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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
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PROJECT PROPOSALS: ARGENTINA

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

Foam

- Conversion from CFC-11 to methylene chloride/LIA technology in the manufacture of flexible polyurethane boxfoam at Fasax UNDP
- Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray, PIP and boxfoam) at Mendoza de Poliurethanos UNDP
- Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray) at O.S.I.R. UNDP
- Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray) at Obras de Ingenieria UNDP
- Phasing out CFC-11 by conversion to HCFC-141b as a blowing agent in the manufacture of rigid P.U. foams: umbrella project (Tarco, Mondino, Schaum, Fadep, Occhipinti and Friolatina) UNIDO

Fumigant

- Demonstration project for testing methyl bromide alternatives in post-harvest disinfestation for cotton and citrus IBRD
- Phase-out of methyl bromide in strawberry production with alternative chemicals and steam pasteurisation UNIDO
- Phase-out of methyl bromide in protected vegetables and flower crops with alternative chemicals and steam pasteurisation UNIDO

**PROJECT EVALUATION SHEET
ARGENTINA**

SECTOR: Foam ODS use in sector (1998): 1,370 ODP tonnes

Sub-sector cost-effectiveness thresholds: Flexible US \$ 6.23/kg

Project Titles:

- (a) Conversion from CFC-11 to methylene chloride/LIA technology in the manufacture of flexible polyurethane boxfoam at Fasax
- (b) Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray, PIP and boxfoam) at Mendoza de Poliurethanos
- (c) Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray) at O.S.I.R.
- (d) Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray) at Obras de Ingenieria
- (e) Phasing out CFC-11 by conversion to HCFC-141b as a blowing agent in the manufacture of rigid P.U. foams: umbrella project (Tarco, Mondino, Schaum, Fadep, Occhipinti and Friolatina)

Project Data	Flexible slabstock	Rigid	Rigid	Rigid	Rigid
	Fasax	Mendoza	O.S.I.R.	Obras de Ingenieria	Umbrella 6 SMEs
Enterprise consumption (ODP tonnes)	50.00	49.30	20.00	18.50	34.10
Project impact (ODP tonnes)	50.00	43.90	17.80	16.50	30.35
Project duration (months)	36	36	36	36	18
Initial amount requested (US \$)	129,000	300,940	139,374	121,128	305,431
Final project cost (US \$):					
Incremental capital cost (a)	85,000	112,500	75,000	75,000	187,000
Contingency cost (b)	8,500	11,250	7,500	7,500	6,700
Incremental operating cost (c)	158,500	110,659	44,892	41,525	33,348
Total project cost (a+b+c)	252,000	234,409	127,392	124,025	227,048
Local ownership (%)	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%
Amount requested (US \$)	252,000	234,409	127,392	124,025	227,048
Cost effectiveness (US \$/kg.)	5.04	5.34	7.16	7.52	7.51
Counterpart funding confirmed?					
National coordinating agency	OPROZ	OPROZ	OPROZ	OPROZ	APPRAISE
Implementing agency	UNDP	UNDP	UNDP	UNDP	UNIDO

Secretariat's Recommendations					
Amount recommended (US \$)		234,409	127,392	124,025	227,048
Project impact (ODP tonnes)		43.90	17.80	16.50	30.35
Cost effectiveness (US \$/kg)		5.34	7.16	7.52	7.51
Implementing agency support cost (US \$)		30,473	16,561	16,123	29,516
Total cost to Multilateral Fund (US \$)		264,882	143,953	140,148	256,564

PROJECT DESCRIPTION

Sector Background

- Latest available total ODS consumption (1998)	1,893.6	ODP tonnes
- Baseline consumption* of Annex A Group I substances (CFCs)	5,016.7	ODP tonnes
- 1998 consumption of Annex A Group I substances	1,066.9	ODP tonnes
- Baseline consumption of CFCs in foam sector	Not reported	
- 1998 consumption of CFCs in foam sector	1,370**	ODP tonnes
- Funds approved for investment projects in foam sector as end of 1998	US \$ 8,231,658	
- Quantity of CFC to be phased out in foam sector as of end of 1998	1,430.5	ODP tonnes
- Quantity of CFC phased out in foam sector as of end of 1998	749	ODP tonnes
- Quantity of CFC to be phased out in foam projects approved in 1999 (27 th and 28 th Meetings)	93.8	ODP tonnes
- Funds approved for investment projects in the foam sector in 1999 (27 th and 28 th Meetings)	US \$ 289,601	

*Baseline consumption of Annex A controlled substances refers to average of the consumption for the years 1995-1997 inclusive.

**Based on information provided in the project documents.

FLEXIBLE SLABSTOCK

Fasax

1. Fasax used of 50 tonnes of CFC-11 in production of flexible polyurethane boxfoam in 1998. Under this project, the production is to be converted to methylene chloride/LIA technology. The project includes retrofit of the existing boxfoam dispenser with a methylene chloride metering system (US \$5,000), a softening agent metering system (US \$15,000) and ventilation (US \$30,000). Other costs include trials (US \$15,000), technology transfer and training (US \$20,000). There is incremental operational cost for four years of US \$158,000 due to the higher cost of the Santofom additive used for conversion.

2. The project document indicates that the enterprise has determined that it wishes to convert the boxfoam operation to a more efficient slabstock continuous production line, and may incorporate LCD technology in order to eliminate the use of CFCs as well as methylene chloride in its flexible slabstock production. Thus it wishes the project to be approved with the stipulation that the eligible funds may be applied against its expansion programme.

RIGID FOAM PROJECTS

Mendoza de Poliurethanos

3. Mendoza de Poliurethanos used 49.3 tonnes of CFC-11 (average 1996-98) in rigid foam applications (spray, pour-in-place and boxfoam). Under this project, the production is to be converted to HCFC-141b as an interim technology, with later conversion to an ODS-free technology. The project includes retrofit of two Glas-Craft dispensers and a new boxfoam dispenser with ventilation (US \$90,000) with 25% contribution by the company for technology upgrade. Other costs include trials (US \$15,000), technology transfer and training (US \$15,000) and incremental operational cost (US \$102,940).

O.S.I.R. and Obras de Ingenieria

4. O.S.I.R. and Obras de Ingenieria used 20 tonnes and 18.5 tonnes of CFC-11 respectively in sprayfoam applications in 1998. Under the projects, the production is to be converted to HCFC-141b as an interim technology, with later conversion to an ODS-free technology. The projects include replacement of three low pressure dispensers with high pressure dispensers (US \$60,000). Other costs include trials (US \$5,000), technology transfer and training (US \$10,000) per project. Incremental operational costs amount to US \$80,736 and US \$38,628 respectively.

Umbrella Project

5. The six companies (Tarco, Mondino, Schaum, Fadep, Occhipinti and Friolatina) in this umbrella project use 34 ODP tonnes of CFC-11 per annum to manufacture rigid foam products such as rigid foam panels for cold stores, sprayfoam for tanks. The companies operate a range of low pressure and low output high pressure dispensers. The chosen interim replacement is HCFC-141b. The final conversion will be an all-water or HFC based system when available in the market. The project includes the purchase of three new machines (low output high pressure dispenser and low pressure foam dispenser at US \$40,000) and the retrofitting of three existing machines. Incremental operating costs are also included. The choice of HCFC-141b and the envisaged time frame for the phasing out of ODS is in line with the programme of the Government of Argentina.

Justification for the Use of HCFC-141b

6. Both UNDP and UNIDO have provided justifications for the use of HCFC-141b. The Government letter of consent has also been provided. Copies are attached to this Evaluation Sheet.

Impact of the Projects

7. The four rigid foam projects will eliminate 108.55 ODP tonnes of CFC-11. This constitutes 2.1% of the country's baseline consumption and 10.2% of its 1998 consumption of Annex A Group I substances.

8. The total consumption of CFC to be phased out in all the projects submitted to the 29th Meeting is 158.55 tonnes. This will eliminate about 15% of its 1998 consumption but 3.1% of the baseline consumption of Annex A Group I substances.

Project Implementation Time Frame

9. While UNIDO indicates that its rigid foam projects will be implemented in 18 months (1 ½) years, UNDP indicates implementation period of 36 months (3 years) for similar projects. UNIDO also indicates that its time frame for phasing out the ODS is in line with the Government's programme.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Flexible Slabstock

Fasax

1. In view of the fact that the company (Fasax) has indicated its intention not to use the LIA technology and was requesting Executive Committee approval to apply the approved grant to its expansion programme, the Secretariat had difficulty addressing the project cost eligibility. The Secretariat was concerned that if the company was not intending to use the LIA technology whose cost is high on account of very high operational cost (US \$158,000) of a substance it is not going to use, and the project cost was based on this technology, a precedent would be set where companies would request funding based on a high cost technology only to apply to an ineligible development cost. Therefore it advised UNDP to use methylene chloride which is a standard technology (in all countries except those where the LIA technology has been introduced through UNDP or World Bank projects) for which the Executive Committee has approved a specific methodology for calculation of incremental costs (UNEP/OzL./Pro/ExCom/6/20, para. 85 (b) and Annex IV). However, UNDP insisted that the calculation should be based on LIA in view of the country's standing objection to the use of methylene chloride.

2. The cost of the project based on LIA will be US \$252,000 including US \$158,500 in incremental operational costs due to the high cost of the Santofoam additive of the LIA technology. The cost of the project based on methylene chloride will be about US \$80,000 in view of the savings of about US \$14,500. The capital costs in both cases are the same. The occupational safety and hygiene measures undertaken in both cases are the same since the methylene chloride continues to be used with the LIA.

3. In an effort to ascertain the regulatory basis for the presumption against the use of methylene chloride in projects in Argentina, the Secretariat requested evidence of national regulation in this regard. UNDP provided a letter from the office of Ozone Programmes (OPROZ) in Argentina to UNDP/UNOPS which indicated that as of 1995 majority of the flexible slabstock companies had converted to methylene chloride for economic reasons, as at that time, methylene chloride was three times cheaper than CFC-11. However, investment projects for almost all major producers of flexible slabstock foam have been submitted and

approved for implementation after this date. Six projects with a total CFC-11 consumption of 502 tonnes were submitted and approved at the 18th Meeting (November 1995) at the total cost US \$2.65 million due to the high cost of technologies employed, while one project with consumption of 95 tonnes was again approved at the 20th Meeting (October 1996) at the cost of US \$561,000. Other smaller projects have subsequently been submitted for the country. UNDP has been requested to provide clarification of the CFC-11 consumption situation.

4. The letter also indicated that no regulation has been enacted, but (methylene chloride) beside being inconvenient in view of its toxicity, its use by the companies would put them in an inferior competitive situation compared with companies who were producing foam with expensive machines paid for by the Multilateral Fund. This issue of distortion of the competitive situation was however disputed by UNDP indicating that all-out use of methylene chloride would even improve the competitive situation, albeit marginally.

5. In view of the above information:

- (a) The Secretariat was not able to ascertain the eligibility of this or other projects in the sub-sector for funding in view of uncertainties in the CFC consumption, i.e. whether the companies are included in those that had already phased out CFC use in 1995 or not as the Secretariat does not have any means of verification;
- (b) Agreement could not be reached with the implementing agency on the basis of calculation of eligible grant, whether it should be based on LIA or methylene chloride.

The project is therefore submitted for individual consideration.

Rigid Foam Projects

6. The Secretariat and the implementing agencies (UNDP and UNIDO) have discussed and agreed on the costs.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the projects for Mendoza de Poliurethanos, O.S.I.R., Obras de Ingenieria and the Umbrella project with the level of funding and the associated support costs indicated below.

	Project Title	Project Funding (US\$)	Support Cost (US\$)	Implementing Agency
(b)	Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray, PIP and boxfoam) at Mendoza de Poliurethanos	234,409	30,473	UNDP
(c)	Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray) at O.S.I.R.	127,392	16,561	UNDP
(d)	Phase-out of CFC-11 by conversion to HCFC-141b technology in the manufacture of rigid polyurethane foam (spray) at Obras de Ingenieria	124,025	16,123	UNDP
(e)	Phasing out CFC-11 by conversion to HCFC-141b as a blowing agent in the manufacture of rigid P.U. foams: umbrella project (Tarco, Mondino, Schaum, Fadep, Occhipinti and Friolatina)	227,048	29,516	UNIDO

**PROJECT EVALUATION SHEET
ARGENTINA**

SECTOR: Fumigant ODS use in sector (199): ODP tonnes

Sub-sector cost-effectiveness thresholds: N/A

Project Titles:

- (a) Demonstration project for testing methyl bromide alternatives in post-harvest disinfestation for cotton and citrus
- (b) Phase-out of methyl bromide in strawberry production with alternative chemicals and steam pasteurisation
- (c) Phase-out of methyl bromide in protected vegetables and flower crops with alternative chemicals and steam pasteurisation

Project Data	Methyl bromide	Methyl bromide	Methyl bromide
	Demonstration	Strawberry production	Vegetables & flower crops
Enterprise consumption (ODP tonnes)		121.00	210.00
Project impact (ODP tonnes)		121.00	210.00
Project duration (months)	24	60	60
Initial amount requested (US \$)	482,130	2,769,790	3,420,010
Final project cost (US \$):			
Incremental capital cost (a)	438,300	1,413,490	2,641,900
Contingency cost (b)	43,830	96,000	90,000
Incremental operating cost (c)		1,260,300	688,110
Total project cost (a+b+c)	482,130	2,769,790	3,420,010
Local ownership (%)	100%	100%	100%
Export component (%)	0%	0%	0%
Amount requested (US \$)	482,130	2,769,790	3,420,010
Cost effectiveness (US \$/kg.)		22.90	16.30
Counterpart funding confirmed?			
National coordinating agency	UEPRO - SENASA	OPROZ	OPROZ
Implementing agency	IBRD	UNIDO	UNIDO

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

PROJECT DESCRIPTION

- (b) Phaseout of methyl bromide in protected vegetables and flower crops with alternative chemicals and steam pasteurization**
- (c) Phaseout of methyl bromide in strawberry with alternative chemicals and steam pasteurization**

Background

1. In 1998, the consumption of methyl bromide (MB) in Argentina was estimated at 536 ODP tonnes. Approximately 487 ODP tonnes are used for soil fumigation: 186 ODP tonnes for horticulture, mostly for tomatoes, celery and peppers; 138 ODP tonnes in tobacco seedbeds; 42 ODP tonnes for ornamental and cut-flowers; and 121 ODP tonnes for strawberry crops. Consumption for citrus and cotton post-harvest operations is 18 ODP tonnes and for quarantine and storage of grains and legumes it totals 31 ODP tonnes.

2. There is no information on export of horticulture products and strawberries. According to the National Statistics Institute, the total value of exports for 1997 was estimated at US \$351 million (including all vegetables).

3. The Executive Committee approved at its 23rd Meeting a project to demonstrate the technical and economic feasibility of soil solarization, steam pasteurization, non-soil cultivation techniques and alternative chemicals as part of an integrated pest management (IPM) system as alternative technologies to the use of MB in the production of tomato, cut flowers and strawberries, and allocated US \$482,000 to UNIDO for its implementation.

Horticulture project

4. The Government of Argentina is submitting a project to phase out 210 ODP tonnes of MB used for soil disinfestation in protected vegetable and flower crop production, covering 728 ha which represents the entire commercial production in the country. The selected alternatives are steam pasteurization, alternative chemical products and soil-less cultivation for seedling production, which have been successfully tested in the demonstration project under current implementation.

5. In greenhouses, MB is used for substrate sterilization for seedling production (mostly using one-pound cans) and for soil treatment, which is usually applied through a drip irrigation system. Of the 228 ODP tonnes of MB used in greenhouses, 18 ODP tonnes is consumed used for seedling production (this application will be covered under a project to phaseout MB in tobacco seedlings to be submitted to a future meeting of the Committee).

Strawberry project

6. The Government of Argentina is also submitting a project to phase out 121 ODP tonnes of MB used for soil disinfestation in strawberry production, covering 130 ha of strawberry nurseries and 970 ha of production (open field) representing the entire commercial strawberry production in the country. The selected alternatives are steam pasteurization and alternative

chemical products, which have also been successfully tested in the demonstration project under current implementation.

7. The application of MB in large-scale farms is carried out through equipment specifically designed for fumigation with the substance. In small farms, application is carried out through the drip irrigation system; while this method may not be efficient in terms of utilization of the gas, it is easy to apply and has led to a substantial increase in the consumption of MB over the last three years in the country.

Alternatives selected

8. The alternatives selected for phasing out MB are:

- (a) Metam sodium (chemical), which has been tested in the field and has been demonstrated as effective in controlling the main soil-borne pests and diseases, without provoking major changes in production methods. It is presently the cheapest and easiest alternative to use;
- (b) Steam pasteurization has also been tested in the field with good results particularly where soil is heavily infested with weeds and nematodes (as is the case in some horticultural regions). Special equipment is necessary to implement this technology (31 steam generators and ancillary equipment for the two projects at a cost of US \$60,000 per unit). Due to the potential higher operating costs of this technology as compared to MB or metam sodium and to guarantee the sustainability of the projects, only the area used for the production of flowers, strawberry nurseries and part of the strawberry produced in open-fields will be treated with steam pasteurization.

Training programme

9. Due to the present nature of production of vegetables, flowers and strawberries in the country (many small farmers distributed in different regions), the two projects include comprehensive training programmes using extension agents from the National Institute of Technology for Agricultural and Livestock (INTA). These agents need to be trained prepared in the application of the alternative technologies in order to disseminate the knowledge to farmers.

10. The two projects proposed the establishment of farmers' associations during the first year of project implementation, since they either do not exist or are poorly represented in terms of members. The farmer's associations will be responsible for: (i) keeping and maintaining the equipment provided under the project (steam boilers), (ii) providing steam service to associated farmers, (iii) receiving and distributing consumable agricultural inputs, and (iv) collecting fees associated with basic operating costs. Incremental operating costs will be financed by the project. As the project will pay only incremental costs, and products will be delivered directly to farmer's associations, the difference between the actual cost of the raw materials (metam sodium, petrol) and the amount the project covers will have to be paid by the association.

Implementation modalities

11. The project will be implemented by UNIDO under national coordination by the Ozone Office, in close cooperation with the SENASA (“Servicio Nacional de Sanidad Agroalimentaria”) and INTA.

12. The estimated time for the implementation of the two projects is 5 years.

Policy measures

13. During the preparation of these projects it was concluded that Argentina is prepared to phase-out the use of MB in vegetables, flower and strawberry production as soon as the following basic conditions are met: (i) the proposed alternative technologies have been acquired by the farmers; (ii) the necessary equipment has been installed; (iii) technical staff of public and private institutions involved have been trained; and (iv) the farmers’ associations have been properly established.

14. At the conclusion of the projects, the Government of Argentina will issue a regulation forbidding the use of MB in the production of vegetables, flower crops grown under greenhouses and strawberries. Also, the Government will establish a programme for the qualification and authorization of fumigators of MB, for making its use through regulations.

15. Instead of freezing consumption of MB by the year 2002, the Government has agreed to reduce all fumigation uses of MB, commencing in January 2002. Only essential and critical uses of MB will be allowed after 1st January 2007.

SECRETARIAT’S COMMENTS AND RECOMMENDATIONS

COMMENTS

(a) Demonstration project for testing methyl bromide alternatives in post-harvest disinfestation for cotton and citrus

1. The project is to demonstrate the technical and economic feasibility of phosphine (citrus and cotton), carbon bisulphide (cotton), cold treatment (citrus) and integrated pest management systems as alternative technologies to the use of methyl bromide: It will be executed by SENASA (National Phytosanitary Service), which will be accountable for expenditures made under the project, and will prepare annual progress reports on the achievements of the overall project. A bidding process for contracting research and test services will be established.

2. The project was first submitted to the 28th Meeting of the Executive Committee (UNEP/OzL.Pro/ExCom/28/24). However, based on a recommendation by the Sub-Committee on Project Review, the Executive Committee deferred consideration of the above project until the nature of the application of methyl bromide in the project could be verified (decision 28/37).

3. Through the World Bank, the Government of Argentina submitted an official letter stating that “In the case of raw cotton and cotton fibre, methyl bromide fumigation is carried out

to eliminate the boll weevil; a serious problem that reduces productivity by over 30 per cent. In the case of post-harvest citrus crop treatment, the presence of fly larvae makes it difficult to sell this fruit on the increasingly demanding local market. Since methyl bromide is an immediate and effective means of fighting these pests, its use is not only widespread but also growing and contributing to the depletion of the ozone layer. We therefore reiterate our immense interest in carrying out such an important project and clarify that it does not involve quarantine and pre-shipment treatment”.

4. The Secretariat and the World Bank have agreed on the cost of the project as shown in the table below.

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Demonstration project for testing methyl bromide alternatives in post-harvest disinfestation for cotton and citrus	375,000	48,750	World Bank

5. The Executive Committee may wish to consider the project in light of the explanation provided by the Government of Argentina regarding quarantine and pre-shipment applications.

- (b) **Phaseout of methyl bromide in protected vegetables and flower crops with alternative chemicals and steam pasteurization**
- (c) **Phaseout of methyl bromide in strawberry with alternative chemicals and steam pasteurization**

Selection of alternatives

6. Findings from the demonstration project under implementation shown that metam sodium is an effective chemical in controlling main soil-borne pests and diseases, has a low cost and is easy to use. Based on these finding, the Secretariat sought a clarification from UNIDO on the reasons for not replacing MB fully with metam sodium. UNIDO explained that the main problem present in several regions in the country is a perennial weed, with a tuber, that grows well under the soil. This weed is very resistant to herbicides, and tilling processes disperse it instead of eliminating it. Good management practices are not very effective to control weeds as the seeds are diffused through wind and human activities. Thus, it has been demonstrated that steam is the only effective alternative to control this weed.

7. The Secretariat also requested an explanation of the reasons for not considering non-soil cultivation techniques as an alternative technology to MB, which was included under the demonstration project under current implementation. UNIDO stated that based on the results of the demonstration project it was not a cost-effective technology in the case of Argentina for the following reasons: (i) direct costs are more than double with non-soil cultivation techniques as compared to standard cultivation methods, (ii) the technology requires investment that is not affordable by most of the growers (farmers have to change to greenhouses); this technology also requires a cultural change, which implies major changes in farm operation; (iv) labour required

to implement the technology is not yet available; and (v) the necessary raw materials (chemical and substrates) are very expensive.

Capital costs

8. The Secretariat questioned the cost of steam generators (at US \$60,000 each) taking into account that the cost of similar equipment approved under demonstration projects was US \$27,000 and that the cost of small self-contained steam generators in the United States is US \$6,000, and the large number of units requested (15 units for the vegetables project and 16 units for the strawberries project). Responding to the query on the cost of the equipment, UNIDO stated that the size of the steam generators proposed by the Secretariat is very small, mainly used for substrate treatment, and they have a low working capacity. The equipment that has been proposed in the projects would be able to work under surface and local conditions; the surface area to be treated is large and thus the equipment must be capable of treating the area in a limited period of time compatible with the crop needs (15 to 30 days for strawberry crops).

9. Regarding the number of units requested, UNIDO indicated that the number was based on the number of days in which the technology can be technically applied and the number of hectares to be treated. Considering an efficiency of 2 days/ha and a season of two months for the treatments, 31 steam boilers could treat around 900 ha; this estimation, however, does not account for the time to transfer the equipment to the different farms and maintenance. Further to discussion on this issue, UNIDO agreed to reduce the size of the surface area to be treated with steam (from 490 ha to 310 ha in strawberry crops and from 446 ha to 300 ha in horticulture) and proportionally increase the area to be treated with metam sodium (from 610 ha to 790 ha in strawberry crops and from 282 ha to 428 ha in horticulture). As a result, the total number of steam generators was adjusted to 20 units (capital and operating costs were adjusted, accordingly).

Training programmes and farm associations

10. The Secretariat considered that the costs for the training programmes were high (US \$1,741,900 for the vegetables project and US \$453,490 for the strawberry project), which covers the fees for 34 professional staff, meetings and visits to farms, especially in the light of the training programme under the demonstration project. UNIDO responded that the scope of the training component in the demonstration project is very limited. While dissemination of the results of the demonstration project are being carried out successfully, they do not reach all the farmers involved in the investment project, nor is there the capacity to make changes. In the investment project, besides the training of the trainers, training of the farmers is the main core of the programme. The success of the investment project is based on the change and adoption of the alternatives, breaking the natural resistance to change from MB, because of the good results obtained when using this gas. The main purpose of the training programmes within the investment projects is to group the farmers in order to provide them with the services necessary to phase out MB and establish an extension programme.

11. In order to reduce the costs of the training programmes, instead of hiring the staff on a full time basis (at US \$1,500/month), UNIDO considered that the trainers could be hired on a part time basis (US \$1,000/month). Thus, the training costs were adjusted accordingly.

12. The projects proposes to create and establish 22 farmer associations (15 for the vegetables project and 7 for the strawberries) and train their staff to initiate and carry out the extension services (training and steam applications). In this regard, the Secretariat and UNIDO discussed the potential failure of such approach, especially when established for the first time. UNIDO stated that while the probability of failure for farmers associations is very high, failure rate in any extension system can be reduced by proper selection of staff and training. Thus, this became the only possible solution.

Operating costs/savings

13. The calculation of the operational costs was based on amounts used and prices of chemicals (either MB or metam sodium), petrol used for generation of steam, labour and equipment (tractor to pull the steam generators). During the project review, the Secretariat indicated that the calculations were very sensitive to small changes in the amounts of chemicals, and/or raw materials used and/or their costs. For example, the dosage rate of application of metam sodium in greenhouses for vegetables has been estimated at 1,000 liters/ha, which is similar to the maximum recommended level of application of this chemical in the United States. The cost of petrol in the project proposals was estimated at US \$0.42/liter while this price in the demonstration project under implementation was US \$0.40/liter. This small difference (US \$0.02) is equivalent to US \$128/ha in savings.

14. UNIDO informed the Secretariat that the requirements for fertilizers, plastics, labor, and other material were furnished by farmers. There are many differences in the use of these inputs among farmers, especially when location is taken into consideration. As the project can not contemplate every different situation an average was taken into account for the calculation of operating costs. Small modifications for these inputs do not change the direct costs dramatically, and for estimation purposes, the support of these figures was considered good enough. The amount of metam sodium was taken from the recommendations given by the companies selling the products (in greenhouses the dosage varies from 1,000 to 1,250 liters/ha of commercial product), which have proven to be effective during the demonstration project. Average prices in Argentina for these inputs were considered.

15. The Fund Secretariat and UNIDO are still discussing issues associated with the incrementality of some of the projects components, including the operating costs. The results of the discussions will be communicated to the Executive Committee, accordingly.

RECOMMENDATION

1. Pending.