OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

23177

AGRO CONSULTING S.A.

UNIDO CONTRACT 2005/038

PROJECT No: MP/BRA/05/001
PURCHASE ORDER No.: 16000942

FINAL REPORT

November 2005

TABLE OF CONTENTS

1. INTRODUCTION

Agro Consulting S.A. entered in agreement with UNIDO on 18 of October 2005. This is the final report mentioned in Annex C of the contract 2005/038

2. FLOWERS SECTOR

2.1 Activities undertaken

The main activities undertaken were the following:

Activity	Output
Contact the main producers and associations in Holambra, Ibiuna, Atibaia, Arujá, Dutra Road and Gravatá	Workplan forfield visits
Holding discussions with the main producers and associations in Holambra, Ibiuna, Atibaia, Arujá and Dutra Road and Gravatá concerning 2003/2004 consumption and present consumption. Cross checking the data with previous reports	Full picture of past and present consumption
Discussions with: In Holambra: Cooperflora, Van Zantem, Bakker, Terra Viva, AAFAN, AAFHOL In Atibaia: Oikawa, Aoyama, Santa Rosa, Asociacao Proflor, and Proagro group In Arujá: Association Aflord In Ibiuna: Association Sudflora In Gravatá: Cooperativa Floragestre	Agreements on: ➔ Selection of the alternate technology. ➔ Agreement on the type and amount of the equipment to be provided by UNIDO ➔ Agreement on training ➔ Agreement on personnel to be provided by the users ➔ Agreement on fuel costs to be at users's charge ➔ Agreement on water supply, electrical connections, etc. ➔ Agreement on equipment mobility and steaming programme ➔ Agreement on the number of boilers and solar dryers

Activity	Output
	➔ Agreement on the steam injection system (Mobilvap)
Discussions with the representatives of the Associations and some companies on the content of the minutes	Minutes of the meetings and agreements signed

2.2 Associations/Companies visited and agreements achieved

2.2.1 Holambra (SP)

This region, is the largest consumer of MB in the flowers sector in Brazil. The main consumers, within the region are the following:

- "Associação de Agricultores Familiares de Artur Nogueira AAFAN".

This small association is of about 10 farmers producing plants in pots. They cultivate about 1.6 Hectares and use 0.7 tonnes of MB to treat recycled or new substrate. Their needs can be covered with 81 solarization boxes, which will be distributed among producers according to their consumption.

- "Associação de Agricultores Familiares de Holambra" AAFHOL

Likely the previous one, this is an association composed by 12 small growers producing plants in pots in an area of 2,46 hectares. They use 0.8 tonnes of MB for substrate disinfestation (new or recycled). In some cases they mix substrate and soil. Their needs can be covered with 93 solarization boxes to be distributed according to consumption.

- Cooperflora

This cooperative is composed of 54 members mostly producing cut flowers like Lysiantus, Gypsophila, Gerbera and Chrysanthemum. The cooperative will operate one 600 kg/hr boiler in an area of about 100 km. They have the means to transport the boiler. They have agreed to phase out their consumption of 4.5 tons of MB used by their associates scattered in Holambra, State of São Paulo and Andradas and Munhoz in Minas Gerais.

The cooperative has agreed to recruit and cover the cost of one boiler operator, which will be trained by the project in order to get the Brazilian license for operating low-pressure steam boilers. They will organize the steaming operation by themselves, charging a small amount per hectare in order to cover operator costs, maintenance and transport. Each farmer will supply the wood for the boiler

- Fazenda Terra Viva

Production area of this company is about 47 hectares in two sites: Santo Antonio de Posse and Arachá in the State of Minas Gerais at a distance of 500 kilometres. They are producing bulbs and cut flowers as solidago, chrysanthemum, lyatrix, zantandeschia and others. They have a consumption of 8.45 tonnes of MB.

Taking into account the distance between the production centre as well as the big area to be treated, the agreement is as follows: One 1200 kg/hr boiler with two injectors for Santo Antonio and one mobile 600 kg/hr boiler for Atachá.

The Company will provide the services of two boiler operators to be trained by the project in order to get the Brazilian license for operating low-pressure steam boilers

- Van Zanten Schoenmaker

This Company is specialized in the production of cuttings of chrysanthemums in 19 hectares of greenhouses. They consume 11 tons of MB. 50% of the capital of the enterprise is foreign (Holand) and therefore the enterprise qualifies for 50% of MB used.

During the negotiations their express their willingness to expand their already working steaming facilities in order to meet the 100% phase out and that the assistance from UNIDO was welcomed. However, when UNIDO's team approached the company for signing the agreement we were informed that the company policy was to phaseout 100% by next year and that they can do it with their own equipment which is sufficient to achieve this target.

- Flores Bakker

This Brazilian company is located near Holambra and produces cut flowers. The company works in area of 10 hectares and cultivates in greenhouses and open field. They consume 4.5 tonnes of MB.

Agreement was reached for one mobile 600 kg/hr steam boiler and one injection machine. The Company will provide and cover the cost of one boiler operator to be trained by the project in order to get the Brazilian license for operating low-pressure steam boilers

2.2.2 Atibaia (SP)

This is the largest MB consumer area with the largest number of consuming farmers. There are growers integrated in one association, large independent growers and some large companies. The number of growers is about 300.

In order to reach the maximum number of consumers Agro Consulting established a multi approach strategy, which consist is the following:

1 Negotiate directly with the large enterprises or important growers who can make an efficient use of the equipment by themselves or shared between them. Agreements were reached with Oikawa Flores (4.2 tonnes in 10 He), Flora Aoyama (3.2 tonnes in

7 He) and Rosas Santa Rosa (4 tons in 10 He). They will get one set of boiler plus injector each. They mainly produce rose cuttings, roses and gypsophila

2 Negotiate with the Association Proflor, in order to pool six boilers and to cover the steaming needs of their 48 associates. The association has a consumption of 30 tonnes of MB agreement was reached for the operation and transport of the boilers at association's own charge. The association as also agreed to recruit and cover the cost of six boiler operators, which will be trained by the project in order to get the Brazilian license for operating low-pressure steam boilers.

3 A pool of growers consuming 18 tons of MB, agreed to put the boilers in the hands of an enterprise of agrochemicals and agricultural inputs (PROAGRO), which will give the steaming service. The growers will, at the end of the project, keep the ownership rights but the operator will provide the service in the terms agreed by all of them. Agreement was reached for four 600 kg/hr boilers and four injectors

2.2.3 Arujá and Dutra Road (SP)

The Association AFLORD covers a large area from Guarulhos to São José dos Campos, (Guarulhos, Aruja, Itaquaquecetuba, Moji das Cruzes, Santa Isabel, Guararema, Jacarei, São José dos Campos and Taubaté).

This Asociation gives an important technical support to the growers in the area focusing in phytopathology and soil management. There are 86 members cultivating about 200 Hectares. Main production is cut flowers like lysiantus, gypsophila y chrysanthemum among others. They also produce flowers in pots and sterilize substrate. Their consumption is 9.4 tonnes of which 3.4 for substrate sterilisation.

In view of the large distances among users and the need to transport the boilers by road, it has been agreed to supply two 600 kg/hr boilers mounted on a "in road" platform, which requires special design and traffic department authorisation. For the treatment of substrate it has been agreed to supply 390 solarization boxes. As in other cases, the association has agreed to recruit and cover the cost of two boiler operators, who will be trained by the project in order to get the Brazilian license for operating low-pressure steam boilers.

2.2.4 Ibiuna (SP)

This region has many small growers, which are integrated in the Association SUDFLORA. The majority of them produce cut flowers in five municipalities at the SW of the State of Sao Paulo. The Association SUDFLORA has 78 members producing flowers in 60 Hectares with an MB consumption of 60 tonnes. 93% of the consumption goes to soil disinfestations and the rest to substrate disinfestations. Agreement has been reached to phaseout with five 600 kg/hr boilers and all equipments plus 230 boxes for substrate solar pasteurization. The Union of Rural Workers of Ibuna has cooperated actively in promoting the project and their assistance will be very important in monitoring the MB consumption.

2.2.5 Gravatá (PE)

The majority of growers of Gravatá are integrated in the association FLORAGRESTE which has 25 associates in an area of about 25 hectares. The main productions are chrysanthemum, lysiantus and gypsophilae in greenhouses and in open field. There are also producers of plants in pots using substrate, which needs to be fumigated for initial use and occasionally re-use.

In view of the relatively low consumption, about 9 tonnes, it was originally planned to have one single boiler of 600 kg/hr. However, in view of the large distances between farms, it ha been agreed to supply two boilers plus accessories and 181 boxes for solar sterilization.

The Association will take care of the management of the boilers once adequate training has been provided. FLORAGESTRE also agreed to give steaming service to any other grower in the region not belonging to the association.

3. STRAWBERRIES SECTOR

The main producer area in Brasil, which supplies Sao Paulo area, is located between Atibaia and Guarulhos.

Agro Consulting recruited Dr. Aurelio de Abreu who is a producer of strawberry runners to identify areas of consumption and possible phaseout agreements. Dr. Abreu informed that prices of strawberries in Brazil were quite low and most of the producers were small, with low technology and not using any MB. This was confirmed by the three producers which were visited namely: MM: A. Souza brothers, H. Honda and S. Cardoso.

Dr. Abreu confirmed that some producers of runners were using Metam Sodium with mixed results and Fusarium problems and it was decided that the future strategy should focus on training and the use of injection machines in order to get more consistent results

4. SUGGESTED STRATEGY AND OPERATIONAL ARRANGEMENTS FOR PROJECT IMPLEMENTATION

Steam soil fumigation is already in use in Brazil as well as soilless cultivation using locally produced substrates of inconsistent quality. Steam is properly used in some cases but many producers did not have adequate know-how and face serious pathologies mainly fungi and nematodes attacks.

Video projections and performance of the steam injection machine used by UNIDO in Argentina created a very big expectation. However, during the discussions held with the farmers it was emphasized that proper application of steam was essential but not sufficient. Steaming needs to be part of an Integrated Pest Management (IPM) approach. Cases like the ones of some producers in Gravatá, who had very big problems of nematodes (after fumigating with MB) due to the use of contaminated water from the river are common.

The above considerations support the conclusion that project implementation should address three key issues:

- Delivering the best equipment available for soil fumigation in flowers like steam (wood fired boilers) and in substrate pasteurization (solar boxes)
- Intensive training in the field by agronomist well known locally in (a) steam application using the injector movilvap developed in Argentina (b) IPM
- Complete training in boilers operation and maintenance

The choice made by UNIDO of using wood firing boilers is excellent because, in Brazil conditions were large amount of wood is produced in plantations, it is cheap and ease to obtain. Present comparative operational costs of the three available fumigation techniques (1-3 D+ Pic is not registered) is as follows:

COMPARATIVE COST CALCULATION

TECNOLOGY	Units	Amount for treating 100 m2	Price for unit (Rs)	Cost in Rs for treating 100m2
Steam produced with diesel boilers	liters	40	1.79	71.6
Steam produced with wood boilers	m3	0.33	50	16.5
Methyl Bromide	kg	3.5	8.8	30.8

4.1 Equipment to be purchased and delivered

The following Table gives the total amount of boilers to be purchased, as well as the number of solar driers and injection machines

EQUIPMENT TO BE PURCHASED IN SOIL FUMIGATION IN FLOWERS

Sites	MB Consumed (kg)	MB eligible	MB use in substrate sterilization (kg)	MB use in soil sterilization (kg)	Area to be steamed (He)	Working months (25 days)	Number of boilers 600 kg/hr	m3 substrate	m3 per day over 200 days	Number of solar dryers	Number of injection machines "movilvap"
Dutra Road	9,400	9,400	3,400	6,000	17	8	2	9,444	47	394	2
Atibaia	60,200	60,300	5,000	60,300	172	8	13	13,889	69	579	13
Holambra	30,459	30,350	0	30,350	87	6	4	4,167	21	174	4
Ibiuna	28,600	28,600	2,100	26,500	76	6	5	5,833	29	243	5
Pernambuco	8,600	8,600	1,300	7,300	21	12	2	3,611	18	150	2
TOTAL	137,259	137,250	11,800		399		26	36,944	250	1,539	26

Note: One of the boilers in Holambra has double capacity (1200 kg/hr)

Terms of reference for the boilers and the injection machines as well as preliminary list of some suppliers of this kind of equipment have been included in Annexes 2 and 3.

In view of the relative small consumption and importance of the strawberries sector, the equipment needs should be established once the project is being implemented

4.2 Training

Training is the most delicate component of the project. Failure in reaching all farmers and other users involved in the project, would result in unacceptable risks. One of the essential points is to build a good team of trainers, living and well known in each area or region. The cost of transport has also be taken into consideration.

First step: Training of trainers (horticulturalists and one licensed boiler operator) in steam application in flowers, boiler operation, boiler maintenance and Metam sodium injection. Training should be preferably done in Argentina

Second step: Training of trainers in substrate pasteurization in Embrapa. Brasil

Third step Trainer farmers and farmer's designated boilers operators, in operation and maintenance at the occasion of each boiler delivery, installation and commissioning. It would the be advisable to deliver boilers by area or region in order to minimize travel and reduce time

Fourth step: training farmers on steam application and IPM. At least one seminar per area shall be organized. Field training to be delivered by each regional/area part time trainer.

Fifth step: Refreshment of training in boilers operation and maintenance by means of periodic visits undertaken by the boiler's trainer

Sixth step: periodic visits by the field project coordinator to the regional area trainers and to farmers to identify problems and coordinate good and bad experiences

Seventh steep: Strawberries trainer will visit all runners producers in Brazil, discuss the introduction of Metam Sodium injection machines and try to identify possible consumers which might not be properly identified during the survey

Eight step: organization of a national seminar to which ants control companies would be invited to attend. A lecture by a well- known international expert in sulfuril fluoride applications shall be invited. Registration of sulfuril fluoride shall be examined and promoted

Ninth step: Series of regional seminars with farmers to share experiences.

4.3 Personnel needed and organizational matters

The following table summarized the needs in personnel:

REGION	BACKGROUND OF THE TRAINER	POST	TRAVEL INVOLVED	WORK/MONTHS
All	Agronomist/horticulturalist	Field Coordinator	To all areas	18 w/m

Holambra	Agronomist/horticulturalist	Area trainer in steaming and IPM in flowers	Holambra	
All	Boiler licensed operator and mechanical specialist	Boilers training operator	All regions	12 w/m.
Atibaia	Agronomist/horticulturalist	Area trainer in steaming and IPM in flowers and strawberries	Within the area and to the rest of Brazil for strawberries	18 w/m
Ibiuna	Agronomist/horticulturalist	Area trainer in steaming and IPM in flowers	Within the area.	18 w/m
Dutra Road	Agronomist/horticulturalist	Area trainer in steaming and IPM in flowers	Within the area	18 w/m
Gravata	Agronomist/horticulturalist	Area trainer in steaming and IPM in flowers	Within the area	18 w/m

The project should therefore have:

1. A General Manager, preferably horticulturalist, to manage the whole project.
2. A Field manager who will coordinate the four/five area technicians who have to be well known in each region and also based in the Region. The Field manager shall also deliver the technical training in each take one of the regions
3. Ideally, one of the area trainers should be knowledgeable in strawberries cultivation. If not available, then another specialist shall be recruited
4. A steam boiler specialist or a subcontracted Company to assist in the start up of the boilers and to train boilers operators made available by each industry or association
5. All technicians including the project manager and the boilers operator should be trained preferably in Argentina where UNIDO has successful project operating with steam

The Field project manager shall visit each area at least once every two months and be in permanent contact with all area trainers. He should produce a report every three months with:

- The status of equipment delivery and start-ups
- Activities undertaken by all trainers ad boiler operator trainer
- MB phaseout
- Difficulties and problems encountered, if any

ANNEX I

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the Company Flores Bakker Viva, which took place on 18.10.2005 in Holambra

1. Description of the Association

1.1 Address: Sitio Tres Rios. Rodavia Campinas-Mogli Mirim SP 340-Km 141.5 1.2 Contact person: Mr. Johannes M. Bakker
1.3 Phone: (19) 3802 1197
1.4 e-mail: floresbakker@terra.com.br
1.5 Crop area: 10 He
1.6 Crops and crop distribution: Cut flowers
1.7 Approximate Methyl Bromide consumption in 2003: 4.5 ODS tonnes
1.8 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector:
2.2 Description of the equipment: UNIDO will supply one mobile 600 kg/hr, 3 bars boilers (wood fired) with all accessories.

These equipments will be transferred to the Company at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover one-year cost of an horticulturalist, working past time, based in the Region of Holambra, trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the the operator designated by the Association in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Company Flores Bakker described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation

5.3 The Company agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For the Company Flores Bakker

For UNIDO

Date 19 October 2005

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the "Asociacao de Agricultores Familiares de Artur Nogueira" AAFAN, which took place on 15.10.2005 in Holambra

1. Description of the Association

1.1 Address: Rua Rota dos Imigrantes n. 447 Sala 3 Centro Holambra Cep. 13825-000
1.2 Contact person: Mr. Vanderlei Aparecido Arantes
1.3 Phone: (19) 91383987
1.4 e-mail: v.franciscoh@uol.com.br
1.5 Number of Associates: 10
1.6 Crop area: 1,6 He
1.7 Crops and crop distribution: Pot plants and cut flowers
1.8 Approximate Methyl Bromide consumption in 2004: 0.7 ODS tonnes of which 100% for substrate
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Solar pasteurizers
2.2 Description of the equipment: UNIDO will supply 81 solar fumigators for substrates.

These equipments will be transferred to the Association at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

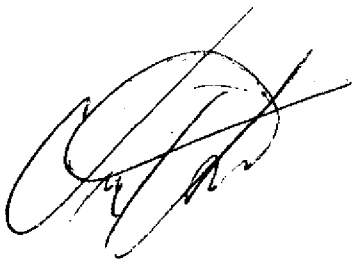
4. Training provided by UNIDO

4.1 UNIDO will cover one-year cost of an horticulturalist, working past time, based in the Region of Holambra to assist in the management and implementation of solar pasteurisation

5. Agreement

UNIDO represented by Agro Consulting S.A and the "Asociacao de Agricultores Familiares de Artur Nogueira" AAFAN described above have agreed on the following:

5.1 UNIDO will supply the number of solar dryers and the training described above in point 2
5.2 The association will be fully in charge of operating the equipment and of the expenses incurred in such operation
5.3 The Association agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all equipment

For AAFAN 

For UNIDO

Date 15 October 2005

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the Company Fazenda Terra Viva, which took place on 14.10.2005 in Holambra

1. Description of the Association

1.1 Address: Rodavia Sao Paulo 107 km 27. Holambra SP CP 61-CEP 13.825-000
1.2 Contact person: Mr. Frans Schoenmaker. Director
1.3 Phone: (19) 3802 9036
1.4 e-mail: frans@terraviva.agr.br
1.5 Crop area: 47 He
1.6 Crops and crop distribution: Bulbs and cut flowers
1.7 Approximate Methyl Bromide consumption in 2003: 8.45 ODS tonnes
1.8 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector:
2.2 Description of the equipment: UNIDO will supply one mobile 600 kg/hr, 3 bars boilers (wood fired) with all accessories and one fixed 1200 kg/hr boiler

These equipments will be transferred to the Company at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover one-year cost of an horticulturalist, working past time, based in the Region of Holambra, trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the three operators designated by the Association in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Company Fazenda Terra Viva described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation

5.3 The Company agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For the Company Fazenda Terra Viva

For UNIDO

Date 14 October 2005

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the "Asociacao dos Floricultores da Regia da Via Dutra" AFLORD, which took place on 12.10.2005 in Arujá.

1. Description of the Association

1.1 Address: Av. P.L. do Brasil, Km 4.5.Fazenda Velha-Arujá SP-CEP 07400-970-CP 172
1.2 Contact person: Mr. Hidetoshi Carlso Kibe, Vicepresident and Mrs. Silvia Megumi Kato, agronomist
1.3 Phone: (11) 4655-4227 and 4655-1928
1.4 e-mail: aflord@nethall.com.br
1.5 Number of Associates: 86
1.6 Crop area: 200 He
1.7 Crops and crop distribution: Cyclamen, Begonia, Gerbera and Lisianthus
1.8 Approximate Methyl Bromide consumption in 2004: 9.4 ODS tonnes of which 3400 kg for substrate and 6000 kg for soil.
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector: Solar dryers
2.2 Description of the equipment: UNIDO will supply two 600 kg/hr, 2.5-3 bars boilers (wood fired) with all accessories, and 390 solar fumigators for substrates. Boilers will be mounted on platforms having all auxiliary equipments (brakes, lights, etc) as required by federal authorities, for circulating in roads.

The equipment supplied by UNIDO does not include light camions or tractors to track the boiler platform. These equipments will be transferred to the Association at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover one-year cost of an horticulturalist, working past time, based in the Region of Gravatá, trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the two operators designated by the Association in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Asociacao dos Floricultores da Regia da Via Dutra" AFLORD described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation
5.3 The Association agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For AFLORD

For UNIDO

Date 15 October 2005

51 255 420 / 0001 - 09

AFLORD Associação dos Floricultores da Região da Via Dutra

Estrada RL do Brasil, Km 4,5

Cx. Postal 172 - CEP 07400-000

[illegible]

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the Association COOPERFLORA, which took place on 14.10.2005 in Holambra.

1. Description of the Association

1.1 Address: Estrada Municipal HBR-40 km 01. Zona Rural.13825-000. Holambra SP.
1.2 Contact person: Mr. Moyses Lupion Neto
1.3 Phone/Fax (19) 3802 9900
1.4 e-mail: moyses.lupion@floranet.com.br
1.5 Number of Associates: 54
1.6 Crop area: 100 He
1.7 Crops and crop distribution: Rosas, gerberas, etcLisianthus
1.8 Approximate Methyl Bromide consumption in 2003 4.5 ODS tonnes of which 100% for soil.
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector.
2.2 Description of the application arrangements: UNIDO will supply one 600 kg/hr boiler (wood fired) with all accessories. These equipments will transferred to the Association at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover for one year the cost of an horticulturalist, working past time, based in the Region of Holambra trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the one operators designated by the Association in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Association COOPERFLORA described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation

5.3 The Association agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For COOPERFLORA

For UNIDO

Date 13/10/2005

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the "Asociacao de Agricultores Familiares de Holambra" AAFHOL, which took place on 15.10.2005 in Holambra

1. Description of the Association

1.1 Address: Rua Rota dos Imigrantes n. 447,Sala 4,Centro, Cep. 13825-000
1.2 Contact person: Mr. Joel Luiz de Azevedo
1.3 Phone: (19) 91630975
1.4 e-mail: v.franciscoh@uol.com.br
1.5 Number of Associates: 12
1.6 Crop area: 2,46 He
1.7 Crops and crop distribution: Pot plants.
1.8 Approximate Methyl Bromide consumption in 2004: 0.8 ODS tonnes of which 100% for substrate
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Solar pasteurizers
2.2 Description of the equipment: UNIDO will supply 93 solar fumigators for substrates.

These equipments will be transferred to the Association at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

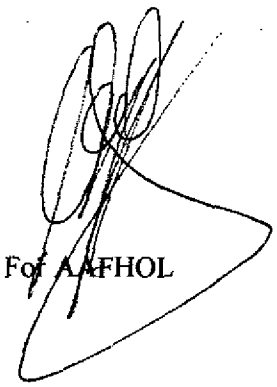
4. Training provided by UNIDO

4.1 UNIDO will cover one-year cost of an horticulturalist, working past time, based in the Region of Holambra, to assist in the management and implementation of solar pasteurisation

5. Agreement

UNIDO represented by Agro Consulting S.A and the "Asociacao de Agricultores Familiares de Holambra" AAFHOL described above have agreed on the following:

5.1 UNIDO will supply the number of solar pasteurizers and the training described above in point 2
5.2 The association will be fully in charge of operating the equipment and of the expenses incurred in such operation
5.3 The Association agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all equipment



For AAFHOL

For UNIDO

Date 15 October 2005

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the Company Flora Aoyama which took place on 18.10.2005 in ,Atibaia.:

1. Description of the Association

1.1 Addresses: Sitio AoYama Enio Rodovia Fernao Diaz km 31. Bairro Tanque. CEP 12940-000 Atibaia. Brazil.
1.2 Contact person: Akimasa Aoyama
1.3 Phone/Fax (011) 4416-1185
1.4 e-mail: floraaoyama@uol.com.br
1.5 Number of Associates:
1.6 Crop area: 7 He
1.7 Crops and crop distribution: Cut flowers
1.8 Approximate Methyl Bromide consumption in 2003 3.4 ODS tonnes of which 100% for soil.
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector.
2.2 Description of the application arrangements: UNIDO will supply one 600 kg/hr boiler (wood fired) with all accessories. These equipments will transferred to the Company at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover for one year the cost of an horticulturalist, working past time, based in the Region of Atibaia trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the one operators designated by the Association in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Company Flora Aoyama described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation

5.3 The Association agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For the Companies
Flora Aoyama

For UNIDO

Date 18.10.2005

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the "Cooperativa de Productores de Flores del Estado de Pernambuco" FLORAGRESTE which took place on 10.10.2005 in Gravatá.

1. Description of the Association

1.1 Address: Av. Cicero Batista de Oliveira, 1622. CEP 55640000
1.2 Contact person: Lourenço Zarzar
1.3 Phone: (81) 3533 1472
1.4 e-mail: floragreste@gtanet.com.br
1.5 Number of Associates: 21
1.6 Crop area: 25 He
1.7 Crops and crop distribution: Chrysantemus 80%, Lysiana , Gypsophila
1.8 Approximate Methyl Bromide B consumption in 2004: 9 ODS Tons. Open field and greenhouse, substrate initial use or re-use, etc
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector: Solar dryers
2.2 Description of the application arrangements: UNIDO will supply two 500 kg/hr boilers with all accessories and 181 solar dryers. These equipments will transferred to the Association at the end of the project

3. MB phaseout schedule

25% en 2006 and 75% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover for one year the cost of an horticulturalist, working past time, based in the Region of Gravatá, trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the two operators designated by the Association in the operation and maintenance of the boiler for a least one week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Association of Growers Cooperativa de Productores de Flores del Estado de Pernambuco" FLORAGRESTE described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2

5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation

5.3 The Association agrees on reducing by 25% the amount of Methyl Bromide used until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and train the boilers operators designed by the Association

5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For the Association of Growers

For UNIDO

Date: 10 October 2005

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the Company Facenda Santa Rosa, which took place on 18.10.2005 in Atibaia.

1. Description of the Association

1.1 Address: Enio Abreu de Camargo, 121 CEP- 12.940-000 Atibaia. Brazil.
1.2 Contact person: Francisco Issaio Saito
1.3 Phone/Fax (55) 4416-1381
1.4 e-mail: faz-santarosa@uol.com.br
1.5 Number of Associates:
1.6 Crop area: 10 He
1.7 Crops and crop distribution: Cut flowers
1.8 Approximate Methyl Bromide consumption in 2003 4 ODS tonnes of which 100% for soil.
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector.
2.2 Description of the application arrangements: UNIDO will supply one 600 kg/hr boiler (wood fired) with all accessories. These equipments will transferred to the Company at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover for one year the cost of an horticulturalist, working past time, based in the Region of Atibaia trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the one operators designated by the Association in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Company Facenda Santa Rosa described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation

5.3 The Association agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For Facenda Santa Rosa

For UNIDO

Date 18-10-05

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the Associacao PROFLOR , which took place on 18.10.2005 in Atibaia.

1. Description of the Association

1.1 Address: Rua Dr. Eurico de Souza Pereira,142-B Alvinopolis.Atibaia-SP-CEP 12942-490 Atibaia. Brazil.
1.2 Contact person: Francisco Issaio Saito
1.3 Phone/Fax (11) 4411-1443
1.4 e-mail: proflor@uol.com.br
1.5 Number of Associates: 48
1.6 Crop area: 10 He
1.7 Crops and crop distribution: Cut flowers
1.8 Approximate Methyl Bromide consumption in 2003 23 ODS tonnes of which 100% for soil.
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector.

2.2 Description of the application arrangements: UNIDO will supply six 600 kg/hr boiler (wood fired) with all accessories. These equipments will be transferred to the Association at the end of the project.

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover for one year the cost of an horticulturalist, working past time, based in the Region of Atibaia trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the one operators designated by the Association in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Company Facenda Santa Rosa described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2

5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation
5.3 The Association agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For Proflor

For UNIDO

Date 18-10-05

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the following group of growers:

- Mr . Claudio Sato. Av, Doctor Joviano Alvim 550 apto 11 Bairro Atibaia Jardim Atibaia Cep. 12942-000
- Mr. Alexandre Zine da Silva. Rua Jandira Costa Valente 320 Bairro Jardim America 3 Bragança Paulista Cep. 12900-000
- Mr. Roberto Kobayashi Caixa Poastal 11 Centro Atibaia Cep. 12940-000
- Mr. Jose Pereira Vidago. Rua Antonio Buava 22, Centro Nazare Paulista Cep. 12960-000
- Mr Marco Antonio Barbosa Alves. Av. Santana 1050 Casa 1 Bairro Vila Giglio 12946-000

The growers have decided to pool the Methyl Bromide Consumption to be phaseout and to make private arrangements with the Company Próagro, which will operate the boilers and give service to them and to other small consumers of MB in the area of Atibaia which might require soil sterilization with steam.

1. Description of the Company Proagro

1.1 Address: R.Guaraci,512-Recreio Estoril. CEP 12.944-410-Atibaia-SP. Brazil.
1.2 Contact person: Millton Heigi Komada
1.3 Phone/Fax (11) 4411-4698
1.4 e-mail:
1.5 Crop area: 31 He
1.7 Crops and crop distribution: Cut flowers
1.8 Approximate Methyl Bromide consumption in 2004: 18 ODS tonnes of which 100% for soil.
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector.
2.2 Description of the application arrangements: UNIDO will supply four 600 kg/hr boiler (wood fired) with all accessories and deliveded to the PROAGRO address. These equipments will transferred to the Group of growers at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover for one year the cost of an horticulturalist, working past time, based in the Region of Atibaia trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the four operators designated by the Company in the operation and maintenance of the boiler for a least one-week.

He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A, the group of farmers and the Company PROAGRO described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The Company and the growers will be fully in charge of operating all steam boilers and of the expenses incurred in such operation as per the arrangements signed with the growers
5.3 The Group of growers agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Group

5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the group of growers for comments

For the Group of Growers

For UNIDO

For the Company

Date 19.10.2005

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the Company Oikawa Flores which took place on 18.10.2005 in ,Atibaia.:

1. Description of the Association

1.1 Addresses: Oikawa Flores Rodovia Fernao Diaz km 31. Bairro Tanque. CEP 12940-000. Atibaia. Brazil.
1.2 Contact person: Olimar Nunes do Amaral
1.3 Phone/Fax (011) 4416-1333
1.4 e-mail: oikawaflores@uol.com.br
1.5 Number of Associates:
1.6 Crop area: 10 He
1.7 Crops and crop distribution: Cut flowers
1.8 Approximate Methyl Bromide consumption in 2003 4.2 ODS tonnes of which 100% for soil.
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector.
2.2 Description of the application arrangements: UNIDO will supply one 600 kg/hr boiler (wood fired) with all accessories. These equipments will transferred to the Company at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover for one year the cost of an horticulturalist, working past time, based in the Region of Atibaia trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the one operators designated by the Company in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

5. Agreement

UNIDO represented by Agro Consulting S.A and the Company Oikawa Flores described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The company will be fully in charge of operating all steam boilers and of the expenses incurred in such operation

5.3 The Company agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For the Companies Oikawa Flores

For UNIDO

Date 18.10.2005

5. Agreement

UNIDO represented by Agro Consulting S.A and the Asociation SUDFLORA described above have agreed on the following:

5.1 UNIDO will supply the number of steam boilers and the training described above in point 2
5.2 The association will be fully in charge of operating all steam boilers and of the expenses incurred in such operation
5.3 The Association agrees on reducing by 35% the amount of Methyl Bromide used in 2006 until a complete phaseout not latter than in 24 months after UNIDO delivers all boilers and trains the boilers operators designed by the Association
5.4 Steam boilers supplied by UNIDO will be purchased through international competitive bidding. Draft terms of reference of the equipment will be sent to the association in time to make comments

For SUDFLORA

Date Ibiuna, 25/10/2005

For UNIDO

Minutes of the Meeting between:

The UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION and the Associacao SUDFLORA , which took place on 25.10.2005 in Ibiuna.

1. Description of the Association

1.1 Address: Rua Pinduca Soares 260 Bairro Centro, Caixa Postal 15 Cep. 18140-970 Ibiuna, São Paulo, Brazil
1.2 Contact person: Miriam Saito
1.3 Phone/Fax (15) 3241-1431
1.4 e-mail: miriamsaito@terra.com.br
1.5 Number of Associates: 28
1.6 Crop area: 60 has in Green house
1.7 Crops and crop distribution: Cut flowers and pot plants
1.8 Approximate Methyl Bromide consumption in 2003 28 ODS tonnes of which 93% for soil and 7% for Substrate.
1.9 Approximate schedule of application: all year around

2. Alternate technology to phaseout Methyl Bromide (MB)

2.1 Alternate technology: Steam with injector.

2.2 Description of the application arrangements: UNIDO will supply five 600 kg/hr boiler (wood fired) with all accessories. These equipments will be transferred to the Association at the end of the project.

2.3 Alternate technology: Solar pasteurizers
2.4 Description of the equipment: UNIDO will supply 230 solar fumigators for substrates.

These equipments will be transferred to the Association at the end of the project

3. MB phaseout schedule

35% en 2006 and 65% in 2007

4. Training provided by UNIDO

4.1 UNIDO will cover for one year the cost of an horticulturalist, working past time, based in the Region of IBIUNA trained abroad, to assist in the management and implementation of steam application

4.2 A UNIDO's experienced boiler operator will train the one operators designated by the Association in the operation and maintenance of the boiler for a least one-week. He/She will come back at least twice in the year 2006 to refresh the knowledge and if necessary he will come in case of urgency.

ANNEX II

TERMS OF REFERENCE

Supply of equipment to phaseout Methyl Bromide in Brazil

1. GENERAL INFORMATION

These terms of reference shall be used for the preparation of bids for the supply of the following equipment required to phaseout MB using soil steaming alternative in Brazil

- Twenty three (23) mobile (off road) 600 kg/hr, wood firing, compact boilers described below
- Two (2) mobile (in road) 600 kg/hr, wood firing, compact boilers described below
- One (1) fixed 1200 kg/hr, wood firing, compact boiler described below

Overseas suppliers shall deliver DDU Brazil to the addresses described below. The Contractor shall be responsible for costs, fees and charges in respect of the export and transit of the equipment and technical documentation, but not for customs duties, taxes or license fees in the Project Area, which are the responsibility of the Project Counterpart. The Contractor shall also obtain, at his own risk and expense, any export license or other governmental authorization(s) necessary for the export of the equipment and technical documentation. The Brazilian Government will authorize a free customs clearance.

National Suppliers shall deliver to the same addresses described below. The National Contractor shall be responsible for payment at its own cost of all local and national taxes, assessments, liens and charges which will be due to be paid by the Contractor as a result of this Contract.

2. THE PROJECT

Methyl Bromide is a soil fumigant, which has been included in the list of substances that deplete the Ozone layer, and is subject to a phase-out schedule according to the Montreal protocol and subsequent amendments ratified by the Government of Brazil.

The project aims at phaseout 218 tons of MB in flowers, strawberries and other minor uses in Brazil. Use of steam in the production of cut flowers is one of the alternatives selected

3. SCOPE OF SUPPLY

For the purpose of implementing the project, the contractor shall supply:

A. 23 (twenty three) mobile (off road) 600 kg/hr, wood firing, compact, steam-producing unit for soil pasteurization composed of a tubular boiler, manuals, know-how and expertise in boiler installation for soil steaming as per boiler specifications given in 3.1(A)
B. 2 (two) mobile (in road) 600 kg/hr, wood firing, compact, steam-producing unit for soil pasteurization composed of a tubular boiler, manuals, know-how and expertise in boiler installation for soil steaming. The boilers shall be mounted on a platform with plates and certificates authorizing to circulate on Brazil roads. The Association AFLORD will provide all details concerning the tractor truck. Boiler specifications are the same as above, described in 3.1, but the platform shall allow its transport by road
C. 1(one) fixed 1200 kg/hr, wood firing, compact, steam-producing unit for soil pasteurization composed of a tubular boiler, manuals, know-how and expertise in boiler installation for soil steaming, as per specifications given in 3.1 (B)
D. Twenty seven (27) sets of 50 meters long flexible pipes for steam as per specifications given in 3.2
E. Manuals as per specifications given in 3.3
F. Know-how in boiler installation, and maintenance as per specifications given in 3.4

3.1 (A) 600 kg/hr steam generator specifications

Type of boiler:	Monoblock, horizontal with fire tubes
Output:	Minimum 600 kg/hr of steam at a minimum temperature of 125° Celsius at an operating pressure of 3 bar.
Heating surface	As required
Testing pressure	6 bar
Security coefficient	Steel security coefficients used in design and calculations shall be a minimum of 50%
Codes:	Boiler shall be built in accordance with the latest edition and addenda of the A.S.M.E. Boiler and Pressure Vessel Code (Book I.Secc VIII) or European equivalent. ABNT: NB-227 and ABNT 12.117 It shall be registered by the corresponding authorities or have the quality certificate from Brazil MTb regional. The supplier shall provide its authorization for manufacturing pressure steam boilers
Design temperature	250° Celsius
Efficiency:	Minimum 86% fuel to steam efficiency

Dimensions — As appropriate but not longer than a platform of 3.2 meters. Compact dimension would be an advantage

Fuel: — The boiler must be designed on purpose for using wood as fuel. Adaptation of oil-burning boilers is not acceptable

Use: — Outdoors use, waterproof and corrosion resistant. No condensate recovery.

Water input — Medium hard water, which cannot be additivated. The boiler has to be designed for easy regular maintenance, cleaning and removal of wood burning smoke and chemical removal of calcium deposits on tubes at least once a month. Minimum input water temperature 10° Celsius.

Fire tubes — Mandrill or welded attached to the base plaques. Wall thickness: (minimum) 3.5 mm.

Heating body — Heating body shall be composed of:

- Wood firing furnace
- Turnaround chunk fully submerged in water
- Fire tubes

Wood firing furnace shall have a minimum volume of 0.8 m3 and the area shall be not less than 1 m2. Ash shall be easily discarded from the bottom and air injection for combustion shall be regulated. Furnace shall preferably be of double wall with water circulating between the double-wall. Furnaces designed with water circulating through high temperature resistant pipes at bottom grid would be considered advantageous.

Boiler's fire and hot gas design shall be three-pass. A three-pass design would be considered an advantage

Fire tubes and combustion chamber shall be fixed, on one side, at the front and in the other side to the gases turnaround rear box. This set of three elements shall be easily accessible by unqualified operators for cleaning the inner part of firing tubes

Front — The front of the boiler shall preferably be easy to open in order to get easy access to the fire tubes.

Safety valves — A minimum of two safety relief valves, of at least 1" each, starting opening at nominal pressure and reaching maximal flow at 10% higher above nominal pressure, shall be installed. These calibrated

spring valves shall allow a minimum flow of steam of 100% of nominal capacity each when fully open.

Water inlet — One inch (1") manual blocking valve of external cast iron body and internal parts in brass, plus 1" solenoid valve. DIN connection plug to the control box. A water filter and a non-return valve shall also be included

Bottom drain — Minimum 1 ½ " spherical valve

Steam output — 2" valve with quick coupling (female) to attach one end of the flexible pipe

Control instruments — The boiler shall be equipped with at least the following instruments:

- One Bourdon type manometer to measure steam pressure in the boiler, with 4" quadrant. Class 1. Range 0-6 Kg/cm2, ½"NPTM connection integral manifold in brass with blocking and blow off. Shall have a ½" hydraulic seal.

- One class 1 pressure/switcher/transmitter to regulate air inflow and consequently furnace flame. Range 0.2-3 Kg/cm2; 0.08-0.25 adjustable differentials with graduated scale, IP65 protection, ½" NPTM process connection ½" NPTF electrical connection, and SPDT connection terminals. Shall have ½" hydraulic seal.

- One bimetallic thermometer to measure steam temperature in the boiler. Length to be determined by the supplier, with ½" to ¾" sheath

- An independent class 1 pressure-switcher, to generate stop when there is steam over-temperature in the boiler. Range 0-4 bar adjustable from outside with graduated scale, IP65 protection, ½" NPTM connection. ½" to ¾" sheath, NPTF ½" electrical connection, and SPDT connection.

- One visual REFLEX type level gauges with bodies of adequate length,
- A three point level electronic system with appropriate sensors to regulate water level which will activate/deactivate water pump and solenoid valve. It shall include a low level electronic switch to stop air fan and activate sound alarm (90 db) when water level is very low in the boiler.
- As required by the Brazilian authorities for boilers using solid fuel, an independent manual system to inject water into the boiler in case of power failure.
- A system preventing the operation of the water pump in case of switch-off because of very low water level. This system prevents the operator or the water feeding pump to start when the tube-fires are too hot

Insulation:	1 cm air layer plus 4 cm mineral wool (K=0.27) totally covering the smoke box and the shell with at least 0.6 mm metal sheet except in the openings
Lifting eyes	Two
Welding	Welding shall be carried-out by officially certified welders according to well know norms. Lineal welds shall be random x-ray inspected. Joint welds shall be fully x-ray inspected.
Painting	All metallic surfaces shall be painted with high temperature resistant paint
Switchboard	The central switchboard control unit cabinet, designed for outdoors conditions (IP65) shall include:

- One punch type pushbutton for start/stop operation of all elements, pump, regulation and safety systems and separate pushbuttons for water pump.
- Green light indicators of all active elements and red light indicators for malfunction or alarm indicators
- Power failure alarm, low water level alarm, high pressure alarm shall activate flashing red indicators and a buzzer.
- Diagram and acrylic labels of elements written in Portuguese
- Control and signal system shall be 220 Volts sourced from one of the three phases and neutral.
-

Mobility:	Shall be mounted on two or three wheels to be tracked at a maximum speed of 10 km/hr; shall have a manual brake

3.1 (B) 1,200 kg/hr steam generator specifications

The specifications shall be same as above with the exception of:

- Not mobile. The boiler shall be fixed
- Not maximum length. Dimensions as appropriate
- Furnace volume as appropriate

3.2 Flexible pipe specifications

28 sets composed of 50 m of flexible hose, internal diameter 50 mm, reinforced, with high capacity synthetic fibers, flexible and adequate to carry steam at 3 bars and 140° Celsius. Male and female quick couplings shall be attached to each end.

3.3 Manuals and Documents

The following manuals and documents shall be included

- Boiler: Three complete operating and maintenance manuals **in Portuguese** with wiring diagrams and full description of the operating and security systems. Manuals shall include identification references for all spare parts
- Welding inspection and welding procedures including type of electrodes, pre-heating, etc. Certificate of welders qualifications
- Firetests report (Inspeção de Segurança Inicial) including the hydraulic testing certificate established by an independent firm or qualified engineer or the manufacturing firms itself if it is licensed to do so (Serviço Próprio de Inspeçao de Equipamientos)
- Register book (Livro de Registro)
- Identification plate (Placa de identificaçao) fixed at boiler's body

3.4 Know-how

The subcontractor shall include in his proposal:

- Agreement to train, by the contractor, of twenty seven future boiler's operators in order to get their corresponding operator certificate (Treinamento de Segurança na Operação de Caldeiras). Same training shall be given to UNIDO recruited boiler operator.
- Seven days training of a UNIDO recruited boiler operator in the field, at the same conditions as regular conditions in soil pasteurization. All materials, fuel and supplies shall be at contractor's own cost

4. FACTORY FIRETESTS

All elements included in the supply shall be mounted and the unit shall be ready for final connection of water and power.

The factory firetests shall be a complete functional test conducted at the maximum pressure and, at a minimum, is to consist of filling the boiler with water and burning wood until the boiler reaches its complete range of operation. Additionally, all components wired into the boiler safety control circuit are to be tested by simulating a failure condition. A copy of the firestest report is to be included in the delivery
Upon completion of the factory firetest, the boiler shall be cooled and hydrostatically tested, and the external piping documented.

5. DELIVERY

The contractor shall deliver the equipment at a pace of five boilers per month starting 45 days after the signature of the contract. Boilers shall be marked as follows:

"UNDP Resident Representative for project MP/BRA/05/001 "

The contractor shall deliver DDU at the following addresses:

NAME	ADDRESS	Mobile 600 kg/hr	In road 600 kg/hr	Fix. 1200 kg/hr
Asociacao dos Floricultores da Regia da Via Dutra" AFLORD	Av. P.L. do Brasil, Km 4.5.Fazenda Velha-Arujá SP-CEP 07400-970-CP 172. Brazil		2	
COOPERFLORA	Estrada Municipal HBR-40 km 01. Zona Rural.13825-000. Holambra SP. Brazil	1		
FLORAGRESTE	Av. Cicero Batista de Oliveira, 1622. CEP 55640000. Gravatá.PE.Brazil	2		
Company Fazenda Terra Viva,	Rodavia Sao Paulo 107 km 27. Holambra SP CP 61-CEP 13.825-000. Brazil	1		1
Asociacao de Agricultores Familiares de Artur Nogueira" AAFAN	Rua Rota dos Imigrantes n. 447 Sala 3 Centro Holambra Cep. 13825-000. Brazil			
Asociacao de Agricultores Familiares de Holambra" AAFHOL	Rua Rota dos Imigrantes n. 447,Sala 4,Centro, Cep. 13825-000. Brazil			
Flores Bakker	Sitio Tres Rios. Rodavia Campinas-Mogli Mirim SP 340-Km 141.5 1.2. Brazil	1		
Associacao PROFLOR	Rua Dr. Eurico de Souza Pereira,142-B Alvinopolis.Atibaia-SP-CEP 12942-490 Atibaia. Brazil.	6		
Company Facenda Santa Rosa	Enio Abreu de Camargo, 121 CEP- 12.940-000 Atibaia. Brazil	1		
Sudflora. Ibuna	Rua Pinduca Soares 260 Bairro Centro, Caixa Postal 15 Cep. 18140-970 Ibiuna, São Paulo, Brazil	5		
Company Flora Aoyama	: Sitio AoYama Enio Rodovia Fernao Diaz km 31. Bairro Tanque. CEP 12940-000 Atibaia. Brazil.	1		
Oikawa Flores	Oikawa Flores Rodovia Fernao Diaz km 31. Bairro Tanque. CEP 12940-000. Atibaia. Brazil	1		
Proagro Group of growers	*R.Guaraci,512-Recreio Estoril. CEP 12.944-410-Atibaia-SP.* Brazil.	4		
TOTAL		23	2	1

6. CONTRACTOR'S GENERAL RESPONSIBILITIES

- The contractor shall assume overall responsibility for the quality and timeless supply of the equipment and services related to this contract.
- The contractor shall arrange for transportation and insurance of the materials and bear all costs risks thereof
- The contractor shall be responsible for applying best international procedures, including safety aspects in the equipment supplied
- The contractor is responsible for securing that all equipment supplied is new.
- The contractor shall be responsible for the control of all the work, services and supplies that might be executed by local subcontractors.

- The contractor shall be responsible for the quality and completeness of its technical services.

- The contractor shall be responsible for the insurance and social benefits, of all the contractor's personnel, if any, working in Brazil.

7. CONTRACTOR QUALIFICATIONS

- The contractor shall be a manufacturer of the equipment having its own production facilities and the necessary technical personnel. The contractor shall include in the bid documentary evidence of this.

- The contractor shall have proven experience in manufacturing boilers and accessories for soil pasteurization. The contractor shall include in the bid documentary evidence of this.

8. TERMS OF GUARANTEES and SERVICING

The contractor shall guarantee the quality and completeness of its work, equipment, supplies and its compliance with the specifications described above. Minimum guarantee for regular operation a parts under pressure shall be two years at the delivery site (in site), which includes materials, defective parts, mainpower, and transportation costs. One-year guarantee in the same conditions is required for non-pressure equipments

UNIDO will keep the right to carry out quality tests. In case of non-compliance with the aforementioned specifications, UNIDO will stop the payments and return the equipment to the supplier at its own expenses

The contractor must have its own technical and spare parts services in Brazil and be ready to service in less than 24 hours

9. LANGUAGE OF THE PROPOSALS

All proposals shall be written in English. Welding and Testing Certificates can be supplied in the original language.

10. CURRENCY OF THE PROPOSALS

All proposals shall be quoted in United States dollars and the contract will be awarded in this currency. Proposals in other currencies will automatically be disqualified. The contractor shall bear all exchange rate risks/rewards.

11. SHIPMENTS (FOREIGN FIRMS)

In order to avoid unnecessary delays and demurrage costs at the border, firms from countries other than Brazil, **shall confirm** in the proposal their commitment to provide to UNIDO, two weeks before dispatching any shipment, the following documents:

- Three original invoices in English
- One certificate of origin and its translation into English
- Three originals of the shipment documents
- One original packing list in English

ANNEX III

TERMS OF REFERENCE

Supply of equipment to phaseout Methyl Bromide in Brazil

1. GENERAL INFORMATION

These terms of reference shall be used for the preparation of bids for the supply of the following equipment required to phaseout MB using soil steaming alternative in Brazil

- Twenty seven mobile steam injection machines as described in 3.1

Overseas suppliers shall deliver DDU Brazil to the addresses described below. The Contractor shall be responsible for costs, fees and charges in respect of the export and transit of the equipment and technical documentation, but not for customs duties, taxes or license fees in the Project Area, which are the responsibility of the Project Counterpart. The Contractor shall also obtain, at his own risk and expense, any export license or other governmental authorization(s) necessary for the export of the equipment and technical documentation. The Brazilian Government will authorize a free customs clearance.

National Suppliers shall deliver to the same addresses described below. The National Contractor shall be responsible for payment at its own cost of all local and national taxes, assessments, liens and charges which will be due to be paid by the Contractor as a result of this Contract.

2. THE PROJECT

Methyl Bromide is a soil fumigant, which has been included in the list of substances that deplete the Ozone layer, and is subject to a phase-out schedule according to the Montreal protocol and subsequent amendments ratified by the Government of Brazil.

The project aims at phaseout 218 tons of MB in flowers, strawberries and other minor uses in Brazil. Use of steam in the production of cut flowers is one of the alternatives selected

3. SCOPE OF SUPPLY

For the purpose of implementing the project, the contractor shall supply:

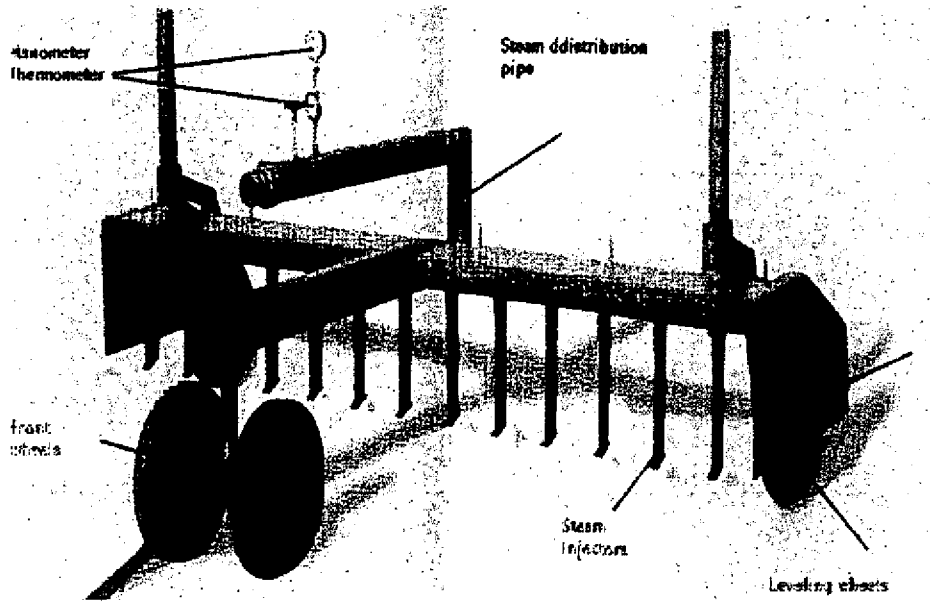
A. Twenty seven (27) machines as described 3.1
B. Twenty seven (27) manuals in Portuguese on the operation and proper identification and description of the parts of the machine
C. Know-how in assembling, operation and parts of this machine given to ten UNIDO specialists which will visit subcontractor's premises for this purpose

3.1 Steam injector specifications

Purpose of the equipment: This equipment injects dry steam at a maximum pressure of 3 bars and 22 cm deep in the soil. The machine distributed steam at 22 cm deep into the soil by means of 14 injectors as in Figure 1. The equipment has wheels and is tracked by means of a winch.

Once steam is injected the machine covers the soil with a heat resistant canvas of the same wide

FIGURE 1



Technical specifications of the injector part

Chassis wide: 2650 mm
Number of injectors: 14. The injectors shall be removable.
Steam inlet: male 2" quick coupling in brass
Steam distribution: Distribution bar to which each injector is attached by means of a connection with collar in brass. The last four injectors in each side shall have valves to cut steam input in order to work in a narrow strip
Steam pressure: The equipment shall be designed for a maximum pressure of 3 bars.
Operating pressure: between 2 and 3 bars depending on soil and other characteristics
Side barriers: two side barriers in steel to avoid steam leakage
Manometer and thermometer: one of each
Wheels: Four wheels with inflatable tires for leveling and for transportation
Painting: chassis hot coated with epoxy
Canvas: 2.8 wide, 20 meters long heat resistant PVC canvas to be unfold and pulled along the pasteurization area. In the area close to the machine, the canvas shall be reinforced with fiberglass

Technical specifications of the pulling winch

Motor: electrical 1 HP. Three-phase 220 Volts, with variable speed within a range 0.3 to 1 *meter per minute*
Towline: steel cable of 65 meters long. Breaking resistance: 2600 kg
Winch Traction Force: 1000 kg

Electrical cabinet: IP65 with command of variable motor speed and stop/go push buttons. 20 meters of insulated electrical wire 3x2.5 mm for connection

Self-anchorage: The whole equipment mounted in small chassis, shall be designed for self anchorage in the soil

Security: A quick stop security device shall be installed

3.2 Manuals and Documents

The following manuals and documents shall be included

- Three complete operating and maintenance manuals **in Portuguese** with wiring diagrams and full description of the operating and security systems. Manuals shall include identification references for all spare parts

3.3 Know-how

The subcontractor shall include in his proposal:

- Agreement to train, by the contractor, of a maximum of ten UNIDO personnel in the use of the machine and sterilization with steam. Training shall be done in his own premises or in the field .

4. DELIVERY

The contractor shall deliver the equipment at a pace of five machines per month starting 45 days after the signature of the contract. Equipment shall be marked as follows:

"UNDP Resident Representative for project MP/BRA/05/001 "

The contractor shall deliver DDU at the following addresses:

NAME	ADDRESS	Number of injectors
Asociacao dos Floricultores da Regia da Via Dutra" AFLORD	Av. P.L. do Brasil, Km 4.5.Fazenda Velha-Arujá SP-CEP 07400-970-CP 172. Brazil	2
COOPERFLORA	Estrada Municipal HBR-40 km 01. Zona Rural.13825-000. Holambra SP. Brazil	1
FLORAGRESTE	Av. Cicero Batista de Oliveira, 1622. CEP 55640000. Gravatá.PE.Brazil	2
Company Fazenda Terra Viva,	Rodavia Sao Paulo 107 km 27. Holambra SP CP 61-CEP 13.825-000. Brazil	3
Flores Bakker	Sitio Tres Rios. Rodavia Campinas-Mogli Mirim SP 340-Km 141.5 1.2. Brazil	1
Associacao PROFLOR	Rua Dr. Eurico de Souza Pereira,142-B Alvinopolis.Atibaia-SP-CEP 12942-490 Atibaia. Brazil.	6
Company Facenda Santa Rosa	Enio Abreu de Camargo, 121 CEP- 12.940-000 Atibaia. Brazil	1
Sudflora. Ibuna	Rua Pinduca Soares 260 Bairro Centro, Caixa Postal 15 Cep. 18140-970 Ibiuna, São Paulo, Brazil	5
Company Flora Aoyama	Sitio AoYama Enio Rodovia Fernao Diaz km 31. Bairro Tanque. CEP 12940-000 Atibaia. Brazil.	1
Oikawa Flores	Oikawa Flores Rodovia Fernao Diaz km 31. Bairro Tanque. CEP 12940-000. Atibaia. Brazil	1
Proagro Group of growers	R.Guaraci,512-Recreio Estoril. CEP 12.944-410-Atibaia-SP. Brazil.	4
TOTAL		27

5. CONTRACTOR'S GENERAL RESPONSIBILITIES

- The contractor shall assume overall responsibility for the quality and timeless supply of the equipment and services related to this contract.

- The contractor shall arrange for transportation and insurance of the materials and bear all costs risks thereof

- The contractor shall be responsible for applying best international procedures, including safety aspects in the equipment supplied

- The contractor is responsible for securing that all equipment supplied is new.

- The contractor shall be responsible for the control of all the work, services and supplies that might be executed by local subcontractors.

- The contractor shall be responsible for the quality and completeness of its technical services.

- The contractor shall be responsible for the insurance and social benefits, of all the contractor's personnel, if any, working in Brazil.

6. CONTRACTOR QUALIFICATIONS

- The contractor shall be a manufacturer of the equipment having its own production facilities and the necessary technical personnel. The contractor shall include in the bid documentary evidence of this.

- The contractor shall have proven experience in manufacturing steam injection equipment and accessories for soil pasteurization. The contractor shall include in the bid documentary evidence of this.

7. TERMS OF GUARANTEES and SERVICING

The contractor shall guarantee the quality and completeness of its work, equipment, supplies and its compliance with the specifications described above. Minimum guarantee for regular operation shall be one years at the delivery site (in site), which includes materials, defective parts, mainpower, and transportation costs.

UNIDO will keep the right to carry out quality tests. In case of non-compliance with the aforementioned specifications, UNIDO will stop the payments and return the equipment to the supplier at its own expenses

8. LANGUAGE OF THE PROPOSALS

All proposals shall be written in English.

9. CURRENCY OF THE PROPOSALS

All proposals shall be quoted in United States dollars and the contract will be awarded in this currency. Proposals in other currencies will automatically be disqualified. The contractor shall bear all exchange rate risks/rewards.

10. SHIPMENT DOCUMENTS (FOREIGN FIRMS)

In order to avoid unnecessary delays and demurrage costs at the border, firms from countries other than Brazil, **shall confirm** in the proposal their commitment to provide to UNIDO, **two weeks** before dispatching any shipment, the following documents:

- Three original invoices in English
- One certificate of origin and its translation into English
- Three originals of the shipment documents
- One original packing list in English