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Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

Twenty-second Meeting
Nairobi, 28-30 May 1997

DEMONSTRATION PROJECTS ON THE PHASE OUT OF METHYL BROMIDE IN FOUR ARTICLE 5 COUNTRIES: BRAZIL, CHINA, GUATEMALA AND MOROCCO

PROJECT EVALUATION SHEET

SECTOR: FUMIGANT

Sub-sector cost-effectiveness threshold: N/A

Project Titles:
Alternatives to the use of methyl bromide: steam pasteurization, non-soil cultivation, solarization, and low-dose chemicals, in combination with an Integrated Pest Management system (demonstration project)

Project Data	**FUMIGANT (Alternative to methyl bromide)**			
	Brazil	**China**	**Guatemala**	**Morocco**
ODS phase-out (ODP tonnes)	-	-	-	-
Proposed project duration (Yrs)	2	2	2	2
Incremental capital cost (US $)	553,000	539,000	621,000	661,000
Contingency (%)	15	15	15	15
Incremental operational cost (US $)	0	0	0	0
Total project cost (US $)	553,000	539,000	621,000	661,000
Local ownership (%)	-		-	
Export component (%)	-		-	
Amount requested (US $) {Original}	553,000	539,000	$621,000	661,000
{Revised}	393,800	443,300	440,000	487,300
Cost effectiveness (US $/kg)	N/A	N/A	N/A	N/A
National Coordinating Agency	EPAGRI	NEPA	ICTA	DPVCTRF
Implementing Agency	UNIDO	UNIDO	UNIDO	UNIDO
Technical review completed?	Yes	Yes	Yes	Yes

Secretariat's Recommendations:				
Amount recommended (US $)	393,800	443,300	440,000	487,300
Project impact (ODP tonnes)	-	-	-	-
Cost effectiveness (US $/kg)	-	-	-	-
Implementing Agency support cost (US $)	51,194	57,629	57,252	63,349
Total cost to Multilateral Fund (US $)	444,994	500,929	497,252	550,649

PROJECT DESCRIPTION

1. The Governments of Brazil, China, Guatemala and Morocco are each submitting a project proposal to demonstrate alternatives to methyl bromide for consideration by the Executive Committee at its 22nd Meeting. The four proposals are being submitted through UNIDO.

2. The projects are to demonstrate the technical and economic feasibility of the following four alternative methods to the use of methyl bromide in the production of melons, tomatoes, tobacco and broccoli: (i) solarization, (ii) non-soil cultivation techniques, (iii) steam pasteurization, and (iv) application of mixtures of other chemicals in low doses. The alternative methods will be implemented in combination with an integrated pest management system.

3. Integrated pest management (IPM) approach for crop protection utilizes pest monitoring techniques to detect pest presence and determine the economic threshold that warrant treatment. It 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.

4. Solarization consists of simply heating the soil, by covering it with a plastic sheet. This technique is effective against many pathogenic bacteria, a wide range of nematodes, and, to some extent, fungi. The usefulness of the technique depends on climatic conditions, water availability for crop irrigation and application procedures. In countries with a temperate climate and marked seasons, the land must be covered during the most productive periods of the summer. This technique might prove to be cost-effective in the case of seedbeds.

5. Non-soil cultivation technique is used in nurseries, glasshouses and seedbeds to prevent infestation by bacteria and fungi. Soil is replaced by synthetic or natural sterilized soil substitutes which provide reliable support. Two types of soil-less media are available: (i) organic media, such as peat, sawdust, straw bales, which have good cation-exchange and water holding capacity, and (ii) inert media, such as rock wool, perlite, polyurethane, expanded clay and polystyrene, which have high water holding capacity but low cation-exchange capacity. Organic media and some inert media can be sterilized with steam and re-utilized. Some inert media can also be re-extruded.

6. Soil pasteurization by steam, consists of heating the soil up to 80° Celsius, 65 centimeters deep, in order to inactivate nematodes and 95 per cent of the spores of the pathogenic fungi.

7. Implementation of an integrated pest management programme reduces the doses of mixtures of pesticides and fungicides applied. The type of chemicals to applied and their doses are related to the crop and the environmental parameters of the area.

8. The Brazil project is to demonstrate the feasibility of using alternate technologies to methyl bromide in the tobacco sector, the largest consumer of methyl bromide in the country. Brazil is the third largest tobacco producer in the world and the largest exporter worldwide. Tobacco is mainly grown in the south of Brazil (Rio Grande do Sul, Santa Catalina and Paraná),

with an estimated annual production of 400,000 tonnes, equivalent to 89 per cent of the total tobacco production..

9. The China project is to demonstrate the feasibility of alternative technologies to methyl bromide applied to cucumber and tomatoes (Beijing and Shouguang), tobacco (Wuhan), strawberry (Mancheng) and medicinal herbs (Jilin province). The demonstration trials will be carried out in small plots, taking into account the economic aspects and reliability of alternatives.

10. The Guatemala project design was based on a field survey carried out in November 1996. The objectives of the survey were, inter alia, to determine the technologies and agricultural practices in use; identify possible alternatives to methyl bromide, and determine the availability of parcels of land to demonstrate alternative technologies to methyl bromide. Four sites have been identified for demonstration of alternatives to methyl bromide: Chimaltenango for broccoli; La Fragua and San Jorge for melon; Monjas Jalapa for tobacco; and Masagua Escuintla for tomatoes.

11. The Morocco project is to demonstrate the feasibility of four alternative technologies to methyl bromide use as a fumigant in horticulture. It will be implemented in production units of the Société de Développement des Exploitations Agricoles in the following three regions: Sous-Massa (south), Oualidia (centre) and Loukkos (north).

12. The projects propose to implement the following methodology. For the purpose of comparison, soil preparation will be carried out using the same methodology currently employed in the demonstration field. At the time of the application of methyl bromide, the alternative treatments would be applied in the testing area in order to have a controlled field. "No Treatment" trials will also be carried out for comparison purposes. A field worker will supervise the process on a daily basis and will file a daily report that will be sent to the project manager. Data will be processed and analyzed in terms of comparative product effectiveness, productivity and cost. Data collection and monitoring will be conducted throughout project implementation. Soil samples will be analyzed before and after the soil treatment and three days after planting has taken place. Levels of pathogens and pest counts will be used as indicators to assess treatment effectiveness.

13. The project will be coordinated by a national project director in close cooperation with the implementing agency. The services of local personnel will be required (industrial technical engineer, agro-ecomonist, agronomists and crop specialist.

14. In Brazil, the Comite Executivo Interministerial (PROZON) will be the overall coordinator of the project. The Empresa Brasileira de Pesquisas Agropecuarias (EMBRAPA) will assist in the technical aspects of the projects, and the Empresa de Pesquisa Agropecuaria de Santa Catalina S.A. (EPAGRI) will be responsible for field operations.

15. In China, the National Environmental Protection Agency will coordinate project activities, while Institute for Control of Agrochemical will be the agency responsible for project implementation.

16. In Guatemala, the National Environment Commission (CONAMA) will be responsible for the coordination of the project, and the "Instituto de Ciencia y Tecnología Agrícola" (ICTA) will be responsible for field operations.

17. In Morocco, the Direction de la Protection des Végétaux, des Contrôles Techniques et de la Repression des Fraudes (DPVCTRF) in cooperation with the Institut Agronomique et Vétérinaire (IAV) Hassan will be the counterpart institutions in charge of field operations. In addition, DPVCTRF will be responsible for the logistic aspects and transport of experts. The Ozone Bureau at the Ministry of Industry will be responsible for the coordination of the project.

18. A monitoring unit will be established to supervise the field work on a daily basis; daily reports will be sent to the project manager. Data will be processed and analyzed in terms of comparative product effectiveness, productivity and cost. The monitoring phase and the collection of data will start with the pasteurization of the soil and will continue until planting starts. Soil samples will be analyzed before and after the soil treatment and three days after planting had taken place. Levels of pathogens and pest counts will be the indicators to assess treatment effectiveness.

19. The expected results from project implementation are: (i) a technical and economic analysis of utilization of four alternatives to methyl bromide, (ii) at least six agronomists and crop specialists fully trained in the alternative technologies used; and (iii) dissemination of the results of the demonstration project among Article 5 countries.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The 20th Meeting of the Executive Committee adopted interim guidelines on methyl bromide projects and allocated US $100,000 for preparation of project proposals on alternatives to methyl bromide. The Committee requested the implementing agencies to submit an initial coordinated group of projects that ensures work in each region, and does not exceed US $2-3 million.

2. UNIDO developed a strategy paper for the phase-out of methyl bromide with three immediate objectives: (i) to demonstrate well-proven alternate technologies for soil fumigation in selected geographical, climatic and socio-economic environments and to disseminate the results among users in similar environments and conditions; (ii) to demonstrate well-proven alternate technologies for commodity treatment and structural fumigation; and (iii) to implement selected investment demonstration projects using relatively new alternative technologies for commodity treatment and structural fumigation (companies interested in participating will be asked to co-finance the projects to a certain extent).

3. The Fund Secretariat reviewed the project proposals in the context of the Executive Committee's interim guidelines on methyl bromide projects, the report of the Methyl Bromide Technical Options Committee (MBTOC), UNIDO's strategy paper for the phase-out of methyl bromide, as well as several publications on alternatives to methyl bromide.

4. The Fund Secretariat sought advice from a renowned international expert in methyl bromide to determine the technical and economical feasibility of the project proposals and the level of funding requested

5. The project concept follows the Executive Committee's guidelines and is consistent with MBTOC reports.

6. The amount of methyl bromide to be phased out is negligible.

7. The project duration is two years. During the first year, testing of the four alternative methods to methyl bromide will be conducted and technicians will be trained. During the second year, the alternative methods tested would be replicated on a full-scale commercial basis and reports and publication of results would be prepared. Taking into consideration that the results achieved through the project would be used to design and implement large scale projects applicable to a large number of Article 5 countries, quarterly and/or bi-annual technical progress reports would be made available.

8. Issues regarding salaries of international and national experts, project implementation, project outputs and coordination with other relevant national and international agencies and organizations were also discussed. UNIDO agreed to implement the project by subcontracting

services by a local institution rather than recruiting national experts. Projects costs were subsequently adjusted and contingency costs were reduced from 15 per cent to 10 per cent.

RECOMMENDATION

1. The Fund Secretariat recommends blanket approval of 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
Alternative to methyl bromide, Brazil	393,800	51,194	UNIDO
Alternative to methyl bromide, China	443,300	57,629	UNIDO
Alternative to methyl bromide, Guatemala	440,000	57,252	UNIDO
Alternative to methyl bromide, Morocco	487,300	63,349	UNIDO