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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Thirty-fourth Meeting  
Montreal, 18-20 July 2001

**PROJECT PROPOSALS: LEBANON**

This document consists of the comments and recommendations of the Fund Secretariat on the following project proposals:

Fumigant:

- Sectors phase-out of methyl bromide in vegetable, cut flower and tobacco production (first tranche) UNDP
- Phase-out of methyl bromide for soil fumigation in strawberry production (first tranche) UNIDO

Refrigeration:

- Phasing out CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at the Fourth Group of Lebanese commercial refrigeration manufacturers UNIDO

**PROJECT EVALUATION SHEET  
LEBANON**

SECTOR: Fumigant ODS use in sector (2000): 236.4 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

***Project Titles:***

- (a) Sectors phase-out of methyl bromide in vegetable, cut flower and tobacco production (first tranche)  
(b) Phase-out of methyl bromide for soil fumigation in strawberry production (first tranche)

<b>Project Data</b>	<b>Methyl bromide</b>	<b>Methyl bromide</b>
Enterprise consumption (ODP tonnes)	310.20	50.40
Project impact (ODP tonnes)	310.20	50.40
Project duration (months)	60	60
Initial amount requested (US \$)	3,536,580	2,591,606
Final project cost (US \$):		
Incremental capital cost (a)		
Contingency cost (b)		
Incremental operating cost (c)		
Total project cost (a+b+c)	2,600,000	1,821,945
Local ownership (%)	100%	100%
Export component (%)	0%	0%
<b>Amount requested (US \$)*</b>	800,000	350,000
Cost effectiveness (US \$/kg.)		27.00
Counterpart funding confirmed?		
National coordinating agency	Ministries of Environment and Agriculture, LARI	Ozone Office, Ministries of Environment & Agriculture
Implementing agency	UNDP	UNIDO

<b><i>Secretariat's Recommendations</i></b>		
Amount recommended (US \$)		
Project impact (ODP tonnes)		
Cost effectiveness (US \$/kg)		
Implementing agency support cost (US \$)		
Total cost to Multilateral Fund (US \$)		

\* First tranche

## PROJECT DESCRIPTION

### Sectors phase-out of methyl bromide in vegetable, cut flower and tobacco production Phase-out of methyl bromide for soil fumigation in strawberry production

1. The Government of Lebanon is submitting two project proposals to phase out 186 ODP tonnes of methyl bromide (MB) used for soil disinfestation in vegetables, cut flowers and tobacco production (to be implemented by UNDP) and 50.4 ODP tonnes used in strawberry production (to be implemented by UNIDO). Implementation of these two projects will lead to the complete phase out of MB in Lebanon.
2. MB consumption in Lebanon increased from 186 ODP tonnes in 1995 to 251 ODP tonnes in 1999, and in 2000, it was reduced to 220 ODP tonnes due to a decrease in the economic growth arising from political problems in the region. MB is used mainly for production of seedlings in greenhouses and soil disinfestation, for the production of vegetables, strawberries, cut flowers and tobacco.
3. Based on the results from the demonstration project on alternatives to the use of MB for soil fumigation approved by the Executive Committee at its 26<sup>th</sup> Meeting (UNDP, US \$328,200), the technologies selected to replace MB in soil fumigation are: solarization in combination with alternative chemicals (metam sodium, 1,3-dichloropropene) and bio-fumigation (for vegetables), and floating tray system (for tobacco). The selection of negative pressure steam (for cut flowers and strawberries) was based on the positive results achieved in other countries (Morocco and Syria), since it was not tested in the demonstration project.
4. The use of chemical alternatives requires modification of the irrigation systems currently available in farms (estimated at US \$262,625). Negative pressure steam technology requires installation of pipes in the soil, an electric fan, and the use of 12 steam generators (at a total cost of about US \$2 million). Replacement of MB used in tobacco seedlings requires installation of micro-tunnels covered with polyethylene sheets, with 100 plastic trays (at a cost of US \$120,300). The project proposals also include two training programmes at a total cost of US \$1,512,290. Operating costs are estimated at US \$955,200.
5. The Government of Lebanon will be responsible for providing the legal framework for phasing out MB used in the production of vegetables, cut flowers, tobacco and strawberries; the required infrastructure for reaching the farmers involved; and the institutional support for implementing the projects.
6. The project will be implemented by UNDP (vegetables, cut flowers, tobacco) and UNIDO (strawberries) in cooperation with the Ministries of the Environment and Agriculture, under the coordination of the Ozone Unit.
7. The estimated time for the completion of the projects is four years for vegetables, cut flowers, tobacco and five years for strawberries.

## SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

### COMMENTS

#### Alternative technologies

8. Upon a request from the Secretariat, UNIDO confirmed that MB is applied in 93 per cent of the strawberry production area, and since most of the strawberry production is either in greenhouses or small tunnels, farmers apply MB fumigation every year.

9. The Secretariat sought clarification on the use of negative pressure steam sterilization in the production of cut flowers and strawberries and its long-term sustainability. In this regard, the implementing agencies indicated that this technology was selected by growers who have considered the possibility of procuring additional boilers, covering the operating and maintenance costs. Also, the Government of Lebanon has enacted a new regulation that encourages the replacement of MB with non-chemical alternatives in strawberry production. Furthermore, the negative pressure technology provides a more effective treatment than other technologies to kill previous crop roots and soil nematodes and pathogens; its long-term viability has been proven in commercial practice in other countries. The piping system installed on farms continues to work after 15 years and boilers have a life of more than 30 years.

#### Equipment

10. The Secretariat discussed with the implementing agencies issues associated with the cost of boilers, the request for safety kits and the need for more than 700 soil thermometers which are only used to measure soil temperature during steaming operations. The agencies reported that the proposed steam boiler was selected based on the need to deliver steam deep into the soil for a sufficient period time to kill pathogens. The thermometers are required for solarization and biofumigation treatments in vegetables, and for steam treatments. As the projects involve the use of chemicals, safety kits are essential for the people who will handle them.

11. Upon a request from the Secretariat to assess the feasibility of sharing boilers among strawberry growers and cut flower producers (9 boilers were requested for strawberry production and 3 boilers for cut-flowers), the implementing agencies reported that sharing the boilers would not be possible since the location of the strawberry and cut flower production areas are apart. Furthermore, application of steam in strawberry crops and cut flowers is at about the same time of the year.

#### Operating costs and training

12. The Secretariat pointed out that although over US \$1.5 million was budgeted for training activities in the two project proposals, only US \$200,000 was related to the training of farmers, and about US \$1 million was for salaries of specialists. In addition, some items requested cannot be justified (i.e., international travel (US \$50,000) and TV spot (US \$50,000); an international lawyer (US \$80,000); miscellaneous training material (US \$19,840) in addition to leaflet and manual (US \$18,500)).

13. The Secretariat and the implementing agencies also discussed issues related to the methodology used for calculating operating costs which were based on difference in costs of chemicals, plastic covers, labour and increased field irrigation. It was noted that any small change in the amount of chemicals, farm materials, labour and/or their cost, will result in major changes in the overall calculation.

14. Subsequently, the Secretariat and implementing agencies agreed that the cost of the training programmes, technical assistance and operational costs should be adjusted to US \$1,306,474 considering that the project will completely phase out MB which is used in four major crops, the large number of farmers involved and their geographical distribution throughout the country.

Agreement between the Government of Lebanon and the Executive Committee

15. UNDP and UNIDO are assisting the Government of Lebanon in drafting a proposal for an agreement between the Government and the Executive Committee with the commitments proposed and action plan for the phase out of MB in Lebanon. The draft agreement will be finalised prior to the 34th Meeting of the Committee.

**RECOMMENDATIONS**

16. The Fund Secretariat, UNDP and UNIDO have agreed on the total cost of the projects (US \$4,421,945). Based on the above considerations, the Executive Committee may wish to consider approval of the projects for Lebanon as follows:

- (a) US \$1,821,945 plus agency support cost of US \$210,414 for UNIDO
- (b) US \$2,600,000 plus agency support cost of US \$296,000 for UNDP

17. The Executive Committee may also wish to request UNDP and UNIDO to disburse the funds allocated in tranches according to the proposed MB phase out schedule indicated in the agreement.

**PROJECT EVALUATION SHEET  
LEBANON**

SECTOR: Refrigeration ODS use in sector (2000): 227 ODP tonnes  
 Sub-sector cost-effectiveness thresholds: Commercial US \$/15.21kg

**Project Titles:**

- (a) Phasing out CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at the Fourth Group of Lebanese commercial refrigeration manufacturers

Project Data	Commercial
	Fourth Group
Enterprise consumption (ODP tonnes)	19.52
Project impact (ODP tonnes)	18.75
Project duration (months)	24
Initial amount requested (US \$)	279,672
Final project cost (US \$):	
Incremental capital cost (a)	174,650
Contingency cost (b)	11,365
Incremental operating cost (c)	93,657
Total project cost (a+b+c)	279,672
Local ownership (%)	100%
Export component (%)	0%
<b>Amount requested (US \$)</b>	279,672
Cost effectiveness (US \$/kg.)	14.92
Counterpart funding confirmed?	Yes
National coordinating agency	Ministry of Environment
Implementing agency	UNIDO

<b>Secretariat's Recommendations</b>	
Amount recommended (US \$)	279,672
Project impact (ODP tonnes)	18.75
Cost effectiveness (US \$/kg)	14.92
Implementing agency support cost (US \$)	36,357
Total cost to Multilateral Fund (US \$)	316,029

## PROJECT DESCRIPTION

### Sector Background

Latest available total ODS consumption (1999)	618.10 ODP tonnes
Baseline consumption of Annex A Group I substances (CFCs)	725.50 ODP tonnes
Consumption of Annex A Group I substances for the year 1999	463.40 ODP tonnes
Baseline consumption of CFCs in refrigeration sector	365.13 ODP tonnes
Consumption of CFCs in refrigeration sector in 2000	227.01 ODP tonnes
Funds approved for investment projects in refrigeration sector as of end of 2000	US \$3,053,706.00
Quantity of CFC to be phased out in investment projects in refrigeration sector as of end of 2000	277.56 ODP tonnes

18. Original equipment manufacturers in the refrigeration sector in Lebanon are comprised of one manufacturer of domestic refrigeration appliances which has received assistance from the Multilateral Fund and about 50 small- and medium-sized commercial refrigeration enterprises, 34 of which have also received assistance from the Fund. The Executive Committee has also approved a recovery/recycling project as part of bilateral co-operation with France to assist Lebanon in phasing out 62 ODP tonnes in the servicing sub-sector. In total, the Executive Committee has approved about US \$3 million for 15 projects to phase out 277.56 ODP tonnes of CFCs in the refrigeration sector in Lebanon.

19. The consumption of CFCs in the refrigeration sector in the year 2000, according to information from the Government of Lebanon, was 227 ODP tonnes.

### Project description

20. The proposal submitted by UNIDO covers nine small commercial refrigeration companies in Lebanon (Al-Ammoury, Angelidis Freres, Chemayssem, Cold Refrigeration, Georgio, International Est. Badarco, Kassha, Le Condor and Mohieddine Adada). All the companies under this proposal are producing similar equipment (display cabinets, commercial freezers, commercial refrigerators and ice cream machines). The combined annual ODS consumption is 11.85 ODP tonnes of CFC-11 and 7.67 ODP tonnes of CFC-12. All nine companies will convert their refrigerant operations from CFC-12 to HFC-134a.

21. All nine companies employ manual mixing and foam pouring for foam operations. They are equipped with portable refrigerant charging machines, hand held leak detectors, and vacuum pumps in the baseline for refrigerant operations. The project will include incremental capital costs covering replacement of refrigerant charging equipment and leak detectors and replacement/retrofit of vacuum pumps. No incremental capital costs are requested for conversion of foam operations. The companies will make the necessary little modifications to provide additional heating in foaming jigs at their own expense. The projects also include re-design,

testing, trials, technical assistance and training. Incremental operating costs are requested to cover the higher cost of chemicals and components, and an increase in foam density.

Justification for the use of HCFC-141b

22. Justification for the use of HCFC-141b by companies has been provided in each project and is available in the Secretariat. The Government of Lebanon has also provided letters endorsing the use of HCFC-141b by enterprises.

**SECRETARIAT’S COMMENTS AND RECOMMENDATIONS**

**COMMENTS**

23. The Secretariat has sought additional information from UNIDO on the technology and equipment used in baseline foam operations, consumption of chemicals per unit production and the size of compressors used for different products. UNIDO provided the necessary information.

**RECOMMENDATIONS**

24. The Fund Secretariat recommends blanket approval of the commercial refrigeration projects from UNIDO with the level of funding and associated support costs as indicated below.

	<b>Project Title</b>	<b>Project Funding (US\$)</b>	<b>Support Cost (US\$)</b>	<b>Implementing Agency</b>
(a)	Phasing out CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at the Fourth Group of Lebanese commercial refrigeration manufacturers	279,672	36,357	UNIDO

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