosystem services and recommends on ways to tie up and upgrade all the on-going activities in a coherent conceptual and institutional framework, and is to be translated into numerous action plans.

Key means

The key means currently applied for biodiversity conservation and sustainable use of its resources and their sectoral and cross-sectoral integration include:

- Using the national framework for sustainable development as the main platform for mainstreaming of biodiversity conservation;
- Direct activities for nature conservation;
- Protection of environmental quality and sustainable use of resources, thus affecting ecosystems and individual species, populations and other natural resources;
- Centralized regional planning, usage and management of open landscapes, mainly in forestry and agriculture;
- Research activity, monitoring, scientific and technical education as well as education activities for school students and to the general public
- Legal, institutional and economic tools.
- International activity and related national activity.
- Activity of other sectors such as that of NGOs.

[1] Israel (2009). Fourth Country Report to the United Nations Convention on Biological Diversity, Ministry of Environmental Protection, November 2009, 97 pp.

The national framework for promoting sustainable development

2. National Sustainable Development Strategy

A 2003 Government decision requires all government ministries to prepare strategies for sustainable development (SD) and participate in a National Committee for Sustainable Development (NCSD), which also includes representatives of the private sector, local authorities and civil society (a coalition of environmental NGOs).

The NCSD activity

The NCSD, lead by the Ministry of Environmental Protection, has been working for several years and is the main governmental framework dealing with SD. Mainstreaming of SD issues is in rather preliminary stages, with ministerial strategic plans either still under preparation or in first stages of implementation.

The process has defined 16 principles for SD so as to establish a common ground between the government ministries, including the sustainable use of biodiversity resources and the equitable distribution of their benefits. These principles are the common ground for the work of the committee and to the ministerial SD strategies and action plans.

To promote some common themes, several sub-committees have been formed. As from 2006 onwards, cooperative activities were also initiated between ministries and with NGOs.

This NCSD is also the major platform to manifest sectoral responsibility to biodiversity conservation (BdC) and the main pathway to sectoral and cross-sectoral integration or mainstreaming of BdC in governmental policies and activities. So far, the NCSD has not addressed directly specific BdC issues, but rather supported them indirectly, to a limited extent, through efforts to conserve open space/ natural landscapes and their associated ecosystems and natural assets, and through budget allocation to the preparation of the NBS.

Israel's procedures to join the OECD may further enhance the inclusion of environmental assessments prior to decision-making, probably incorporating also information on the implications of these decisions on biodiversity conservation.

The NCSD as the future platform to promote the NBS

Once the NBS is presented to the government, it will be further handled by the NCSD and a special sub-committee is to be appointed under the NCSD to promote the NBS implementation.

A professional consultant will review the strategic plans devised by the ministries and update them with aspects relevant to biodiversity conservation. The action plans derived and developed from the NBS will be presented to government approval.

This platform should facilitate the integration of biodiversity conservation within the framework of the national strategy for SD and assist relevant cooperation at the ministerial and other administrative level.

The ecosystem approach, linking biodiversity conservation with economic and social considerations can be best treated through this platform, particularly with the contribution of the NGOs participating in this forum and their demand for a more holistic viewpoint and activity.

Indicators for SD and for biodiversity conservation

A study on indicators for sustainable development also included a chapter on proposed indicators for biodiversity status and trends. The NCSD has started to test the applicability of several SD indicators using data already available at the National Bureau of Statistics. Of these, the indicators relevant to biodiversity, though indirectly, are those on open landscape availability and to a lesser extent – that monitoring aquifer status. Other activities relevant to indicators are presented where monitoring is discussed.

Achievements and obstacles

The ecosystem approach and long-term planning are more prevalent than they were in 2003, and cross-sectoral cooperation has been improving; whereas the development of quantitative targets and indicators for progress assessment has not advanced much in all aspects of SD activities, all required also for biodiversity conservation. Israel's budget is re-allocated yearly, thus interfering with long-term planning.

Low budget allocation for biodiversity conservation is the main obstacle for its promotion. The NCSD has allocated within its work plan for 2009 substantial funding to promote biodiversity conservation under this framework (ca. 130,000 USD).

3. Ministry activity within the NCSD

Several ministries have completed their strategic plan for sustainable development. As mentioned above, most of them do not directly consider biodiversity conservation, but address it indirectly to some extent, mainly through efforts for the conservation of open landscape where natural ecosystems reside and of natural resources and assets. Ministerial activities relevant to SD and BdC are briefly presented.

Ministry of Environmental Protection – In 2007, the ministry initiated a comprehensive and in-depth strategic process aimed at setting long-term policy, including defining a ministerial vision, setting multi-annual targets, formulating goals for the years 2008-2010, setting priorities and measuring progress by means of performance indicators. The multi-annual targets included:

- Protection, increased efficiency of use and rehabilitation of environmental resources and ecosystems for future generations;
- Fair distribution of environmental costs and benefits among different population groups;
- Increased efficiency and effectiveness of policy tools: regulatory, informative, economic and operational to achieve ministerial targets.

This SD strategic plan puts special emphasis on promoting the NBS, on the preparation of a national plan to address climate change (including its consequences on biodiversity) and on the conservation of open landscape in agriculture and within local authorities.

It has adopted the ecosystem approach to integrative management of natural resources and promotes the regional planning of biosphere regions.

The activities supported by the Ministry include: Applying the NBS, establishing the national monitoring scheme, distribution of information on biodiversity and its conservation among decision makers and the general public, and mainstreaming biodiversity conservation in governmental SD programs.

Ministry of Finance – the principles and criteria for its SD program include:

- Promoting the saving of common goods (mainly air, land and water resources);
- Ensuring that the usage of renewable resources will not exceed their renewal rate;
- Decreasing the use of non-renewable resources.

Ministry of Health – its strategic SD plan includes:

- Monitoring, research and publication of information regarding environmental hazards that may adversely affect public health;
- Activities associated with biodiversity assets or hazards (such as invasive species);
- Activities to safeguard the quality of drinking water;
- Cooperation on medical research and on activities of health organizations that benefit from proper taxonomic identifications and biological expertise.

Ministry of Foreign Affairs – its activities on SD include:

- Follow up on the environmental conventions that Israel has signed and representation in international meetings;
- Promoting SD issues within the bilateral and multilateral peace process;
- Knowledge exchange, such as joining GBIF (Global Biodiversity Information Facility), sending experts to international activities and offering international courses for experts from developing countries on BdC and related topics;
- Activity towards joining other conventions and protocols

Ministry of Education – has produced guidelines for teachers on embedding SD issues in its programs. The Ministry collaborates with the education units of the MoEP, INPA, JNF-KKL and various NGOs in

developing and implementing educational programs on nature protection and conservation and on SD. The educational year 2009-2010 was proclaimed as "The Year of Biodiversity" in the formal education system.

An action program on SD and biodiversity was prepared in collaboration with the MoEP and NGOs, emphasized sustainability as the main theme for the year 2008-2009.

The ministry's web site for teachers hosts a special clearing house for teachers dedicated to SD which holds ca. 80 documents referring to biodiversity and its conservation. Textbooks describe the term "biodiversity" and introduce it to students in elementary, middle and high school.

The Ministry of Agriculture – is currently preparing a SD strategic plan. Special attention is to be given to open landscape conservation and to active involvement in BdC, to handling natural hazards to agriculture and to policy regarding alien or invasive species. It will include planning tools and economic incentives to agriculture to promote the use of techniques that support BdC.

The Ministry of Construction and Housing – its SD strategic plan includes: Adopting principles of rational use of natural resources and protection of ecosystems; Research and setting guidelines for SD planning and building. Conservation of open landscape is included as a target in the yearly plan for 2009.

The Ministry of Interior – is concerned with biodiversity conservation and the protection of open landscape mainly through its planning administration, concerning national, regional and local planning. Several statutory National Master Plans are protecting habitats, natural resources and natural assets. These are further supported by guidelines for ecological corridors and by guidelines for animal passages in roads. The planning administration also promotes the inclusion of plans for urban nature, intended also to protect natural relicts in the urban environment and its surroundings.

The ministry is promoting SD strategies and action plans in local authorities, of which the most relevant to BdC are those concerning development policies in rural areas, with ca. 30 regional councils at a process of planning towards sustainable development. It also promotes SD in local authorities through funding and through sustainable use of resources.

The ministry of science – its agenda for SD includes promoting research on biodiversity conservation, mainly through financial support to: the Israeli Gene Bank, the national biological collections, the marine biological research in the gulf of Eilat, to national and regional academic biodiversity research projects. It participates in the steering committee for the Long-term Monitoring project.

The Ministry of Social Affairs and Social Services is in the process of preparing a strategic plan. It promotes public involvement in planning processes, also those relevant to sustainable development and to biodiversity conservation, and helps developing community-level mechanisms for their implementation..

The Ministry of tourism – its SD strategic plan includes:

Definitions of environmentally sensitive touristic development; Inclusion of SD and BdC criteria for project funding such as protection of endangered resources, recovery of damaged resources and contribution to open landscape conservation. It has started to develop a program for sustainable tourism, linking development efforts to databases on ecologically sensitive areas and natural assets.

The Ministry of National Infrastructure – its activities relevant to SD and to BdC are:

- Cooperation on pollution prevention of natural habitats (especially wetlands);
- Developing and implementing policies for sustainable mining, in particular to safeguard coastal sandy habitats and to promote quarry restoration.
- Monitoring the marine and the Dead Sea environment and participating in the joint steering committee on policy to the complex environmental problems of the Dead Sea.
- A strategic plan for SD in the water authority and for sustainable water management, including desalinization of water, water saving schemes and changes in the organizational framework of the authority. These have major implication for the conservation and restoration of wetland habitats.
- Allocation of highly treated wastewater to river restoration programs, supporting wetland conservation efforts;

Israel Land Administration – protecting lands with unique ecological values and protecting ecologically important open landscape have been included in the administration's SD criteria.

The Ministry of Industry, Trade and Labor promotes the development of water technologies and involved in the development of a national program for advancement of environmental friendly technologies.

The Ministry of Public Security – is involved in enforcement activities relevant to combat illegal mining of sands and other minerals; its target for 2005-2007 was a decrease of these activities by 10%.

4. Environmental quality and sustainable use of resources

The MoEP is engaged in BdC and the sustainable use of natural resources, operating at the national, regional and local levels through several channels:

- Direct protection of open landscape where most biodiversity resides through independent and collaborative activities with the INPA and with several river authorities (over which it has ministerial responsibility);
- Regional planning processes;
- Protection of environmental quality and the sustainable use of natural resources of open landscapes and their ecosystems, thus safeguarding their quality and promoting their long-term sustainability.

Pollution prevention is not described here in detail, yet it has a major role in BdC efforts.

5. Forestry

All afforestation areas fall under legislation. Forest, woodland and shrubland areas are protected under National Master Plan#22, which protects a total area of 1,604 km2, consisting of 8 vegetation categories. The main agent for forest management in Israel is the Jewish National Fund (KKL-JNF), the non-governmental organization currently managing ca. 1,000 km2, largely in areas with semi-arid climates and with rocky, hilly terrain unsuitable for agriculture and where the risk of land degradation is high. The afforested areas are used for tourism, pastureland, and wood industry as well as providing other general ecosystem services, contributing to the water budget, and to stream restoration. In fact Israel is one of the only nations in the world that has more trees today than it did a hundred years ago.

The objectives of afforestation in Israel are as follows:

- Improving the landscape, biological diversity and natural ecosystems
- Developing parks, recreational, and hiking areas for the public
- Improving the public's connection to forests and participation in planting
- Preservation of Israel's open spaces.

The countrywide afforestation program is run for decades and has gradually changed its orientation towards increased biodiversity considerations. The last decade marks a shift towards ecologically oriented forest management with a growing emphasis on fostering of woodland biodiversity. The conifer-dominated forestry has changed to mixed woodland management, allowing the regeneration and penetration of wild tree and shrub species into carefully managed areas and increasing biodiversity wherein. About 55% of afforestation areas are to remain as open space with natural woodlands contributing to soil fertility and in many cases sanctuaries for protected wildlife. There is some exchange between different woodland categories; allocate areas may be converted to agriculture on one hand and to protected nature reserves and parks on the other hand, or allowed for development where necessary.

In 2005, the JNF adopted a commitment to "sustainable forestry" involving the implementation of ecological principles in planting, rehabilitation, management methods and pest control and increasing biodiversity within JNF-managed areas.

Afforestation activities also include:

- Statutory protection for safekeeping the areas under NMP#22 areas through preparation of detailed plans for specific forests and involvement in steering and planning committees;
- Involvement in the preparation of surveys and policy papers;

- Community outreach through education and other activities;
- Special projects to combat desertification in Israel's semi-arid region.

Achievements and obstacles

The outcomes of the shift in afforestation activities in Israel are increased attention to biodiversity considerations, more heterogeneous planted forests and the use of more environmental and biodiversity friendly management methods. An observed overall increase in precipitation in Israel's semiarid southern coastal area and northern Negev is attributed by some researchers to the afforestation, to intensive irrigated agriculture and to grazing restrictions that jointly reduced surface albedo and increased convection during daytimes, thus enhancing diurnal rain.

The process of defining the relevant meaning of "increasing biodiversity" is on-going, mainly engaged in ways to measure fluctuating biodiversity and finding the appropriate indicators that are relevant to forest health and resilience.

6. Agriculture

Agricultural activities contribute to the general pressure on biodiversity and natural ecosystems through land-use change, nutrient loading, pollution of various types and poisoning, overexploitation of natural resources, introduction of invasive species and human-wildlife conflicts. On the other hand, agriculture supports additional habitats that the natural fauna and flora can use temporarily or regularly.

The challenges of the rural sector in Israel are similar to the worldwide experience. As in many parts of the world, agricultural lands have been abandoned in the last decades and efforts are made to maintain them, also for safekeeping of open landscape and prevent their conversion to built areas. The total area designated to agriculture is about 19% of Israel's total area; in 2006 the total area used for cropland and fruit orchards was ca 2,900 km2.

The Grazing Authority has the responsibility, through grazing statutes and policy implementation, of maintaining the sustainability of some 2,000 km2 of public rangelands, with oversight for 300,000 grazing animals, of either stationary farmers (typically in the Jewish sector) or nomadic herders (typically Bedouin). The Authority provides extension support focused on maintaining rangeland fertility and productivity, reducing fire hazards and fencing of vulnerable areas to control grazing levels and protect soil and biodiversity within.

Some sustainable agricultural practices in arid and semi-arid drylands contribute to Israel's efforts on combating desertification, through centralized national water management combined with national policy for land preservation and active erosion control programs, measures taken to increase soil productivity, regulation of nomadic grazing, and the promotion of water-saving, salt-tolerant crops with advanced agricultural techniques.

The share of treated wastewater in agriculture has greatly increased in the last decade as freshwater quotas to agriculture were gradually reduced due to water scarcity; this was guided by research on the proper use of treated wastewater so as not to damage soil quality and not to adversely affect underlying aquifers. Upgraded sustainable water management for drylands, based on effluent recycling, desalination, water harvesting techniques and the establishment of watershed management projects also contributes to Israel's efforts in combating desertification. Yet, Soil conservation and drainage activities may also adversely affect biodiversity.

The Israel Gene Bank is a unit in the Ministry, working in collaboration with the Ministry of Science and INPA, active in the preservation of genetic diversity of crops and of wild plants. To widen the scope of the IGB's activities in this direction, the Ministry of Environment is about to become one of its controlling ministries.

Agricultural activity in Israel has always been guided by intensive inter-disciplinary research activity; research has also dealt with biodiversity in open agricultural landscapes, yet there are only few research projects on ecology and agriculture (agroecology), and few on SD of forests and their biodiversity and their association to the agricultural field. Long-term research helped, for example, in adapting crops and techniques to the local soil and climate conditions, in developing more efficient methods for water usage and reuse of effluents, in the efforts to prevent soil erosion, in understanding the important role of goats in rangeland management (also enhancing biodiversity) and in averting desertification risks when transforming rangeland to cropland in semi-arid regions. Agriculture expertise in arid and semi-arid zones is an area where Israel's experience contributes to the international knowledge base.

Agriculture-wildlife conflict handling

Damage to agriculture through wildlife activity is widespread, covering numerous taxons and a wide array of agricultural activity. The Ministry of Agriculture & Rural Development cooperates with INPA and with farmers to minimize human-wildlife conflicts and damage to both agriculture and wildlife using various means:

- Decreasing and preventing wildlife damage to agriculture through management and international cooperation, such as avian management by supplying external feeding sites or wolf predation on cattle;

- INPA has published special guidelines to farmers, including recommendations for fencing, deterring, sanitation (removal of possible attractions to wildlife), protection of equipment, trapping (legal) as well as combating illegal hunting that is threatening wildlife (especially by foreign workers in agriculture).

Case study: Pelicans and fishponds

Bird migration carries through Israel between September and November some 45,000 pelicans yearly. Pelicans feeding in fishponds were recently either shot by fish growers or electrocuted when fleeing

from shooting, after an arrangement between SPNI, INPA and fish growers was broken, and in 2008 nearly 50 pelicans were killed.

According to a new arrangement the pelicans are to be fed in special feeding sites so that they can quickly continue their migration and not over-winter in Israel. The Ministry of Agriculture, INPA and MoEP (each) allocated 300,000 NIS to finance the 15 ton of fish required for their feeding (with damage costs otherwise accumulating up to 2 million NIS).

Nekudat Hen

Nekudat Hen framework was established by Yad Hanadiv Fund (the Rothschild foundation in Israel) in 1999. It aims to promote professional know-how on multifunctional scenic agriculture and to foster its interaction with ecology and broad environmental concept in Israel, under the basic assumption that well-managed agriculture provides food and other important resources and contributes to the environmental protection. Nekudat Hen creates opportunities for convening, learning, and discussion for agricultural and environmental researchers, farmers, environmental activists, and policy makers. Its projects and activities seek to build a professional and interdisciplinary knowledge base which can contribute to the formation of a common language between the different disciplines and to encourage informed dialogue, though the benefits of these projects are not yet fully used. It:

- Funds short term research projects that focus on agricultural land use and its effect on the environment and on life quality. So far, more than 70 projects were supported;
- Organizes a conference to disseminate the results and highlights of some of the supported projects. The Conference features guest speakers from outside Israel;
- Publishes project reports, conference proceedings and other publications through its website.

The SD strategic plan for agriculture

The Ministry of Agriculture & Rural Development has undertaken a SD strategic process as part of its activity within the NCSD framework. A report analyzing the current activity of the agricultural administration identified a change of attitude among officials in the ministry from economic emphasis to a broader ecosystem (environmental-economic-social) perspective.

The report commented on the lack of adequate attention to issues of BdC (such as ownership over land or water resources, wildlife poisoning or the introduction of invasive species) and to the lack of attention to harm caused by agriculture to nature (only to natural hazards to agriculture), to the contribution of agriculture to enhance biodiversity (like that of well-managed grazing or traditional olive groves) and noted that the biodiversity within agricultural fields are not appropriately appreciated and handled, as the relationship between biodiversity and agriculture is perceived as a conflict so that the ministry's approach is mainly targeted towards minimizing the negative effects of natural components on agriculture.

The report also pointed at the lack of incentives and other economic tools to promote organic agriculture, conservation of open landscape and natural assets or scenic agriculture (but for pasture and through natural hazard insurance policies) and that biodiversity considerations are not taken into account in the financial support to intensive agriculture. It noted that efforts to prevent excessive use of natural resources (protection of genetic resources, preventing overgrazing, restricting fishing of fisheries and protecting trees) have generally succeeded.

The strategic SD plan is under preparation, with its long-term targets including the conservation of open landscape and the promotion of agro-ecological programs that support it through:

- Regional and agricultural planning;
- Decreased pesticide use and increased share of IPM and biological control of pests;
- Promoting of agro-tourism practices that are based to a large extent on local biodiversity components;
- Promoting organic agriculture and sustainable resource use.

The recommended direction is towards multi-functional agriculture with increased attention to biodiversity issues: decreasing negative effects of agriculture practices on natural ecosystems and checking whether agriculture's contribution to biodiversity is sufficiently addressed. One of the proposed operative targets is to promote the benefits of agriculture to natural and environmental resources, including BdC.

Achievements and obstacles

Current biodiversity-related activities include conservation of biodiversity and agro-biodiversity through the gene bank activities, conservation of pastureland, combating desertification, efforts to prevent the entrance of invasive species (even if they are potential biological control agents), decrease of pesticide usage and supporting Integrated Pest Management, biological control of pest species, and organic farming. The emerging SD strategic plan intends to pay greater attention to biodiversity considerations. The required change in attitudes and priorities may be an obstacle in this respect.

7. Regional planning

Regional planning is currently the main channel to address the perceived conflict between pressures for development and the need to preserve landscapes and ecosystems. This is largely lead by the Ministry of Interior's Planning Administration which applies several legal and institutional tools to protect biodiversity components, mainly through land use allocation in planning:

- National master plans: The National Master Plan #35, the combined plan for construction, development and conservation, defines a clear policy for conservation of open landscape and embeds it statutorily, in conjunction with the national master plan for nature reserves and national parks (NMP#8) and the national master plan for forestry and afforested areas (NMP#22).

- Environmental Impact Assessments (EIAs): EIAs call for information on the impact of development plans on biodiversity components. Revised regulations from 2003 broaden the possibility to require EIAs for proposed development in environmentally sensitive areas, such as coasts and riverbanks. Most EIAs consider species and habitat diversity, endangered species, and connectivity issues (through ecological corridors). TORs for EIAs occasionally directly consider "biodiversity impacts", though not as a regular rule.

- Ecological corridors are meant to connect statutorily protected areas and open spaces so as to provide conduits for the passage of animals and plants in a fragmented landscape. Several major axes were recommended for protection as ecological corridors, and are taken into account where development is considered.

- Open landscape sensitivity to development: mapping of "hotspots" and open landscapes that are more sensitive to development via the integration of vulnerability, continuity and functionality provided a basis for open space sensitivity maps which delineate the “value” of open spaces throughout the country.

- Connectivity and animal passages through linear infrastructure: is further addressed in the 2008 updated guidelines for landscape and environmental planning, published by the Israel National Road Company, incorporating guidelines to enhance connectivity and mitigate habitat fragmentation effects of roads using animal passages below and above roads, and via the implementation of ecological considerations in planning, rehabilitation and management of road verges and other areas affected by road construction.

- Biosphere planning: Two biosphere regions are in planning stages, in central and northern Israel, aimed to improve ecosystem protection beyond that given by statutorily protected areas. Biosphere planning adopts the ecosystem approach to planning and management. A national plan for locating suitable areas for biosphere regions is currently prepared, having the conservation of biodiversity and agro-biodiversity among its major goals, with emphasis on traditional agricultural and pastoral practices and on the conservation of landscapes that can help increase local biodiversity and agro-biodiversity.

- Urban nature conservation: has been given greater attention in the last few years. Urban nature conservation is being embedded in several regional or local plans, with a growing degree of supporting surveys and public involvement.

Case study: Rare butterfly changed building plans

The EIA guidelines for a building project in the northern part of Israel specifically requested to evaluate the project's impact on the population of a rare butterfly known from that area, Apharitis cilissa (Lycaenidae), as part of Israel's commitment to CBD.

A two-year study on the butterfly populations in the region recommended on changes to the original

plans, reducing the size of the proposed built area and adapting it spatially to safeguard the main habitats where populations of the butterfly were observed and maintain the connectivity between them. Further management recommendations were drawn to improve the suitability of the non-built area to the butterfly's requirements.

To further help guide decision making on development plans in Israel in a manner which would reduce ecosystem fragmentation and biodiversity loss, additional projects were initiated by the MoEP and NGOs:

- The classification of Israel's landscapes according to sensitivity and value criteria. These include vulnerability, continuity and functionality and are also based on surveys to identify landscapes deserving of protection.

- A policy document from 2003 provides planners with tools for the sustainable use and development of landscapes in the short and medium term and with operational principles for the long term. It brings together the economic, legislative, social, and other tools necessary for the protection of essential open spaces.

Achievements and obstacles

Regional planning has greatly increased its attention to considerations of ecosystem well-being, though the specific term "biodiversity" is not often used and ecosystem services are usually not considered. According to the NBS, the understanding that development relies on biodiversity, thus not being in conflict with biodiversity, has not been fully embedded in regional planning.

Furthermore, all plans ignored the effects and future threats of climate change, which in Israel may be even stronger than previously perceived, on biodiversity.

8. Research, monitoring and Education

Research

In Israel biodiversity-related research is mainly carried out by universities and research institutes, sometimes in conjunction with other professionals, NGOs and amateur naturalists.

Great concern is given today to the academic knowledge base required to handle biodiversity issues: taxonomic expertise in Israel is already dwindled with a low recruit to taxonomic research, and of the few remaining taxonomists and systematists, only fewer are able (by their position) to advise graduate students. New relevant initiatives are led by the Israel Academy of Sciences and Humanities and funded by the planning and budgeting committee of the council of higher education (VATAT).

Biological collections:

The national biological collections of natural history are university-based, housed at the Hebrew University of Jerusalem and at Tel Aviv University, providing the infrastructure and support for basic

taxonomic, evolutionary, biogeographic, conservation and agricultural research and provide a dynamic record of the fauna and flora of Israel. With a substantial national funding for the last 5 years, the collections have been upgraded (through improved maintenance, buildings to house them and advancement of professionals). For example, the entire infrastructure of the national collections of natural history at Tel Aviv University is funded at ca. 1,500,000 USD per annum; in the academic year 2006/2007 the Hebrew University has invested ca. 400,000 USD in this infrastructure and scientific field. Current national support in taxonomy has increased and partially guaranteed for the next 5-year period (In the last 3 years a total of 300,000 USD per annum was provided by VATAT to support the national collections and this support is expected to continue in the 5-year plan starting 2008/2009, ensuring the continued recording of biodiversity and the maintenance of the record).

Training and research:

VATAT acts to promote research and technical positions and advance specialists on specific taxons, aimed to employ and attract more taxonomists to academic research towards conservation through:

- Providing 12 half academic positions in Israel to encourage the hiring of the next generation of curators. Until those are hired, these funds are available to hire additional collections managers at ca. 400,000 USD per annum.

- Stipends for young researchers in taxonomy have been set, but not yet materialized: VATAT set a special 3-year program for post-doctoral fellowships for taxonomic research (2 years abroad and 1 year in Israel) to encourage the training abroad of new Israeli taxonomists; in the coming 3 years 5-6 new fellowships will be made available annually (estimated at a total of 1.35 million USD). A complementary initiative is the "Israel Taxonomy Initiative".

Conservation and management:

Much effort is given to issue-specific research, carried out by research institutes and universities in collaboration with managing bodies such as INPA, JNF-KKL or ministry of Agriculture (pasture authority) to develop and test appropriate management, to answer conservation and management needs.

Case study: The" Israel Taxonomy Initiative" – Taxonomy for a sustainable future: Promoting biodiversity research in Israel.

A unique collaboration project between academics, governmental bodies and NGOs (covering the relevant representatives of all organizations in Israel for whom taxonomic research and/or biodiversity surveys can be of value) has been launched in spring 2009, led by Tel Aviv University. It aims to create a joint appeal to pool private and national funds in order to promote biodiversity research, mainly through support in taxonomic research and in biological collections.

The project seeks to answer the urgent need to train and hire taxonomists in Israel in the higher education system and in governmental agencies to meet the challenges of studying, protecting, and managing the natural and human-dominated landscapes of Israel in a sustainable way; it is expected to

fill in the lacunae in the current situation by developing a methodical program for the duration of the period proposed, training experts, upgrading the collections as a research infrastructure and establishing a significantly improved survey database.

The project will support 10 doctoral and 10 post-doctoral positions to promote biodiversity surveys (with preference to taxonomic groups with many species, those where Israeli taxonomic knowledge is lacking and those with economic or agricultural significance).It also allocates grants for 30-50 visiting taxonomist for biodiversity surveys, that will also give a short course/workshop on their special field and allow for a short survey/research, expected to provide a key to the fauna/flora of their specialty. Priority is given to taxonomic groups where knowledge is deficient or of economic and agricultural importance.

Israel-LTER – the Ma'arag network:

The Ma'arag is a national network of ecological research organizations, a consortium of 4 Israeli universities with 12 research stations country-wide, under the sponsorship of the Israel Academy of Sciences and governmental organizations. Its mission is to provide natural resource managers with the scientific information necessary to promote long-term biodiversity and sustainable development through: State-of-the-art long term ecological research (LTER); A national program of biodiversity monitoring; A center for ecological synthesis and modeling; Educational programs for resource managers; A library of research data and publications.

Monitoring

In Israel there is no Biological Survey and no funding agency that targets biodiversity surveys. The NBS states that current monitoring involves only few species and selected ecosystems and cannot answer the needs of BdC management due to lack of awareness to the benefits of monitoring and as to knowledge gaps required to its appropriate planning and operation. Currently, there is no regular monitoring at the habitat or ecosystem level, and monitoring is held by several bodies for various purposes: the INPA, the JNF-KKL, the Ma'arag network and surveys by or in collaboration with the SPNI. Several efforts were made to create a united national monitoring framework and today Israel is in the process of developing a National Biodiversity Monitoring Framework. The development of tools for the valuation of biodiversity is a high priority.

Currently INPA monitors several species for the purpose of their own conservation or as indicators for ecosystem status. Environmental monitoring includes monitoring of water quality (for human health and for ecosystem health), use of treated water, mapping of stream sewage pollution (GIS) on aquifer feeding areas, and monitoring for pest control (mosquitoes, flies, the invasive ant species). Monitoring of illegal hunting is also carried out.

Monitoring selected species and habitats:

INPA monitors various species, some annually and some periodically, some on a national scale and some locally: breeding raptors (with emphasis on Vultures), Gazelles (mainly Gazella gazelle), aggregating birds (that are agricultural hazards such as Great Cormorant), bats (not annualy), chuckars, Ibex,

Houbara bustards, Otter, wolves and other carnivores, rare plant surveys (not annualy) and Acacia trees (monitored locally as key species in desert ecosystems).

Habitat monitoring is done locally (e.g. INPA monitoring wetland habitats for the last 4 years in the central part of Israel).

The Red Sea at Eilat Gulf has been monitored for the last 5 years, following increased pollution and damage to coral reef, which led to the gradual removal of aquaculture from the gulf waters.

This scheme measures pollutant levels and indices to coral health and biodiversity; The Mediterranean coastal waters are monitored regularly for pollutant levels and for eutrophication and invasive species.

River restoration scheme: Periodic monitoring involves mainly pollutant indices. A new biodiversity index is developed, with its testing and implementation yet budget-dependant.

Biodiversity surveys: those carried out by scientists are currently very limited as they are funded only through specific studies. Nevertheless, these funds amount to fairly large sums per year. In addition, surveys for planning, conservation, or agricultural purposes are held by INPA, KKLJNF, the SPNI Open Lands Institute, the Ministry of Agriculture, some supported by private funds. These surveys are usually targeted to a limited number of taxa at specified locations and for specific purposes EBONE/BIOHAB landscape and biodiversity mapping project: In the last few years Israel has participated in an EU-led multinational project for the mapping and monitoring of habitats. In Israel the project is in testing/research stage: In 2007 the INPA introduced and tested the use of BIOHAB landscape and habitat recording and monitoring system, and in 2008 the INPA joined EBONE (EU 7th Framework project – European Biodiversity Observation Network), whose main objective is to establish a pan-European biodiversity monitoring scheme, with the goal of adapting the European system and developing a local biodiversity observation network. Israel is responsible for one of the teams testing mapping and monitoring methods outside Europe, mainly in Mediterranean and arid regions. This work also involves the selection of suitable indicators for biodiversity monitoring, adaptations to the BIOHAB methodology to local conditions and using satellite imagery to upgrade the scale of monitoring and the ability to detect changes at the landscape level.

Development of a National Biodiversity Monitoring Framework: The LTER-Ma'arag team is preparing a draft monitoring plan, which currently includes 6 arrays:

1. Mapping landscape (habitat and ecosystem) and species diversity, mainly using vegetation structure, land use and few representing taxonomic groups, as well as monitoring specific unique populations;

2. Monitoring functioning of dominant ecosystems through species diversity of selected taxons and key factors or indicator species.

3. Identifying large scale changes to open landscape using remote sensing and GIS mapping;

4. Following the dynamics of woody vegetation. The parameters to be recorded may serve as important indicators for climate change and for important ecosystem function;

5. Following disturbances, drought or specific issues as rare or invasive species;

6. Monitoring management practices and their impact.

Education

Biodiversity conservation education is implemented on both the formal k-12 education system, in academic education, as well as through various activities addressing the general public. The term is just slowly introduced to the public arena, but is still far less used than "sustainable development" or "sustainability".

Several educational programs were prepared, usually coupled with education for nature conservation and sustainability, though some of the programs specifically address BdC.

BdC is mentioned or discussed in numerous web sites and web pages, that distribute information, educational material and papers on environmental issues (see example below), and promote BdC activities (such as the websites of INPA, MoEP, Israel Open Spaces coalition, SPNI and other NGOs, several sites hold information and databases on Israeli flora, the Hebrew University of Jerusalem's BioGIS project. Some of these sites are linked to GIS or database information facilities.

The INPA, JNF-KKL and NGOs gradually increase their biodiversity education through their educational and information activities, which are performed as a part of their public and community outreach, aimed to create affiliation and commitment to BdC and to minimize damage to and pollution of natural habitats and resources. Sessions are held to schools, to rural populations harvesting natural resources, to tourists using open landscape, reserves and parks, to police units and to judges involved in legal protection of biodiversity through enforcement, punishment and penalties and to army units. Special activity projects are initiated (e.g. Week of love to Nature, Water and the Environment; Clean Beach; Links to nature reserves with neighboring communities).

Case study: biodiversity education using the university infrastructure and the internet

A special educational centre was established by Tel Aviv University to promote public education on science, nature and environment and to bridge between academic research and the general public. It relies on the infrastructure of the national biological collections and of the botanical and zoological research gardens and holds guided activities to a varied audience, hosting organized groups of children and students for science days and science workshops and training nature guides, rangers, and school teachers on biodiversity-related topics (ca 10,000 people yearly).

The centre works in collaboration with governmental and local authorities, NGOs, UNESCO representatives and is supported by national and private funding. The center holds a special educational web site presenting its activities, mainly suitable for teachers. The site introduces scientific research on

nature and environment and discusses biodiversity, natural resources, ecosystem services, the environmental crisis and sustainability, presents information on invasive species and additional information and links, including a virtual tour to the botanic and zoological gardens (http://www.tau.ac.il/lifesci/campusteva/virtual.html#) and usage of live webcams (http://www.tau.ac.il/lifesci/zoolive/).

Its team developed, with funding from the ministry of Environmental Protection, a special series of presentations about biodiversity: part 1 introduces the term and its hierarchical levels, discussing its importance to ecosystem services; part 2 presents the biodiversity crisis; and part 3 presents biodiversity in Israel, its sources, present conditions and actions required for its conservation (http://campusteva.tau.ac.il/campus/?cmd=knowledge.1321).

Other information tools include visitor centers in nature reserves, where information on the biodiversity of a given area is presented by displays, maps and pamphlets, and the production of varied education and information materials such as brochures, stickers and leaflets are produced.

Achievements and obstacles

Increased attention is given to scientific taxonomic activity, with pooled efforts and budget allocation. The benefits from allocated budgets were not fully drawn.

Biodiversity monitoring is advancing towards a national framework. This will require continuous efforts to coordinate the individual monitoring schemes and adapt them to the united framework while maintaining the interests of each scheme.

Biodiversity education is slowly spreading, having yet a great challenge to meet a far larger audience, including decision makers.

9. Legal, institutional and economic aspects

The country's environmental legislation, included in a wide range of legislative instruments, rather than in a single environmental law, encompasses laws for the protection of nature and natural resources. Regulative tools include some 15 laws protecting habitats and ecosystems, special sites, natural assets and specifically trees, national master plans. Most laws protect discrete biodiversity components but do not refer to ecosystem services or to genetic biodiversity, yet they can be used for that purpose. Indirect protection to habitats is also given through legislative tools regulating land and water uses. The most important are:

- The National Parks, Nature Reserves, National Sites and Memorial Sites Law and the Protected Natural Assets Law provide the legal structure for the protection of natural habitats, natural assets, wildlife and sites of scientific, historic, architectural and educational interest in Israel.

- National master plans:

- The National Master Plan for Nature Reserves and National Parks (NMP#8) and the National Master Plan for Forests and Afforestation (NMP#22) guide Israel's conservation efforts and help prevent development which threatens the country's biodiversity;

- The Comprehensive National Master Plan for Building, Development and Conservation (NMP#35) limits development in conservation worthy areas and gives protection to landscape ensembles, ecological corridors, coastal and river strips.

- A 2004 amendment to the Water Law allocated 50 million m3 water for wetland conservation and rehabilitation.

- Israel ratified several international conventions on nature conservation, all of which are also reflected in national legislation.

- The 2004 Protection of the Coastal Environment Law aims to sustainably balance between the protection of the coastal environment and its management, development and use.

The NBS states that these tools are inadequate for BdC, as manifested by the continuous damage to Israel biodiversity and recommends on adopting a pro-active approach.

Economic Instruments and financing

Most currently available economic instruments used in Israel (including taxes, fees, charges, fines and environmental subsidies) are generally included within the framework of environmental legislation and refer mainly to the protection of environmental quality.

Economic tools for BdC are under development, mainly through research studies on the benefits and economic values of ecosystem services and of various types of landscapes and natural assets. Incentives for the protection of agricultural land for its landscape and biodiversity value are under review and development. The NBS points that special economic tools need to be formed specifically for the purpose of biodiversity conservation (for example, a fee imposed on owners or holders of coastal facilities that caused damage to the coastal environment, will be paid to the Maintenance of Cleanliness Fund for the protection of the coastal environment).

Most BdC-relevant activities are supported through the governmental budget allocated for the INPA or the MoEP. Philanthropic foundations help to provide essential funds for environmental projects implemented by non-governmental organizations. In recent years foundations have supported such priorities as open landscape protection and environmental education.

Institutional Tools

Several administrative tools are relevant to BdC:

- INPA with its governing council, coordinated by the MeOP, is in charge of nature reserves, national parks and other biodiversity components and natural assets that reside in unprotected open landscape.

- The Israeli Gene Bank for Agricultural Crops (IGB) is affiliated with the Ministry of Science & Technology and the Ministry of Agriculture & Rural Development. To widen IGB's scope of the activities, the MeOP is about to become one of its controlling ministries. The IGB collaborates with scientists from academic institutions and with Israel's seed industry for proper conservation and sustainable use of Israel's plant genetic resources.

- Several statutory committees operate under the National Planning and Building Board, Israel's national level planning body in the Planning Authority and are relevant to BdC: A committee on the implementation of NMP#22 on Forests and Afforestation, a Protection of the Coastal Environment Committee and a committee for the Protection of Agricultural Lands and Open Landscape – aiming to protect their specifically designated areas.

- A National River Authority (with 3 statutory river authorities) is coordinated by the MeOP, includes a variety of stakeholders and holds local administrations for river restoration. Cross-sectoral cooperation as a major tool for mainstreaming biodiversity conservation:

Many of the activities presented in this report are carried out as cooperative efforts between institutions and organizations – various administrative bodies and NGOs. Such cooperation usually involves formulation of agreed targets and resource pooling and is more commonplace among the different "green" agents (between the MoEP, INPA, JNF-KKL, SPNI, universities and other research institutes), usually requiring the formulation of agreed targets to bridge over gaps of different agendas or mandates, also involving financial and professional resource pooling.

Cooperation also occurs between these bodies and other administrative sectors such as Israel Land Administration, Water Authority, the Planning Authority and other governmental institutions, the Electricity Company (which is a semi-independent company) and to a lesser extent – specific projects with the industrial and the business sectors, with local authorities and other NGOs.

The NBS suggests ways to incorporate existing activities into a larger framework with a broader title and a broader conceptual view of targets. The existing infrastructure of cooperation channels can be upgraded to encompass "biodiversity conservation" once the term and the concept will be applied more fully.

10. International activity

Israel has signed on several environmental conventions: CBD, CITES, the Convention on Migratory Species, Ramsar, the World Heritage Convention, UNCCD, Barcelona convention for the Mediterranean, ENP with the EU. A limited budget allocation withholds the signature on additional protocols (such as Agreement on the Conservation of Cetaceans of the black sea Mediterranean sea within the Convention

on Migratory Species), and limits the country's ability to participate in some of the associated international activities.

These commitments are reflected in national legislation and in national activities. Progress and international cooperation in these channels is coordinated through the Ministry of Foreign Affairs in conjunction with the MeOP, INPA and other professionals.

International cooperation:

Israel manifests its commitment to the CBD, despite the restricted budget allocated to biodiversity conservation, also by paying special attention to share its knowledge and existing experience and know-how with other countries through the activities of Israel's Center for International Cooperation (known as MASHAV in its Hebrew acronym), which is a part of the Ministry of Foreign Affairs. MASHAV is responsible for initiating and implementing Israel's development cooperation program worldwide and aims at transferring the expertise and technologies which have assisted Israel in its own path to development to other countries. It is active in fields ranging from agriculture to medicine and from community development to entrepreneurship.

Today, Israel cooperates with over 140 countries, providing training in Israel and abroad. MASHAV collaborates with local experts and institutes and offers international courses for experts from developing countries on BdC, sustainable practices and combating desertification, such as: Conservation of biodiversity in desert ecosystems; Ecological considerations for sustainable agricultural development projects; Desert agro biology; Sustainable vegetable production systems; Trees for arid lands and planting native trees to combat desertification; Agro-forestry development; Social , economic and political challenges in nature conservation.

Other international activities that seem to be instrumental to further enhance the implementation of the CBD at the national level are where professionals participate in international workgroups, discuss problems, share solutions and know-how, and build together action plans and work procedures to be later adopted and implemented at the national level, benefiting from the professional supporting forum, sharing both the ecological, environmental and administrative knowledge. These international collaborations include, among others, hosting international conferences and seminars (e.g. the JNF-KKL hosted an international conference on forestry and desertification) and collaboration in biodiversity research and monitoring schemes (e.g. the above mentioned EBONE/BIOHAB project).

11. Other sectors and activities

NGO activity on BdC is implemented mainly through education and through regional planning.

The biodiversity-related activity of most NGOs takes place in two channels: One is targeted to BdC through efforts to protect open landscape and endangered species, through help in preparation of red data books, surveys and policy papers and through lobbying and advocacy. A major active participant NGO is the SPNI’s Open Landscape Institute that aims to promote the protection of land resources and open spaces in Israel and the region. It has been involved in the preparation of numerous policy papers,

research activities and landscape surveys (where habitat and species mapping are the basis for defining sensitivity to development); The other is targeted towards sustainable development, where BdC is treated both per se and as part of equity issues.

Biodiversity conservation was further introduced as an issue to the political agenda with the establishment of a new green party at the end of 2008.

12. Conclusions

Much effort and money have been invested in biodiversity-related activities of different sectors in Israel, contributing to the overall implementation of BCD articles. Quite a few policy papers were prepared, presenting analyses, drawing recommendations and suggesting directions for activity, reflecting the different viewpoints and interests of various stakeholders. A long editing process and personnel changes have delayed the final publication of the NBS.

Biodiversity considerations are not generally integrated into poverty reduction strategies, as the issue of economic dependence of low-income sectors on biodiversity is generally irrelevant to Israel: most poverty reduction efforts are targeted to urban populations, and are not necessarily related to agriculture or to natural resources. Yet, biodiversity considerations are linked to equity issues, as part of the discussion on resource availability, mainly related to the availability of drinking water, to the access to marine and inland coasts, and to the availability and accessibility of natural areas for recreation to socially-deprived sectors.

It seems that there are several obstacles in translating policy papers into action:

- There are difficulties to synthesize all the professional input into concrete and precise action plans, to find or allocate the appropriate budgets, to gain acceptance and cooperation from stakeholders, to translate the recommendations into priorities, targets, deadlines and indicators for progress, to perform and to monitor performance through the designated indicators. Audit-like processes are not customary in Israel's administration and are currently gradually introduced to administrative procedures.

- A gap sometimes exists between the professional knowledge that is involved in devising policies and action plans and the administrative or even entrepreneur or business-like capabilities that are sometimes required for the translation, adaptation and application of the recommendations into a long-term efficient process.

- Long-term commitments are difficult to achieve when governmental budgets are allocated yearly.

It seems that for a good implementation of the NBS, a coordinating unit with budget and with authority/ mandate will be required. For example, the preliminary recommendations for a SD strategy in the Ministry of Agriculture & Rural Development advise to establish a special unit within the ministry to promote the application of the strategy and of action plans.

Improvements and progress in planning and management can also be achieved through:

- Upgraded guidelines to environmental planning can be better and more fully established as to how to relate and handle BdC and how to shift from a phase of strategic planning and policy papers into a more ecosystem approach. Currently, planning is not always integrative, for example some of the infrastructure planning may not integrate with BdC planning.

- Upgraded guidelines to EIAs that include as a rule a specific reference to biodiversity and ecosystem services, though not easy to assess. Currently these are referred to mainly by attention to endangered habitats and endangered or unique species, whereas the functional aspects of biodiversity are referred to via the concern over ecological corridors and maintaining connectivity.

- Guidelines to the management of areas can be incorporated into planning, since defining land use is not enough to protect biodiversity, and the way an area is managed also matters.

For example the lack of management definitions in the national master plan for afforestation is occasionally a cause for conflicts between the two managing agents, INPA and JNF-KKL, whose agendas are not identical. At the moment, there is also no formal way for follow-up on management-related issues and for deciding on intervention and care where required, though part of the areas are under the management of INPA or JNF-KKL.