State of Israel

NATIONAL REPORT

OF

ISRAEL

years 2000 and 2001

TO THE

UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION (UNCCD)

June 2002

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Summary

This report covers the years 2000 and 2001. It presents (a) the current status of the combat against desertification in Israel, as an affected country, and (b) the Israeli activities as a developed country party to the CCD, most of which involves capacity building and technology transfer through interacting with trainees and experts from affected developing country Parties. Most of these activities were carried out by the Center for International Cooperation of the Israeli Ministry of Foreign Affairs ("MASHAV), assisted by several Israeli research and teaching institutions. Other organizations interacting with trainees and experts from developing affected country parties are Israeli academic organizations, and especially the Blaustein Institute for Desert Research of Ben-Gurion University of the Negev, the Faculty of Agriculture of the Hebrew University of Jerusalem, and the Agricultural Research Center of the Israeli Ministry of Agriculture and Rural Development. In these modes Israel participated in combating desertification in some 50-affected developing country parties, in Africa and Asia (including 4 Arab countries in these regions), and in Latin America. Funding for these activities have been of various sources - the Government of Israel, Israeli universities and research institutions, philanthropic donations, and partnership with other developed country parties and international organizations. For the two years, 2000 and 2001 combined, the Israeli assistance to developing country parties amounted to $10,248,850, which is divided between Africa ($3,088,750), Asia ($6,076,500) and Latin America ($1,083,600).

Structure of the Report

Israel signed the United Nations Convention to Combat Desertification (UNCCD) on 26 March 1994 and was the 27th country to ratify it, on 26 March 1996. Israel is located in the Asian region, at its western sub-region. It is also a Mediterranean country, at the northeastern edge of the Mediterranean basin. Israel actively participated in the INCD (Intergovernmental Negotiating Committee – Desertification) from the very beginning in 1992; it chaired the Drafting Committee of the CCD's Regional Implementation Annex for Asia, and acted as an Observer in meetings of the Regional Implementation Annex for the Northern Mediterranean.
Positioned at the edges of the Sahara-Arabian deserts and the Asian steppes, Israel is a dryland country prone to and affected by desertification. Israel is also a developed country Party, and until now it is one that has not prepared an action program.

The first part of the report **"Israel as an affected country Party"** is therefore compatible with *Decision COP1/11 paragraph 10 (d)* **"Reports of affected developed country Parties not preparing action programmes"** by describing *"The strategies and priorities, within the framework of sustainable development plans and/or policies, to combat desertification and mitigate the effects of drought and any relevant information on their implementation"*, and under this heading attend the key thematic topics identified in *decision 1/COP.5*, as follows:

Participatory processes involving civil society, non-governmental organizations and community-based organizations;
Legislative and institutional frameworks or arrangements;
Resource mobilization and coordination, both domestic and international, including conclusions of partnership agreements;
Linkages and synergies with other environmental conventions and, as appropriate, with national development strategies;
Measures for the rehabilitation of degraded land and for early warning systems for mitigating the effects of drought;
Drought and desertification monitoring and assessment;
Access by affected country Parties, particularly affected developing country Parties, to appropriate technology, knowledge and know-how.

The second part of the Report **"Assistance provided to developing affected country Parties in implementing the Convention"** is structured to comply with the *"Explanatory Note in Preparation for the First Session of the Committee for the Review of the Implementation of the Convention (CRIC) in November 2002"*, proposing *(paragraph 9)* that the format of reports for developed countries should follow the headings of the format detailed in *decision 11/COP.1, paragraph 10 (c)* **"Reports of developed country Parties"** taking into account the recommendations of a meeting held in Recife, Brazil that developed country Parties will report on their assistance by regions (detailed in the *Annex 1* of the above document), as follows:

For each Region (Africa, Asia, Latin America and the Caribbean, Central and Eastern Europe):

Part A: Core report:
A summary of activities of Israel in capacity building and technology transfer, followed by tables of data from which the summary was extracted.

The consultative processes and partnership agreements in which they are involved –Measures taken to support the preparation and implementation of action programmes at all levels, including information on the financial resources they have provided, or are providing, both bilaterally and multilaterally – Israel had not been involved in these activities much.

Part B: Any other activities related to combating desertification – here some of the capacity building and technology transfer activities mentioned in the summary, are elaborated on in some detail.

Israel as an affected country Party - strategies and priorities and their implementation

Summary

Israel is dryland country, with dry subhumid, semiarid, arid and hyperarid drylands covering its area successively along a north–south and west–east descending precipitation gradients. Its dry subhumid areas are of an eastern Mediterranean eco-climatic nature; the semiarid area has a strong Asian biotic component, its arid region has a mixture of Mediterranean, Asian and African desert biota, and its hyperarid areas are of Saharo-Arabian desert conditions. In Israel, the sensitivity to desertification increases with aridity, whereas the exposure to human impact decreases with aridity.

The arid regions of Israel suffered natural soil erosion due to climate change during early historical times, and ancient Negev populations invested commendable terracing efforts to halt this erosion and to develop run-off agriculture there. From the dawn of history nearly all parts of the country have been under intensive land use by humans, including pastoralism and cropping, though evidence for desertification or the lack of it during historical times is not conclusive. During the turn of the 19th century and the beginning of the 20th century exploitation of woody and herbaceous vegetation especially in the dry subhumid areas, for firewood and due to grazing, caused severe soil erosion and significant degradation of vegetation. Many lowland regions have become waterlogged and salinized. It is not known whether or not semi-arid drylands suffered desertification at that time.

Measures to combat dry subhumid desertification (afforestation and drainage) and develop semiarid lands (water resource development) were initiated by Jewish settlers and the British Government prior to the establishment of the State of Israel in 1948. During its first decades, Israeli agriculture development, water resource development, water conservation policies, and afforestation projects seemed to have rehabilitated many previously desertified areas and to have prevented further desertification. However, in recent decades signs of emerging desertification and of future potential risks have been detected. In the dry subhumid areas there is soil salinization due to irrigation in dry subhumid valleys, and increasing impenetrability of dry subhumid woodland and "bush encroachment" leading to degraded range quality on the one hand, and woodland fires leading to soil

erosion on the other hand. In the semiarid areas there are indications of sheet soil erosion on irrigated agricultural land, and of highly intensified gully erosion, both in regions of agricultural activity and of grazing activity. Risk of soil salinization of a large scale may become high due to expanding areas of agriculture irrigated with treated wastewater, which is not desalinated. Similar risk is imminent in arid drylands that are due for further agricultural development to be irrigated with brackish fossil water, though at a smaller scale. Gully erosion is evident also in the arid region, and risk of salinization is imminent in the intensive though patchy agriculture in the hyperarid areas. Both the arid and the hyperarid areas suffer from excessive road construction and use, leading to loss of vegetation, soil erosion and loss of water.

Israel has not produced a National Action Plan to Combat Desertification. In recent years it has initiated and completed a National Master-plan for the dry subhumid and part of the semiarid parts of Israel, and a process of exploring, together with stakeholders and experts, the country's options for sustainable development and modalities for synergizing the joint implementation of the "Rio Conventions." A planning workshop carried out in 1999 within the framework of regional cooperation to combat desertification in the Middle East and utilizing a participatory approach, established a preliminary template for a National Action Plan, with emphasis on research.

An intra-governmental Steering Committee on Desertification has been set to coordinate the activities of government departments related to combating desertification, and an advisory professional committee advises the Steering Committee on budget allocation. A list of urgent activities that may constitute a framework for an Israeli NAP includes actions for assessing, combating and monitoring soil salinization, sheet and gully erosion, and for improving the management of rangeland, woodland fires and road construction and use. Above all it is necessary to increase the awareness of the public and decision makers alike, to the already occurring and to the future damages of desertification. It is also critical now to evaluate the feedbacks between desertification, loss of biodiversity and predicted future impacts of climate change, and to design an effective joint implementation of the UNCCD, the CBD (Convention on Biodiversity) and the UNFCCC (Framework Convention on Climate Change), such that it paves the path for Israel towards sustainable development.

Participatory processes involving civil society, non-governmental organizations and community-based organizations

Legislative and institutional frameworks/arrangements

Israel has not established a National Committee to Combat Desertification. However, the Ministry of Foreign Affairs has established an Intra-governmental Steering Committee for Combating Desertification. Members of the Committee are representatives of the Department of International Organizations and the Peace Wing of the Ministry of Foreign Affairs, the Ministry of Environment, the Ministry of Agriculture and the Ministry of Science. Not governmental organization represented in the Committee is the KKL. The Committee is chaired by the a representative of the Center for International Cooperation of the Ministry of Foreign Affairs, and the Secretary is a representative of the Center for International Agricultural Development Cooperation (CINADCO). The Committee coordinates the desertification-related activities of the different governmental departments, and allocates budgets for these activities. The Committee appointed a Professional Advisory Sub-Committee, members of which are representatives of the Technion – Israel Institute of Technology, the University of Haifa, the Hebrew University of Jerusalem, Tel-Aviv University, Ben-Gurion University of the Negev and the Volcani Center for Agricultural Research. This Sub-Committee is chaired by representative of the Blaustein Institute for Desert Research, the Focal Point of the CCD for Israel. This Sub-Committee is charged by the Steering Committee with issues requiring professional opinion, and it advises the Steering Committee on budget allocations. One such activity is the implementation of the agreement between the Kingdom of Spain and the Government of Israel on joint research for combating desertification.

Resource mobilization and coordination, domestic and international, and conclusions of partnership agreements

Not attended.

Linkages and synergies with other environmental conventions and with national development strategies

The growing environmental awareness, a committed environmental administration, and greater integration of environmental considerations into local, regional and national planning create an enabling environment for preparing a national action program for sustainable development of Israel. The Government of Israel has carried out two major relevant activities during the last five years. A Master plan for the 21st century – "Israel 2020" was initiated in 1996 and was recently completed (Gabbay 1998). Though this Master-plan does not give much attention to the arid and hyperarid regions of Israel, it encompasses several objectives for a sustainable development policy in Israel:

- To secure maximum freedom and opportunity for future generations to determine their environment and style of life, especially in light of increasing pressures on land and other natural resources in Israel;
- To encourage development which internalizes environmental impacts. While economic growth should be encouraged through physical development and through policy measures, development costs should incorporate environmental costs so as to limit damages to resources and environmental quality;
- To maintain minimal standards for the prevention of irreversible and expensive damage to vital or rare national resources so as to protect Israel's resource reserves;
- To assure a reasonable quality of life and the environment to the entire population, including weak sectors and minorities;
- To disseminate environmental awareness beyond state and administrative boundaries in view of the sharp rise in trans-boundary environmental issues.

For constructing a sustainable development strategy, seven target groups (industry, energy, transport, tourism, agriculture, urban sector, biodiversity) have been put to work. The groups were composed of a wide range of stakeholders including national government, local government, the private sector, academic institutions and NGO's. The preliminary documents for each sector are presented in two documents (Ministry of Environment, 1996, 1998). Issues pertaining to desertification in these documents are:

- Sustainable agriculture development - Allocation of production factors in sustainable agriculture, sustainable use of water and sustainable land cultivation, prudent use of pesticides;
- Sustainable water use - Development of marginal water sources, adopting wastewater quality to each specific use, taking precautions for minimizing potentially adverse effects on soil and groundwater;
- Sustainable development of open spaces - reshaping forests and scrublands, rehabilitation of rivers and creating new water bodies, and converting agricultural land into open public land in the form of parks.

Measures for the rehabilitation of degraded land and for early warning systems for mitigating the effects of drought

National Action Program

Though the Inter-ministerial Steering Committee has not yet decided upon the need for Israel to construct and implement an NAP to combat desertification, some outlines for such a plan can already be roughly drawn. Since Israel has several types of drylands, goal to be achieved are listed by dryland types.

The dry subhumid drylands

- Reduction of salinization in high-salinity areas and preventing further salinization;
- Assessment of carrying capacity and management options for averting risks of degradation of herbaceous, scrubland and grassland ranges;
- Reduction of fire risks by woodland management and controlled grazing.

The semiarid drylands

- Assessment of the impact of the "Savannization" afforestation practice, for improving further such afforestation efforts;
- Assessment of soil erosion due to irrigated agriculture and devising agro-technological practices to reduce this risk;
- Reducing the salinity contents of treated wastewater and monitoring the effects of brackish irrigation on crops, soils and groundwater;
- Improve and monitor afforestation and mechanical measures for reducing gully erosion;
- Quantification of range degradation and soil erosion caused by Bedouin herds, and designing and carrying out programs for alternative decent livelihoods for the Bedouin community, including the development of economically viable and sustainable agro-forestry and sylvi-pastroral systems;
- Establishing areas protected from desertification, for conservation of biodiversity, especially plants, that are at their distributional edge in the semiarid region, and may be instrumental as an adaptation for future climate chance.

The arid drylands

- Quantification of range degradation and soil erosion caused by Bedouin herds, and designing and carrying out programs for alternative decent livelihoods for the Bedouin community, including the development of economically viable and sustainable agro-forestry and sylvi-pastroral systems;
- Exploration of methods and practices for soil and vegetation rehabilitation, degraded by military maneuvers;
- Planning and carrying out programs to develop desert tourism and eco-tourism, as a sustainable alternative livelihood for arid drylands populations;
- Re-planning and protecting roads to make them least damaging to the environment;
- Restoration of ancient wadi terraces, to arrest soil erosion and water losses, as well as to protect biodiversity assets.
- The hyperarid drylands
- Reduction and prevention of salinization risks from irrigated intensive agriculture;
- Planning and carrying out programs to develop tourism and eco-tourism as a sustainable livelihood for hyperarid drylands populations;
- Re-planning and protecting roads to make them least damaging to the hyperarid vegetation.

NAP components common to all dryland types

Several components of the NAP apply to all dryland types and regions. These include:

- Planning and carrying awareness raising campaigns are required, to encompass the general public, local populations, experts and decision makers;
- Determining areas of synergy and complementarities between combating desertification, conserving water resources, adapting for climate change, and conserving biodiversity;
- Explore the concept of UNESCO's Biosphere Reserves as a tool for synergistic implementation of the "Rio Conventions";
- Use the national combat against desertification, past, present and future, as a tool and a vehicle for promoting regional cooperation and for disseminating knowledge and transferring technologies to Affected Country Parties of the CCD.

Drought and desertification monitoring and assessment

Desertification that developed in the Land of Israel during the turn of the 19th century and at the first decade of the 20th century has been combated in the pre-State of Israel years, and as of the establishment of the State. Not only desertified areas seem to have been rehabilitated, but also new development did not seem to cause desertification in the first decades of the existence of the State of Israel. The issue of whether or not changes in land use and the accelerated development during the first five decades of Israel not only rehabilitated previously caused desertification and averted potential risk of desertification, but also induced new desertification risks - has not received sufficient attention, neither of experts nor of policy-makers. Some people claim that there is no evidence for ongoing desertification, while others point at expressions of desertification and of increasing potential risks. It has been already pointed out that indicators of desertification may easily go unnoticed or unheeded (Heathcore, 1980).

Currently active gully erosion is easily evident in many sites in the semi-arid and arid areas of Israel. Mechanical and afforestation efforts by the KKL are directed to slow down gully erosion in several sites. However, this phenomenon in itself is not an indication of anthropogenically-induced desertification, resulting from the agricultural development of Israeli drylands. It was hypothesized that the main winds bringing loess to the Negev desert prior to the Holocene came from the Sahara, and as a consequence of the direction and great fetch of the wind, brought as much loess to the desert as that which was washed away each winter during the floods (Evenari *et al*.1982). Thus there was no net erosion during this period. Since the Holocene wind directions have changed and loess arrives the Negev desert from Saudi Arabia, a far shorter distance. Moreover, less loess reaches the desert to replace that lost in the floods. This results in net erosion, which is a natural process (Avni 1998). The Nabbatean people, who inhabited the Negev between 200 B.C. and 100 A.D., built tens of thousands of terraces in the wadis to stop this erosion and to facilitate the use of run-off agriculture (Evenari *et al*., 1982).

However, such practices have stopped after the Byzantine period. Ever since, the deterioration of the terraces' walls continues, causing more gully erosion in wadi channels. Yet, though this erosion is a long-term process that started at the end of the Pleistocene (Avni 1998), Ward et al (2000) set out to explore a prediction that the rate of this erosion has increased exponentially since the advent of modern agriculture in the arid and semiarid region of Israel.

Ward et al (2000) selected gullies within active agricultural land and within nature reserves in the arid – semiarid transition region in the northern Negev, receiving 250-350 mm of annual precipitation. Floods create waterfalls within these gullies, and the researchers found that areas above waterfalls have better soil quality (as expressed by physical and chemical composition, as well as by results of a simple bioassay) than those below. This is probably due to a decrease in soil nutrients as one moves downstream from the head of a waterfall, a decrease caused by an increased erosive impact. This finding confirms that water erosion reduces productivity, but Ward et al (2000) also found that the effect of land degradation is more pronounced in agricultural areas than in nature reserves. Thus, not only gully erosion may have recently intensified, but also this intensification is linked to some sheet erosion and subsequent initiation of soil degradation in irrigated agricultural land. This degradation has not yet been expressed by a reduction in crop productivity.

The transition from a nomad, pastoralists' society to a sedentary Bedouin society has had an initial positive effect on range and soils. However, though of much lower economic significance than during the pre-State period, Bedouins continue to maintain livestock. Furthermore, it is likely that socio-economic developments gradually increased grazing pressure, following its initial decline in the early years of the State (Pervolotsky 1999). This is because (a) the population increased from 11,000 immediately after 1948 to 120,000 nowadays (and utilizing ca 1000 km^2 of semiarid and arid lands, Azmon 1999), (b) forage denied due to cessation of migration has been replaced by heavy grain and hay supplementation, (c) the exclusion from some traditional grazing lands increased the pressure on other lands, and (d) the increased spatial availability of drinking water, together with accessibility to veterinary services, all led to an increasing number of animals (the 70,000 sheep of 1960 increased to 80,000, 130,000 and 200,000 in 1978, 1980 and 1984, respectively [Abu-Rabia 1994]) and an increased grazing pressure on areas not transformed into irrigated croplands.

Since many Bedouins tend to settle along major roads, to facilitate their transportation to urban centers and working places, their herds are maintained in these permanent residences along the roads, and overgraze several kilometers of both sides of the roads (during the dry season animals are maintained on purchased fodder). As a result, severe gully erosion is becoming evident along these major roads, especially in the semiarid region. In some regions, e.g. the Yatir forest, KKL is investing huge efforts to arrest this phenomenon, by (a) applying the "Savannization" afforestation technique, that should not only arrest gully and sheet erosion, but also improve range productivity; and (b) encourage local Bedouins to utilize the already existing Yatir forest for collection of firewood and for grazing.

Following harvest, especially of cereals, in the semiarid areas, Bedouins are encouraged to introduce their herds to these croplands for feeding on the stubble. It is not known what is the contribution of this trampling and removal of soil cover to wind erosion during the end of summer, and water erosion by first rains. Surely this practice contributes to the economic profitability of free range livestock growing, and to the livestock intensified impact on vegetation cover and soil erosion during sites and times off the stubble-dependence periods.

Economical, social and military demands dramatically increased the number and extent of roads constructed all over Israel, both paved and non-paved ones. The desertification-related damage of these roads increases with aridity. Many of these roads have generated run-off that contributed to soil erosion and flush floods, and to severe ever-intensified gully erosion. The roads increased the accessibility of many regions to vehicles, which get off the roads and cause either compaction or breakage of crusts and grinding of soils. Both civilian and military vehicles contribute in this way to soil erosion and dust generation, which may jointly reduce vegetation cover (Rozin, 1997). In the hyper-arid Arava Rift Valley and in many arid areas the roads blocked and diverted floodwater and run-off courses, causing mortality of indigenous trees and other vegetation, instrumental in both soil conservation and range productivity. Up to 61% mortality of acacia trees in these areas was attributed to the absence of culverts under roads cross-cutting the ephemeral river beds, where acacia trees abound, and five species of perennial plants disappeared downstream from roads (Ward and Rohner 1997). This damage to the vegetation, together with the intensified impact of the diverted runoff, contributes too to gully erosion.

Soil salinization

Surveys completed during last five years indicated that at least 110 km^2 are prone to salinization and 40 km^2 need rehabilitation, mainly in the northern dry subhumid region, on clay soils with high ground water table (Jezre'el Valley, Kharod, Beth-Sa'an Valley, Western Galilee, Benyamini et al 1998-9). Rehabilitation is already underway by subsurface drainage systems and adapted irrigation protocols. However, saline drainage water withdrawn from a field into a nearest trench, gully or river, can lead to salinization of rivers or nearest lands, which will require further disposal facilities and means. Finally, soil salinization, excess irrigation water and effluents, and overuse of renewable water resources for agriculture, cause also salinization of water resources, which in turn, further salinize soils when used

for irrigation. These already occurring problems in the dry subhumid regions may be minor, as compared to future potential risks in more arid drylands of Israel.

Irrigation with brackish water in the hyperarid and arid regions

Though the Arava Rift Valley is categorized as hyperarid because its precipitation is very low and the potential evapotranspiration there is very high, the natural productivity is in places relatively high - being a valley, its productivity is supported by floodwater, generated by the high and extensive mountain ranges at both sides of the valley. Indeed, a chain of very successful agricultural communal farms (Kibbuzim and Moshavim) has been stretched along the Arava Valley. However, this oasis or patch agriculture is based neither on run-off nor on transported water, but on local groundwater, most of which of "fossil" origin, and brackish. Given the extremely high evaporation rates in that region, there is a mounting risk of soil salinization due to the continued dependence on this water. Such brackish water also abounds in the arid region, and plans of widespread and intensive use for vineyards and other crops in this region are underway, with a similar associated risk.

Irrigation with treated wastewater in the semiarid region

Three socio-economic and political trends have recently combined to induce a new salinization risk to large areas in the semiarid region, linked to intensified agricultural development of this region. First, population growth and the increase in standard of life intensified urbanization in the central and southern dry subhumid region of Israel, where most of the population is concentrated. This urbanization is at the expense of agricultural land, which has become prime real estate. Second, the increasing population generates ever-increasing quantities of wastewater, that in order to comply with international agreements for protecting the waters and beaches of the Mediterranean Sea, cannot be anymore disposed to that sea. Third, the amount of renewable freshwater required for satisfying the demand for domestic use increases, at the expense of freshwater for agricultural use. The proposed and already executed solution is to transfer the receding dry subhumid agriculture from the dry subhumid areas to the semiarid areas, and to irrigate this agriculture with treated waste water generated by the densely populated center of the country – agricultural production will thus continue, a new water source will become available for this agriculture and the Mediterranean Sea will not be polluted by Israel.

The total amount of wastewater generated in Israel is about 60% of the urban water supply (364 million m^3). Around 310 million m^3/year is treated. Of this, only a small amount is disposed into the sea and surface streams, while the bulk (255 million m^3/year) is reused for irrigation (Eitan 1995). The Shifdan plant on the coastal sand dunes in central Israel is a large-scale project for wastewater treatment. The treated water is recharged to a nearby aquifer. The percolation of the water through the deep sand provides an additional cleaning phase, and the aquifer serves as an underground reservoir for the recharged water, preventing loss by evaporation. Water is pumped off mainly in summer, and more that 100 million m^3 of this treated wastewater is transported annually via the "Third Negev Pipeline" to the western Negev for irrigation. Smaller-scale plants in the Negev provide treated wastewater for irrigation of fields located a short distance from the source of the effluent. This water is of inferior quality because of minimal treatment, and use is restricted to irrigation of crops such as cotton in the summer. Additional small and large plants are under construction and it is expected that most of the water allocated for agriculture will eventually consist of treated wastewater. Also, methods of sub-surface drip irrigation using treated wastewater are under experimentation, with good initial results.

These developments have two desertification risks. The first relates to the salinity of treated wastewater, which is higher than that mostly used in Israeli agriculture. All improvements with respect to treatment effectiveness attend the issue of health safety but not the risk of soil salinization. The second risk is related to the sludge, a sizeable by-product of the wastewater treatment process, which too cannot be disposed to the Mediterranean Sea. Sludge can be applied to increase soil fertility, which

may be a great advantage for agriculture in the nutrient-poor dryland soils. However, salinity, heavy metals and other toxic compounds may abound in sludge, and its effect on dryland soils is still unknown.

Israel operates some 30 desalination facilities and in1997 Israel's national water company Mekorot desalinated 9.8 million m^3 of water, much of it for domestic use, especially in the far south, which is out of reach of the National Water Carrier. The Negev fossil and brackish groundwater is good candidate for more desalination efforts, though desalination of treated wastewater requires more research.

Access by affected country Parties, particularly affected developing country Parties, to appropriate technology, knowledge and know-how

Not attended.

Israel as developed country party - assistance provided to developing affected country Parties

Africa

Summary

MASHAV's Capacity-building and technology-transfer

The Center for International Cooperation ("MASHAV") of the Ministry of Foreign Affairs carried out capacity-building and technology-transfer activities directed at 27 African countries in year 2000 and in 27 African countries in year 2001) and in the two years combined – 30 different African countries (not including North Africa and Egypt, and including Cape-Verde) affected by desertification. These included:

1. Courses commissioned by MASHAV and carried out at several teaching and training facilities in Israel. Trainees and experts from affected African countries (altogether 244 in year 2000 and 184 in year 2001) participated in such 29 courses in year 2000 and in 21 courses in year 2001; In the two years combined 428 African trainees and experts attended 40 different courses in Israel (Table 1), lasting 2-6 weeks each, at a cost of $722K in year 2000 (Table 2) and $757K in year 2001 (Table 3).

2. "In country" courses administered by MASHAV-commissioned Israeli experts and carried out in African countries. Twelve courses attended by a total of 421 participants, were delivered by 28 Israeli experts in 10 African countries, at an overall cost of $180K in year 2000 (Table 2); 9 courses attended by a total of 280 participants, were delivered by 18 Israeli experts in 4 African countries, at an overall cost of $108K in year 2001 (Table 3).

3. MASHAV-commissioned, three Israeli experts carried out short-term consulting missions in two African countries, at a cost of $9K in year 2000 (Table 2), and 7 Israeli experts carried out short-term consulting missions in four African countries, at a cost of $39K in year 2001 (Table 3).

4. MASHAV operated long-term agricultural demonstration projects, one in each of 5 African countries in year 2000 and of 3 African countries in year 2001. An Israeli expert functioned as a Project Manager in each of these countries, throughout a whole-year mission at a total cost of $667K in (Table 2), and a total cost of $450K in year 2001 (Table 3).

More detailed account of long-term cooperation with 5 African countries is provided in Table 4. Altogether the investment of MASHAV in the partnership with African affected countries amounted

to $1,574,750 in year 2000 and to $1,354,000 in year 2001. These figures do not include cost of travel between Israel and the African countries.

Capacity building and technology transfer through studies in academic institutions in Israel

Studies in the Albert Katz International School for Desert Studies, Blaustein Institute for Desert Research, Ben-Gurion University of the Negev

During 2000 and 2001 one student from affected African county enrolled the Albert Katz International School for Desert Studies of the Blaustein Institute for Desert Research (BIDR), Ben-Gurion University of the Negev, for a two-year program, reading for an M.Sc. degree in Desert Studies (Table 5). The overall expenditure was $27,000 for the two years combined, generated from sources raised by the BIDR from various sources, within and outside Israel.

Studies in the Division for External Studies, Faculty of Agricultural, Food and Environmental Quality Sciences of the Hebrew University of Jerusalem

During years 2000 and 2001 students from Ethiopia, Madagascar, Uganda and Zambia (one from each country) enrolled in the Division for External Studies, Faculty of Agricultural, Food and Environmental Quality Sciences of the Hebrew University of Jerusalem, reading for a M.Sc. degree in Agriculture.

Capacity building and technology transfer through scientific exchange and cooperation

Scientific exchange carried out by the Blaustein Center for Scientific Cooperation of the BIDR

The Blaustein Center for Scientific Cooperation (BCSC), the instrument of the Blaustein Institute for Desert Research for cooperation with other countries, carried out in year 2001 three exchanges with two African countries, on issues related to combating desertification, at an overall cost of $25K (Table 6).

Cooperation between Israeli research institutions and research institutions in African affected countries

United States Agency of International Development (US-AID) supported in year 2001 six research cooperation projects in areas related to combating desertification between Israel and four African affected countries at a total investment of $384K (Table 7). The Israeli research institutions matched this contribution by providing the salaries of the Israeli researchers and additional in-kind contributions.

Tables

Table 1 – Courses on issues related to combating desertification	
Water and irrigation	**Dryland agriculture**
Irrigation and extension*	Irrigation & soil management**
Development of water resources	Desert agrobiology
Management of groundwater resources**	R&D in integrated pest control
Pressurized irrigation systems*	Trees and horticulture
Water seminar for Africa	Trees for arid zones*
Irrigation & soil management**	Date palm cultivation for arid zones*
Meteorology and dryland agriculture	Sustainable horticultural crop production under climatic constraints
Data-base agrometeorology*	R&D in integrated pest management**
Basic agrometeorology	Vegetable growing**
Hydrometeorology*	**Agribusiness in drylands**
Crop weather monitoring & modeling*	Agricultural business development
Animals	Farm development & agribusiness
Sheep & cattle production	Agribusiness in rural & peri-urban conditions
Beekeeping	Post harvest treatment & marketing of agricultural produce
Poultry production	Post-harvest production & marketing of fruits
Aquaculture**	Local economic development*
Aquaculture – production & management**	**Role of women & cooperation**
Dryland biotechnologies	The role of women in the leadership of cooperatives
R&D in protected crop technologies*	Project management – women in position of leadership
Biotechnology in agricultural plants & micro-organisms	Management of cooperatives through computers
R&D in post-harvest biology & technology*	Women in Agriculture**
Regional development	**Conservation of dryland biodiversity**
Development projects in rural areas**	Conservation of biodiversity in arid ecosystems*
Integrated regional & rural development**	
Development of rural tourism**	

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* Provided in both years – 2000 and 2001

** Provided only in 2001

Table 2 - Africa: Capacity building and technology-transfer by MASHAV, year 2000							
	Courses in Israel		In-country participation				
			Roving workshops			Israeli experts	
Country	# Courses	# participants in all courses combined	# Israeli experts	# courses	# partici-pants	# Short-term consulting experts	# Long-term projects
Angola	1	1					
Benin	3	9					
Burkina-Faso	4	9					
Cameroon	9	19					
Cape Verde	1		2	1	23		
Central African Republic	2	2					
Chad	2	3					
Cote d'Ivoire	7	8	2	1	18		1
Democratic Republic of Congo	2	2	2	1	34		
Ethiopia	12	24	2	1	35	1	1
Gambia	2	2					
Ghana	5	7					
Kenya	13	28	6	2	93	2	1
Malawi	1	1					
Mali	6	21					
Mauritania	3	8					
Namibia	1	1	2	1	74		
Niger	3	7					
Rwanda	2	5	2	1	23		
Senegal	12	35	4	1	52		1
South Africa	6	11					
Swaziland	1	2					
Tanzania	7	9	2	1	33		
Togo	4	8					
Uganda	7	12					
Zambia	6	7					
Zimbabwe	2	3	4	2	36		1
Totals		**244**	**28**		**421**	**3**	**5**
Total costs (US$)		**$721,750**	**$180,000**			**$9,000**	**$667,000**
Grand total Africa		**$1,574,750**					

Table 3 - Africa: Capacity building and technology-transfer by MASHAV, year 2001							
	Courses in Israel		In-country participation				
			"In country" courses			Israeli experts	
Country	# Courses	# participants in all courses combined	# Israeli experts	# courses	# participants	# Short-term consulting experts	# Long-term projects
Angola	1	1					
Benin	1	2					
Burkina-Faso	3	10				1	
Burundi	1	1					
Cameroon	4	6					
Central African Republic	1	1					
Cote d'ivoire	4	9	4	2	68	2	
Democratic Republic of Congo	2	5					
Ethiopia	14	25	2	1	30		
Eritrea	10	11	2	1	22		
Gambia	2	2					
Ghana	3	4					
Kenya	18	40	6	3	82	3	1
Lesotho	1	1					
Mali	4	7					
Mauritania	2	2					
Namibia	1	1					
Niger	3	9					
Rwanda	1	1					
Senegal	5	11				1	1
South Africa	4	7					
Swaziland	2	2					
Tanzania	3	4					
Togo	4	4					
Uganda	8	9					
Zambia	2	2					
Zimbabwe	6	7	4	2	78		1
Totals		**184**	**18**	**9**	**280**	**7**	**3**
Total costs (US$)		**$757,000**	**$108,000**			**$39,000**	**$450,000**
Grand total Africa		**$1,354,000**					

Table 4 - Africa: long-term participatory projects & capacity-building activities of MASHAV - year 2000											
	Courses in Israel			In-country participatory activities							
				In-country courses				Short-term consulting		Long-term projects	
Country	# Courses	Participants in all courses combined	cost (US$)	Israeli experts	# courses	# participants	cost (US$)	Israeli experts	Cost (US$)	Project theme	Cost (US$)
Cote d'Ivoire	7	8	26,000	2	1	18	12,000			Beekeeiping project	160,000
Ethiopia	12	24	78,000	2	1	35	12,000	1	3,000	Kobo demonstration Farm	27,000
Kenya	13	28	96,000	6	2	93	48,000	2	6,000	Kilmeg demonstration Farm	160,000
Senegal	12	35	96,000	4	1	52	24,000			Fossil Valley Project	160,000
Zimbabwe	2	3	14,000	4	2	36	24,000			Vegetable growing project	160,000

Table 5 - Albert Katz International School for Desert Studies	
Research themes of MSc. Students enrolled in 2000-2001	
Student's country	**Theme**
Burkina Faso	Assessment of Land-cover changes in Bekuy (Burkina Faso) using remote sensing and GIS

Table 6 - Blaustein Center for Scientific Cooperation (BCSC) of the Blaustein Insititute for Desert Research (BIDR)		
Exchange visits of Israeli scientists with scientists from affected African countries - supported by BCSC		
Country	**Theme discussed in the exchange**	**cost ($US)**
Kenya	Plant-Soil-Water relations indesertification processes	17,900
Kenya	Competition of roots among dryland plants	6,700
Morocco	Biotechnology for dryland development	500

Table 7 - Research cooperation between institutions in Israel and in affected African countries, supported by US-AID			
Affected Counrty	**Israeli Institution**	**Research theme**	**Cost (US$)**
Kenya	Ben-Gurion University	Coordinated use of marginal water resources in arid and desert areas	50,000
Morroco	Arava Institute	The introduction of new sustainable crops to arid and saline zones	95,871
Morroco	Volcani Institute	Evaluation, mass-propagation and conservation of superior virus-free Prunus landraacecs	127,165
Senegal	Hebrew University	Slow sand filtration for wastewater irrigation	39,950
South Africa	Ben-Gurion University	Developing Habitat Suitability Indices for Mammalian Herbivores at Augrabies Falls, South Africa	30,909
South Africa	Hebrew University	Biological control of the Diamondback moth in South African cole crops	39,905

The consultative processes and partnership agreements

Consultative processes

Not attended.

Strengthening grassroots extension delivery systems

Not attended.

Policy formation, planning and implementation of small irrigation projects

Women as entrepreneurs

The Golda Meir Mount Carmel International Training Center affiliated with MASHAV cooperated with Winrock International and UNESCO in carrying out workshops in several African countries, aimed at transferring knowledge and skills to rural women's groups. The training emphasized organizational development and project planning skills and was then further strengthened by inviting workshop graduates to a full eight-week course on "Community Development and Management of Income-Generating Projects". This project aims to act as a catalyst for the continuous transfer of skills to women leaders and trainers at the regional level.

Partnership agreements

Not attended.

Measures to support the preparation and implementation of action programmes, including bilaterally and multilaterally provided financial resources

Not attended.

Other activities related to combating desertification

Project on management of natural resources

Promotion of the African Market Garden Concept Project
MASHAV introduced to several African countries very low cost and low-pressure irrigation system is used to irrigate single-household plots. With a judicious mix of crops, these plots have sufficient yields to feed a family unit and provide a small surplus for cash.

Socio-economic and sustainable development projects

Integrated Rural Regional Development (IRRD) Course
The Weitz Center for Development Studies sponsored by MASAV carried out a 7-month course in Integrated Rural Regional Development (IRRD). The course brought together government officials and planning professionals from Africa and other developing countries in order to exchange experiences and to enhance their capacity to implement change in their own countries. The course involved 5 months of study in Israel and two months conduced in a selected region of a participating country. During this stage participants worked in inter-disciplinary teams in order to prepare a complete integrated development plan, including identification of specific projects for implementation. The final regional report was then presented to the national and regional authorities. The course combines vertical integration of the macro and micro level planning, as well as horizontal integration, amount the agricultural, industrial and social services sectors.

Ethiopia - Agricultural Development and Settlement - Kobo Demonstration Farm

The Kobo irrigation project is based on a dam erected on the Gulina River, 20 km south of Kobo. From that dam a canal was dug, carrying the water into the farmers' fields to flood-irrigate their crops. The objectives were: To display the potentials of utilizing a natural source of water for the irrigation of agricultural cultivation; To demonstrate the agro-technology of working the land in depth, and preparing for the sowing of planting in rows; To demonstrate proper fertilization and timing, as well as adequate use of pesticides; To promote larger cycles and maintaining clean fields ("farming culture"); to instruct farmers on how to plan their daily schedule, learn to discern problems arising in the field, and finding proper solutions; To carry out on farm training in farm management and cost-efficiency, as well as plant cultivation to attain maximum yield; and to demonstrate the importance of marketing good quality produce and income-generation (buying inputs, such as seeds, fertilizers, etc.)

The project promoted the transition from traditional agriculture to modern farming, introducing new methods of cultivation, fertigation and irrigation and appropriate farming practices: high pressure sprinkling for crops such as maize, sorghum and teff; low pressure permanent sprinkling for vegetable watering. The water is pumped from the central canal and filtered in order to prevent clogging of the sprinklers. To improve traditional agricultural methods, the project displays an advanced sowing system. Instead of the usual method of sowing, scattering seeds over an entire field, planting low pressure drip irrigation for vegetable growing in rows has been adopted to enable farmers to better care for their various crops. Plowing in depth also improves the rooting of the plants, and allows permeation of water and fertilizers, whereas traditional plowing (oxen) is superficial, and creates a compact layer of upper soil that impedes the deep penetration of water. The correct use of fertilizers and pesticides is constantly employed for improved and more abundant yields. Yields obtained were between 8 to 10 times larger than those produced by traditional methods.

Eight families participate in the Project, which extends over an area of 7.5 hectares. Each family works about half a hectare, with the objective being to extend the cultivated area up to 10 hectares. The Kobo Project is supervised by an Israeli agricultural expert. The goal is to reach a level of sustainability, and then to hand it over to a local manager after the second season's yields in November 1997. Influence of the project on the close environs is greatly felt, due to the high yields obtained. These results are directly linked to the use of appropriate agro-technology. As a result of this project it was decided to allocate some 10,000 hectares - about one-fifth of the entire Valley - to advanced irrigation systems for the cultivation of cereals and vegetables and the planting of orchards. Only 10 years ago the area was so desolate that its inhabitants suffered from starvation, or were forced to abandon their property in despair. This project is conducted jointly by MASHAV, the Ethiopian Ministry of Agriculture and USAID.

Kenya - Kibwezi Agricultural Demonstration Farm

The Kibwezi project is jointly carried out by MASHAV, the University of Nairobi, USAID and the Kenyan Ministry of Agriculture. It began in January 1991 as a demonstration farm, based on pressurized irrigation in a semi-arid area of about 40 hectares between Nairobi and Mombasa. Since the beginning of 1995, the Kibwezi project has become a training center, aimed at transferring know-how from the central farm to approximately 480 farm households in the area. New staff members were recruited and trained to instruct local farmers. The center functions in close cooperation with the Kenyan Ministry of Agriculture. Vegetables are grown for domestic and export markets. Water from the Kibwezi River is used to irrigate a variety of crops, such as sweet corn, tomatoes, onions, garlic, green pepper, cabbage and pumpkin for local consumption, whereas aubergine, okra, karela and cayenne pepper are grown for export. Some of the seeds for these products are imported from Israel. Fruit trees are also grown, including bananas, oranges and mangoes.

The project employs overhead sprinklers and furrow or drip-irrigation, depending on the crop. The project is assisted by two professional long-term Israeli experts, aided by short-term consulting missions, as well as on-the-spot training courses in many subjects, such as fertilizer spreading and the

processing of meteorological data. The local staff consists of 50 permanent workers and some 150 farmers. The project staff comprises 12 members, including training officers and field instructors. Every fortnight, members of the staff gather for a day-long refresher course; they visit the farms in the area once a week and participate, from time to time, in a two-day seminar on the latest technological innovations in agriculture.

Burkina Faso – Studies in the Albert Katz International School for Desert Studies

A student from Burkina Faso studied during 2000 in the Albert Katz International School for Desert Studies, the Jacob Blaustein Institute for Desert Research. His studies encompassed remote sensing and geographical information system methods for assessing anthropogenic induced land cover changes. Study case: community-based land of Bekuy - Burkina Faso.

Senegal - Agricultural Demonstration and Development - Fossil Valley Project

The project's objective is to support and encourage regional development of the Fossil Valley by introducing new methods of horticulture cultivation, irrigation and improved farming practices in the region and in other parts of Senegal. A demonstration farm facility of 14 ha has been established, including irrigation and fertigation infrastructure. The farm is functioning both as a commercial demonstration unit and as an instructional training site for the farmers in the area. The demonstration farm is one of the Fossil Valley Regeneration Programmes (FVRP), under the direction of the Fossil Valley Study and Development Mission (Mission d'Etude et d'Aménagement Vallées Fossiles - MEAVF) projects, that lie within the overall national FVRP programme.

The farm, operated by a skilled local staff and supervised by an Israeli agricultural expert, was created to study crops, seeds, irrigation methods and fertilization as a function of socio-economic factors specific to the region. The first step was to create a 14-hectare pilot irrigation plot to guarantee agricultural output. The farm's first planting season started in January 1999, and included corn, groundnuts, okra, eggplant, tomatoes, onions, potatoes, carrots, sweet and hot peppers, melons and watermelons. Selection criteria for these crops are based on the potential adaptability of the crop to existing environmental conditions; potential use for large-scale farming when more regions are developed in the Fossil Valley; and marketing and export factors. This plot will expand up to 22-hectares after the first year. There is also the possibility to expand up to 150-hectares depending on future needs, such as an agro-pastoral model.

The main activity involves: Introduction and study of improved methods of pressurized irrigation; Introduction of irrigated crops to test the adaptability and to assess marketing prospects; Determining production technologies for specific regional crops, i.e. choice of varieties, planting periods, fertigation techniques, and pest and disease management practices; Demonstration and training in the use of appropriate agricultural practices for intensive crop cultivation, as well as the dissemination of technical information and know-how to the local population.

The chosen methods of irrigation technologies provide efficient control of water use. Although the project focuses on new, advanced activity, project development is planned as, the future model for larger regional development programmes. A large part of the success of the project will include local farmer participation. Farmers will be trained in various agro-technologies through on-site training sessions, as well as in their own fields. The idea is to help prepare farmers for future agricultural roles as plot-owners using optimized water availability.

Zimbabwe - Hatcliff Drip and Micro-Irrigation Demonstration Plot

The project focuses on use of modern irrigation and fertilization methods in order to save water and improve fruit and vegetable quality and yields. A training program aimed at transferring know-how to small holders accompanies the demonstration farm. The project is in two phases. The first phase involved the establishment of a 3-hectare semi-commercial farm with various fertilization and

irrigation methods. The second phase was the establishment of demonstration units for small holders on irrigation methods displayed at the units.

Ivory Coast - Beekeeping

The beekeeping development project in Côte d'Ivoire aims at introducing and enhancing this agricultural branch and developing it as a source of income for the rural population. Within a five-year period, MASHAV has contributed significantly to the beekeeping training center in Katiola. This center trained and provided assistance to dozens of farmers, focusing on the young generation, as well as disseminating know-how and appropriate technologies to other parts of the country. This project is carried out jointly by MASHAV, USAID, the Government of Côte d'Ivoire, the Ministries of Agriculture and Youth, ANADER and FDFP.

Arab Republic of Egypt - The Nubaseed Demonstration Farm

Many of MASHAV's agricultural activities in 2000 were operated and/or coordinated by Israel's resident long-term agricultural consultant in Egypt. The Nubaseed Demonstration Farm, established in 1987, is a result of a cooperative endeavor between the government of Egypt, Israel, the United States (USAID). The farm is the property of the Egyptian Ministry of Agriculture; arid extends over some 15 hectares. It lies about 85 km south of Alexandria, Egypt's second largest city on the shores of the Mediterranean Sea.

Israel's involvement in the project consists in the transfer of know-how, technologies, expertise and providing advisory services on managing the farm. Israel has also supplied the necessary implements arid various agricultural inputs, including a modern irrigation network, pesticides, up-to-date fertilizing systems, greenhouses, tunnels, etc., as well is ill grafted fruit-tree seedlings and seeds for seasonal vegetables, such as melons, high quality tomato, cucumbers, watermelons, ground nuts, and sweet peppers. Today, these seeds are diffused throughout the entire country. The greatest part of the farm is planted with deciduous fruit trees, such as apples, peaches, nectarines and apricots. These specific trees were chosen due to the demand of the local markets.

The location of the farm was chosen because of its geographical climatic position, in the harsh and dry Western desert. The two main objectives guiding the establishment of the demonstration farm were, primarily, the creation of a pilot farm, where modern technologies in agriculture could be displayed, especially in the desert region, which constitutes most of Egypt's territory; and to fully perform as a self-sustaining and commercially profitable farm. Recently, the farm was able to show a net annual profit of around 100,000 US Dollars. In its efforts to modernize the agricultural sector to produce more food for an ever growing population, Egypt has undertaken a series of reforms, encouraging young graduates to settle in villages created in arid lands reclaimed from the desert where they endeavor to work their plot of laud and transform it into a profitable farm.

Asia

Summary

MASHAV's Capacity building and technology-transfer

The Center for International Cooperation ("MASHAV") of the Ministry of Foreign Affairs carried out capacity-building and technology-transfer activities directed at 10 Asian countries (not including Jordan and the Palestinian Authority) affected by desertification (9 in year 2000 and 10 in year 2001). These included:

1. Courses commissioned by MASHAV and carried out at several teaching and training facilities in Israel. Altogether 187 trainees and experts from affected Asian countries participated in such 31

courses in year 2001(Table 1, Table 3), and 154 persons participated in 20 courses in year 2001 (Table 1, Table 4). The courses lasted 2-6 weeks each, and the costs were $617.5K in year 2000 and $717,000 in year 2001 (Table 3, Table 4).

2. "In country" courses administered by MASHAV-commissioned Israeli experts and carried out in Asian countries. In year 2000 twelve courses attended by a total of 1652 participants, were delivered by 68 Israeli experts in 6 Asian countries, at an overall cost of $180K (Table 2, Table 3). In year 2001 1.064 trainees and experts participated in these courses, at a cost of $228K (Table 4).

3. MASHAV-commissioned, 18 Israeli experts carried out short-term consulting missions in 4 Asian countries, at a cost of $69K in year 2000 (Table 3), and 38 Israeli experts carried out such missions in 4 Asian countries at a cost of $186k; in the two years combined Israel carried out short-term consulting missions in 5 affected Asian countries.

4. MASHAV operated long-term agricultural demonstration projects, one in each of 4 Asian countries. Eight Israeli experts functioned as a Project Managers in each of these countries, throughout a whole-year mission during year 2000 at a total cost of $1,130K (Table 3), and six Israeli experts carried out long-term consulting projects in 3 Asian countries at a total cost of $1,811K in year 2001 (Table 4).

Altogether the investment of MASHAV in the partnership with Asian affected countries amounted to $1,612,500 in 2000 and to $2,942,000 in year 2001.

Cooperation with Arab countries in combating desertification

The Center for International Cooperation ("MASHAV") of the Ministry of Foreign Affairs carried out during year 2000 capacity-building and technology-transfer activities directed at 4 Arab countries – in Asia (Jordan and the Palestinian Authority) and in North Africa (Morocco and Egypt). Eight short-term missions of Israeli experts to these countries included courses in which 313 trainees participated, at a total cost of $369K. During year 2001 13 Egyptian trainees and experts participated in 10 courses in Israel and 18 Israeli consultants carried out short-term consulting mission to Jordan, at a total cost of $66K.

Capacity building and technology transfer through studies in academic institutions in Israel

Studies in the Albert Katz International School for Desert Studies, the Blaustein Institute for Desert Research, Ben-Gurion University of the Negev

During 2000 and 2001 seven students from affected Asian countries enrolled the Albert Katz International School for Desert Studies, for a two-year program reading from an M.Sc. degree in Desert Studies of the Blaustein Institute for Desert Research (BIDR), Ben-Gurion University of the Negev (Table 6). At a cost of $27,000 per student for the two years combined, the overall expenditure was $135K, generated from sources raised by the BIDR from various sources, within and outside Israel.

Studies in the Division for External Studies, Faculty of Agricultural, Food and Environmental Quality Sciences of the Hebrew University of Jerusalem

During years 2000 and 2001 one student from China enrolled in in the Division for External Studies, Faculty of Agricultural, Food and Environmental Quality Sciences of the Hebrew University of Jerusalem, reading for an M.Sc. degree in Agriculture.

Capacity building and technology transfer through scientific exchange and cooperation

Scientific exchange carried out by the Blaustein Center for Scientific Cooperation of the BIDR

The Blaustein Center for Scientific Cooperation (BCSC), the instrument of the Blaustein Institute for Desert Research for cooperation with other countries, carried out in year 2001 13 exchanges with five African countries, on issues related to combating desertification (Table 6), at an overall cost of $75K.

Cooperation between Israeli research institutions and research institutions in Asian affected countries

Research cooperation with the Agricultural Research Center – Volcani Institute

(a) Joint projects aimed at the enhancement of agriculture in arid regions.

The following research project were carried out cooperatively by Scientists from China and Israel in both countries:

- Efficient irrigation and minimization of soil erosion in field crops production in arid regions.
- Efficient irrigation and minimization of soil erosion in orchards production in arid regions.
- Intensive cultivation methods for vegetables in arid regions.
- Breeding of wheat varieties for arid regions.

The Israeli partner invested in each of the years, 2000 and 2001 $100,000 in each project. Thus, the overall Israeli expenditure was $800,000 for the two years combined.

(b) A Sino-Israeli binational agriculture research and development fund (SIARF)

In the framework of this binational fund the Chinese and Israeli scientists jointly carried out the following desertification-related projects during 2001:

- Breeding of wheat varieties with adaptation to arid regions.
- Optimization of the use of brackish water in arid regions.
- The annual budget for the two projects in 2001 was $50,000.

United States Agency of International Development US-AID) – cooperation with Israel

In year 2001 seven research projects in areas related to combating desertification were jointly carried out by Israeli and four Asian affected countries, at a total investment of $259.4K (Table 7). The Israeli research institutions matched this contribution by providing the salaries of the Israeli researchers and by other in-kind contributions.

Tables

Table 1 – Courses on issues related to combating desertification	
Rural planning and development	**Dryland agriculture**
Rural regional development planning through cooperatives	Salt-removing plants, changes in plant composition in desert habitats
Integrated regional rural development planning**	Sustainable horticultural crop production under climatic constraints
Development projects for rural areas**	Horticulture production, management & marketing**
Development of rural tourism**	**Dryland biotechnologies**
Regional development for the western provinces	Agriculture biotechnology
Agribusiness in drylands	R&D in protected crop technologies
Farm development & agribusiness	Biotechnology in agricultural plants and micro-organisms
Local economic development*	R&D in post-harvest biology & technology*
Conservation of dryland biodiversity	Principles of advanced technology in agriculture under arid conditions
Conservation of biodiversity in arid ecosystems*	Protected crop technologies
Animals	**Role of women & cooperation**
Beekeeping	The role of professional women in agriculture production & rural development
Aquaculture**	**Dryland biotechnologies**
Aquaculture production & management**	
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* Provided in both years – 2000 and 2001	
** Provided only in 2001	

Table 2 - "In country" courses and consultancies – in Asian countries	
Water, soil & irrigation	**Animals**
Integrated water resource development & management	Aquaculture
Irrigation & vegetable growing	Cattle herd husbandry
Chemical pollution of soils	Cattle herd health
Meteorology	**Women empowerment**
Agricultural meteorology	Women & mini-enterprises
Agriculture	**Horticulture & Afforestation**
Vegetables	Fruit tree cultivation
Greenhouse flower production	Horticulture production
Flower cultivation	Afforestation
Plant protection	**Marketing & Consulting**
Fruit crops	Agricultural marketing
Agriculture in semi-arid zones	Consulting missions
Nurseries	**Rural planning**
Flower cultivation	Project planning & rural development

Table 3 - Asia: Capacity-building and technology-transfer, year 2000							
Country	Courses in Israel		"In-country" participation				
			"in country" courses			Short-term consulting	Long-term projects
	# Courses	Participants in all courses combined	Israeli experts	# courses	No. of participants	Israeli experts	Israeli experts
China	19	63	34	17	1066	4	1
India	16	39	16	8	224	6	2
Kazakhstan	7	15	4	2	82	5	3
Kyrgyzstan	4	11	8	4	170		2
Mongolia	6	8					
Myanmar	6	8	4	2	72		
Tajikistan	4	14					
Turkmenistan	2	4					
Uzbekistan	11	23	2	1	38	3	
Totals		**185**	**68**		**1,652**	**18**	**8**
Total expenditure	**$617,500**		**$180,000**			**$69,000**	**$1,130,000**
Grand total	**$1,612,500**						

Table 4 - Asia: Capacity-building and technology-transfer, year 2001							
Country	Courses in Israel		"In-country" participation				
			"in country" courses			Short-term consulting	Long-term projects
	# Courses	Participants in all courses combined	Israeli experts	# courses	No. of participants	Israeli experts	Israeli experts
China	14	41	28	15	842	10	2
India	15	30	10	5	143		2
Kazakhstan	8	27	6	3	79	16	2
Kyrgyzstan	2	5				2	
Mongolia	1	2					
Myanmar	7	12					
Sri Lanka	12	14					
Tajikistan	2	2					
Turkmenistan	2	2					
Uzbekistan	11	19				10	
Totals		**154**	**44**	**23**	**1,064**	**38**	**6**
Total expenditure	**$717,000**		**$228,000**			**$186,000**	**$1,811,000**
Grand total	**$2,942,500**						

Table 5 - Asia: long-term participatory projects and other capacity building activities - year 2000												
Country	Courses in Israel			In-country participation								Total cost (US$)
				"in country" courses				Short-term consulting		Long-term projects		
	# Courses	Participants in all courses combine	cost (US$)	Israeli experts	# courses	No. of participants	cost (US$)	Israeli expert	Cost (us$)	Project's theme	Cost (us$)	
China	19	63	206,000	34	17	1066	140,000	4	18,000	Yongledian demonstration farm	160,000	524,000
India	16	39	155,000	16	8	224	96,000	6	15,000	Vegetable & Flower cultivation project	320,000	586,000
Kazakhstan	7	15	48,000	4	2	82	18,000	5	24,000	Vegetable - cultivation,irrigation & agrobusiness	400,000	490,000
Kyrgyzstan	4	11	30,000	8	4	170	30,000			Cattle husbandry & field crop & irrigation	250,000	310,000

Table 6 - Albert Katz International School for Desert Studies Research themes of M.Sc. Students enrolled in 2000-2001	
Student's country	**Research theme**
China	Dryland afforestation - run-off harvesting
China	Dryland agriculture - plant nutrition
China	Dryland agriculture - plant nutrition and salinity resistance
China	Dryland agriculture - plant physiology and genetics
China	Alternative energy sources - development of solar energy device
India	Rangeland management - propagation of range plants using tissue culture
Kazakhstan	Dryland cultivation of micro-algae for producing food additives

Table 7 - Blaustein Center for Scientific Cooperation (BCSC) of the Blaustein Insititute for Desert Research (BIDR) in 2001 **Exchange visits of Israeli scientists with scientists from affected Asian countries - supported by BCSC**		
Country	**Theme discussed in the exchange**	**cost ($US)**
China	Solar energy engineering .	5400
China	Stress physiology and astaxanthin accumulation	9,500
China	Anatomy and histochemistry of medical plants	16,000
China	Mass production of exocellular polysaccharides from *Porphyridium cruentum*	1,100
China	Biochemical changes in Monodus induced by stress	3,000
India	Photosynthesis in Microalgae .	8,000
India	Range quality - grass /bush ratio on productivity gradient	6,000
Kazakhstan	Studies of the bio -synthesis of eico -sapentaenoic acid in *Monodus subtarraneus* .	800
Kazakhstan	Selection and clonal propagation of drylands fodder shrubs	4,000
Turkmenistan	Turkmenistan 's flora & fauna , and its *Pistacia* germplasm	4,000
Turkmenistan	Land reform and consequences of farm restructuring in Turkmenistan	6,000
Uzbekistan	Dryland ecology in Uzbekistan	800
Uzbekistan	Molecular cloning dehydrin gene from Pistachio Molecular Biology	10,300

Table 8 - Research cooperation between institutions in Israel and in affected Asian count supported by USAID in year 2001			
Affected Counrty	**Israeli Institution**	**Research theme**	**Cost (US$)**
Kazakhstan	Ben-Gurion University	Prevention of pre-harvest sprouting	37,500
Kazakhstan	Volcani Institute	Enhancement of fruit arom and quality by postharvest pretreatmer with anaerobiosis onaerobic metabolites	29,992
Kyrgystan	Galil Research Center	Pilot irrigation management information system for the Cho Valley	30,000
Mongolia	Ben-Gurion University	Assessement and monitoring of desertification process in mongol using GIS	49,670
Turkmenistan		Integration of geophysical methods for groundwater exploration i Turkmenistan	37,464
Turkmenistan	Ben-Gurion University	Assessing & monitoring land degardation due to salinization in Turkmenistan and examining new phytoremediation methods	37,254
Turkmenistan	Ben-Gurion University	*Distichlis spicata* (Saltgrass) - a new salt-resistance forage crop for reclamation of salinized soils	37,500

The consultative processes and partnership agreements

Consultative processes

China

An MoU was signed in January 2000 between China and Israel on a cooperative project of the Chinese-Israeli Center for Training in Agriculture (CIICTA).

Partnership agreements

Not attended.

Other activities related to combating desertification

China - Yongledian Demonstration Farm

The Yongledian Demonstration Farm was established in 1994 following the signing of a bilateral agreement between the governments of Israel and China. The objective of the project is to establish a central demonstration farm for adapted technologies, crop diversification and dissemination of know-how in various agricultural fields. Operations started in March 1994, with the dispatch of a multi disciplinary Israeli team of experts, whose task was to make a comprehensive survey, propose an appropriate site for the programmes and evaluate the benefits for a commercially favorable outcome. In June 1994 a team of Chinese experts was invited to Israel to become acquainted with Israeli technology. Two months later, an irrigation system was installed on the farm, the first seedlings of Israeli- bred vegetables were planted, and Israeli experts took office. The first phase of the project was underway. The Yongledian farm was established in the Tongxian Province and is located on the outskirts of Beijing based on a 75 ha land area.

The Chinese Ministry of Agriculture pledged to provide the infrastructure, the water and energy supply, necessary manpower and the joint management of the farm. Upon the recommendations of the surveying team, the Yongledian farm focused on high-income crops - flowers and vegetables, grown in both Chinese and Israeli greenhouses monitored by computers, as well as a nursery facility for high quality seedlings and an orchard. The project included the construction of a packinghouse and refrigerated storerooms for the vegetables, flowers and fruits.

The project operates as a closed economic unit and is focusing its marketing activities towards the high-quality markets of Beijing. From the very beginning the yields were twice to three times bigger than those of conventional farms, the quality of the produce was by far superior and their "shelf-life" much longer. Therefore, the prices were much higher and the profits greater.

These results proved that it was possible to make better use of the same plot of land, thus affording a higher income to the farmer. In addition, less dependence on water and on climate chances was achieved. The successes of the Yongledian farm reached the media and were covered enthusiastically by the electronic and written press, which resulted in the daily visit of hundreds, even thousands of Chinese farmers, who come to see for themselves the accomplishments of the latest methods of Sino-Israeli technologies.
Professionally, the project is managed by an Israeli expert working alongside his Chinese counterparts to ensure a continuous output of high quality produce, introduction of innovative technologies, production practices, combined with training and demonstration. This project is jointly conducted between MASHAV and the Ministry of Agriculture of the Republic of China.

India - The Indo-Israeli Horticultural Demonstration Farm

This farm is located at IARI Research Center in Pusa and is a result of a technical cooperation agreement between the two countries. The aim of the project is to demonstrate various methods of cultivation, irrigation and fertigation technologies, crop diversification both in vegetables, flowers and orchard crops. The farm is designed to become a focal demonstration site, including research and development (R & D) and extension to rural areas. Farmers from all over India can receive their detailed information and training. The farm became operational in 2000. The main technological and professional components include greenhouse facilities of about 1 ha of flowers, 2 ha of vegetables, 1.6 ha of orchards. The project comprises a nursery, post-harvest facilities and other management support services.
This project is jointly conducted between MASHAV and the Indian Agricultural Research Institute (IARI) and is managed by two Israeli experts working alongside their Indian counterparts

Hashemite Kingdom of Jordan – sheep farm

In the year 2000 MASHAV operated a joint Israeli-Jordanian farm for intensive sheep's milk production and processing, introducing the advanced "Awassi" sheep to the country. In addition, MASHAV sponsored an ongoing program of cross border cooperation, training and transfer of agricultural technology between Kibbutz Yotvata and Jordanian farmers. Environmental cooperation was also further developed in the year 2000, including cooperation on the control of house flies, the Red Palm Weevil and the Mediterranean fruit fly. MASHAV also had a training program in physiotherapy and rehabilitation and co-sponsored, with Norway and Canada, two professional seminars on rehabilitation of land mine victims in Jordan.

Palestinian Authority – capacity building

Israel's cooperation with the Palestinian authority focused on human capacity building and institution building. In 2000, Palestinian professionals represented the largest contingent of participants in professional training courses in Israel. Israeli Government Ministries also worked directly with Palestinian Authority bodies in order to increase official and informal dialogue and exchanges on all levels. In particular, there was fruitful cooperation in the fields of Agriculture, Environment, and Civil Society. In addition, cooperation with Palestinian telecommunications companies PALTEL and PALCEL was established, including several training courses.

Donor countries played an important role in facilitating program partnerships with the Palestinian Authority. For example, MASHAV cooperated with Sweden on a symposium on management of water resources. Planning was also initiated for a Belgian sponsored training program of Palestinian women in Entrepreneurship.

The Hashemite Kingdom of Jordan and the Palestinian Authority – the Regional Initiative for Dryland Management

This project has been conceived by the Working Group on Environment of the Multilateral Middle East Peace Talks, chaired by the Government of Japan. Its objective is to promote peace between Israel and Arab countries: in Asia – Jordan and the Palestinian Authority, and in Africa – Egypt and Tunisia. This by R&D projects carried out jointly and aimed at combating Middle East and North-African desertification. In 2000 the second phase of this project was designed and agreed upon, and the World Bank raised funds for the second phase, initiated and carried out in 2001. Switzerland, South Korea, USA, Japan and the World Bank support this project, and Israel provides an in-kind support. The project concentrates on watershed management using run-off water harvest techniques, and on reuse of treated wastewater and biosolids for dryland agriculture.

Joint Cooperative Development Program/Central Asian Republics (CDP/CAR)

This is a project supported jointly by US-AID and MASHAV. The program focuses on the regional, sub-regional and field level of the agricultural sector in order to demonstrate a combination of appropriate know-how, technologies, training, marketing and management towards market-driven production and privatization. The project includes: Fostering small-scale enterprise and trade, including through establishment of agricultural consulting centers and demonstration farms; better management of water and energy resources, including demonstrations in wetland management in the Aral Sea region and in biological techniques to drain waterlogged soil in the Ferghana Valley.

Kazakhstan - Dairy Cattle Husbandry - Raimbek Experimental and Demonstration Project

This project is based on individual dairy farmers, formerly members of the Raimbek Sovkhoz. These farmers reorganized as a new legal entity, and operate as a private dairy agribusiness. The project provides professional consultancy to 42 families of the new entity. The project demonstrates improved dairy management practices, and includes a mini-dairy facility for processing milk products, in order to improve the economic base of the farmers. The project is serviced regularly by local veterinarians who have been trained in Israel, focusing on professional aspects of dairy development, e.g., feeding, health, management, in-service training and marketing considerations. The project also includes an artificial insemination station that is managed by the veterinarians.

The project is part of the USAID/MASHAV CDP program for the Central Asian Republics (CAR). The Project involves the Kazakhstan Ministry of Agriculture, the Regional Administration and the Project Administration.

Kazakhstan - Kunarli High Value Horticulture Project

This project aims at demonstrating modern and innovative horticulture developments of both protected and out-of-season production as well as diversified and quality fresh horticulture production. The site was established within the privatized Kunarli Farm, formerly a sovkhoz. The project focuses on improved production and technology improvements, including greenhouse facilities, using existing structures that were upgraded with relevant technologies, enabling the re-use of local non-operational infrastructures and equipment for economic market development. This endeavor has become a focal point for farmers and professionals to observe and study the farm activities, as well as for similar private commercial initiatives. The demonstration farm is linked to, and serves as a study and training facility for the Almati University, for both the academic staff and students. The project is also utilized by the agribusiness center for demonstration and entrepreneurial activities.

The project is part of the USAID-MASHAV Cooperative Development Project (CDP) program designed to support the process of modernization and commercialization of the agricultural sector of the Central Asian Republics (CAR).

In its first season of growing vegetables, the Kunarli Farm succeeded in obtaining high yields with improved quality, and was able to harvest earlier than neighboring farms. These improvements were the result of a combination of innovations introduced into the former kolkhoz; they included the use of new hybrid varieties, netting with insect-proof nets, drip irrigation and irrigation control by tension meters, as well as fertilizing with compound fertilizers, hot water and improved hot air heating.

Through the understanding of these new technologies and their adaptation to local conditions, the Kunarli Farm was able to achieve a series of impressive successes. In 1997, the greenhouse area was doubled, and a plot of 3.6 hectare was planted for demonstration purposes with open field crops, such as tomatoes, peppers and eggplants. At the end of May 1997, a new project covering 35 hectares of open field vegetable crops was planted, using drip irrigation as well as sprinklers. The greenhouses contained four walk-in tunnels (locally built) that served in the past as a nursery. These tunnels were

renovated, covered with polyethylene covering imported from Israel, and two side-windows were erected from the ground up. Underneath these windows Israeli insect-proof nets were installed. However, the side-windows were not sufficient to provide satisfactory ventilation, given the high summer temperatures prevailing in the area. Therefore, the covering was sprayed with lime and a 22" fan was operated as soon as the temperature reached 28 ^{o}C.

Future plans include trebling the greenhouse area (part of which will be used as a commercial nursery), and establishing a center for counseling and training. For flower growing, the soil was tilled twice and four beds were prepared in each tunnel. Two tons of manure were distributed to each tunnel before tillage.

An important decision was made to use drip irrigation instead of flood irrigation, as had been done in the past. Many advantages resulted from the use of this type of irrigation, the most obvious being water conservation and the reduction of plant disease caused by high humidity. It also offered the possibility of combining fertilization with irrigation (fertigation). A well-located water source enabled water to be pumped into a huge container, which then pumped into the head control, placed at the entrance to each tunnel. Since the water quality is high, with very little clogging problems and a very low salinity coefficient, this system proved quite efficient.

Fertilizers were provided after planting, and only through the irrigation system. In order to use space and light efficiently, as well as to reach higher tomato and cucumber yields and improved quality, trellising (high-wire latticework support) was used, involving the fastening of each plant to a wire and removing all side shoots, in order to assure that the plant climbs vertically instead of horizontally. For the flowers that were cultivated (chrysanthemums), two layers of netting were used for support.
The first vegetable season, in which Israeli experience and technologies were adapted to local conditions, proved a tremendous success. The cucumber harvest received prices five time higher than those of local farmers.

The first tomato harvest was equally successful, and obtained high prices; however, the second season, of both cucumber and tomato, was less successful and the yields poorer, owing to deteriorated weather conditions and plant diseases. The conclusion reached indicated that it was essential to begin the first crop earlier, in order to start the second crop before the winter weather sets in (lack of light, high humidity and low temperatures). In general, the quality of the vegetables was found to be far above the local level, and therefore received higher prices throughout the season.
The chrysanthemums gave an average of four flowers per plant and earned substantial prices on the local market.

Kyrgyzstan - Dairy Cattle Husbandry - Sokuluk Demonstration Project

The project, which began operating in 1998, is governed by the idea that private ownership of dairy farms will improve both quality and quantity of the milk, and increase by far the commercial benefits of the individual farm, based on promoting private farming and entrepreneurship in rural areas. This project supported the establishment of a sustainable, private dairy farm managed by its female owner in her capacity as promoter and head of the family farm.

The management of the project was assisted by the participation of its owner in the training course on Agribusiness Development held in Israel in 1997 under the CDP Program.
The project is part of the USAID/MASHAV CDP program designed for the Central Asian Republics (CAR).

Kyrgyzstan - Field Crops and Irrigation - Belovodsk Agricultural Project

The project is part of demonstration farm activities reflecting promotion and development of private commercial farming, and is operated within a former sovkhoz, which has been transformed into a private agribusiness enterprise for tree nursery production. The project is managed by a female

manager, operating the farm as a private cooperative of the families involved. The project aims to demonstrate high quality production, and improved technologies, including upgrading of existing infrastructures and business management.
The project is part of the USAID/MASHAV CDP program designed for the Central Asian Republics (CAR).

Kyrgyzstan - Field Crops and Irrigation - MIC Demonstration Project

The MIC Project, a government farm that became one of the largest and most advanced cooperative farms in the CIS, demonstrates modern methods of growing and management, particularly in field crops and vegetables. The MIC farm, through the demonstration project, introduced modern methods of irrigation and water management. In addition, the cooperative management system underwent a revolution, and every branch went over to independent management, under a general manager. Output and quality of the product, as well as vegetable shelf life, increased as a result of the modern and more efficient methods. The project serves as a center for demonstrations and workshops for farmers from all over Kyrgyzstan, and exports high value crops to CIS countries. New varieties that better fulfill the market demands for field crops and vegetables have been introduced. The MIC Farm serves as a seed farm, developing and marketing Israeli seed varieties to farmers in Kyrgyzstan. In this way, crop output increases and the quality of the produce also improves. The MIC Farm has the potential to become a national center for demonstrations and training. The project is part of the USAID/MASHAV program designed for the Central Asian Republics (CAR).

Kazakhstan, Kyrgyzstan and Georgia - Agribusiness, Entrepreneurship and Professional Advisory Service Centers

The project involves the establishment of a network of agribusiness entrepreneurship and advisory centers to assist the development of private farming and agribusiness initiatives. The centers provide a range of professional and technical services and business plans to assist agricultural entrepreneurs in establishing new sustainable businesses. The centers also organize and carry out training and professional workshops. The centers are linked through international communication means in order to provide access to both professional and commercial information for local businessmen and entrepreneurs of the agricultural sector. The services of the centers are highly in demand by the new emerging private sector, and agribusiness initiatives. The centers are in line with government programs to promote consulting center activities. The services provided are also involved with the preparation of business plans to be submitted to local and international funding institutions. The program is currently operating in three regions in Kyrgyzstan, five regions of Kazakhstan, one center in Georgia and one center in Uzbekistan.

Uzbekistan - Dairy Cattle Husbandry - Akurgan Agricultural Demonstration Project

The project's goals are the modernization of dairy farming, combining management improvements to the central dairy farm at Akurgan, as well as the development of two model family dairy farms. The activities of the project focus on improving feeding systems, marketing and overall dairy management practices including by establishment of a miny-dairy processing unit. The project, and in particular the two model family dairy farms, demonstrate a successful and sustainable farm unit and have raised the interest of the Ministry of Agriculture and financing institutions to promote and support this type of development at the national level.

The project is part of the USAID/MASHAV CDP program designed for the Central Asian Republics (CAR). The Akkurgan demonstration farm in Uzbekistan is located in the former Akkurgan *kolhoz*, some 80 km from the capital city of Tashkent. This project is one of the agricultural demonstration activities established under the special cooperation programme developed in the Central Asian Republics by MASHAV, the Centre for International Cooperation of The Israel Ministry of Foreign Affairs, in cooperation with the US-AID.

The programme is designed to assist in the process of modernization; privatization; human resource development; transfer of appropriate technologies; advisory services and other support activities to the agricultural sector, geared towards a market-oriented economy. The programme also aims to encourage privatization, market development and in particular, the development of the emerging private family rural sector. The demonstration farm focuses on the dairy production of larger operations, representing both the former *kolkhoz* and the *sovkhoz* farm system, currently in the process of converting into new private-based legal entities. Another important aspect of the project is the establishment of two family dairy model farms. These activities promote unique concepts of business and professional management operations for the development and advancement of family-based dairy entrepreneurship. The project, established in Akkurgan, is designed to address some of the main development trends in the agricultural sector of Uzbekistan. Its professional and operational goals are based oh th following components:

Feed Center - Improving the feeding system for the provision of high quality feeding. This facility integrates local infrastructures and appropriate technologies, such as feed-mixing machines, to optimize cattle-feeding resources.

Computerized herd feed and overall dairy animal husbandry management - This element provides a modern on-line system to improve resource management and control capabilities for the dairy branch, and the farm as a whole.

Mini Dairy - An on-site milk processing facility, to improve value-added milk production. The project aims to improve the economic and marketing potential of the farm as a business operation. The unit introduces appropriate technologies to the production of milk derivatives, such as yoghurt, hard cheeses, butter and soft cheeses. The project also involves market development, both in the local vicinity and in the more lucrative markets of Tashkent, for the promotion and sale of these higher value products.

Family Dairy Development - The project has developed two commercially-based dairy family farms. These two commercial farms operate as independent, concurrent units within the former Akkurgan *sovkhoz*, seeking the build-up of commercial and market-based service relations with the central farm. This involves the purchase of improved feed, marketing, processing of raw milk and other agricultural support services.

The two family dairy enterprises serve as a model and demonstration site for the development of the family dairy farm sector in Uzbekistan. It is envisaged that the project, like in other similar projects in the Central Asian Republics, will service and assist the process of agricultural development, and improve the conditions of the rural populations.

The development of the project also involved NGOs operating in the Central Asian Republics, and demonstrated the advantages of international cooperation. This resulted in additional support to the family farm entrepreneurs lacking collateral to raise the financing needed for the establishment of the dairy farms.

This cooperative enterprise, involving NGOs and the Uzbek Commercial Development Bank, enabled family farms to establish the necessary production and financial resources to develop the two economically sustainable dairy model farms.

As a result of the decision to implement the Akkurgan project, an intensive training programme was initiated, wherein key farm professionals and management personnel, representatives from the Uzbekistan Ministry of Agriculture, and regional administrators were trained in various fields such as herd management, feeding systems, veterinary care, computers, milk processing, farm machinery, marketing, etc. Training activities were conducted both in Israel and in Uzbekistan.

Training and operation of the project, carried out by a long-term Israeli expert, are continuing as in-service components. The programme is also assisted by the dispatching of short-term Israeli professional consultants on a wide range of agricultural topics.

Uzbekistan - Dairy Cattle Husbandry - Kibrai Agricultural Demonstration Project

The project is a further expansion of the Akurgan dairy family farm development, and involves the initiative of the Kibrai authorities and various new private dairy farms in the vicinity to formulate a privately operated commercial undertaking.

The farmers are the shareholders of the project, financing the construction of the processing unit and at the same time being provided with technical and professional extension and other advisory services. This project, along with other family farm developments, demonstrates possibilities of market-oriented developments of former kolkhozes and sovkhozes transformed into economically sound family dairy businesses.

Middle East Agriculture Program – DANIDA-MASHAV cooperation

Given the common agricultural conditions and challenges faced by the region's countries, as well as the importance of this sector to all the region's economies, agriculture has proven to be the ideal sector for promotion of regional cooperation. DANIDA, in cooperation with MASHAV and other regional partners, has made possible the forging of a comprehensive network of academic and professional ties in this field, in what has been one of the Middle East's most successful cooperative projects. The three-year Regional Agricultural Program, sponsored by DANIDA and involving Israel, Egypt, Jordan and the Palestinian Authority is aimed at promoting joint applied research, extension and training. Each of the program participants is responsible for chairing one of five main program components: production of low-cost fodder, productivity of small ruminants, saline water for irrigation, dryland agriculture and post-harvest technology and marketing. Gender issues are covered by a special task-force on Women in Agriculture. The year 2000 included expert meetings, study tours and professional visits as well as training courses in all five areas of cooperation.

Netherlands-Israel Development Research Program

The Netherlands-Israel Development Research Program (NIRP) established by the governments of Israel and the Netherlands contributes to generating new knowledge and new ways of applying existing knowledge in areas that have a clear relevance for developing countries. The Program is directed by a joint steering committee of scientists from both countries.

Research funded by NIRP has to be relevant for developing countries in Africa and the Middle East, to be policy-oriented, to focus on socio-economic and cultural change. It is aimed at strengthening the research capacity and capability in developing countries and includes training of scientists in the project, it encourages participation of female researchers and is carried out jointly by researchers from Israel and developing countries, preferably also with Dutch researchers, under the aegis of universities or other independent academic institutions.

In 2000, 29 research programs were conducted, including nine joint research programs between Israel and the Palestinian Authority.

Latin America and the Caribbean

Summary

MASHAV Capacity building and technology-transfer

The Center for International Cooperation ("MASHAV") of the Ministry of Foreign Affairs carried out capacity-building and technology-transfer activities directed at 10 Latin-American countries affected by desertification. These included:

1. Courses commissioned by MASHAV and carried out at several teaching and training facilities in Israel. Altogether 104 (in year 2000) and 120 (in year 2001) trainees and experts from affected Latin-American countries participated in such 26 courses (Table 1,2,3), lasting 2-6 weeks each, at a cost of $408K (in year 2000, Table 2), and $458K (in year 2001, Table 3).

2. "In country" courses administered by MASHAV-commissioned Israeli experts and carried out in Latin-American countries. Six courses attended by a total of 315 participants, were delivered by 12 Israeli experts in 5 Latin-American countries, at an overall cost of $66K in year 2000 (Table 2). Five courses attended by a total of 146 participants, were delivered by 10 Israeli experts in two Latin-American countries, an overall cost of $60K in year 2001 (Table 3).

3. MASHAV-commissioned, three Israeli experts carried out short-term consulting missions in two Latin-American countries, at a cost of $18K in year 2000 (Table 2, 4), and $15 in year 2001(Table 3,4).

Altogether the Israeli investment in the partnership with Latin American affected countries amounted to $420,000 in year 2000 and $533,000 in year 2001.

Capacity building and technology transfer through studies in academic institutions in Israel

Studies in the Albert Katz International School for Desert Studies, the Blaustein Institute for Desert Research, Ben-Gurion University of the Negev

During 2000 and 2001 4 students from affected Latin American countries enrolled the Albert Katz International School for Desert Studies, for a two-year program reading from an M.Sc. degree in Desert Studies of the Blaustein Institute for Desert Research (BIDR), Ben-Gurion University of the Negev (Table 5). At a cost of $27,000 per student for the two years combined, the overall expenditure was $108K, generated from sources raised by the BIDR from various sources, within and outside Israel.

Studies in the the Division for External Studies, Faculty of Agricultural, Food and Environmental Quality Sciences of the Hebrew University of Jerusalem

During years 2000 and 2001 students from Chile and Mexico (one from each country) enrolled in in the Division for External Studies, Faculty of Agricultural, Food and Environmental Quality Sciences of the Hebrew University of Jerusalem, reading for an M.Sc. degree in Agriculture. The students were supported by funds raised by the Hebrew University of Jerusalem from various Israeli sources.

Capacity building and technology transfer through scientific exchange and cooperation

Scientific exchange carried out by the Blaustein Center for Scientific Cooperation of the BIDR

The Blaustein Center for Scientific Cooperation (BCSC), the instrument of the Blaustein Institute for Desert Research for cooperation with other countries, carried out in year 2001 five exchanges with three Latin-American countries (Table 6), on issues related to combating desertification, at an overall cost of $22.6K.

Tables

Table 1 – Latin-American countries in MASHAV courses on issues related to combating desertification	
Water and irrigation	**Role of women & cooperation**
Development of water resources	Women leadership in agricultural entrepreneurship
Pressurized irrigation systems*	The role of women in production of saving facilities
Wastewater treatment & reuse in agriculture**	**Conservation of dryland biodiversity**
Meteorology and dryland agriculture	Conservation of biodiversity in arid ecosystems.
Basic agrometeorology	**Dryland biotechnologies**
Crop weather monitoring	R&D in protected crop technologies
Agrometeorological data base management*	Biotechnology in agricultural plants and micro-organisms
Dryland agriculture	**Animals**
Desert agrobiology	Beekeeping
R&D in integrated pest control*	Aquaculture**
R&D in post-harvest biology & biotechnology*	Aquaculture production management**
Vegetable production in different climatic conditions*	**Rural Planning and Development**
R&D in protected crop technologies*	Agricultural management & entrepreneurship*
Agribusiness in drylands	Development of micro-regions & rural settlement areas
Production, post-harvest & marketing of fruits	Local economic Development**
Local economic development	Development projects in rural areas**
	Developing rural tourism**
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* Provided in both years – 2000 and 2001	
** Provided only in 2001	

Table 2 - Latin America: Capacity building and technology-transfer, by MASHAV, year 2000						
Country	Courses in Israel		In-country participation			
			Roving workshops			Short-term consulting
	# Courses	Participants in all courses combined	Israeli experts	# courses	No. of participants	Israeli experts
Argentina	8	20				
Bolivia	4	5	2	1	45	
Brazil	7	11	2	1	25	
Chile	4	7	2	1	147	
Columbia	8	19	2	1	37	
Ecuador	5	10				1
Mexico	6	11	4	2	61	2
Paraguai	4	9				
Peru	5	10				
Venezuela	1	2				
Totals		**104**	**12**		**315**	**3**
Total costs (US$)	**$408,000**		**$66,000**			**18,000**
Grand total Latin America	**420,000**					

Table 3 - Latin America- Capacity building and technology-transfer, year 2001						
Country	Courses in Israel		In-country participation			
			In country workshops			Short-term
	# Courses	Participants in all courses combined	Israeli experts	# courses	No. of participant	Israeli experts
Argentina	5	11				
Bolivia	6	10				1
Brazil	9	11				
Chile	4	7				
Columbia	9	23	2	1	31	
Ecuador	5	20				
Mexico	6	10	8	4	115	
Paraguai	4	5				1
Peru	9	18				1
Venezuela	5	5				
Totals		**120**	**10**	**5**	**146**	**3**
Total costs(US$)		**$458,000**	**$60,000**			**$15,000**
Grand total Latin America	**$533,000**					

Table 4 – "In country" courses and consulting missions in Latin America on issues of combating desertification	
Courses	**Consulting missions**
Irrigation	Beekeeping
Aquaculture	Agriculture extension
Marketing and vegetable growing	Vegetable cultivation & irrigation
Agricultural education & rural training	
Irrigation & fertigation	
Planning & methodology in agricultural extension	

Table 5 - Albert Katz International School for Desert Studies	
Research themes of M.Sc. Students enrolled in 2000-2001	
Student's country	**Subject**
Bolivia	Water use efficiency of *Acacia saligna* - a firewood and fodder producing dryland shrub
Bolivia	Effects of water salinity on root development of *Acacia saligna* - a firewood and fodder producing dryland shrub
Guatemala	Somatic embryogenesis in Haoxylon aphyllum - tissue culture technology for improving dryland range quality
Peru	Developmental ecology of a dryland pasture plant - *Trifolium purpureum*

Table 6 - Blaustein Center for Scientific Cooperation (BCSC) of the Blaustein Insititute for Desert Research (BIDR)		
Exchange visits of Israeli scientists with scientists from affected Latin-American countries - supported by BCSC		
Country	**Theme discussed in the exchange**	**cost ($US)**
Brazil	Influence of human and environmental policy in the development of desert Rural areas	2,000
Colombia	Genotopic and phenotopic effects on herbivory on isolated populations of Pancratium sickenbergeri	12,600
Columbia	Nutrient cycling in a grazed ecosystem	4,000
Ecuador	Physiological and molecular aspects of crop production in arid lands	2,000
Ecuador	Drought and leguminous crops– effect of microbial symbionts	2,000

The consultative processes and partnership agreements

Not attended.

Other activities related to combating desertification

Not attended.

Central and Eastern Europe

Not attended.

Northern Mediterranean

Southeastern Anatolia Project (GAP)

MASHAV cooperated with Turkey in the GAP region - Turkey's largest rural agricultural project. In the context of this project, Israel provided widespread agricultural training in Israel and in Turkey. Within the context of the GAP, planning began on a demonstration project in animal husbandry with a focus on development of the dairy industry for both large and family-operated farms. MASHAV, in cooperation with the FAO, also prepared a manual and recommendations on improvement of the feed supply to the dairy and animal husbandry sectors in the GAP region.

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