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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Forty-fourth Meeting
Prague, 29 November-3 December 2004

PROJECT PROPOSAL: CUBA

This document consists of the comments and recommendation of the Fund Secretariat on the following project proposal:

Fumigant

• Phase-out of methyl bromide in soil fumigation, substrates, storage and structures	UNIDO

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS
CUBA

PROJECT TITLES		BILATERAL/IMPLEMENTING AGENCY
(a)	Phase-out of methyl bromide in soil fumigation, substrates, storage and structures	UNIDO

NATIONAL CO-ORDINATING AGENCY	INISAV, OTOZ and CITMA

LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT

A: ARTICLE-7 DATA (ODP tonnes, 2001, as of October 2004)

Annex E: methyl bromide	23.70		

B: COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes, 2003, as of October 2004)

ODS Name	Sub-sector/quantity	Sub-sector/quantity	Sub-sector/quantity	Sub-sector/quantity.
MeBr	23.70			

CFC consumption remaining eligible for funding (ODP tonnes)	n/a

CURRENT YEAR BUSINESS PLAN ALLOCATIONS		Funding US $ million	Phase-out ODP tonnes
	(a)	323,000	24.0

PROJECT TITLE:	Methyl bromide
ODS use at enterprise (ODP tonnes):	24.1
ODS to be phased out (ODP tonnes):	24.1
ODS to be phased in (ODP tonnes):	n/a
Project duration (months):	48
Initial amount requested (US $):	699,809
Final project cost:	
Incremental Capital Cost (US $)	488,875
Contingency (10%) (US $)	48,888
Incremental Operating Cost (US $)	
Total Project Cost (US $)	537,763
Local ownership (%):	100
Export component (%):	0
Requested grant (US $):	537,763
Cost-effectiveness (US $/kg):	22.31
Implementing agency support cost (US $):	40,332
Total cost of project to Multilateral Fund (US $):	578,095
Status of counterpart funding (Y/N):	n/a
Project monitoring milestones included (Y/N):	Y

SECRETARIAT'S RECOMMENDATION	For individual consideration

PROJECT DESCRIPTION

1. The Government of Cuba submitted for consideration by the Executive Committee at its 44th Meeting a project proposal to phase out 24.1 tonnes of methyl bromide (MB) used in soil and substrate fumigation, and storage and structure fumigation. This represents the total consumption of controlled uses of MB in Cuba. The total cost of the project, as submitted is US $699,809 (US $29.03/kg). The MB baseline for compliance is 50.5 ODP tonnes.

MB consumption

2. In 1980, a total of 240 ODP tonnes of MB were used for the fumigation of tobacco seedbeds. Due to economic constraints experienced in Cuba and the national policy on environmental issues, in 1998 the use of MB decreased to 71 ODP tonnes including 48 ODP tonnes used on tobacco seedbeds. The consumption of MB in tobacco seedbeds has been phased out through the implementation by UNIDO of an investment project for the phase-out of MB in the tobacco sector (approved at the 26th Meeting of the Executive Committee at a total cost of US $1,673,324).

3. Therefore, the remaining MB consumption (24.1 ODP tonnes) in Cuba is related to soil fumigation in protected horticulture, flowers and ornamental plants (17.6 ODP tonnes), fumigation of substrates used in coffee nurseries (2.3 ODP tonnes) and fumigation of grain and industrial facilities (4.2 ODP tonnes).

National policy

4. The Government of Cuba has issued policies to promote the use of environment-friendly technologies in all sectors, particularly in the agricultural sector. Emphasis was placed on reducing the use of pesticides in all agricultural sub-sectors, particularly in the production of tobacco. The Government has set a strict control on MB imports and uses (Resolution 65/99). The Ozone Office issues import quotas on an annual basis; direct imports of MB by users has been banned; recently, a new resolution was issued with more rigorous control of the use of MB by crop and application; MB has been banned for the production of tobacco. The Ministry of the Interior controls the storage and movement of MB.

Project proposal

5. The alternative technologies proposed to phase out MB are grafting for protected horticulture, steam for soil and substrate fumigation, and alternative chemicals for grain and industrial facilities, namely phosphine combined with CO_2 and heat, and sulfuryl fluoride. A brief description of the different alternatives is presented below:

(a) Protected horticulture: Installation of four nurseries for the production of grafted plants; the nurseries will be located in four different regions of the country. Each nursery will be composed of production greenhouses, a grafting workshop and a healing greenhouse. The capital cost for the installation of the four nurseries has been estimated at US $253,875. The amount of MB to be phased-out through this technology is 13.8 ODP tonnes;

(b) Flowers and ornamental plants: Procurement of two fully equipped steam boilers for soil sterilization (US $84,000) and one additional high capacity steam boiler for fumigation of substrates for the production of ornamentals (US $35,000). The amount of MB to be phased out through this technology is 4.1 ODP tonnes;

(c) Coffee nurseries: Procurement of two fully equipped steam boilers for soil sterilization (US $52,000). The amount of MB to be phased out through this technology is 1.7 ODP tonnes;

(d) Grain and industrial facilities: Equipment required for the application of phosphine with CO_2 alone, and with heat and sulphuryl fluoride in some facilities (US $71,315). The amount of MB to be phased out through this technology is 4.5 ODP tonnes.

6. The project also includes a training programme in the use of the alternative technologies and the application of integrated pest management systems (US $140,000), with 10 per cent contingency (US $63,619). Operating costs were estimated at US $48,228; however, the Government of Cuba agreed not to request these costs. The total cost of the project is US $699,809, with a cost-effectiveness value of US $29.03/kg.

7. The project will be implemented by UNIDO and the Institute of Vegetal Sanitation, in coordination with the Ozone Unit, the Ministry of Science, technology and the Environment, and the Ministry for Foreign Investment and Economic Cooperation.

8. The estimated project implementation timeframe is four years.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Protected horticulture

9. The project proposes to establish four nurseries to supply the entire country (13 provinces with protected horticulture practices) with grafted plants (cucumber, melons, tomatoes and/or peppers). In this regard, the Secretariat solicited further explanation of the reasons for selecting the grafting alternative over other cost-effective technologies available, such as the use of solarization with reduced doses of chemicals.

10. The Secretariat also requested additional information on the logistical arrangements required to distribute grafted plants among all farmers in the 13 provinces with protected horticulture practices. For example, just the costs associated with transporting grafted plants could make the technology economically non-viable.

11. Subsequently, UNIDO indicated that the sites for the location of the four nurseries were selected taking into consideration that they would address over 70 per cent of MB consumption in protected horticulture. About 65 per cent of concerned farmers are located in these areas, and

the basic infrastructure (including roads) is available. Only 30 per cent of production would be subject to transport over a distance ranging from 30 to 220 km. The logistical arrangements for the provision of the grafted plants would be based on the distribution system in place for agriculture inputs.

12. The use of solarization was discussed with major stakeholders. However, it was not considered an effective alternative technology since production in protected horticulture is based on 2.5 cycles per year. The farmers would be unable to leave the soil for the three-week period required for the application of this technology. While the exposure time could be reduced with the application of alternative chemicals, there is strong Government policy to reduce the use of chemicals in agricultural practices, reduce dependence on imported goods and to rely as much as possible on local resources. Therefore, imports of alternative chemicals such as 1,3-D, chloropicrin or metam sodium would be more costly than for other countries. Under these circumstances, grafting is the most cost-effective technology to replace MB in protected horticulture in Cuba.

Flowers and coffee nurseries

13. The project proposes to replace MB with steam for the treatment of substrates used for flowers, ornamental plants and in coffee nurseries. The Secretariat raised its concern about the long-term sustainability of the steam alternative in Cuba for the following reasons:

(a) Implementation of the steam technology will result in four-year operating costs at US $76,729 for cut flowers, US $12,451 for ornamental plants and US $18,863 for coffee nurseries, notwithstanding that the price of fuel used in the calculation appears to be low (US $0.50/l);

(b) Other costs associated with the use of steam technology, such as water treatment to provide the quality needed for generating steam; water and fuel replenishment; machine maintenance; and machine breakdown and associated time delays, have not been considered in the proposal;

(c) The request for three boilers ($130,900) for the phase-out of 4.1 ODP tonnes of MB used in cut flowers cannot be justified for the small surface area to be treated (21 ha) and the very small number of farms involved (16). The cost-effectiveness value of this application, taking into consideration both capital and operating costs, is very high (US $53.67/kg);

(d) The two boilers requested for the coffee nurseries (US $57,200) will be used only in two provinces, with a total MB consumption of only 0.9 ODP tonnes. The cost-effectiveness value of this application, taking into consideration both capital and operating costs, is extremely high (US $84.51/kg). Furthermore, no alternative technology has been proposed for the other six coffee nurseries where MB is used; and

(e) On the basis of the operational capacity of the boilers (i.e., treatment of 15 to 20 m^3 of substrate per day), the total amount of substrate that could be treated

with the three boilers would be very limited (i.e., less than 25 per cent of the total substrate for ornamentals and less than 15 per cent of the total substrate for coffee nurseries).

14. Subsequently, UNIDO responded as follows:

(a) The project proposes steam for the treatment of substrates used for flowers and in coffee nurseries and soil fumigation in greenhouses; therefore, it cannot be compared with the projects in Lebanon and Morocco, in which the steam technology was for soil sterilization in open fields;

(b) The high operating costs associated with steam technology are based on a price of MB of US $2.90/kg, which is low compared to other countries (the price of MB is expected to increase after 2005 as many countries phase-out its use). The boilers for substrate fumigation are stationary and require less ancillary equipment and maintenance than the boilers used for soil fumigation. Furthermore, two boilers that were purchased by the Government (with its own resources) and were used in the tobacco sector, are now being use for sterilizing substrates for ornamentals plants;

(c) In regard to the coffee nurseries, the project proposes the treatment of substrate in the two provinces with the largest MB consumption (over 50 per cent), which could then be distributed to other provinces from there;

(d) The Government of Cuba is implementing an integrated pest management programme addressing ornamental plants and small coffee producers, combined with the use of rootstock resistant to some pathogens;

(e) The Government of Cuba considers the substrate treatment as part of a larger programme. Currently the Government is implementing an integrated pest management programme in the whole country addressing, among others, ornamental plants and coffee nurseries; and

(f) UNIDO, recognizing that the cost-efficiency of the project was low, convinced major stakeholders not to claim incremental operating costs. The small amount of MB used in these applications will result in lower cost-efficiency per kg when compare with other projects.

Grain and industrial facilities

15. For storage facilities, the alternative technologies that have been selected are phosphine combined with CO_2 and, in some cases, also with heat. For some industrial facilities, sulphuryl fluoride has been selected as the alternative technology. The Secretariat has the following comments:

16. According to the calculations provided in the project proposal, implementation of phosphine combined with CO_2 and heat for grain storage will result in operating costs of

US $83,953 over a four-year period, while the selection of phosphine with CO_2 only for rice and coffee will result in operating savings of US $159,894. The Secretariat pointed out that it is recognized that fumigation with phosphine is the method of choice for stored grain facilities around the world and requested clarification UNIDO regarding the selection of a very expensive alternative when other technically and economically viable technologies were available (i.e., phosphine alone or phosphine in combination with CO_2).

17. The Secretariat also noted that, based on the information in the proposal, sulphuryl fluoride is not registered in Cuba and, therefore, cannot be considered as a viable alternative technology for Cuba. Furthermore, the price of this chemical is 5 times more expensive than MB, making the long-term sustainability of this alternative doubtful.

18. UNIDO indicated that, based on research on methods of phosphine application, corrosion issues caused by the high doses of phosphine, and the risk of pest resistance, the project proposed the use of CO_2 in combination with phosphine. During project preparation, the national experts indicated that phosphine could not be used when fumigation could not be done under tarps. Under these special circumstances, heat is proposed to reduce the doses of phosphine and the exposure time. Currently, the Government is considering the registration of sulphuryl fluoride (according to the National Office for the Registry of Pesticides, there is no existing restriction on the registration of this chemical). While the price of the chemical is high compared to other alternatives, the project is proposing to apply it only in very specific situations, such as industrial facilities with a high risk of combustion.

Training programme

19. The Secretariat and UNIDO also discussed issues related to the cost of the training programme (equivalent to 22 per cent of the total project cost), which is high for the limited number of MB users in Cuba.

Conclusion

20. On the basis of the issues raised by the Secretariat, UNIDO agreed to replace the use of steam as the prevailing alternative technology for soil and substrates fumigation through a comprehensive integrated pest management programme that would minimize fumigating substrates except in cases of major pest infestation. It also included technical support to farmers that are currently using grafting with rootstocks resistant to some pathogens, and assistance for the introduction of compost for the preparation of suitable substrate used for flowers and in coffee nurseries (only in cases where the substrates or soil is highly infested, some sterilization technique could be used). UNIDO also agreed not to consider sulphuryl fluoride as an alternative technology for fumigation of some industrial facilities.

21. Subsequently, the cost of the project was adjusted accordingly. The agreed cost of the project is US $537,763 (US $22.31/kg).

Agreement between the Government of Cuba and the Executive Committee

22. A draft agreement between the Government of Cuba and the Executive Committee on the modalities for implementing the MB phase-out project is contained in Annex I to the present document.

RECOMMENDATION

23. The Executive Committee may wish to consider approving the project proposal in the light of the Secretariat's comments.

Annex I

AGREED CONDITIONS FOR PHASE-OUT OF METHYL BROMIDE IN CUBA (DRAFT)

1. The Executive Committee at its 26th Meeting approved a project to phase out 48 ODP tonnes of methyl bromide used in the tobacco sector at a total cost of US $1,673,324, to be implemented by UNIDO. The project was completed in December 2002 and 48 ODP tonnes of methyl bromide were phased-out. The Government of Cuba has also issued regulations banning the use of methyl bromide in the tobacco sector.

2. The Executive Committee at its 44th Meeting approved in principle an additional US $537,763 as the total funds that will be available to Cuba to achieve the complete phase-out of methyl bromide used for soil fumigation in horticulture, flowers and ornamentals, coffee nurseries, storage and food facilities (24.1 ODP tonnes), representing the total consumption of controlled uses of methyl bromide.

3. As reported to the Ozone Secretariat, the methyl bromide baseline for Cuba is 50.47 ODP tonnes and reported consumption for 2003 is 24 ODP tonnes. Cuba therefore appears to be in compliance with the Montreal Protocol's 20 per cent reduction, since allowable consumption for 2005 is 40.4 ODP tonnes.

4. Reductions in accordance with the terms of the project in horticulture, flowers and ornamentals, coffee nurseries, storage and food facilities, and other commitments presented in the project document, would ensure that Cuba would meet the reduction schedule outlined below. In that regard, Cuba commits through the implementation of the projects, to reduce total national consumption of controlled uses of methyl bromide to no more than the following levels of consumption:

2005	24.1 ODP tonnes
2006	16.2 ODP tonnes
2007	8.4 ODP tonnes
2008	0.0 ODP tonnes

5. Funding for the projects will be disbursed by UNIDO in three instalments: US $215,105 in 2005, US $161,329 in 2006, and US $161,329 in 2007. Funding disbursement for the project will be conditional on the achievement of project milestones and the specific reduction schedule outlined above. In case of unjustified delays, UNIDO will inform the Executive Committee and will cancel any further release of funds until all problems are solved and the schedule is brought back on track. If unjustified delays continue, the projects may be cancelled.

6. The Government of Cuba, in agreement with UNIDO, will have flexibility in organizing and implementing the project components that it deems most important in order to meet the methyl bromide phase-out commitments noted above. UNIDO agrees to manage the funding for the project in a manner designed to ensure that the specific methyl bromide reductions are achieved.
