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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Twenty-fifth Meeting
Montreal, 29-31 July 1998

PROJECT PROPOSAL: JORDAN

This document includes the comments of the Fund Secretariat on the following project proposal:

Fumigant

•	Demonstration project: four alternatives to the use of methyl bromide: solarization plus bio-fumigation, stream pasteurization, non-soil combination with an integrated pest management (IPM) in cucumbers and tomatoes	UNIDO

PROJECT EVALUATION SHEET
JORDAN

SECTOR: FUMIGANT ODS use in sector (1996): 350 ODP tonnes

Sub-sector cost-effectiveness thresholds: N/A

Project Title:

Demonstration project - Three alternatives to the use of methyl bromide: steam pasteurization, non-soil cultivation, and optimal use of soil fumigants in combination with an Integrated Pest Management (IPM). (Horticulture: cucumbers and tomatoes)

Project Data	**Methyl Bromide**
	Ministry of Agriculture, Direction of Plant Protection
ODS phase-out (ODP tonnes)	-
Proposed project duration (months)	24
Total incremental costs (US $)	520,410
- including contingency (%)	10
Total project cost (US $)	520,410
Local ownership (%)	100
Export component (%)	-
Amount requested (US $) {Original}	600,710
{Revised}	520,410
Cost effectiveness (US $/kg)	-
National Coordinating Agency	General Corporation for Environment Protection (GCEP)
Implementing Agency	UNIDO
Technical review completed?	n/a

Secretariat's Recommendations:	
Amount recommended (US $)	Pending decision of the Executive Committee
Project impact (ODP tonnes)	
Cost effectiveness (US $/kg)	
Implementing Agency support cost (US $)	
Total cost to Multilateral Fund (US $)	

PROJECT DESCRIPTION

Demonstration project - Three alternatives to the use of methyl bromide: steam pasteurization, non-soil cultivation, and optimal use of soil fumigants in combination with an Integrated Pest Management (IPM) (horticulture: cucumbers and tomatoes)

1. According to a recent survey carried out by UNDP in 1997, the use of methyl bromide for soil fumigation in Jordan increased from 237 tonnes in 1991 to 303 tonnes in 1992. Since then, annual consumption has remained at the same level. Methyl bromide consumption reported to the Ozone Secretariat in 1996 was 180 tonnes.

2. Most soil fumigation is applied in greenhouses covering an area of 400 ha located in the Jordan valley and in the irrigated uplands. The major crops treated with methyl bromide are cucumbers and tomatoes.

3. This project is to demonstrate the technical and economical feasibility for three alternative methods to the use of methyl bromide in protected horticultural crops (tomatoes and cucumbers), namely: application of low doses of alternative chemicals according to strategies of low environmental impact, non-soil cultivation techniques and steam pasteurization, as part of an integrated pest management (IPM) system.

4. An Integrated Pest Management (IPM) programme for crop protection utilizes a combination of cultural practices, including crop rotation, cover crops, fertilization and plant nutrition; physical methods, including steam, solarization, and heat, and use of chemical compounds. A combination of soil pasteurization and IPM has proven to be an effective approach for the control of pests and diseases in horticulture (annual losses of only 1-2% due to bacterial and fungal diseases, as compared to much higher losses when relying on soil fumigation with methyl bromide only). Also, an IPM programme could improve the effectiveness of mixtures of certified pesticides, nematodes, herbicides and fungicides (the pesticide mix has to be prepared according to the ecology and climate of the area).

5. The project will be implemented in the Northern Jordan Valley (cucumbers and tomatoes) and in the irrigated uplands (cucumbers). These sites have been selected for their high consumption of methyl bromide. The trials will be implemented on private farms selected among members of the Farmer's Union of Jordan.

6. Soil preparation will be carried out by using the traditional methodology of the area. For solarization and bio-fumigation alternatives, the soil will be prepared in May-June. The organic matter will be well distributed on the surface and mixed with the soil to the maximum depth possible. Irrigation and deep ploughing of the soil to eliminate all the remaining roots of the previous crop (tomato or cucumber)

and to expose the deeper inoculum to solar irradiation will be undertaken. The soil will then be covered with a transparent plastic sheet until it is time for seedbed preparation. Trials with methyl bromide alternatives will be performed simultaneously with trials using methyl bromide and with blank trials in order to have similar control. Soil samples will be analyzed before and after the soil treatment and three days after planting has taken place.

7. The Project will be co-ordinated by the Ministry of Agriculture, Direction of Plant Protection, in cooperation with the steering committee comprising representatives of the Faculties of Agriculture, the General Corporation for Environment Protection (GCEP), and the Farmer's Union of Jordan. The Ozone Unit will be responsible for the logistics and coordination during project implementation.

8. The expected results from project implementation are: (i) a technical and economic analysis of utilization of proposed alternatives to methyl bromide, (ii) four local specialists fully trained in the alternative technologies used; and (iii) dissemination of the results of the demonstration project among qualified specialists from producers in Article 5 countries.

9. The project will be coordinated by an international consultant, a specialist in integrated soil-borne diseases and pesticide management, with the assistance of a national project coordinator and in close cooperation with the subcontractor and the implementing agency. The total cost for human resources is US $298,000 including a subcontract for field work (US $154,000), the cost of the equipment is US $164,100, and the cost of study tours and travel is US $62,000. A cost breakdown is attached to the project evaluation sheet.

SECRETARIAT'S COMMENTS

1. The project concept follows the Executive Committee's guidelines. Jordan ratified the Copenhagen Amendment on 30 June 1995.

2. UNIDO informed the Secretariat that, during project preparation, special emphasis has been put in working with the institutions, organizations, professionals and agro-industries which are transferring the technology to the farmers.

3. The Secretariat asked if UNIDO had contacted Article 2 countries with a view to recruiting government experts from those countries (as per Decision 24/18). In this regard, UNIDO indicated that "the use of external expertise is needed only when the local institutions require advice in using state of the art techniques of which there is only a theoretical knowledge in Article 5 countries".

4. In January 1995, a bilateral Jordan-German integrated pest management project commenced (through bilateral assistance outside the Multilateral Fund) to be funded until December 2001. Several alternatives to methyl bromide, including soil solarization, soil disinfection and IPM, are being tested in the Jordan Valley. Efforts are currently being undertaken to integrate beneficial organisms into solarization technology to adapt it to cooler climates outside the Jordan Valley. The Team Leader of the project informed the Secretariat that there has already been good experience with one of the alternatives proposed by UNIDO, namely soil solarization, and solarization with soil conditioner (e.g. *Trichoderma*). Jordan has also a number of very experienced farmers using solarization successfully for several years, and a scientific staff at the University of Jordan that has been researching methyl bromide alternatives for over 15 years.

5. In the light of the strategy on methyl bromide projects which specifically calls for extensive coordination of work among agencies and bilateral partners in order to avoid duplication of efforts, the Secretariat informed UNIDO of the ongoing work through the bilateral Jordan-Germany project referred to above. Subsequently, UNIDO redesigned the proposal to exclude solarization and adjusted the costs accordingly.

6. In the light of the bilateral Jordan-German integrated pest management project currently under implementation, the Executive Committee may consider whether it wishes to approve the project with associated support costs at the funding level shown in the table below:

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Demonstration project - Three alternatives to the use of methyl bromide: steam pasteurization, non-soil cultivation, and optimal use of soil fumigants in combination with an Integrated Pest Management (IPM) (horticulture: cucumbers and tomatoes)	520,410	67,653	UNIDO

ANNEX A

PRELIMINARY EQUIPMENT SPECIFICATIONS

Preliminary equipment specifications and cost breakdown are as follows:

ITEM	DESCRIPTION	COST IN US$
1	One compact steam boiler, with a capacity of 1200 kg/h of steam at 10 bar, complete with fittings and 500 l/h water softening system	**30,000**
2	Two mobile platforms, one for the boiler and the other for the fuel tank and water	**5,000**
3	One 10,000 liter, steel plated tank, to store fuel	**5,000**
4	Data logger for soil and temperature measurement	**10,000**
	Total non expendable	**50,000**
5	100 m. of flexible pipe for steam at 10 bar and 60 m. of flexible diffusion pipes, plus fittings, connecting devices, filters, water poof electrical connections etc..	**21,000**
6	Auxiliary equipment, plastic sheets for tunnels and soil, PVC tubes and drippers, fertilizers, pesticides, bio-control agents, seeds and unforeseen material	**57,100**
7	Non-soil cultivation media and equipment	**26,000**
	Total expendable	**104, 100**
	GRAND TOTAL	**154,100**

ANNEX B

Preliminary terms of reference for the subcontract

The subcontractor is expected to deliver the following services or inputs:

1. Provide the national expertise over a period of 24 months, namely:

- 1 Engineer, specialist in integrated soil-borne diseases management, team coordinator (24 months over 2 years)

- 1 Engineer, specialist in plant protection (6 months over 2 years)

- 3 National Agronomists (6 months over 2 years)
  To assist in the coordination of the project

- 1 National Agro-economist (6 months over 2 years)
  To evaluate the effectiveness of different alternatives in comparison to MeBr

2. Provide transportation for national and international experts to visit different demonstration fields;

3. Soil preparation, determination of physical and chemical parameters of soils and irrigation water at each site, evaluation of the natural infestation by soil-borne diseases before planting and throughout the season of production in accordance with the guidelines given by the experts;

4. Collect scientific data on the impact of different alternatives on the soil micro- flora and on the soil pesticide behavior;

5. Provide healthy seedlings and manual workers to implement the above and for the regular maintenance of the demonstration plots;

6. Preparation of a study of the alternatives tested and the comparison of their operational and investment costs with those of methyl bromide use;

7. Preparation of a paperback publication containing a description of the results obtained;

10. Organization of a 2 to 3 days workshop, with field visits for 20-25 individuals including 8-10 participants to be invited by UNIDO from Article 5 countries.

ANNEX C

PROJECT BUDGET

Line	Description	w.m.	COST IN US$
11-51	International consultant in integrated soil-borne disease management, specialist	3.0	**48,000**
11-52	International consultant in non-soil cultivation	2.0	**32,000**
11-53	International consultant in solarization plus biofumigation	1.0	**16,000**
17-01	National project coordinator	24.0	**48,000**
32-00	Study tour (10 participants)		**35,000**
35-01	Workshop		**22,000**
41-00	Expendables		**104, 100**
42-00	Non-expendables		**50,000**
	SUBTOTAL		**473,100**
51-00	Contingencies (10%)		**47,310**
	TOTAL PROJECT COSTS		**520,410**
	Overhead costs		**67,653**
	TOTAL PROJECT BUDGET		**588,063**