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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: CHILE

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

Fumigant

- Demonstration project for testing methyl bromide alternatives in soil treatment applications for tomatoes and peppers — World Bank

PROJECT EVALUATION SHEET
CHILE

SECTOR: FUMIGANT ODS use in sector (1996): 320 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

Project Title:
Demonstration project for testing methyl bromide alternatives in soil treatment applications for tomatoes and peppers

Project Data	Methyl Bromide
ODS phase-out (ODP tonnes)	-
Proposed project duration (months)	24
Incremental capital costs (US $)	435,162
- including contingency (%)	10
Incremental operating costs: (US $)	0
Total project cost (US $)	435,162
Local ownership (%)	100
Export component (%)	-
Amount requested (US $) {Original}	494,994
{Revised}	435,162
Cost effectiveness (US $/kg)	-
National Coordinating Agency	CONAMA
Implementing Agency	World Bank
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 for testing methyl bromide alternatives in soil treatment applications for tomatoes and peppers

1. Methyl bromide is used in Chile as a soil fumigant to control a broad spectrum of pest pathogens, insects, nematodes, and weeds. The project proposal reports that in 1996, Chile imported 393 metric tonnes of methyl bromide; however, methyl bromide consumption reported to the Ozone Secretariat in 1996 was 236.2 ODP tonnes. About 70% of this use is for sterilizing soils in the production of tomatoes (open-field and seedbeds), peppers (open-field and seedbeds), tobacco (seedbeds), cut flowers (nursery green houses), and fruits (seedbeds in nursery green houses). Tomatoes and peppers account for more than half the total methyl bromide consumption for soil treatment. Post-harvest applications, mainly for pre-shipment and quarantine purposes, including fruit and wood fumigation account for 22% of methyl bromide use in the country. Fumigation of other commodities in warehouses accounts for 8%.

2. This project is to demonstrate the technical and economical feasibility of five alternative methods to the use of methyl bromide in horticultural crops (tomatoes and peppers), namely: soil-solarization, biological controls, alternative chemicals, plant breeding, cultural practices (crop rotation, mulching, substrate modification), in combination with an integrated pest management (IPM) system.

3. An Integrated Pest Management (IPM) programme for crop protection monitors pests, in order to establish pest injury levels and a mix of strategies to sustainably control them. Aimed to be cost-effective, this approach allows the whole range of pest control options, including the use of pesticides (reduced). Cultural practices and agrochemicals are usually combined and include crop rotation, artificial substrates, deep ploughing, fallowing, flooding, mulching, plant breeding and grafting, and biological controls.

4. The project will be implemented by the "Instituto Nacional de Investigación Agrícola" (INIA), with the participation of University of Chile and the Institute for Agricultural Development (INDAP) which will participate in the activities related to technology transfer, dissemination of information, training and technical assistance. INIA and the University of Chile will provide their facilities and technical personnel for undertaking laboratory analysis, crop fields, green houses, and controlled environment chambers. INIA will host the personnel required for managing the project.

5. The expected results from project implementation are: identification of economically and technically feasible alternatives to methyl bromide that will constitute a basis for designing and implementing a phase-out strategy for Chile; training of agronomists and crop specialists; dissemination of results from the demonstration project; and promotion of methyl bromide phase-out, since private growers will be participating and testing alternatives.

6. The project will require a project coordinator, an extensionist, field and laboratory technicians, and support staff. Field technicians will help undertake essays in each region, while laboratory analysts will perform soil analysis, microbiological evaluations and organic matter analysis. The total cost for human resources is US $226,667 and costs of equipment and travel are US $66,569 and US 36,547, respectively. A cost breakdown is attached to the project evaluation sheet.

SECRETARIAT'S COMMENTS

1. The project concept follows the Executive Committee's guidelines. Chile ratified the Copenhagen Amendment on 14 January 1994.

2. The project proposal states that although pepper is not listed as a priority crop in the strategy and guidelines, more than 61 tonnes of methyl bromide are used to fumigate this crop. Also, methyl bromide consumption is expanding in this sector (10% between 1996 and 1997), making a demonstration project necessary to halt this growing trend. In this regard, the World Bank further indicated that according to the Guidelines ("projects in crops other than those listed may be considered in cases where the use in the country is expanding, and the demonstration is deemed necessary to stop the growth").

3. The Secretariat and the World Bank also discussed issues regarding a request for compensation for productivity losses associated with the land allocated to the project, and salaries of project personnel and equipment costs. Subsequently, the World Bank agreed to withdraw the request for compensation for productivity losses, and to reduce the staff costs to, in the Bank's views, minimum possible to properly implement the demonstration project.

4. Notwithstanding the emphasis placed by the World Bank on working with local institutions and on seeking to reduce salary costs through the use of local experts, the concept and cost structure of this project is similar to projects initially approved by the Executive Committee. Taking this into consideration and that peppers represent an important crop for Chile although not in the list of priority crops, the Executive Committee may consider whether it wishes to approve the project with the associated support costs at the funding level shown in the table below:

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Demonstration project for testing methyl bromide alternatives in soil treatment applications for tomatoes and peppers	435,162	56,571	World Bank

PROJECT COSTS

The total estimated cost of the project is US$ 556,496 as calculated below:

PROJECT TOTAL COSTS (US$)

Item	Locally funded*	Funded by Project
Human Resources	104,667	226,667
Travel Costs		36,547
Laboratory Analysis		10,042
Technol. Transfer and Diffusion		55,777
Equipment Investment		49,636
Operating expenses	16,667	16,933
Subtotal	121,334	395,602
Contingencies (10%)		39,560
Grant Subtotal		435,162
TOTAL		**556,496**

6.1. Laboratory Analysis Costs. Laboratory Analysis costs ascend to US$ 10,042 as explained in the chart below:

Type of Analysis	Unit Cost ($pesos)	Unit Cost (US$)	Quantity	Annual Cost (US$)	Total Cost (US$)
Soil fertil. anal.	6,000	13.33	100	1,333.00	2,666
Soil phys. anal.	5,000	11.11	80	888.89	1,778
Nematodes anal.	1,500	3.33	400	1,333.33	2,667
Microbiol. anal.	3,000	6.67	200	1,333.00	2,666
Seed viabil. anal.	2,000	4.44	80	133.00	266
Biolog. activity	22,000	48.89	200	n.r	n.r
Org. Mat. anal.	28,000	62.22	200	n.r	n.r
Total				5,021	10,042
(1) Exchange Rate	Pesos$ 450=1 US$				

The organic matter analysis pursues to measure C by deploying an elemental analyzer to find out presence of C, H, N, and S in the soil (C total). With this analysis it's possible to determine organic stability and behavior as a result of different treatments. The biological activity analysis is needed to determine the efficiency of treatments and doses for comparing treatments with MeBr and alternatives, and also to determine presence of pathogens before and after the treatment.

6.2. Human Resource Costs. The project staff will require a project coordinator, an extensionist, field and laboratory technicians, and support staff. The field technicians will help undertake the essays in each region, in what respect to measurement, doses, and other field activities. The laboratory analysts will devote their work to physical and chemical analysis of soil, and to microbiological evaluations and organic matter analysis. Other costs have been reduced to the maximum possible to properly implement a demonstration project in Chile. The extensionist will be in charge of technology transfer activities (i.e., information dissemination, brochure and

publication production and editing, lectures and conferences, field trips, demonstration activities, etc.). The thesis support item means minimal economic support (US $333/month) for two agronomy students which will be undertaking their Research Theses; this work will be orientated to evaluate the impact of each alternative, the degree of learning by the stakeholders, and estimations about future outcomes. Also, they will support statistical databases related to each essay. Also, specialists will be required for the different MeBr alternatives. These costs will amount US $226,667. Other human resource costs, arising from the services provided on a continuous basis by INIA's regular staff (See Annex II) will be assumed locally, as well as the agrochemical consultant.

Project Staff	Cost ($pesos)	Cost (US$) *	Quantity	Months	Total Cost (US$)
Coordinator	1,200,000	2,667	1	24	64,000
Extensionist (Agronomist)	1,000,000	2,222	1	19	42,222
Field technician	450,000	1,000	2	22	44,000
Laboratory Analyst	350,000	778	2	22	34,222
Secretary	300,000	667	1	24	16,000
Thesis support	150,000	333	2	11	7,333
Worker	200,000	444	1	11	4,889
IPM Consultant	2,250,000	5,000	1	1	5,000
Agri-chem. consultant**	2,250,000	5,000	1	2	n.r.
Steaming consult.	1,350,000	3,000	1	3	9,000
Total					**226,667**

(*) Exchange Rate Pesos$ 450=1 US$
(**) Not requested

6.3. Promotion and Information Dissemination Costs. In order to promote a better technology transfer, and disseminate the project results informative material will be produced, and field trips including technical lectures and workshops will be conducted, at an approximate cost of US $55,777.

Diffusion and Technology Transfer Costs

Item	Unit Cost ($pesos)	Unit Cost (US$)1	Quantity	Total Costs (US$)
Brochures and publications	3,750,000	8,333	n.a.	8,333
Photographic material**	5,000	11.11	120	1,333
Initial workshop	2,250,000	5,000	1	5,000
Field trips and Techn. Training	75,000	167	20	3,333
International Seminar	12,000,000	26,667	1	26,667
Technical Manual***	5,000,000	11,111	n.a.	11,111
Total				**55,777**

(1) Exchange Rate Pesos$ 450=1 US$
(*) At least 5 Process Bulletins (steaming, solarization, IPM, alternative agri-chemicals, substrates) with a printing run of 500 copies each (12,500 total)
(**) Slides and photographs for publications, lectures and conferences. Calculated as 6 films per specialist (10) at CLP $5,000 per film (including developing), per year.
(***) It will gather all information resulting from the project, and will consist of a 150 pages document (20 pages color) with a print run of 2,500 copies (CLP$2,000 each)

6.4. Travel Costs. Traveling will be required to learn from other successful experiences in the region in eliminating the use of methyl bromide by adopting some of the technological approaches foreseen in the project. Also, internal travel for mobilizing to the regions covered by the project, and international travel for consultants are included. The project will require about 340 trips (number of tolls), to mobilize a minimum of 20 people at an average 265 km per trip, although some journeys will reach 400 km. INIA uses a factor cost of CLP $120/km to incorporate equipment reposition and insurance costs; the CLP $91/km used last year and charge to all government agencies will be taken as a good measure to calculate the project travel costs. The total is US $36,547.

Travel Costs	Unit costs ($pesos)	Unit costs (US$)	Quantity	Total Costs (US$)
Technical visit to other country	225,000	500	2	1,000
Consultants' travel	600,000	1,333	2	2,667
Per diem (1/2 day)	4,200	9	840	7,840
Per diem (1 day)	28,500	63	60	3,800
International per diem	54,000	120	14	1,680
Road tolls	1,800	4	340	1,360
Road travel (km)	91	0.20	90,000	18,200
Total				**36,547**

(1) Exchange Rate Pesos$ 450=1 US$

6.5. Equipment Investment Costs. The project will fund essential pieces of equipment and materials, such as an incubation chamber and the steaming equipment. Although INIA has incubators for fungi and other microorganisms, these are fully employed by INIA's investigators and researchers to undertake their daily activities, especially in the peak seasonal loads. Considering that the project will also require this equipment during the same peak loads, and that there will be a significant volume of microbiological and seed samples evaluated throughout the year, the project will need full time availability of this essential equipment. To speed-up data gathering at the field and its subsequent computer processing at La Platina, the project will count on 2 data loggers, digital inter-phase RS-232 to input data directly into the system. The total equipment investment ascends to US $49,636.

Equipment Investment	Unit Cost ($pesos)	Unit cost (US$)	Quantity	Total Cost (US$)
Steam boiler, tank, platform, tubes	17,100,000	38,000	1	38,000
Polyethylene for steam, solarization*	1,656,190	3,680	n.a.	3,680
Data storage equipment**	709,200	1,756	2	3,512
Incubator	2,000,000	4,444	1	4,444
Total				**49,636**

(1) Exchange Rate Pesos$ 450=1 US$

(*) 50 m2 per essay X 2 seasons X 12 essays X 2 regions = 2,400 m2, at CLP$3.1 million per hectare, plus $200 for fittings. Same calculus for steaming.

(**) US $1,556 plus a US $200 charger each

6.6. Operating Costs. The project operating costs, in the amount of US $16,933, consist of agrochemicals, fertilizers and other raw materials, fuel, and office supplies. Productivity losses associated to the land allocated for the project would represent around $16,667 (25% estimated

loss per m2 = 2500 m2 of loss at 20Kg/m2 and at an average of $0,33/kg). However, due to the lack of policies from the ExCom regarding this type of costs, there won't be a request for funding.

Operating Costs	**Unit Cost ($pesos)**	**Unit cost (US$) ***	**Quantity**	**Total Cost (US$)**
Agricultural inputs (per year)	1,500,000	3,333	2	6,667
Office Supplies (per year)	150,000	333	2	667
Steam Boiler operation (per day)**	60,000	80	120	9,600
Productivity loss compensation (kg) ***	150	0.33	n.a.	n.r.
Total				**16,933**

(*) Exchange Rate Pesos$ 450=1 US$

(**) Includes fuel costs, and other operation costs (machinist, lubricants, water, servicing)

(***) 25% estimated loss per m2 = 2500 m2 of loss at 20Kg/m2 and at an average of $0,33/kg would represent $16,667 approximately