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Final report for the implementation of the national phase-out of MB-China Phase II-II

**FINAL REPORT**

**FOR THE IMPLEMENTATION OF THE**

**NATIONAL PHASE-OUT OF METHYL BROMIDE-CHINA**

**Phase II-II**

**REPORTING PERIOD:** July 2007 - March 2008

**Project No.:** TF/CPR/05/004

**UNIDO's Contract No.:** 16001403

**Beijing, China**

**31<sup>st</sup> March 2008**

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2008 work plan for methyl bromide phase-out in the agriculture

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*Terms of reference of equipment to be procured in 2008 in the agriculture sector*

**Acronyms:**

ExCom: Executive Committee

FECO: Foreign Economic Cooperation Office

MB: Methyl Bromide

MEP: Ministry of Environmental Protection

MLF: Multilateral Funds

MOA: Ministry of Agriculture

ODP: Ozone Depleting Potential

TA: Technical Assistance

UNEP: United Nations Environment Programme

UNIDO: United Nations Industrial Development Organization

## 1. Abstract

Phase II: At the 44<sup>th</sup> Meeting, an additional 10,702,742 US\$ were approved, which includes 4 million USD from the Italian contribution, to achieve the complete phase-out of methyl bromide, corresponding to additional 698.8 ODP tones.

The final report for the implementation of the national phase-out of methyl bromide-China Phase II-II summarizes the activities implemented until 31st March 2008.

## 2. Methyl bromide phase-out target achieved

In 2007, according to the agreement signed between China and ExCom, of the MLF, 153.2 ODP tones MB have been phased out, to meet the maximum eligible consumption of 570.6 tones. It is estimated that the total consumption of methyl bromide in China, in 2007, is 389.54 ODP tonnes, which is 181.06 tones lower than the eligible consumption limit agree with the ExCom, of the MLF. As established by the MLF, the final methyl bromide consumption figure for the year 2007 will be reported to the Ozone Secretariat in September 2008.

### Methyl bromide consumption in 2003-2007

Year		2003	2004	2005	2006	2007
Max. allowable consumption approved by Excom (ODP tones)	Commodity	126	126	46	25.2	0
	Tobacco	427.8	427.8	300	164.6	124.6
	Agriculture	534	534	534	534	446
	Total	1087.8	1087.8	880	723.8	570.6
Actual consumption (ODP tones)	Commodity	126	52.2	32.1	6.96	0
	Tobacco	427.8	227.8	54	21	32.4*
	Agriculture	534	534	534	282.08	357.14*
	Total	1087.8	814	620.1	310.04	389.54*
Phase-out achieved (ODP tones)	Commodity	0	73.8	20.1	25.14	6.96*
	Tobacco	0	200	173.8	33	-11.4*
	Agriculture	0	0	0	251.92	-75.06*
	Total	0	273.8	193.9	310.06	-79.5*

Note:

1) "\*" estimated figure.

- 2) Though the control target has been met, the consumption of methyl bromide increased in 2007 compared to 2006 because:
- In 2006, 300 tonnes of methyl bromide were exported due to the political reasons and, since the methyl bromide production is also controlled under the "Sector plan for methyl bromide production sector in China", the system was unable to compensate timely with extra production, therefore the national market was affected by a shortage of methyl bromide.
  - To increase the farmland area and the crops output, China has adopted several policies to protect the existing farmland and encourage farmers to expand their farmland area, which consequently slightly increased the demand of the methyl bromide in 2007.

### **3. Achievement in the agriculture sector**

- a) The Work plan for 2007 was finalized in April 2007.
- b) Study Tour to Italy: On 15<sup>th</sup>-25<sup>th</sup> April, 2007, 10 trainees visited Italy to be trained on soil fumigation equipment and methyl bromide alternative.
- c) The priority areas and model farms for implementing the programme were selected and approved by MEP in Sep. 2007.
- d) Study tour to Spain and the Netherlands: from 27<sup>th</sup> November to 3<sup>rd</sup> December 2007, the scope was to acquire additional information and technical specification for 1,3D and Chloropicrin application, for grafting technology and monitoring equipment.
- e) Since the approval of the 2007 working plan was effective in September 2007, taking into consideration the procurement and installation of the equipments required, the operation of the alternative technology could not catch up with the crop season. Under such circumstance, it was decided to combine the phasing out activity of 2007 and 2008 into one in 2008.
- f) At the end of Jan 2008, the 2008's work plan for agriculture sector was finalized and approved by MEP, MOA, UNIDO and the Italian Ministry of Environment (Donor) (See details at Annex I) . The priority sectors and areas were selected. Those are: for the cucumber sector, Shandong Province; for the strawberry sector, Hebei Province; for ginger sector, Shandong province.
- g) The ToR for various technical assistance programmes, such as training workshops to farmers, awareness activities as well as progress evaluation were approved and initiated.
- h) In March 2008, one study tour to Japan was organized to acquire additional information and technical specification for equipments.
- i) In March 2008, the technical specification for equipment was finalized and the

procurement process initiated (See details at Annex II). It is expected that the procurement will be completed in May 2008.

- j) FECO/MEP and MOA signed a memorandum in March 2008, to define the responsibilities and the project implementation tasks. In this memorandum, MOA is requested to implement the phase-out of methyl bromide in the agriculture sector based on yearly performance. FECO/MEP will disburse funds to MOA, upon the annual phase-out target is achieved and all the activities are in line with the requirements of UNIDO and national rules on procurement and finance, according to the verification report.

#### **4. Policies**

For the management of methyl bromide production, consumption and trade in China, the following policies have been issued:

- a) Circular on the establishment, expansion or innovation of 1,1,1-Trichloroethane and Methyl Bromide production equipment (Huanfa No. 60 [2003]), July 1st, 2003.
- b) Public Notice on Implementing Methyl Bromide Production Licensing and Quota Management (Huanfa No. 155 [2004]), 21st May 2007.
- c) Control for the methyl bromide import and export (including QPS): the Licensing Management for import and export of Methyl Bromide (including QPS) became effective since 1st January 2004.
- d) Catalogue of Controlled ODS in China's Import & Export (Third batch) (Huanfa No. 25 [2004]), 6th February 2004.
- e) Ban of Methyl Bromide in the commodities sector by SGA and MEP (No. 4 [2006]), 26th September 2006.

**(The end)**



**2008 WORK PLAN FOR PHASING OUT  
METHYL BROMIDE IN THE AGRICULTURE  
SECTOR IN CHINA**

**Final**

**31<sup>st</sup> January 2008**

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**Acronyms:**

SEPA: State Environmental Protection Administration

FECO: Foreign Economic Cooperation Office

UNIDO: United Nations Industrial Development Organization

MOA: Ministry of Agriculture

MB: Methyl Bromide

CAAS: Chinese Academy of Agricultural Sciences

## **1 BACKGROUND**

### **1.1 Protected agriculture in China**

In the last 10 years, following China's economic reforms and economic development, the protected agriculture has grown rapidly too. Nowadays are estimated 2 million Ha of protected horticulture crops, and 20,000 Ha of strawberries, furthermore, as an important tool for increasing farmers' incomes, protected agriculture is likely to continue expanding rapidly. In addition to the current most common crops such as tomato, cucumber, eggplant, pepper, celery and strawberries, more species are coming up, these includes cut flowers, melons, asparagus, ginger, various seedlings, medicinal herbs, etc.

The greenhouse technology in China is very simple but very energy efficient; generally, electric power and drip irrigation are not available and the main irrigation system is flooding; heating systems are very basic. There are three main types of greenhouses in China:

- i. Temporary greenhouses: Wood or bamboo structure, open in summer and covered with plastic film in winter. There are straw shades for winter in the night and open the straw shade in the day. These are the common greenhouses for strawberry production in Hebei Province.
- ii. Permanent greenhouses: steel or concrete structure. There are straw shade for winter in the night and open the straw shade in the day. These are mostly used for tomato, cucumber, eggplant, hot pepper production in Shandong and Henan Province.
- iii. Cold plastic tunnel: Wood or steel structure, without straw shade during the winter.

The first two kind of greenhouses were called 'hot tunnel', the third one called 'cold tunnel'. Mechanization: as for the above, regular tractors and machineries can easily operate, only in summer, in the type "i" greenhouses, small tractors can operate in the type "ii." and "iii." greenhouses.

### **1.2 Methyl bromide consumption in China**

MB consumption in the agriculture sector in China has slightly grown, mainly in the tomato, cucumber, eggplant, hot pepper and cut flower because of the growing market demand and because of the lack of registered alternative fumigants.

With regards to ginger, the MB consumption is increasing faster than other sectors, because of the sharp increase of market price, mainly for export, and therefore good income expectations.

MB consumption in the strawberry sector is reducing, because chloropicrin has been registered and successfully used in the strawberry sector since 2006.

As a last factor affecting MB consumption, arable land is becoming scarce, due to the competition of urbanization, industrial areas and soil degradation; this put more pressure on the remaining land and so leads to an intensive cropping, with no crop rotations or other traditional practices. As a consequence, soil-borne diseases have grown exponentially and yield and quality often decreased, the losses are, as an average, of 20% to 40% but, in some cases, it reaches 60% to 100%, this push farmer at using more extensively and regularly pesticides and so fumigants as MB.

## 2. 2008'S TARGETS

The 2008 s targets are:

- i. Phase-out out 240 tonnes of MB, of which 170 tonnes in strawberry sector, 50 tonnes in the ginger sector and 20 tonnes in the cucumber sector.
- ii. Train 300 trainers.
- iii. Train 13,657 farmers.
- iv. Establish No. 60 model farms, of which: 45 for strawberry, 5 for cucumber and 10 for ginger.
- v. Treat 600 Ha with MB alternatives.

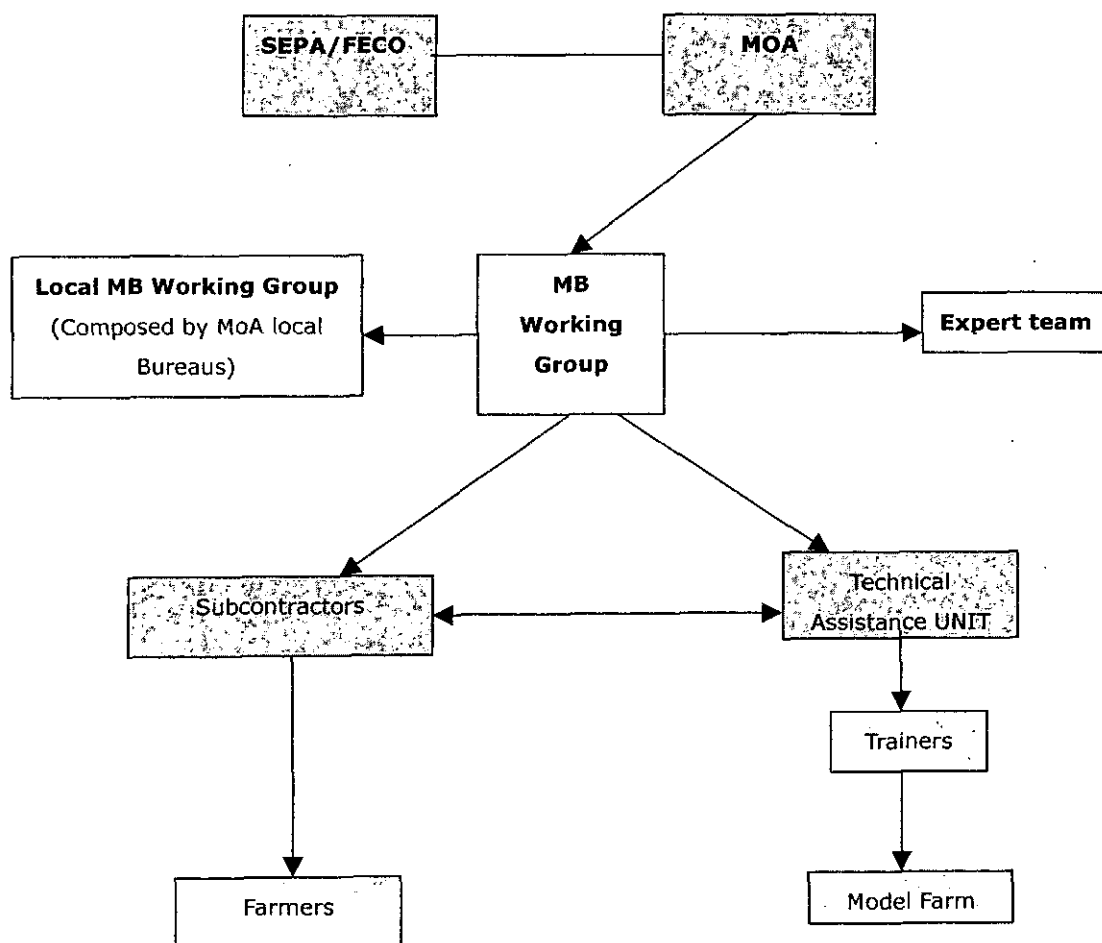
**Table No.1: 2008's targets**

Sector	Region	ODS tones	Model farms No.	Average farm area m <sup>2</sup>	Total Ha to be treated	No. of Farmers	Timing for soil treatment
Strawberry	Hebei, Shandong, Liaoning, Hubei, Anhui, Zhejiang	187	45	400	467	11,667	From the end of June to the beginning of August
Cucumber	Shandong	20	5	670	50	746	From August to October
Ginger	Shandong	33	10	670	83	1,244	March and August
TOTAL		240	60		600	13,657	

## 3 STRATEGY

### 3.1 Project Management

SEPA and MOA have signed a memorandum of understanding that set up each other tasks and responsibility for phasing out methyl bromide in the agriculture sector in China. Furthermore, a MB working group has been established, MOA will be the main actor for the implementation of the programme. The overall management scheme is shown in the chart below.



### 3.2 Terms of reference – tasks/responsibilities

#### 3.2.1 SEPA/FECO

1. Set up the guidelines for the implementation of the "National methyl bromide phase-out plan" in the agriculture sector.
2. Supervise and coordinate with MOA for the implementation of "Methyl Bromide phase-out plan" in agriculture sector.
3. Report to UNIDO on project implementation.
4. Disburse the annual project funds to MOA.
5. Carry out regular field visit for programme monitoring and verification.
6. Coordinate with other ministries and Government bodies the timely and effective issue of policy measures.
7. Ensure an effective implementation of existing policies.
8. Verify and audit the implementation of the programme.
9. Recruit and disburse the payment to the international experts in agriculture sector.
10. In cooperation with MOA propose and enact regulations and policies related to MB issues and MB alternatives.

#### 3.2.2 MOA

1. Phase-out out MB in the Agriculture sector.

2. Design the work plan and implement program.
3. In cooperation with SEPA propose and enact regulations and policies related to MB issues and MB alternatives.
4. Participate in the MB working group.
5. Supervise and guide the activity of the MB working group.
6. Manage the annual fund, to ensure the funds are utilized in accordance with the MLF, UNIDO and domestic management's rules.
7. Compile progress report or other documents required.
8. Accept the audits by national finance administration department and audit department.
9. Select beneficiaries and counterparts at the field level.
10. Carry out Research and Development activities.
11. Select the MB substitute, guide and coordinate the MB alternatives dissemination within the agriculture sector.
12. Carry out regular field visit for programme monitoring and verification.
13. Sign subcontracts for the provision of services.
14. Reports to SEPA.
15. Any other activity required for a smooth, effective and sustainable phase-out of MB in the Agriculture sector.

### **3.2.3 MB Working Group**

1. Carry out the day-to-day project management, according to the work plan and rules and regulations of SEPA and MOA.
2. Implement the work plan.
3. Coordinate the activities of all institutions involved in the programme.
4. In charge for equipment and goods procurement, responsible for equipment and goods allocation and accountable for their management.
5. Report to MOA.

### **3.2.4 Local MB Working Group**

1. Established by local agriculture bureaus.
2. Entrusted by MOA monitor the project implementation at field level.
3. Carry out regular field visits for programme monitoring and verification.
4. Issue and enforce local and national regulations.
5. Disseminate alternative technologies.
6. Report to MB working group.

### **3.2.5 Technical Assistance Unit (TA Unit), in 2008 alias The Institute of Plant Protection of the Chinese Academy of Agricultural Sciences (CAAS):**

1. Implement the TA programme.
2. Assist the MB working group to implement the work plan.
3. Reports to MB working group.

### **3.2.6 Subcontractors**

1. Responsible for the phasing out of MB at the local level.

2. Select and recruit trainers;
3. Assist TA unit to conduct training program;
4. Recipient for equipment and goods for the application of MB alternatives.
5. Employ the MB alternative;
6. Assist the local farmers for the application of MB alternatives;
7. Provide other services, if necessary, to make sure the phase-out target are achieved;
8. Manage and maintain the equipment and goods provided.
9. Report to the MB working group;

### **3.2.7 Trainers**

1. Are selected among subcontractors' employee, local technicians, leading farmers and village leaders, by subcontractors and TA Unit.
2. Are trained by TA Unit.
3. Train farmers in their area.
4. Collect data.
5. Report to the subcontractors, those selected by subcontractors; report to TA Unit, those selected by TA unit.

### **3.2.8 Model Farms/Farmers**

1. Are selected by trainers.
2. Receive services and goods from subcontractors and employ MB alternatives with the assistance of the trainers.
3. Are trained by trainers and encouraged to employ MB alternatives through awareness, incentives such as services and goods.
4. Report to trainers.

### **3.2.9 Expert team**

1. Provide consultancy services.
2. Report to MB working group.

## **3.3 project phases and management**

Step 1 Prepare and clear the Work plan

Step 2 Contracts approval

Step 3 Contracts signing

Step 4 Procurement of equipment

Step 5 Programme implementation

Step 6 Reporting and assessment

## **4. CROPS**

The following crops have been selected for the work plan 2008:

- i. Strawberry.
- ii. Cucumber.
- iii. Ginger.



#### 4.1 Crops and Alternatives identification

The crops and MB alternatives for the work plan 2008 have been selected base on the following parameters:

- i. Registration and availability of effectively proven alternatives.
- ii. Efficacy.
- iii. Cost.
- iv. Compatible to local practices.
- v. Sustainability.
- vi. Potentially growing MB consumption.
- vii. Experience of MB alternatives application at commercial level.

**Table No. 2: chemical alternatives register in China.**

Alternatives	Strawberry	Tomato	Cucumber	Eggplant	Cut flower	Ginger	Ginseng
Chloropicrin	√			√	√	√	√
Dazomet		√			√		
Metham sodium		√	√				
Avermectins			√				

The registration process is initiated for Sulfuryl Fluoride on vegetable and Dazomet and Metham sodium for strawberry, Chloropicrin for cucumber and tomato.

The strawberry sector will contribute mostly for phasing out MB in 2008 because chloropicrin has been registered since 2006 and has shown good result.

Grafted cucumber has a long tradition in China; therefore farmer acceptance is higher then other crops that, potentially, can be grafted. Grafting on tomato, eggplant, pepper, melon and watermelon will be introduced in a later stage.

Despite the fact that the MB consumption on ginger is still limited, it has increased considerably in the recent years, and can potentially grow further; therefore, ginger has become a priority for introducing MB alternatives.

#### 4.2 Strawberry

Strawberry is an important cash crop in China and it is the largest consumer of MB. Due to the fast economic development the demand for strawberry increased enormously in the last 10 years. Presently strawberries are produced in more than 20 provinces. The total area is about 42,500 Ha, 20,000 of which protected, mostly in the Hebei Province, 5,300 Ha, Shangdong Province, 4,600 Ha, mainly in Yantai and Jinan City, Liaoning Province, 3,500 Ha, mainly in Donggang County and Dandong region, Jilin Province, 2,000 Ha, Zhejiang Province, 3,000 Ha, Jiangsu Province, Beijing and Shanghai Municipality, 4,000 Ha. There are more than 1.8 million growers involved in strawberry production.

In China, there are three cultivation methods:

- i. Greenhouse: most common in the north, the total area is about 20,000 Ha, of which only 6.5% is regularly treated with MB. Plant density is about 183,333-225,000 plants/Ha. Strawberries in greenhouse are transplanted in August and harvest start in early January, the last 10 days of January is the peak period of harvesting, in

coincidence with the Chinese New Year. The average price is US\$ 1/kg for wholesale. The normal yield is 22,500-30,000 kg/Ha. In most cases soil is covered with polyethylene mulching film.

- ii. Open field: strawberries are also transplanted in August but the harvesting starts in April and lasts until May or June. The yield is about 30,000 to 37,500 kg/Ha. The price is lower than that in greenhouse.
- iii. Cold plastic tunnel: strawberries are also transplanted in August but the harvesting starts in May and lasts until June. The price is much lower than that in greenhouse.

Strawberries are irrigated by flooding. The tunnel, or plot, is flooded immediately after transplanting. The volume of water is about 750 m<sup>3</sup>/Ha. Since the transplanting coincides with the period of higher temperature, average maximum of 35°C, and the evaporation is high; the plots need to be slightly watered once every 3-5 days. This means that the plot needs at least 2 or 3 small additional irrigation before the plants would be rooted. A soft tillage is done after the first leaves appear, to keep the humidity and remove weeds. If the soil becomes dry, one additional profound irrigation, about 400 m<sup>3</sup>/Ha, is applied before the 5<sup>th</sup> or 6<sup>th</sup> leaves emerge. After mid or late September, no more irrigation is done to control plants growth.

In greenhouses, winter temperature is kept between 10 to 15°C, relative humidity at about 70%.

The major diseases are: Fusarium, Verticillium, Phytophthora and Rhizhhigh volumeoctonia. Plants show poorly developed root system, fewer new roots, slow growth. The number of flowers and fruits is drastically reduced. In most cases plants die at the beginning of harvesting. Yield may drop by 30 to 40%, in the most severe cases up to 100%.

Root-knot nematodes have been found in Shandong Province and Liaoning Province and their incidence is gradually growing in other areas.

The first cause of diseases transmission is infected propagation material; secondly, the irrigation by flooding spread pathogens, third, the monoculture builds up pathogen pressure.

Currently, the main methods to control soil pests are a) rotation with corn or wheat and b) change the soil. According to growers, to control strawberry's pathogens 10 years rotation is need to control soil borne pathogens. Because Mancheng County, Hebei Province have more than 50 years tradition on strawberry, strawberries have been grown almost in all fields, no more land is available for rotation, the only option has become soil disinfestations. Accordingly, MB is mainly used in Hebei and Shandong Province, lesser in Liaoning, Anhui and Zhejiang Province.

### **4.3 Cucumber**

Cucumber is a very important crop in China and it is cultivated all over the country. There are more then one million Ha and usually it is rotated with tomato. The largest production areas are Shandong, Hebei, Henan, Liaoning, Jilin Province, Beijing and Tianjin metropolitan areas.

Since cucumber requires higher temperature and is tolerant to low light radiation, it is a suitable crop for greenhouse, including in the north of China.

Crop cycles:

- i. The most common is the spring/autumn, in open field.
- ii. The most profitable is the winter/spring, in greenhouse, seedbeds are sowed, in the greenhouse, in the middle of October, and seedlings are transplanted in the late November or early December, harvest start from February and last until June. The yield is about 60 to 80 tones/Ha.
- iii. In the autumn/winter cultivation, in greenhouse, seedbed are sowed in the middle of September and seedling are transplanted in early October. Harvesting start in the early November and last until February. The yield is about 40 to 60 tones/Ha.
- iv. In plastic tunnels, seedbeds are sowed in the middle of January, seedlings are transplanted in the late March and harvest last from the middle of April until early July. Specialized growers are relatively few but grow cucumbers all year round, have greenhouses of various types and some basic equipment; they don't practice rotation and therefore use MB for soil fumigation.

The main soil-borne disease is root-knot nematode (*Meloidogyne incognita* Chitwood), other diseases that affect cucumbers are: Fusarium wilt (*Fusarium oxysporum* f. sp. *cucumberium*), cucumber damping-off (*Pythium aphanidermatum*), Phytophthora (*Phytophthora melonis*), Gummy stem blight (*Mycosphaerella melonis*), Sclerotinia rot (*Sclerotinia sclerotiorum*), Anthracnose (*Colletotrichum lagenarium*), Block rot (*Alternaria cucumerina*), Bacteria wilt (*Pseudomonas lachrymans*), Viruses such as TMV, CMV and MMV.

Grafting with black-seeds pumpkin is an effective method to control Fusarium wilt and other fungi, but many farmers are reluctant because they lack skills, training, technical assistance, equipment, and seedlings are too expensive. Some consumers argue that grafted cucumbers are too big, fibrous and taste like pumpkin; an appropriated crop management and selection of rootstock will solve the problem effectively.

Although grafting is an antique and traditional technology in China, it has not been developed in recent years. The main rootstock for cucumber is pumpkin, it has good resistance to Fusarium wilt and other fungi, but it is only slightly tolerant to nematodes, even if some farmers claim it is, therefore, if grafting technology is used to control fungi soil borne diseases, additional measures have to be employed to control nematodes.

MB is mainly used in the Shandong Province, for nematode control.

#### **4.4 Ginger**

Ginger has been grown in China for thousands of years. For its characteristics and uses, Ginger is a kind of special crop and Ginger cultivation cover a relatively small area. The main production areas are in Weifang, Laiwu, Yantai, Taian county in the Shandong Province. The products sold all over China and the main export goes to Japan, Europe, North America and South-east Asia.

Ginger can be grown in open filed, plastic tunnels or greenhouses. The preferred soils are sandy-loam; sowing takes place from March to April; rhizomes are sorted out after germination and transplanted in the soil at a dept of 8cm and 65cm apart.

The crop must be shaded to reduce heat, the irrigation is by flooding and soil must be kept constantly humid.

The harvesting starts 10 months after sowing.

The ginger rhizomes are stored in cellar, 4 to 5 meters deep underground, and can be stored up to two years.

The main soil-borne diseases are root-knot nematodes and ginger bacterial wilt caused by *Ralstonia solanacearum*. Ginger bacterial wilt is very difficult to control because 44 families and over 300 species host it and can survive in the soil for long period also in the absence of hosts. As most bacteria, when the temperature and humidity is high and nitrogen abundant, the disease's incidence and severity is very high too.

MB is used for soil fumigation before transplanting. The application periods are March or August.

## **5. GEOGRAPHICAL AREAS**

For the 2008 work plan, geographical areas have been identified base on the MB consumption, selecting those where the present and potential consumption is higher, and suitable infrastructure for developing and promoting MB alternatives are available.

- i. Strawberry: in the Hebei Province, Mancheng, Shunping and Xushui County and Langfang City; Shandong, Liaoning, Hubei, Anhui, Zhejiang Provinces.
- ii. Cucumber: in the Shandong Province, Qingzhou, Shuoguang and Qingdao City.
- iii. Ginger: in the Shandong Province, Anqiu and Yantai City.

## **6. SUBCONTRACTORS**

MOA has selected two subcontractors for the beneficiary regions for the implementation of the 2008 work plan, those are:

- i. Mancheng Xinnong Service Company: to provide fumigation service and technical assistance to Hebei, Shandong, Liaoning, Hubei, Anhui, Zhejiang Provinces for phasing out 187 ODS tones of MB in strawberry.
- ii. Qingzhou Agricultural Bureau, Shandong Province: to provide fumigation service, and technical assistance to Shandong Province for phasing out 20 ODS tones of MB in cucumber.
- iii. By 31<sup>st</sup> of March, the subcontractor for the ginger sector, who is responsible for phasing out 33 ODS tones of MB, is selected by MOA and approved by SEPA.

The selection process has been verified and approved by SEPA.

## **7 EQUIPMENT AND GOODS**

### **7.1 Selection**

The TA Unit, in consultation with all parties, identifies and selects the equipment and prepare the technical specification. CAAS will hold an expert conference, in March 2008, to review and approve the list.

### **7.2 Procurement**

The MB working group is in charge for equipment and goods procurement, according to

SEPA's rules and regulations. SEPA will nominate the procurement agent by 24th, Feb. The MB working group is also responsible for equipment and goods allocation and is accountable for their management. The request for proposal will be sent by 10<sup>th</sup> March.

### **7.3 Beneficiaries**

Equipment and goods are transfer to the subcontractors; who provides services to farmers accordingly to the work plan and the contract signed with SEPA/MOA. Subcontractors are also responsible for equipment and goods custody and maintenance.

### **7.4 Ownership**

All equipments initially belong to SPEA, once the tasks assigned to each of the beneficiary are achieved, accordingly to the subcontracts terms, and are verified by SEPA/MOA, the equipment ownership is transferred to the beneficiaries.

## **8. R & D**

MOA entrusts the Institute of Plant Protection of the Chinese Academy of Agricultural Sciences (CAAS) to carry out R&D in 2008.

The R&D will focus on full commercial scale tests and on three areas:

- i. Development of registered alternatives and new application technologies.
- ii. Active ingredient not yet registered, such as: chloropicrin+1,3-D, DMDS, sulfuryl fluoride, methyl iodide; and extension of registered active ingredients to new crops and applications methodologies.
- iii. Development of other non-chemical technologies.

## **9. TECHNICAL ASSISTANCE**

Most of MB alternatives, such as chloropicrin and 1.3D, are high toxicity chemicals, dangerous for the users, for the environment and for consumers. Rules and protocols are set up once each active ingredient and application technology obtain the registration however, taking into the consideration that:

- i. The agriculture sector in China employs millions of farmers.
- ii. The average farms account of 3 to 5 people, a family, cropping something from 1,300 to 2,100m<sup>2</sup> of land.
- iii. Most farmers are poorly educated and lack of knowledge, manly with regards to pesticides and their use.
- iv. Most farmers have no financial resources to allow protection cloth and safe equipment.
- v. High toxic fumigants, if not managed properly, may cause a severe national threat, to farmers, to the environment and to consumers.

MOA has selected one subcontractors for the technical assistance program. The Institute of Plant Protection of the Chinese Academy of Agricultural Sciences (CAAS): to provide training and Technical Assistance. The selection process has been verified and approved by SEPA.

### **9.1.1 Targets**

The training programme aims at providing the knowledge and technical means to allow a safe and effective use of MB alternative technologies, mainly chemical alternatives. The programme is designed to target two groups of users:

- i. Fumigant applicators: those are commercial companies who are authorized to apply toxic fumigants. They have appropriated equipment and their managers and personnel are trained to use high toxic fumigant on a safe and effective manner.
- ii. Farmers: the training aims at raising their awareness about the use of high toxic pesticides, and fumigants, and technical knowledge for their safe and effective use.

### **9.1.2 Trainers**

Trainers are selected among subcontractors' employees, local technicians and extension service, leading farmers and village leaders. Their tasks are to

- i. Train farmers.
- ii. Supervise model farms.

### **9.1.3 Incentives**

Subcontractors provide services, such as fumigant applications, equipment, such as drip irrigation plants, and goods, such as chemicals, plastic films for mulching. The incentives are mainly addressed to model farms, but will also be used to promote the replication and adoption of MB alternatives among a large number of farmers.

### **9.2 Extension service**

The TA Unit provides extension services to the subcontractors and farmers involved in the programme. Among the various activities it includes consultancy service, soil analysis, and pathogens identification.

### **9.3 Dissemination and awareness**

MOA, through the Institute of Plant Protection (CAAS), carries out the dissemination. The Institute of Plant Protection develops the awareness and information material, which is disseminated through the Local Government authorities, subcontractors, trainers, local EPBs and local MOA bureaus. These materials includes: television programs, newspapers, posters, T-shirt, and any other mean that have an impact on farmers.

## **10. MONITORING AND ASSESSMENT**

The monitoring and assessment programme has been developed by MOA and approved by SEPA. The TA Unit implements the programme, processes the data, and finalize the assessment. The trainers collect data in the field, on model farms as well on individual farms.

*MB alternatives selected for the cucumber and ginger sectors have been demonstrated to be effective but have not been yet applied in large commercial scale. Therefore, the monitoring and assessment programme will take particular care of the cucumber and ginger sector. The parameters to be collected and monitored are shown in the Table No. 3 below.*

**Table No. 3: monitoring parameters.**

Parameter	Strawberry		Cucumber		Ginger	
	Model farms	Other farms	Model farms	Other farms	Model farms	Other farms
Disease identification						
Disease incidence						
Disease severity						
Plants lost						
Yield						
Product quality						
° Brix						
Consistency						
Shelf-life						
Colour						
Climatic parameters						
Temperature						
Relative humidity						
Light radiation						

SEPA, MOA, MB working group, Experts Team and UNIDO, will jointly review and endorse the assessment.

Officials and experts from SEPA, MOA and UNIDO carry out regular verification missions to ensure that the programme objectives are met in a timely and effective manner. The MOA Bureaus will assist SEPA and MOA and carry out more frequent field visits.

## **11. MB ALTERNATIVES**

### **11.1 Strawberry**

The MB alternative selected for the strawberry sector in China is Chloropicrin, because:

- i. According to MBTOC Progress and analysis report, one of the most effective chemical alternative for strawberry fruit production is the mixture 1.3D + Chloropicrin, applied through drip irrigation, or either Chloropicrin or 1.3D alone followed by metam sodium (Porter *et al.* 2004a). These formulations and methodologies have replaced at least 45% of MB used for soil fumigation in the strawberry fruit production worldwide.
- ii. To the date, Chloropicrin is the only MB chemical alternative registered in China on strawberry. The product has been registered by Daliang Lufeng Chemical Ltd., Liaoning Province, in 2002 and so far has shown good result and acceptance by farmers. The only limitation is due to the very strong and pungent odour released during the application.
- iii. The Sino-Italian demonstration project, 1999/2001, demonstrated that metam sodium, 35% Metham sodium at the rate of 1,000 litre/hectare through drip irrigation, combined

with solarisation is an effective alternative in strawberries fruit production. However, to the date, metham sodium is not yet registered on strawberry; it is expected to be in 2009.

There are three application methods available in China:

- i. Manual injection: allowed to trained and certified applicators.
- ii. Mechanical injection: allowed to trained and certified applicators.
- iii. Capsule: allowed to individual farmers after training.

The big capsule machine will be landed to Mancheng Xingnong service company, who will sign an agreement with the owner of chloropicrin capsule patent for a period of six years. The terms of use of the above machine are included in the subcontractor sign between Mancheng Xingnong Service Company with MOA.

The small capsule machine will be landed to Mancheng Xingnong service company. The terms of use of the above machine are included in the subcontract sign between Mancheng Xingnong Service Company with MOA.

Chloropicrin injection devises so far tested in China have two inconveniences:

- a. Both manual and mechanical injection equipment are not designed to lay the mulching film contemporary with the Chloropicrin injection; mulching film is lied only later on. This allows the product to release gas in the environment, which odour is very strong and pungent, particularly in greenhouse.
- b. Mechanical injection is inefficient because plots are small, from 400 to 667m<sup>2</sup>, and greenhouses are not designed for mechanical operation; tractors don't fit easily and are difficult to handle. To treat a single greenhouse it takes up to three hours. One machine can treat from 3 to 4 greenhouses per day.

In the short term, the programme aims to test more efficient machineries and adapt them to the Chinese condition (R&D); in the long term it aims to adapt the Chinese greenhouses and crop management to more efficient machinery.

Chloropicrin capsule can be applied manually or with simple tools, similar to a sowing machine, and so used by individual farmers, after a short training. The technology for producing capsule is available in China and ready to enter in to commercial scale.

Once incorporated in the soil, capsules, in contacts with the soil moisture, melt and release the chloropicrin content in 4 to 8 hours depend on the soil humidity. This allows the farmer to seal the soil with the mulching film and so avoid the release of gas in the environment. In addition, the treatment can be localized in the seedbed, or on the row, or on spots where high pathogens incidence or severity has been recorded in the previous crop cycle. The initial tests carried out have shown excellent results.

*Since a bad yield most of time start with high-contaminated, by soil borne pathogens, propagation material, runners, particular attention will be given to the production of clean, and eventually certified, propagation material.*



**Table No. 4: machine needed for the MB phasing out on strawberry application**

<b>Application methods</b>	<b>Ha.</b>	<b>Machine needed</b>
Manual injection machine	10	10
Small machine driven by tractor	1	2
Small machine driven by cultivators (China)	456	100
Capsules	0	2
	467	

### 11.2 Cucumber

The MB alternatives selected for the cucumber sector in China are:

- i. Grafting.
- ii. Grafting + avermectin.
- iii. Metham sodium, mechanical injection or drip irrigation.

As shown in the Table No. 5 below.

**Table No. 5: MB alternatives in the cucumber sector.**

<b>No. of Farmers</b>	<b>Total area Ha</b>	<b>Alternatives</b>
600	40.22	Grafting
35	2.35	Metham sodium drip irrigation
65	4.35	Metham sodium injection
46	3.08	Avermectin, sulfuryl fluoride, 1.3D, calcium cyanamide, biological control agents
Total 746	50	

**Table No. 6: machine needed for the MB phasing out on cucumber application**

<b>Application methods</b>	<b>Ha.</b>	<b>Machine needed</b>
Grafting	40.22	0
Metham sodium drip irrigation	2.35	35
Metham sodium injection	4.35	5
Others	3.08	

Grafting technology is well known by Chinese farmers and cucumber has been grafted on black-seeds pumpkin in Shandong Province since long time. The grafted plants are resistant to Fusarium and other soil borne diseases, but only slightly tolerant to nematodes therefore, grafting technology must be combined with other techniques to control nematodes.

To make grafting technology reliable and sustainable, the programme aim at:

- Develop grafting technique and crop management protocols.
- Train farmers on seedling management and grafting technology.
- Identify suitable rootstocks.

- Develop simple and effective tools, such as bamboo tunnel, cutting tools, clips or strips and trays.

The Sino-Italian and the World Bank demonstration projects shown that metam sodium, applied through drip irrigation, is a good alternative to MB fumigation in cucumber. Metam sodium is registered on cucumber but the drip irrigation equipment is hardly available for farmers because the cost is too high.

Mechanical injection of metam sodium faces the same restriction as Chloropicrin, low efficiency and high cost.

The UNIDO and the World Bank demonstration projects evaluated avermectin, which shown promising results to control root-knot nematodes therefore. Avermectin has been registered as nematodes in China. Avermectin will be used in combination with grafting.

Beside the three MB alternatives mentioned above, the following will be further tested at commercial scale:

- iv. Calcium Cyanamid: is a very old and cheap fertilizer, it is registered in China and, combined with solarization or bio-fumigation, can be used to control nematodes, fungi, and weeds. The bibliography is vast and plenty of tests and large-scale applications have been carried out in China and abroad. Recently, preliminary tests run by local MOA bureaus and in cooperation with farmers, and focused on Calcium Cyanamid as MB alternative, have shown interesting results.
- v. Sulfuryl fluoride: it has been evaluated by the World Bank demonstration project.

### 11.3 Ginger

The MB alternative selected for the ginger sector in China is Chloropicrin. It applies the same format as illustrated for strawberries, which however needs to be verified and adjusted for commercial scale applications.

**Table No. 7: machine needed for the MB phasing out on ginger application**

<b>Application methods</b>	<b>Ha.</b>	<b>Machine needed</b>
Manual injection machine	2	5
Small machine driven by tractor	1	0
Small machine driven by cultivators (China)	80	10
	83	

## 12. MB ALTERNATIVES COST COMPARISON

MB alternative cost comparison is shown on the Table No. 8 below.

**Table No. 8: MB alternatives cost comparison RMB/Ha.**

Crop	Alternatives	Applic. Method	Rate g/m <sup>2</sup>	Cost for the Chemical	Cost for the mulching	Applic. Cost	Total cost Ha.
Strawberry	Chloropicrin	Injection	45-50	8,325 9,250	15,750	1,800 2,000	25,875 27,000
	Chloropicrin	Capsule	40	12,000	15,750	0	27,750
	MB	Canister	40	11,000	15,750	0	26,750
Cucumber, Tomato, Eggplant, Pepper	MS	Injection	100	15,000	15,750	1,000	31,750
	Dazomet	Mixture with soil	30	10,500	15,750	1,000	27,250
	1.3D	Injection	15	2,250	15,750	1,000	19,000
	Sulfuryl fluoride	Gas	50	16,500	15,750	0	32,250
	1.8% Avermectin	Mixture with soil	1	300	0	600	900
	Calcium Cyanamide	Mixture with soil	45	3,600	15,750	1,000	20,350
Ginger	Chloropicrin	Injection	45-50	8,325 9,250	15,750	1,800 2,000	25,875 27,000
	Chloropicrin + 1.3D						
	MB	Canister	40	11,000	15,750	0	26,750
Cut flower	Chloropicrin						
Ginseng	Chloropicrin						

**Table No. 9: Notes for MB alternatives**

Technology	Note
Crop rotation	It is impossible to rotate with low value crops
Solarisation	Alone it does not control nematodes, good results combined with other alternatives
Bio-fumigation	Alone it does not control nematodes and fungi, the efficacy is not steady, good results combined with other alternatives
Grafting	Rootstock more tolerant to nematodes need to be identified or combined with other alternatives
IPM	Standard and protocol needs to be established.
BCA	Good results combined with other alternatives

### 13. POLICY

For methyl bromide production, consumption and trade, the following policy and regulation have been issued in China:

- i. Circular (Huanfa) No. 60 [2003], establishment, expansion or renovation of 1.1.1-Trichloroethane and methyl bromide production equipment, 1st July 2003: it is not allowed to establish, expand or renovate methyl bromide production facilities. Local EPBs carry out the supervision and inspection.
- ii. Public Notice (Huanfa) No. 155 [2004], Implementing Methyl Bromide Production License and Quota Management System, 21st May 2004: Methyl Bromide manufacturers whom do not hold Production License and Quota are not allowed to produce methyl bromide. The license and quota are issued and verified on an annual basis by FECO/SEPA. Producers have to restrict their productions within the quota assigned.
- iii. Control measures for the methyl bromide import and export (including QPS): the license and management system for import and export of methyl bromide (including QPS) is effective since 1st January 2004. Import and export dealers have to obtain the license, within the quota assigned, before any methyl bromide import and export transaction initiates.
- iv. Circular (Huanfa) No. 25 [2004], Catalogue of Controlled ODS in China's Import & Export (Third batch), 6th February 2004: methyl bromide has been added to the list of controlled ODS. Methyl bromide export for controlled uses, no QPS, is forbidden since 2004.
- v. Circular No. 4 [2006] by SAG and SEPA, 26th September 2006: Ban of sales and uses of Methyl Bromide in the grain fumigation sector. From 1st January 2007, it is forbidden to use methyl bromide for grain fumigation.

Furthermore, SEPA and MOA will:

- vi. Encourage the registration of other well-proven and effective MB alternatives, such as 1.3D, Chloropicrin+1,3-D.
- vii. Develop new policies and regulation to ensure a safe and effective use of MB alternatives.
- viii. Manage MB production quota, consumption registration, MB trade and uses.

### 14. RISK ASSESSMENT

The following risks, and possible countermeasures, have been identified:

- i. Equipment and goods may not be delivered timely. The MB alternatives applications have to be postponed to the next crop season. All parties will work to their best to deliver timely.
- ii. Major costs fluctuations of MB alternatives, mainly chemical fumigants, could make alternative technologies economically not sustainable. Incentives or other measure may need to be implemented.
- iii. Areas and crops with no experience on MB alternatives application at commercial scale cause a major risk of failing. Training, technical assistance and monitoring has to be strengthened.
- iv. Most farmers have little education and are tight to traditional agriculture practices, MB

is very effective, simple and straight forward to use, while most MB alternatives are less effective, require higher crop management skills and more elaborated pest management. Therefore, awareness and training will play a key role bridging farmers from the old to the new technologies.

- v. The project fund is set in US\$, while equipment and goods are purchased, for the most, in other currencies. Since the weakness of the US\$ the purchase capacity has dropped considerably, and may drop further.
- vi. MB production, consumption and trade are entering a phase of intensive management and strict control. In addition the matter regards a large number of Government bodies and sectors of the Chinese economy. A strong and effective coordination role is required by SEPA and a close and dedicated cooperation needed by all counterparts.

### 15. BUDGET

The estimated budget for the strawberry, cucumber and ginger sectors and training, in 2008, is shown in the Tables No. 10, 11, 12 and 13 below.

**Table No. 10: budget for strawberry sector in 2008.**

Ref. No.	Equipment and material	Unit	Amount	Unit price US\$	Total US\$
1	No. 1 Soft Capsule machine (Big) and No. 1 soft Capsule Machine (Small)	Set	2	50,000	100,000
2	Training, installation and service for No.2 soft capsule machine	Set	1	20,000	20,000
3	Injection machine (metham sodium), including 30 HP tractor and pump for refilling the fumigant tank	Set	2	50,000	100,000
4	Small mechanical injection machines	Set	90	2,000	180,000
5	Small mechanical injection machine including mulching film layer	Set	1	20,000	20,000
6	Manual chloropicrin injection machines	Set	10	80	800
7	Safety kits, each set is composed by No. 1 pair of gloves, No. 1 mask (including No. 3 spare canisters)	Set	600	50	30,000
8	Chloropicrin 94%	Ton	50	2,400	120,000
9	High density polyethylene plastic film for mulching	Ton	30	2,200	66,000
10	Dripping line and venture injection system for drip irrigation	Set	10	700	7,000
	TOTAL				643,800

**Table No. 11: budget for cucumber sector in 2008.**

Ref. No.	Equipment and material		Unit	Amount	Unit price US\$	Total US\$	
11	Grafting kits for 40 Ha		Set	600	50	30,000	
12	Dripping line and venture injection system for drip irrigation		Set	35	760	26,600	
13	Injection pump system for drip irrigation		Set	4	2,000	8,000	
14	Small mechanical injection machines		Set	5	2,000	10,000	
15	Chemical fumigants and BCA	15.1	1.3D	Ton	0.5	N.A.	7,500
		15.2	BCA	Ton	0.5	N.A.	
		15.3	Chloropicrin 94%	Ton	2	N.A.	
		15.4	Metham sodium 35%	Ton	2	N.A.	
16	High density polyethylene plastic film for mulching		Ton	5	2,200	11,000	
17	Safety kits, each set is composed by No. 1 pair of gloves, No. 1 mask (including No. 3 spare canisters)		Set	150	50	7,500	
<b>TOTAL</b>						<b>100,600</b>	

**Table No. 12: budget for ginger sector in 2008.**

Ref. No.	Equipment and material		Unit	Amount	Unit price US\$	Total US\$
18	Injection machine (metham sodium) with rotary-tiller/spading, including tractor for 60 HP and pump to refill the fumigant tank		set	1	90,000	90,000
19	Small mechanical injection machines		set	10	2,000	20,000
20	Manual chloropicrin injection machines		set	5	80	400
21	Safety kits, each set is composed by No. 1 pair of gloves, No. 1 mask (including No. 3 canisters)		set	100	50	5,000
22	Chloropicrin 94%		ton	15	2,400	36,000
23	Metham sodium 35%		ton	1	2,000	2,000
24	1.3D		ton	1	2,000	2,000
25	High density polyethylene plastic film for mulching		ton	20	2,200	44,000
<b>TOTAL</b>						<b>199,400</b>

**Table No. 13: budget for training and technical assistance in 2008.**

Ref. No.	Items	Cost (USD\$)	Approved	To be approved
<b>Carried out by IPP-CAAS</b>				
26	Inception meeting	9,260	9,260	0
27	Training	199,440	151,220	48,220
28	Training equipment and consumable material	101,360	27,600	73,760
29	Assessment equipment	88,800	15,000	73,800
30	Dissemination	76,000	51,900	24,100
31	Formulation of equipment technical specification (Study tour to Japan and expert meeting)	29,840	29,840	0
32	Assessment on project progress and alternative comparison	87,820	87,820	0
	Sub-total	592,520	372,640	219,880
<b>Carried out by SEPA, MOA and UNIDO</b>				
33	Monitoring and Assessment (field visiting and expert meeting)	30,000	0	30,000
<b>Carried out by International consultants</b>				
34	Technical Assistance (International consultants Fee)	120,000	0	120,000
	<b>TOTAL</b>	<b>742,520</b>	<b>0</b>	<b>369,880</b>

**Table No. 13.1: inception meeting**

Ref. No.	Items	Unit	Amount	Unit price US\$	Total US\$
26.1	Transportation	Person	40	100	4,000
26.2	Accommodation	Person, day	40*2	40	3,200
26.3	Meals	Person, day	40*2	15	1,200
26.4	Rent for meeting room	day	2	200	400
26.5	Rent for equipment in meeting	day	2	100	200
26.6	Document				260
	Total				9,260

**Table No. 13.2: training**

Ref. No.	Items	Unit	Amount	Unit price US\$	Total US\$
27.1	Training trainers	time	6	9,380	56,280

Ref. No.	Items	Unit	Amount	Unit price US\$	Total US\$
27.2	Training farmers	person	13,657	6.88	93,960
27.3	Training materials	book	15,000	3	45,000
27.4	Training materials compiled	day	60	70	4,200
	Total				199,440

**Table No. 13.3: training equipment and material**

Ref. No.	Equipment and material	Unit	Amount	Unit price US\$	Total US\$	
28.1	Small mechanical injection machines	set	12	2,000	24,000	
28.2	Manual chloropicrin injection machines	Set	12	80	960	
28.3	Chloropicrin 94%	ton	1	2,400	2,400	
28.4	Metham sodium, 35%	ton	1	2,000	2,000	
28.5	Chemical fumigants	28.5.1 Sulfur fluoride	ton	0.2	N.A.	3,000
		28.5.2 1.3D	Ton	0.3	N.A.	
		28.5.3 Methyl Bromide	ton	0.5	N.A.	
28.6	High density polyethylene plastic film for mulching	ton	4	2,200	8,800	
28.7	Renting fee for greenhouses	No	24	600	14,400	
28.8	Dripping line and venture injection system for drip irrigation	set	24	700	16,800	
28.9	Safety kits, each set is composed by No. 1 glove, No. 1 mask (including No. 3 canisters)	set	60	50	3,000	
28.10	Transportation for materials				10,000	
28.11	No. 4 sets of Video-Computer equipment package and No. 1 Digital video camera	set	4	4,000	16,000	
	Total				101,360	

**Table No. 13.4: assessment equipment**

Ref No	Items	Unit	Amount	Unit price US\$	Total US\$
29.1	Soil pathogens and nematodes analysis kits	set	240	50	12,000
29.2	No. 5 Climate record and No. 1 portable water proof case meteor station	set	6	4,000	24,000
29.3	Diagnostics equipment	set	3	13,000	39,000
29.4	Scale	set	60	150	9,000
29.5	Soil analysis	Kit	120	40	4,800



Ref No	Items	Unit	Amount	Unit price US\$	Total US\$
	Total				88,800

**Table No. 13.5: dissemination**

Ref. No.	Items	Unit	Amount	Unit price US\$	Total US\$
30.1	Dissemination by newspaper	time	4	1,000	4,000
30.2	Dissemination by Local TV	time	4	3,000	12,000
30.3	Dissemination by post	No.	15,000	2	30,000
30.4	Dissemination by promotional T-shirt	No.	15,000	2	30,000
	Total				76,000

**Table No. 13.6: assessment on project progress and alternative comparison**

Ref. No.	Items	Cost (USD\$)
32.1	mid-term on workshop	10,150
32.2	Closing workshop for 2008 activities (be organized in 2009)	14,800
32.3	Assessment on alternatives	58,720
32.4	Report preparation and translation	4,150
	Total	87,820

**Table No. 13.7: international consultants fee**

Ref. No.	Items	Cost (USD\$)
34.1	Travel and DSA	70,000
34.2	Home base technical assistance for: work programme formulation, data processing and assessment, equipment identification and selection, pathogens identification	38,000
34.3	Technical assistance in China: (participation to internal meeting, document preparation, support to field visits)	12,000
	Total	120,000

**Agriculture Work plan of 2008**

Description		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Subcontract sign			■										
TA Unit contract sign													
MOA submit proposal for ginger sector and the equipment specification													
Equipment specification finalize	Expert Conference		■										
	Study tour			■									
Procurement of Equipment	Nominate the procurement agent		■										
	Bidding			■	■								
	Evaluation				■								
	Purchase contract sign					■							
Training material developed						■							
Awareness material developed							■						
Awareness activities							■	■	■	■	■	■	■
Trainer selected				■									
Training of trainers	Strawberry					■	■						
	Cucumber							■	■				
	Ginger								■	■			
Alternative application and training of farmers	Strawberry							■	■				
	Cucumber								■	■			

Description		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
	Ginger												
Evaluation of Alternatives													
Mid-term workshop													

Description		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Finalize 2008 work plan													
Subcontract for ginger and TA project phase II contract sign	Subcontractor												
	TA project												

EXPERT MEETING 23<sup>RD</sup> FEBRUARY 2008

**TECHNICAL SPECIFICATION FOR EQUIPMENT PROCUREMENT FOR THE  
IMPLEMENTATION OF THE WORK PLAN 2008 IN THE AGRICULTURE  
SECTOR  
NATIONAL METHYL BROMIDE PHASE OUT PLAN**

**Contents**

1.	No. 1 Soft Capsule Machine (Big), see reference No. 1 .....	3
2.	No. 1 Soft Capsule Machine (Small), see reference No. 1 .....	6
3.	No. 1 set of Training, Installation and Service for No.2 Soft Capsule Machine, see reference No.2 .....	9
4.	No. 2 Injection machine (metham sodium), see reference No. 3 ...	10
5.	No. 2 tractor for 30 HP, see reference No. 3 .....	13
6.	No. 3 pumps to refill the fumigant tank, see reference No. 3 and 18 15	
7.	No. 1 small mechanical injection machine mulching layer, see reference No. 5 .....	17
8.	No. 1 Injection machine (metham sodium) with rotary-tiller/spading, see reference No. 18 .....	18
9.	No. 1 tractor for 60 HP, see reference No. 18 .....	21
10.	No. 117 Small mechanical injection machines, see reference No. 4, 14, 19 and 28.1 .....	23
11.	No. 27 Manual chloropicrin injection machines, see reference No. 6, 20 and 28.2 .....	24
12.	No. 910 sets of Safety kits, each set is composed by No. 1 pair of gloves, No. 1 mask (including No. 3 canisters), see reference No.7, 17, 21 and 28.9 .....	25
13.	Chloropicrin, see reference 8, 15.3, 22, 28.3 .....	26
14.	Metham sodium, see reference No. 15.4, 23 and 28.4 .....	28
15.	1.3-D, See reference No. 15.1, 24 and 28.5.2 .....	29
16.	Sulfuryl fluoride, see reference No. 28.5.1 .....	30
17.	Methyl bromide, see reference No. 28.5.3 .....	31
18.	BCA, see reference No. 15.2 .....	32
19.	No. 59 tonnes high density polyethylene plastic film for mulching, see reference No. 9, 16, 25 and 28.6 .....	33
20.	No. 69 sets of dripping line and venture injection system for drip irrigation, see reference No. 10, 12 and 28.8 .....	36
21.	No. 4 injection pump systems for drip irrigation, see reference No. 13 38	
22.	No. 600 Grafting sets, see reference No. 11 .....	40
23.	No. 4 sets of Video-Computer equipment package, see reference No. 28.11 .....	41

24.	No. 1 Digital Video Camera, see reference No. 28.11.....	44
25.	No. 5 sets of Climate record, see reference No. 29.2 .....	45
26.	No. 1 portable water proof case meteor station, see reference No. 29.2	50
27.	No. 60 Scales, see reference 29.4.....	54
28.	No. 3 sets of Diagnostics equipment, see reference No.29.3 .....	58
29.	N. 240 Soil pathogens and nematodes analysis kits, see reference No. 35	62

## **1. No. 1 Soft Capsule Machine (Big), see reference No. 1**

Soft Capsule Machine should be equipped comprehensively with manifold of auto-control technologies, which enable the machine to acquire the strong point of accurate loading and measurement of raw materials, simple operation, compact structure, stable performance, reliable running, and ideal economic result of high production and low consumption.

This production line consists of base machine, conveyer, control system, and fitted with an insulation storage barrel, a dryer and unit of other devices. The raw materials applied to the whole production line are exquisite, in conformity to the requirements of GMP.

### **A. Machine body**

The machine body is the core equipment of soft capsule production line. Its function is to accomplish preparation of colloid film, quantitative feed of inner content (multiple forms), and final encapsulation.

#### **Technical specification:**

- a) Filling: liquid or gel.
- b) Capsule volume range: from 0.2 to 5ml.
- c) Capsules are made by gluten or other material resistant to chloropicrin, 1.3D and methyl iodide.
- d) Capsules are filled with: chloropicrin, 1.3D and methyl iodide.
- e) Accuracy: Liquid  $\pm 2\%$ ; others is  $\pm 5\%$ .
- f) Power supply: AC380V 50Hz

### **B. Dryer**

Dryer is mainly used for shaping drying of capsules in the production line.

#### **Technical specifications:**

- a) Dryer is made of stainless steel, and in conformity to GMP standard.
- b) Non-lubricate structure. The machine can be clean during the production process.
- c) The rotating cages are made of stainless steel plate.
- d) The chambers and ventilation ducts are made of stainless steel plate..
- e) The structure must easy to clean, dismantle and reassemble.

### **C. Conveyer**

#### **Technical specifications:**

- a) Material: Teflon.
- b) Conveyer belt speed: about 9.5m/min
- c) Size: minimum 1250 × 300 × 1000mm

#### D. Control System

Fully automatic control system is required. All components must be certified accordingly to the Chinese standards.

#### E. Insulated Storage container

##### Technical specifications:

- a) Material: stainless steel
- b) Volume: minimum 140L
- c) Effective Capacity of the Water Jacket: minimum 60L
- d) Heating system power supply: 1.5kW AC220V/50Hz
- e) Operating temperature: room temperature ~ +95°C
- f) Internal maximum pressure: 0~+0.06Mpa
- g) Equipped with temperature control device.
- h) Gas tight joints, safety valve.
- i) Safety certification meets the Chinese standards.

#### F. Annex

##### Production Capacity and capsules shapes

Capsule Shapes	Production Capacity at average Speed (capsules/h)
Cylinder Shape	From 20,700 to 39,060
Olive Shape	From 15,840 to 50,400
Ball Shape	From 24,300 to 39,600
Tube Shape	From 18,900 to 25,200

##### List of potential suppliers:

###### A) UNIDO SPX BEIJING:

Room 804, Building B of Beijing Productivity Building No.31 Beisanhuanzhonglu, Haidian District, Beijing 100088, China

Tel: + 86 10 820 029 01 Fax: +86 10 820 029 03

E-mail: [spx@bjpc.org.cn](mailto:spx@bjpc.org.cn) Web: <http://www.spx.org.cn>

Contact person: Ms. HE Mingxia

###### B) UNIDO SPX CHONGQING:

No.269, Keyuansi Road , High-Tech Development Zone , Chongqing 400041, China

Tel: + 86 23 686 334 04 Fax: + 86 23 686 337 84

E-mail: [eva@spx-chongqing.org](mailto:eva@spx-chongqing.org) Web: [www.spx-chongqing.org](http://www.spx-chongqing.org)

Contact person: Ms. EVA Leng, SPX-CQ

**C) UNIDO SPX SHANGHAI:**

Room 337, 815 Dong Da Ming Road, Shanghai 200082, China  
Tel: +86 21 659 51197 / 659 52607 Fax: +86 21 659 503 02  
E-mail: [info@shanghai-spx.org](mailto:info@shanghai-spx.org) Web: [www.spx-shanghai.org](http://www.spx-shanghai.org)  
Contact person: Ms. SONG Joanne

**D) UNIDO SPX XI'AN:**

No.1 Huan Cheng Dong Lu Nan Duan, 9F Productivity Office Building, Xi'an 710048,  
China  
Tel. +86 29 824 017 93 Fax. +86 29 824 017 88  
E-mail: [jk@xappc.com](mailto:jk@xappc.com) Web: [www.xappc.com](http://www.xappc.com)  
Contact person: Mr. JIA Kai, Deputy Director

**E) BEIJING ZHONGTIANJINGLAN TECHNOLOGY Co., Ltd.**

Beijing ZhongTianJingLan Technology Co., Ltd  
NO.8 South 2 Tiao WanJuZhuang ,Jiugong County, DaXing District, Beijing  
100076, China  
Tel:86-10-67990289 Fax: 86-10-67990292  
E-mail:[bjztjl@vip.sina.com](mailto:bjztjl@vip.sina.com) Web: [www.bjztjl.com](http://www.bjztjl.com)  
Contact person: Mr. LIU SHENG

**F) BEIJING EASTHUISHEN TECHNOLOGY Co., Ltd.**

NO. 5-1 Yingtou Road,Daxing District,Beijing,100076,China  
Tel: 86-10-69271828 Fax: 86-10-69271816  
E-mail: [vip@dfhs.cn](mailto:vip@dfhs.cn) Web: <http://dfhs.diytrade.com>  
Contact person: Mr. DING GUO FU (Manager)

**G) SKY SOFTGEL Co. ,Ltd. China Representative Office**

NO 10 Yard Dongbai Street, Chaoyang District,Beijing, 100022, China  
Tel: 010-5200 1928 Fax.: 010-5200 1929  
E-mail: [info@delcominc.net](mailto:info@delcominc.net) [skyinfo@bj10000.net](mailto:skyinfo@bj10000.net)  
Web : [www.delcominc.net/sky.htm](http://www.delcominc.net/sky.htm)



## **2. No. 1 Soft Capsule Machine (Small), see reference No. 1**

Soft Capsule Machine should be equipped comprehensively with manifold of auto-control technologies, which enable the machine to acquire the strong point of accurate loading and measurement of raw materials, simple operation, compact structure, stable performance, reliable running, and ideal economic result of high production and low consumption.

This production line consists of base machine, conveyer, control system, and fitted with an insulation storage barrel, a dryer and unit of other devices. The raw materials applied to the whole production line are exquisite, in conformity to the requirements of GMP.

### **A. Machine body**

The machine body is the core equipment of soft capsule production line. Its function is to accomplish preparation of colloid film, quantitative feed of inner content (multiple forms), and final encapsulation.

#### **Technical specification:**

- a) Filling: liquid or gel.
- b) Capsule volume range: from 0.2 to 1.5ml.
- c) Capsules are made by gluten or other material resistant to chloropicrin, 1.3D and methyl iodide.
- d) Capsules are filled with: chloropicrin, 1.3D and methyl iodide.
- e) Accuracy: Liquid  $\pm 2\%$ ; others is  $\pm 5\%$ .
- f) Power supply: AC380V 50Hz

### **B. Dryer**

Dryer is mainly used for shaping drying of capsules in the production line.

#### **Technical specifications:**

- a) Dryer is made of stainless steel, and in conformity to GMP standard.
- b) Non-lubricate structure. The machine can be clean during the production process.
- c) The rotating cages are made of stainless steel plate.
- d) The chambers and ventilation ducts are made of stainless steel plate..
- e) The structure must easy to clean, dismantle and reassemble.

### **C. Conveyer**

#### **Technical specifications:**

- a) Material: Teflon.
- b) Conveyer belt speed: about 9.5m/min
- c) Size: minimum 1250 × 300 × 1000mm

#### **D. Control System**

Fully automatic control system is required. All components must be certified accordingly to the Chinese standards.

#### **E. Insulated Storage container**

##### **Technical specifications:**

- a) Material: stainless steel
- b) Volume: minimum 35L
- c) Effective Capacity of the Water Jacket: minimum 60L
- d) Heating system power supply: 1.5kW AC220V/50Hz
- e) Operating temperature: room temperature ~ +95°C
- f) Internal maximum pressure: 0~+0.06Mpa
- g) Equipped with temperature control device.
- h) Gas tight joints, safety valve.
- i) Safety certification meets the Chinese standards.

#### **F. Annex**

##### Production Capacity and capsules shapes

<b>Shape</b>	<b>Max. Production Capacity (Pill/h)</b>
<b>Cylinder Shape</b>	From 6,720 to 18,240
<b>Olive Shape</b>	From 9,600 to 19,200
<b>Tube Shape</b>	From 7,200 to 12,240

##### **List of potential suppliers:**

###### **A) UNIDO SPX BEIJING:**

Room 804, Building B of Beijing Productivity Building No.31 Beisanhuanzhonglu, Haidian District, Beijing 100088, China

Tel: + 86 10 820 029 01 Fax: +86 10 820 029 03

E-mail: [spx@bjpc.org.cn](mailto:spx@bjpc.org.cn) Web: <http://www.spx.org.cn>

Contact person: Ms. HE Mingxia

###### **B) UNIDO SPX CHONGQING:**

No.269, Keyuansi Road , High-Tech Development Zone , Chongqing 400041, China

Tel: + 86 23 686 334 04 Fax: + 86 23 686 337 84

E-mail: [eva@spx-chongqing.org](mailto:eva@spx-chongqing.org) Web: [www.spx-chongqing.org](http://www.spx-chongqing.org)

Contact person: Ms. EVA Leng, SPX-CQ

**C) UNIDO SPX SHANGHAI:**

Room 337, 815 Dong Da Ming Road, Shanghai 200082, China  
Tel: +86 21 659 51197 / 659 52607 Fax: +86 21 659 503 02  
E-mail: [info@shanghai-spx.org](mailto:info@shanghai-spx.org) Web: [www.spx-shanghai.org](http://www.spx-shanghai.org)  
Contact person: Ms. SONG Joanne

**D) UNIDO SPX XI'AN:**

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China  
Tel. +86 29 824 017 93 Fax. +86 29 824 017 88  
E-mail: [jk@xappc.com](mailto:jk@xappc.com) Web: [www.xappc.com](http://www.xappc.com)  
Contact person: Mr. JIA Kai, Deputy Director

**E) BEIJING ZHONGTIANJINGLAN TECHNOLOGY Co., Ltd.**

Beijing ZhongTianJingLan Technology Co., Ltd  
NO.8 South 2 Tiao WanJuZhuang ,Jiugong County, DaXing District, Beijing  
100076, China  
Tel:86-10-67990289 Fax: 86-10-67990292  
E-mail:[bjztjl@vip.sina.com](mailto:bjztjl@vip.sina.com) Web: [www.bjztjl.com](http://www.bjztjl.com)  
Contact person: Mr. LIU SHENG

**F) BEIJING EASTHUISHEN TECHNOLOGY Co., Ltd.**

NO. 5-1 Yingtou Road,Daxing District,Beijing,100076,China  
Tel: 86-10-69271828 Fax: 86-10-69271816  
E-mail: [vip@dfhs.cn](mailto:vip@dfhs.cn) Web: <http://dfhs.diytrade.com>  
Contact person: Mr. DING GUO FU (Manager)

**G) SKY SOFTGEL Co. ,Ltd. China Representative Office**

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E-mail: [info@delcominc.net](mailto:info@delcominc.net) [skyinfo@bj10000.net](mailto:skyinfo@bj10000.net)  
Web : [www.delcominc.net/sky.htm](http://www.delcominc.net/sky.htm)

**3. No. 1 set of Training, Installation and Service for No.2 Soft Capsule Machine, see reference No.2**

**For both machines:**

- a) Post sale technical assistance: the supplier has to provide post sale technical assistance, set up the equipment for production chloropicrin, 1.3D and methyl iodide capsules and train the final user operators.
- b) *The final user provides the room and infrastructure for operating the machineries.*

#### **4. No. 2 Injection machine (metham sodium), see reference No. 3**

##### **Technical specifications:**

- a) Working width: from 1,200 to 1,500mm
- b) Working Depth: minimum 250 mm.
- c) Power requirement: please specify and provide the technical specification for the tractor to be coupled with the machine
- d) Shanks: minimum distance between shanks 150 to 180mm.
- e) Shanks must be made by hardened steel.
- f) Rear soil levelling and compacting device.
- g) All parts in contact with the fumigant must be resistant to metham sodium, 1.3D and chloropicrin (No PVC, brass, copper, zinc, bronze parts)
- h) Injection rate: from 400 to 2000 L/Ha, specify how the rate is adjusted and calibrated. Range 10 L.
- i) Injection pump: piston pump with independent motor, adjustable injection rate.
- j) Injectors: provided of anti drop system.
- k) Tank volume: minimum 200 L.
- l) Water container and hand and eyes washing system.
- m) Safety device: over pressure valves in the tanks and injection pipes and fumigant level alarm.
- n) Spare parts and tools: minimum one set of shanks and bolts, spare pipes and valves.
- o) Manuals in English.

##### **List of potential suppliers:**

###### **A) IMANTS BV**

NLTurnhoutseweg 29

5541 NV Reusel

The Netherland

T +31(0)497642433

F +31(0)497643205

[info@imants.nl](mailto:info@imants.nl)

<http://www.imants.de/pages/index.php?taalCode=UK>

###### **B) FORIGO ROTER ITALIA S.R.L.**

Via Brennero Nord - Z.i. 9

46035 OSTIGLIA MN

Italy

Phone + 39 0386 32691 - Fax 0386 31250

[info@forigo.it](mailto:info@forigo.it) [info@forigo.it](mailto:info@forigo.it) <http://www.forigo.it/index.asp?IDLang=1>

**C) SCIACCO SRL**

Vittoria - Rg

Italy

Phone + 39 0932 987277

[amministrazione@sciacco.it](mailto:amministrazione@sciacco.it)

<http://www.fumigatrice.com/>

**D) OLIVER**

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37056 Engazzà di Salizzole

Verona

ITALY

Tel. +39(0)45.695.4392

Fax. +39(0)45.695.4408

<http://www.dittaoliver.com/>

**E) DITTA SELVATICI FRANCO**

Via Laura Rodriguez 4

40068 San Lazzaro - BOLOGNA

Italy

Phone + 39 051-463328 / 051-466496 Fax 051 - 454668

[www.selvatici.com](http://www.selvatici.com)

E-mail: [selvatici@selvatici.com](mailto:selvatici@selvatici.com)

<http://www.selvatici.com/intro.html>

[http://www.selvatici.com/Eco-Nurse\\_0\\_6.asp](http://www.selvatici.com/Eco-Nurse_0_6.asp)

**F) KENNCO MANUFACTURING INC.**

PO Box 1149

Ruskin, FL 33570

USA.

Phone: 001 813 645 2591

Fax: 001 813 645 7801

E-mail: [kenncomfg@aol.com](mailto:kenncomfg@aol.com)

Website: <http://www.kenncomfg.com>

**G) KUBOTA**

1-2-47 Shikitsu-higashi,

Naniwa-ku, Osaka 556-8601

Japan

Phone: 06-6648-2111

Fax: 06-6648-3862

<http://www.kubota.com/f/home/home.cfm>

<http://www.kubota.co.jp/english/index.html>

**H) TAMINCO CORPORATE HEADQUARTERS**

Pantserschipstraat 207  
9000 Ghent  
Belgium  
Phone: +32 9 2541411  
Phone: +33 (0) 1 47 29 44 73  
Fax: +32 9 2541410  
Fax: +33 (0) 1 47 25 46 93  
Jean-Michel.Rabasse@Taminco.com

**I) BUHLER INDUSTRIES INC.**

1260 Clarence Avenue  
Winnipeg, Manitoba  
Canada  
R3T 1T2  
Phone (204) 661-8711  
Fax (204) 654-2503  
<http://www.buhler.com/contact.shtml>

**J) CHECCHI & MAGLI SRL**

Via Guizzardi, n.38 - 40054 BUDRIO (BO)  
Phone + 39 051-800.253  
Fax: 051-692.0611  
Email: [info@checchiemagli.com](mailto:info@checchiemagli.com)  
Web: <http://www.checchiemagli.com>

**K) DA LIAN JIN MEI SOIL EQUIPMENT DISINFECTION AND EXPLOITATION Co.,Ltd.**

303 Room technical Agency Building, No.82 Xinkai Road ,Xigang District, Dalian City , liaoNing, China  
Phone 0411-88810800, 0411-88810803 Fax: 0411-88810805  
Email: [king@companycn.com](mailto:king@companycn.com)

## **5. No. 2 tractor for 30 HP, see reference No. 3**

### **Technical specifications:**

- a) Tractor of 30HP with a maximum
- b) Front overhang maximum (mm) 900
- c) Length maximum (mm) 3000
- d) Height with roll bar maximum (mm) 2200
- e) Ground clearance: minimum (mm) 250
- f) Model: maximum 60 HP, 4 cylinder, max engine rpsm 3000, 4 wheel drive
- g) Cooling system water
- h) Transmission: Manual 8x4 (8 forward, 4 reverse synchronised with inverter)
- i) Pto: 540 Rpm.
- j) Hydraulic system: 3 points lift category I
- k) Lift: 1000 kg (two extra lift cylinders)
- l) Tyres (front) 7.50-16 7.50-16 260/70 R16 or similar
- m) Tyres (rear) 300/70 R20 9.50-20 300/70 R20 or similar
- n) Front and rear differential lock, Adjustable, sprung seat, Safety belts, Foldable safety roll bar, Series of control lights, Tachometer/revolution counter, Safety starting switch
- o) Rear revolving working light, Wheel ballasts, Single acting hydraulic outlet with rear quick coupling, Mudguards widening for wide wheels, collapsible safety roll-bar.
- p) Manuals and documents: Each unit shall include the following manuals and documents:
- q) Three complete operating and maintenance manuals in English.
- r) Manuals shall include identification references for all spare parts
- s) Compliance with norms and codes equivalent to European Union or USA

### **List of potential suppliers:**

#### **A) ANTONIO CARRARO SPA (SEARCH FOR CHINA DEALER)**

Via Caltana, n.24 - 35011 CAMPODARSEGO (PD)

Italy

Telefono: 049-921.9921

Fax: 049-921.9944

Email: info@antoniocarraro.it

Web: <http://www.antoniocarraro.it>

#### **B) FERRARI - DIVISIONE DELLA BCS SPA (SEARCH FOR CHINA DEALER)**

Viale Mazzini, n.161 - 20081 ABBIATEGRASSO (MI)

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Phone + 39 02-94.821

Fax: 02-948.2397



Email: [bcs@bcs-ferrari.it](mailto:bcs@bcs-ferrari.it)  
Web: <http://www.bcs-ferrari.it>

**C) SAME DEUTZ-FAHR ITALIA SPA (SEARCH FOR CHINA DEALER)**

Viale F.Cassani, n.15 - 24047 TREVIGLIO (BG)  
Phone + 39 0363-42.11  
Fax: 0363-4211.46  
Email: [marketing@sdfgroup.com](mailto:marketing@sdfgroup.com)  
Web: <http://www.samedeutz-fahr.com>

**D) JOHNN DEERE CHINA**

[http://www.deere.com/zh\\_CN/JDCI/homepage/default.html?location=ww&tm=corp&link=cn](http://www.deere.com/zh_CN/JDCI/homepage/default.html?location=ww&tm=corp&link=cn).  
SHANGHAI NEW HOLLAND - AGRICULTURAL MACHINERY CORP. LTD  
999, XIANG YING ROAD  
SHANGHAI  
PEOPLE REPUBLIC OF CHINA  
Phone +86 21 5505 7771  
Fax +86 21 5505 7770  
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**E) FENDT AGCO GMBH (SEARCH FOR CHINA DEALER)**

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D-87616 Marktoberdorf  
Phone: +49 (0) 8342 / 77-0  
Fax: +49 (0) 8342 / 77-220  
Mail: [info@xfendt.de](mailto:info@xfendt.de)

**F) KUBOTA (SEARCH FOR CHINA DEALER)**

1-2-47 Shikitsu-higashi,  
Naniwa-ku, Osaka 556-8601  
Japan  
Phone: 06-6648-2111  
Fax: 06-6648-3862  
<http://www.kubota.com/f/home/home.cfm>  
<http://www.kubota.co.jp/english/index.html>

**6. No. 3 pumps to refill the fumigant tank, see reference No. 3 and 18**

**Technical specifications:**

- a) All parts in contact with the fumigant must be resistant to metham sodium, 1.3D and chloropicrin.
- b) Capacity: Min 130 L/Min
- c) Max pressure 1 bar
- d) Safety valves for extra gas pressure purging
- e) Hoses and couplings.
- f) On /off switch
- g) Auto priming system
- h) Inlet and outlet parts (pipes, valves, ....)
- i) Stainless steel filter (0.2 mm) in inlet side

**List of potential suppliers:**

**A) METTIFOGO POMPE SPA**

via Armenia, 6 - Z.I. Ponte Rosso  
33078 San Vito al Tagliamento PN  
Italy  
Tel. 0434.85121  
Fax: 0434.85361  
Email: [info@mettifogopompe.it](mailto:info@mettifogopompe.it)

**B) ATA S.R.L.**

Via Molinello 38 16035 Rapallo (GE)  
Italy  
Tel. +39 0185 263015  
Fax +39 0185 260114  
[www.atasrl.it](http://www.atasrl.it)  
[atasrl@atasrl.it](mailto:atasrl@atasrl.it)

**C) LOWARA SRL (AREA NORTH)**

Lowara Subsidiary  
Viale Europa, 30  
20090 Cusago (MI)  
Italy  
Telefono: 848787011  
Fax: (+39) 0444 707176  
E-mail: [lowara.milano@itt.com](mailto:lowara.milano@itt.com)

**D) KUBOTA**

1-2-47 Shikitsu-higashi,

**7. No. 1 small mechanical injection machine mulching layer, see reference No. 5**

**Technical specifications:**

- a) Working width: 1,350mm.
- b) Polyethylene mulching film width: minimum 1,500mm.
- c) Working Depth: minimum 150mm.
- d) Polyethylene mulching film laying device for bed fumigation or broadcast fumigation (to be clearly specified).
- e) All parts in contact with the fumigant must be resistant to chloropicrin, 1,3 D, metham sodium.
- f) Injection rate: from 50 to 400 Kg/Ha; specify how the rate is adjusted and calibrated. Range 1 kg.
- g) Injectors: provided of anti drop system.
- h) Shanks: minimum distance between shanks 150 to 180mm
- i) Tank volume: minimum 50 L.
- j) Power requirement: please specify and provide the technical specification for the tractor to be coupled with the machine
- k) Safety device: over pressure valves in the tanks and injection pipes and fumigant level alarm.
- l) Spare parts and tools.
- m) Training: minimum 3 days on site training, in China (Hebei province), for machine operation, maintenance and safety.
- n) Manuals in English.

**List of potential suppliers:**

A) 商号: 株式会社佐野アタッチ研究所

**SANO ATTACHMENT INSTITUTE CO.,LTD**

所在地〒421-3301静岡県庵原郡富士川町北松野1204番地

TEL 0545-8-3215; FAX 0545-85-2076

web:<http://www.sano-at.co.jp>

B) Minoru Industrial Limited Company

International Private company

447 Shimoichi, Akaiwa-gun, Okayama, , Japan

TEL: 869551122

FAX: 869555520

**8. No. 1 Injection machine (metham sodium) with rotary-tiller/spading,  
see reference No. 18**

**Technical specifications:**

- a) Spading or rotary-tiller, vertical or horizontal shaft driven by tractor.
- b) Working width: from 1,200 to 1,500mm.
- c) Working Depth: minimum 200 mm.
- d) Power requirement: please specify and provide the technical specification for the tractor to be coupled with the machine.
- e) Spades/blades: minimum 6/24.
- f) Spades and blades must be made by hardened steel.
- g) Drive system: PTO, 540 RPM.
- h) All parts in contact with the fumigant must be resistant to metham sodium, 1.3D and chloropicrin (No PVC, brass, copper, zinc, bronze parts).
- i) Injection rate: from 400 to 2,000 L/Ha, specify how the rate is adjusted and calibrated. Range 10 L.
- j) Injector or nozzles: provided of anti drop system.
- k) Rear soil levelling and compacting device.
- l) Tank volume: minimum 200 L.
- m) Water container and hand and eyes washing system.
- n) Safety device: over pressure valves in the tanks and injection pipes and fumigant level alarm.
- o) Spare parts and tools: minimum one set of spades/blades and bolts, spare pipes and valves.
- p) Training: minimum 3 days on site training, in China (Hebei province), for machine operation, maintenance and safety.
- q) Manuals in English.

**List of potential suppliers:**

**A) IMANTS BV**

NLTurnhoutseweg 29

5541 NV Reusel

The Netherland

T +31(0)497642433

F +31(0)497643205

[info@imants.nl](mailto:info@imants.nl)

<http://www.imants.de/pages/index.php?taalCode=UK>

**B) FORIGO ROTER ITALIA S.R.L.**

Via Brennero Nord - Z.i. 9

46035 OSTIGLIA MN

Italy  
Phone + 39 0386 32691 - Fax 0386 31250  
info@forigo.it [info@forigo.it](mailto:info@forigo.it) <http://www.forigo.it/index.asp?IDLang=1>

**C) SCIACCO SRL**

Vittoria - Rg  
Italy  
Phone + 39 0932 987277  
[amministrazione@sciacco.it](mailto:amministrazione@sciacco.it)  
<http://www.fumigatrice.com/>

**D) OLIVER**

Via Torre 32  
37056 Engazzà di Salizzole  
Verona  
ITALY  
Tel. +39(0)45.695.4392  
Fax. +39(0)45.695.4408  
<http://www.dittaoliver.com/>

**E) DITTA SELVATICI FRANCO**

Via Laura Rodriguez 4  
40068 San Lazzaro - BOLOGNA  
Italy  
Phone + 39 051-463328 / 051-466496 Fax 051 - 454668  
[www.selvatici.com](http://www.selvatici.com)  
E-mail: [selvatici@selvatici.com](mailto:selvatici@selvatici.com)  
<http://www.selvatici.com/intro.html>  
[http://www.selvatici.com/Eco-Nurse\\_0\\_6.asp](http://www.selvatici.com/Eco-Nurse_0_6.asp)

**F) KENNCO MANUFACTURING INC.**

PO Box 1149  
Ruskin, FL 33570  
USA.  
Phone: 001 813 645 2591  
Fax: 001 813 645 7801  
E-mail: [kenncomfg@aol.com](mailto:kenncomfg@aol.com)  
Website: <http://www.kenncomfg.com>

**G) KUBOTA**

1-2-47 Shikitsu-higashi,  
Naniwa-ku, Osaka 556-8601  
Japan  
Phone: 06-6648-2111

Fax: 06-6648-3862

<http://www.kubota.com/f/home/home.cfm>

<http://www.kubota.co.jp/english/index.html>

**H) TAMINCO CORPORATE HEADQUARTERS**

Pantserschipstraat 207

9000 Ghent

Belgium

Phone: +32 9 2541411

Phone: +33 (0) 1 47 29 44 73

Fax: +32 9 2541410

Fax: +33 (0) 1 47 25 46 93

Jean-Michel.Rabasse@Taminco.com

**I) BUHLER INDUSTRIES INC.**

1260 Clarence Avenue

Winnipeg, Manitoba

Canada

R3T 1T2

Phone (204) 661-8711

Fax (204) 654-2503

<http://www.buhler.com/contact.shtml>

## **9. No. 1 tractor for 60 HP, see reference No. 18**

### **Technical specifications:**

- a) Tractor of 60HP with a maximum
- b) Front overhang maximum (mm) 1500
- c) Length maximum (mm) 3200
- d) Height with roll bar maximum (mm) 2200
- e) Ground clearance: minimum (mm) 250
- f) Model: maximum 60 HP, 4 cylinder, max engine rpsm 3000, 4 wheel drive
- g) Cooling system water
- h) Transmission: Manual 12x12 (12 forward, 12 reverse synchronised with inverter)
- i) Pto: 540 Rpm.
- j) Hydraulic system: 3 points lift category I
- k) Lift: 2,000 kg (two extra lift cylinders)
- l) Tyres (front) 8.25-R16 280/70-R18 300/80-R15.3 280/70-R18 or similar
- m) Tyres (rear) 11.2 R20 360/70 R20 360/70 R20 12.4 R20 or similar
- n) Front and rear differential lock, Adjustable, sprung seat, Safety belts, Foldable safety roll bar, Series of control lights, Tachometer/revolution counter, Safety starting switch
- o) Rear revolving working light, Wheel ballasts, Single acting hydraulic outlet
- p) with rear quick coupling, Mudguards widening for wide wheels, collapsible safety roll-bar.
- q) Manuals and documents: Each unit shall include the following manuals and documents:
- r) Three complete operating and maintenance manuals in English.
- s) Manuals shall include identification references for all spare parts
- t) Compliance with norms and codes equivalent to European Union or USA

### **List of potential suppliers:**

#### **A) ANTONIO CARRARO SPA (SEARCH FOR CHINA DEALER)**

Via Caltana, n.24 - 35011 CAMPODARSEGO (PD)

Italy

Phone: +39 049-921.9921

Fax: 049-921.9944

Email: [info@antoniocarraro.it](mailto:info@antoniocarraro.it)

Web: <http://www.antoniocarraro.it>

#### **B) FERRARI - DIVISIONE DELLA BCS SPA (SEARCH FOR CHINA DEALER)**

Viale Mazzini, n.161 - 20081 ABBIATEGRASSO (MI)

Italy

Phone + 39 02-94.821

Fax: 02-948.2397  
Email: [bcs@bcs-ferrari.it](mailto:bcs@bcs-ferrari.it)  
Web: <http://www.bcs-ferrari.it>

**C) SAME DEUTZ-FAHR ITALIA SPA (SEARCH FOR CHINA DEALER)**

Viale F.Cassani, n.15 - 24047 TREVIGLIO (BG)  
Phone + 39 0363-42.11  
Fax: 0363-4211.46  
Email: [marketing@sdfgroup.com](mailto:marketing@sdfgroup.com)  
Web: <http://www.samedeutz-fahr.com>

**D) JOHNN DEERE CHINA**

[http://www.deere.com/zh\\_CN/JDCI/homepage/default.html?location=ww&tm=corp&link=cn](http://www.deere.com/zh_CN/JDCI/homepage/default.html?location=ww&tm=corp&link=cn).

SHANGHAI NEW HOLLAND - AGRICULTURAL MACHINERY CORP. LTD  
999, XIANG YING ROAD - SHANGHAI - PEOPLE REPUBLIC OF CHINA  
Phone +86 21 5505 7771 - Fax +86 21 5505 7770 - email:  
[vincent.delassagne@cnh.com](mailto:vincent.delassagne@cnh.com)

**E) FENDT AGCO GMBH (SEARCH FOR CHINA DEALER)**

Johann-Georg-Fendt-Strasse 4  
D-87616 Marktobendorf  
Phone: +49 (0) 8342 / 77-0  
Fax: +49 (0) 8342 / 77-220  
Mail: [info@xfendt.de](mailto:info@xfendt.de)

**F) KUBOTA (SEARCH FOR CHINA DEALER)**

1-2-47 Shikitsu-higashi,  
Naniwa-ku, Osaka 556-8601  
Japan  
Phone: 06-6648-2111  
Fax: 06-6648-3862  
<http://www.kubota.com/f/home/home.cfm>  
<http://www.kubota.co.jp/english/index.html>



**10.No. 117 Small mechanical injection machines, see reference No. 4, 14, 19 and 28.1**

**Technical specifications:**

- a) Working width: minimum 440mm.
- b) Working Depth: minimum 100mm.
- c) Motor: No. 63 diesel engine, minimum 6HP and 64 gas engine, minimum 8HP.
- d) All parts in contact with the fumigant must be resistant to chloropicrin and 1.3D.
- e) Injection rate: from 200 to 400 Kg/Ha.
- f) Tank volume: minimum 20 L.
- g) Manual: Chinese.

**List of potential suppliers:**

**A) DA LIAN JIN MEI SOIL EQUIPMENT DISINFECTION AND EXPLOITATION Co. ,Ltd.**

303 Room technical Agency Building, No.82 Xinkai Road ,Xigang District, Dalian City , liaoNing, China

Phone 0411-88810800, 0411-88810803 Fax: 0411-88810805

Email: [king@companycn.com](mailto:king@companycn.com)

**11.No. 27 Manual chloropicrin injection machines, see reference No. 6, 20 and 28.2**

**Technical specifications:**

- a) Tank volume: 3L.
- b) Weight: maximum 2.7 Kg.
- c) Injection range: from 1 to 5ml per stroke.
- d) Injection depth: from 12 to 18cm..
- e) All parts in contact with the fumigant must be resistant to chloropicrin and 1.3D.
- f) Manual: Chinese.

**List of potential suppliers:**

**A) DA LIAN JIN MEI SOIL EQUIPMENT DISINFECTION AND EXPLOITATION Co. ,Ltd.**

303 Room technical Agency Building, No.82 Xinkai Road ,Xigang District, Dalian City , liaoNing, China

Phone 0411-88810800, 0411-88810803 Fax: 0411-88810805

Email: [king@companycn.com](mailto:king@companycn.com)

**12.No. 910 sets of Safety kits, each set is composed by No. 1 pair of gloves, No. 1 mask (including No. 3 canisters), see reference No.7, 17, 21 and 28.9**

**Technical Specification:**

**No. 910 full-face masks, including No. 2,730 canisters**

Standards		
Name of gas chemical	Concentration of gas mg/L	Life time
Chloropicrin, 1,3-D, methyl bromide	3.0	>=100min

**No. 910 pair of gloves**

Chemical Name	Physical Phase	Average Normalized Breakthrough Time, min	Average Permeation Rate,µg/cm2/min
Chloropicrin, 1,3-D, methyl bromide	Gas and liquid	>480	<0.02

**List of potential suppliers:**

**A) BEIJING JINJIEKANG KEMAO Co.,Ltd.**

No.40 Baochao Bystreet, Dongcheng District,Beijing, 100009,China

Tel: 010-62242818 010-84241818 13701391028

Fax: 010-84242343

E-mail: [yji@public3.bta.net.cn](mailto:yji@public3.bta.net.cn)

**B) EHSY Westing area Produce Service center in China**

18F,Qiangsheng Building, No.145 Pujian Road, PuDong NewDistrict, Shanghai,200127, China.

Tel: 400-880-8822 /86-21-50898822

Fax: 400-880-8812 /86-21-58734680

E-mail: [SH@ehsy.com](mailto:SH@ehsy.com) Web: <http://www.ehsy.com/>

**13. Chloropicrin, see reference 8, 15.3, 22, 28.3**

**Technical Specification:**

- a) Quantity: 68 tonnes.
- b) Concentration: minimum 94%.
- c) Container: maximum 25 Kg.

**List of potential supplier:**

**A) SIS SPA**

Via Palestro 241  
97019 Vittoria RG  
Italy  
[sis@sis-italia.it](mailto:sis@sis-italia.it)

**B) TRIS INTERNATIONAL**

Bologna  
Italy  
Phone: +39 051 33 47 49  
[m.piardi@trisinternational.com](mailto:m.piardi@trisinternational.com)

**C) BROMOTIRRENA**

Italy - 04022 FONDI (LT)  
via Torino 4  
Italy  
tel +39 0771 511225  
fax +39 0771 531532  
<http://www.bromotirrena.it/eng/contatti.htm>

**D) TRICAL INC**

Telephone: 831-637-0195  
FAX: 831-637-0273  
Postal address: P.O. Box 1327, Hollister, CA 95024-1327  
USA  
General Information: [jcooper@trical.com](mailto:jcooper@trical.com)  
Sales: [sales@trical.com](mailto:sales@trical.com)  
Customer Support: [customersupport@trical.com](mailto:customersupport@trical.com)  
Webmaster: [jcooper@trical.com](mailto:jcooper@trical.com)

**E) HENDRIX AND DAIL, INC.**

P.O. Box 648  
Greenville, NC 27835

1-800-637-9466

USA

<http://www.hendrixanddail.com/>

**F) NIKLOR CHEMICAL COMPANY**

2060 East 220th Street

Long Beach, CA 90810

USA

Phone: +001 562-830-2253

**G) DALIAN DYE-CHEMICALS GROUP CO.LTD.**

No.188Zhen Xing Road Ganjingzi Dist., Dalian ,liaoning, 116113,China

TEL:0411-86861148 PHONE:13904113240

FAX:0411-86861018

Web:<http://www.dalianda.com>

Email:[dlldj@sina.com](mailto:dlldj@sina.com)

**14.Metham sodium, see reference No. 15.4, 23 and 28.4**

**Technical Specification:**

- a) Quantity: 4 tonnes.
- b) Concentration: minimum 35%.
- c) Container: maximum 20 Kg.

**List of potential supplier:**

**A) TAMINCO CORPORATE HEADQUARTERS**

Pantserschipstraat 207

9000 Ghent

Belgium

Phone: +32 9 2541411

Fax: +32 9 2541410

**B) SIAPA S.R.L.**

Via Caldera, 21

Palazzo D - Ala 3

20153 Milano

Italy

Phone + 39 02.40946.1

fax +39 02.40946210

email: [siapa@siapa.mi.it](mailto:siapa@siapa.mi.it)

**C) CEREXAGRI ITALIA**

S. Carlo di Cesena (FC)

47023 - Via Terni, 275

Italy

Phone + 39 0547 661523

Fax 0547 661450

[pietro.di-primo@cerexagri.com](mailto:pietro.di-primo@cerexagri.com)

[italiacesena@uniphos.com](mailto:italiacesena@uniphos.com)

**D) CERTIS**

[http://www.certiseurope.com/Certis/English/Home/Our\\_Offices/Worldwide+Locations/page.aspx/83](http://www.certiseurope.com/Certis/English/Home/Our_Offices/Worldwide+Locations/page.aspx/83)

**E)EXPORT DEPARTMENT OF SHENYANG FENGSHOU PESTICIDE Co.,Ltd.**

No.10 Haitang Street Sujiatun Dist. Shenyang City, Liaoning Provice,110101,China

Phone: 86-24-89487890 Fax: 86-24-89487788

Web: <http://www.agrochemcn.com>

**15. 1.3-D, See reference No. 15.1, 24 and 28.5.2**

技术规格:

- a) 总量: 1.8 吨;
- b) 纯度:  $\geq 93\%$ .
- c) 每罐重量  $\leq 20$  千克.

潜在供应商:

**A) DOW AGROSCIENCES**

Global Headquarters  
Dow AgroSciences LLC  
9330 Zionsville Road  
Indianapolis, IN 46268  
USA  
Telephone: +1 317 337 3000  
<http://www.dowagro.com/china/prod/>

**B) CERTIS**

[http://www.certiseurope.com/Certis/English/Home/Our\\_Offices/Worldwide+Locations/page.aspx/83](http://www.certiseurope.com/Certis/English/Home/Our_Offices/Worldwide+Locations/page.aspx/83)

**C) ZIBO YUANWANG CHEMICAL Factory**

Zhutai industry Linzi Dist. ,Zibo City, Shangdong province,China  
**TEL:** 86-0533-7785987 , 13606436983  
E-mail: [root@zywchem.com](mailto:root@zywchem.com)  
Contact person:Mr Zhu Xueyi

**D) DOW AGROSCIENCES IN CHINA**

1103 Room ,east 3 Office ,East trade Building ,East Square ,No 1 East chang'an Street ,Dongcheng District ,Beijing ,100738, China  
Tel: 010-8518 5599  
Fax: 010-8518 1251

**16. Sulfuryl fluoride, see reference No. 28.5.1**

**Technical Specification:**

- a) Quantity: 0.2 tonnes.
- b) Concentration: minimum 99%.
- c) Container: maximum 10 Kg.

**List of potential supplier:**

**A) DOW AGROSCIENCES**

Global Headquarters  
Dow AgroSciences LLC  
9330 Zionsville Road  
Indianapolis, IN 46268  
USA  
Telephone: +1 317 337 3000  
<http://www.dowagro.com/china/prod/>

**B) LINHAI LIMIN CHEMICAL Co.Ltd.**

ChengGuan Zhenxin Street linhai City Zhejiang Province 317000, China  
TEL: 86-576-5177672 FAX: 86-576-5177681  
Web: <http://liminchemicals.com.cn>

**C) DOW AGROSCIENCES IN CHINA**

1103 Room ,east 3 Office ,East trade Building ,East Square ,No 1 East chang'an  
Street ,Dongcheng District ,Beijing ,100738, China  
Tel: 010-8518 5599  
Fax: 010-8518 1251



**17.Methyl bromide, see reference No. 28.5.3**

**Technical Specification:**

- a) Quantity: 0.5 tonnes.
- b) Concentration: minimum 98% plus 2% chloropicrin.
- c) Container: maximum 10 Kg.

**List of potential supplier:**

**A) SHANGDONG CHANGYI CHEMICAL FACTORY**

Erjia Village, Liutong Town, Changyi City, Shandong province,261303,China

TEL: 0536-7802210

FAX: 0536-7802133

**B) Israel Dead Sea Bromide Group**

Hongkong Asia Bromide Co., Ltd.SHANGHAI , 200001,China

TEL: 021-63630018

FAX: 021-63620899

**C) LINHAI JIANXIN CHEMICAL Co.Ltd.**

Chengguan White Tower,Linhai City, Zhejiang Province 317000, China

TEL: 0576-5135553

FAX: 0576-5135505

Web: <http://www.xingye.net>

**18. BCA, see reference No. 15.2**

**Technical Specification:**

- a) Quantity: 0.5 tonnes.
- b) Components: trichoderma, bacillus subtilis, avermectin, streptomyces.
- c) Container: maximum 10 Kg.

**List of potential supplier:**

**A)QINHUANGDAO LEADST TECHNOLOGY DEVELOP Co. ,Ltd.**

No.16 Yellow river Road, high-tech Develop Dist.Qinhuangdao City ,Hebei Province ,  
066004,China

TEL: 0335-8500880

FAX: 0335-8500880

Web: <http://www.leadst.com>

**19.No. 59 tonnes high density polyethylene plastic film for mulching, see reference No. 9, 16, 25 and 28.6**

**Technical specifications:**

- a) High density virgin polyethylene film
- b) Length: 300 m;
- c) Width: 50% 8m and 50% 4m, in rolls 2m width;
- d) Thickness: 0.040-0.050mm  $\pm$  15%;
- e) Colour: transparent;
- f) Roll weight: maximum 70 kg; and
- g) Additives: lubricated, no UV additives.

**List of potential supplier:**

**A) EIFFEL OFFICES AND PRODUCTION PLANT**

Via Provinciale, 35/A  
Località Ghiara Sabbioni  
43012 Fontanellato (Parma)  
EU - Italy  
Call Center: +39 +521 829711  
Fax Center: +39 +521 829777  
eMail Center: [info@eiffel.it](mailto:info@eiffel.it)

**B) AGRIPLAST**

c.d.a Marangio  
97019 VITTORIA (RG)  
ITALY  
Phone: +39 09 32 99 72 11  
Fax: +39 09 32 86 72 38  
e-mail: [agriplast@agriplast.com](mailto:agriplast@agriplast.com)

**C) AT PLASTICS INC.**

134 Kennedy Road S.  
Brampton, Ontario L6W 3G5  
CANADA  
Tel:(905) 451-9985  
Fax:(905) 451-7650

**D) MUTHU SHRI CHAKRA PACKAGING PVT. LTD.**

71/1, Poraiyur, Villianur Commune, Villianur,  
Pondicherry - 605 110  
INDIA

Phone: +(91)-(413)-2666145/2668292  
Fax: +(91)-(413)-2668294  
Email: muthushrichakra@yahoo.co.in

**E) GINEGAR PLASTIC PRODUCTS LTD.**

Kibbutz Ginegar 30053  
ISRAEL  
Phone: +972 6 654 42 22  
Fax: +972 6 654 42 11  
E-mail: GPP@ginegar.co.il  
Contact Person: Mr. Yehuda Shenkar

**F) INDUSTRIA PLASTICA MONREGALESE**

Via Vigevano  
12084 MONDOVI (TO)  
ITALY  
Phone: +39 0174 55 25 51  
Fax: +39 0174 48 10 04  
e-mail: [ipm@ipmspa.com](mailto:ipm@ipmspa.com)

**G) PLASTIKA KRITIS**

P.O Box 1093  
GR 711 10 IRAKLION  
Greece  
Phone: +30 810 30 85 00  
Fax : +30 810 381328  
E-Mail: [info@plastikakritis.com](mailto:info@plastikakritis.com)

**H) ARVIND CHEMI SYNTHETICS PVT. LTD.**

B - 7 / 7 Safdarjung Enclave,  
New Delhi-110029  
INDIA  
Phone: +91 11 51 65 04 27  
Fax: +91 11 51 65 04 28  
e-mail: [acspl@del6.vsnl.net.in](mailto:acspl@del6.vsnl.net.in)  
Contact Persons: Mr. Arvind Gupta

**I) GRAHA PURA**

JL. Pancoran Indah I No.52  
Jakarta Selatan 12780  
INDONESIA  
Tel: (+62-21) 79193585, 79193686  
Fax: (+62-21) 79193586-7, 79193774, 79193775  
e-mail: [marketing@puragroup.com](mailto:marketing@puragroup.com)

Web: <http://www.puragroup.com/pura.html>

**J) PLASTOPIIL**

Menashe Hazarie  
Marketing Manager  
UK, USA, ASIA  
Kibbutz Hazorea 30060, Israel  
Tel: 972-4-9598800  
Mobile: 972-54-4541521  
Fax: 972-4-9894250  
Email: menashe\_ha@plastopil.com

**K) ARUN MANUFACTURING SERVICES PVT. LTD.**

Contact Person : Mr. H.P. Agarwal  
Address : B-53, FF complex, Rani Jhansi Road, Jhandewalan,  
New Delhi - 110 055 INDIA  
Phone no : +(91)-(11)-23544555/23551699  
Mobile : +(91)-9350107214  
Fax : +(91)-(11)-23638587  
Email : amspoly@vsnl.com ,amsdelhi@yahoo.co.in

**L) BAODING JUXIN PLASTIC FACTORY ,HEIBEI**

Contact Person : Mr CHEN GUOLONG  
Address : ManCheng County BaoDing City, HeBei Province,China  
Tel: 0312-7075782

**M) SHANDONG ZIBO ZHONG YI PLASTIC PRODUCE Co. Ltd.**

Contact Person : Mr XU JIANQIANG  
Tel: 0536-3591189  
Fax: 0536-3591189  
Address: QingZhou city ,Shangdong province

**N) QINGDAO HUA YANG FILM FACTORY, SHANDONG**

Contact Person: Mr CHEN LING  
Address: Kangcheng industry, QingDao  
Web: <http://www.qingdaohuayu.com>  
Tel: 13969632858

**L) XINJIANG TIAN YE GROUP , Co. Ltd.**

Tianye Industrial Park Shihezi Development Zone Xinjiang, 832000, China  
TEL:0993-2623102  
Fax:0993-2623103

**20.No. 69 sets of dripping line and venture injection system for drip irrigation, see reference No. 10, 12 and 28.8**

**Technical specification for one set:**

- a) Main pipe: No. 65m lay-flat PE or PP pipe diameter 55mm.
- b) Dripping lines: 1,400m drip lines, inner diameter 6mm.
- c) Fittings: No. 120 fittings between main pipe and dripping lines, No. 1 cap and No. fitting 1.5" for layflat pipe
- d) Drippers: flow rate from 1.2 to 2.4 l/h, no PVC allowed, pressure minimum 1, maximum 4 bar.
- e) Spacing: 400mm.
- f) Disk filter: 120 mesh, diameter 1.5" and anti-back flow valve.
- g) Venturi: injection rate from 2 to 30 L/h, pressure from 1 to 4 bar, anti-back flow valve.
- h) All materials must be compatible with metham sodium, chloropicrin, 1,3 D

**List of potential list:**

**A) NETAFIM™**

Derech Hashalom 10, Tel Aviv 67892  
ISRAEL  
Phone: 972 - 8 - 6474747  
Fax: 972 - 8 - 6473983  
e-Mail: [postmaster@netafim.com](mailto:postmaster@netafim.com)

**B) NETAFIM CHINA BEIJING OFFICE**

ROOM 2608, Wen Hua Palace In The Working People's Cultural Palace,  
Beijing 100006  
Phone: 86 10 65237521/31  
Fax: 86 10 65237522  
mailto: [laoma@netafim.cn](mailto:laoma@netafim.cn)  
Web site: [www.netafim-china.com](http://www.netafim-china.com)

**C) IRRIGRO USA - MAILING ADDRESS:**

LPO Box 163  
1755 Factory Outlet Blvd  
Niagara Falls, NY  
USA  
14304-0163  
<http://www.irrigro.com/indexx.html>

**D) METZERPLAS**

Kibbutz Metzger  
M.P. Hefer 38820  
Israel  
Tel. 972-4-6387001  
Fax. 972-4-6385385  
[info@metzerplas.com](mailto:info@metzerplas.com)

**E) PLASTRO – HEADQUARTERS ISRAEL**

Kibbutz Gvat D. N. Ha'Amakim 36579  
Telephone: 972-4-6549444  
Fax: 972-4-6449244

**F) CARSON**

IDA Industrial Estate,  
Racecourse Road,  
Roscommon,  
Ireland  
Tel +353 (0)9066 25922  
Fax +353 (0)9066 25921  
email Customer Service: [sales@carsoneurope.com](mailto:sales@carsoneurope.com)

**G) KOMET STANDARD SRL**

Via dell'Ora del Garda 11  
I - 38014 Gardolo / TN  
Italy  
phone (+39) 0461 990138  
fax (+39) 0461 990201  
<http://www.kometirrigation.com/w3k/index.jsp?k=5>

**H) JIAN IRRIGATION**

Ontario, California  
P.O. Box 3760  
1450 E. Francis St.  
Ontario, CA 91761  
1-800-828-9919 or (909) 395-5200  
Fax: 1-800-777-6162 or (909) 395-5201  
<http://www.aquariusbrands.com/contactus/>

**I) RAIN BIRD CHINA**

<http://www.rainbird.com/worldwide/asia.htm>

**21.No. 4 injection pump systems for drip irrigation, see reference No. 13**

**Technical specifications:**

- a) Pumps piston and chamber: stainless steel or Teflon.
- b) Use: to inject metham sodium, chloropicrin, 1.3D.
- c) Flow rate of injection: from 2 to 30 L/h.
- d) Pressure: minimum 10 bar.
- e) Adjustment steps: minimum 0.25 L.
- f) Motor: one cylinder gas engine.
- g) Safety valve and anti-back flow valve.
- h) Filter: in the inlet, stainless steel, 200 micron.
- i) Spare parts and tools (specify).

**List of potential supplier:**

**A) AGROQUIMICOS DE LEVANTE**

**Spain**

Poligono Industrial Castilla (CI Vial) 5 46380 Cheste  
SPAIN

Email: [aqlsa@arrakis.es](mailto:aqlsa@arrakis.es)

Tel: +34 962 51 10 00

Fax: +34 962 51 14 61

**B) ATA S.R.L.**

Via Molinello 38

16035 Rapallo (GE)

Italy

Phone +39 0185 263015

Fax +39 0185 260114

[www.atasrl.it](http://www.atasrl.it)

[atasrl@atasrl.it](mailto:atasrl@atasrl.it)

**C) AGRICONTROL S.R.L.**

Reg. Str. Torre Pernice 13/6 17031 Albenga (Sv)

Italy

Phone +39 0182 21002 Fax +39 0182 21095

[info@agricontrol.it](mailto:info@agricontrol.it)

**D) MILTON**

Milton Roy USA

201 Ivyland Road

Ivyland, PA 18974



Phone (215) 441-0800  
Fax: (215) 441-8620  
Tammy Couiton  
Purchasing coultot@miltonroy.com

**E) CDS-JOHN BLUE COMPANY**

Division of Advanced Systems Technology  
P.O. Box 1607, Huntsville, Alabama 35807  
<http://www.cds-johnblue.com/contact-john-blue-company.shtml>

**F) LOWARA SRL (AREA NORTH)**

Lowara Subsidiary  
Viale Europa, 30  
20090 Cusago (MI)  
Italy  
Phone Fax: (+39) 0444 707176  
E-mail: [lowara.milano@itt.com](mailto:lowara.milano@itt.com)

**22.No. 600 Grafting sets, see reference No. 11**

**Technical specifications:**

Each set is composed by:

- a) No. 1,100 grafting clips for cucumber (elastic body);
- b) No. 200 L Substrate, porosity about 60%, pH 6~7.
- c) No. 50 trays.
- d) 3 cutters and 15 spare blades.

**List of potential supplier:**

**A) BEIJING MIAOLE SEEDING CONTAINER FACTORY**

103 Room 9Door No.118 Shaoyaojubelli Chaoyang district,beijing

Tel: 01084617663

Web: <http://mlym.myqy.cn>

**B) WEIFANG HUINONG ZHONGYE TECHNOLOGY Co. Ltd.**

North Road linglong hill ,Qingzhou City, Shandong province,262500,China

Tel: 86 0536 2132718

Fax: 86 0536 3306856

Contract person: Cui Xiujing

**23.No. 4 sets of Video-Computer equipment package, see reference No. 28.11**

Each set of Video-Computer equipment package is composed by No. 1 LCD Projector, No. 1 notebook PC, No.1 digital camera:

**Technical Specification:**

**A. LCD Projector.**

a) General

Device Type	LCD projector
Weight	Less than 1.8 kg
Lamp life	2,000hours

b) Project panel

Image Brightness	2100 ANSI lumens
Image Brightness (Reduced)	1600 ANSI lumens
Image Size	3.3 ft - 25 ft
Projection Distance	4 ft - 35 ft
Digital Zoom Factor	4x
Resolution	1024 x 768 (native) / 1400 x 1050 (resized)
Native Aspect Ratio	4:3
Display Format	2,359,296 pixels (1,024 x 768 x 3)
Max Sync Rate (V x H)	92 Hz x 92 kHz
Lamp Type	UHP 165 Watt
OSD Languages	Chinese (traditional), Chinese (simplified) and English at least
Features	Freeze frame

c) Environmental Parameters

Min Operating Temperature	32 °F
Max Operating Temperature	95 °F
Humidity Range Operating	35 - 85%

d) Power

Power Device	Power supply - internal
Voltage Required	AC 120/230 V ( 50/60 Hz )
Power Consumption Operational	220 Watt

e) Miscellaneous

Included Accessories	Carrying case
Cables Included	1 x VGA cable   1 x A/V adapter
Compliant Standards	FCC Class B certified, CE, IC Class B, C-Tick, VCCI Class B ITE, CE-LVD, cUL, EN 60950, NEMKO, UL 1950
Warranty	One year

**B. Notebook PCs.**

a) General

System Type	Notebook
Built-in Devices	Stereo speakers, Wireless LAN antenna
weight	2,000-2,500g
Wireless	802.11b, 802.11g

b) Processor

Processor	Intel PRO/wireless
Multi-Core processor technology	Dual-Core

c) Storage

Hard drive	160 GB
Hard drive type	Portable

d) display

Display type	14.1 TFT active matrix
Max Resolution	1280 x 800 ( WXGA )
Screen display	wide

e) battery

Battery capacity	at least 56 Wh
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f) Warranty

Service & support type	One year warranty
------------------------	-------------------

g) Environmental parameters

Min operating	32 °F
---------------	-------

temperature  
 Max operating temperature 95 °F  
 Operating humidity rang 10 - 90%

h) Operating system/software

OS Provided Microsoft Windows Vista Home Premium Edition  
 Software Drivers & Utilities, Microsoft Office, Adobe Acrobat Reader,

**C. Digital camera.**

Megapixel Banding 8 to 8.9 Megapixels  
 Maximum Image Resolution 3264 x 2448  
 Optical Zoom 3.8x  
 Lens Zoom  
 Digital Zoom 4x  
 Focal Length (35mm equiv) 28 - 105 mm  
 Macro: 3 cm  
 Storage for Digital Compacts SD Card  
 Connection Type USB  
 Operating System Mac OS, Windows 2000, Windows XP, Windows Vista,  
 LCD Monitor 3.0"-3.5"  
 Built-in Flash Yes  
 Battery Type Lithium-ion (NB-5L)  
 Audio Recording Yes  
 Burst Mode Yes  
 CCD Size 1/2.5 inch  
 Exposure Compensation Yes  
 Movie Mode Yes  
 Video Out PAL, NTSC or Mutli-Use Connector  
 Weight (g) 150-200 g

**D. After sale service**

For all the equipments, after sale service office has to be available in China widely.

**24.No. 1 Digital Video Camera, see reference No. 28.11**

**Technical Specification:**

Surround Sound Type	Dolby Digital
Digital Zoom	20x
Fixed Image Resolutions	640x480
Image Sensor Type	CMOS
Colour Viewfinder	yes
Camera Resolution	4.0 MP
Optical Zoom	10x
Digital video format	MPEG
Video resolutions	2304x1728, 2304x1296, 640x480, 1600x1200
Low Lux	2
Night Shot Mode	Yes
Digital Still Shot Mode	Yes
Display Technology	Colour LCD TFT (Active Matrix)
Screen size	2.7" and up
Weight (g)	500-600
Supported Memory Media	Memory Stick Duo, Memory Stick PRO Duo
Built-in Microphone ( Mobile )	Yes
Power Supply	Battery
Wired Terminals / Ports	Video Out, mini-USB, Component Video Output, Microphone Jack , S-Video Output, USB 2.0

**After sale service**

For all the equipments, after sale service office has to be available in China widely.

**List of potential supplier:**

**25. No. 5 sets of Climate record, see reference No. 29.2**

**Each set is composed by:**

- a) No. 1 water proof case temperature data logger
- b) No. 1 portable water proof case PH meter.
- c) No. 1 portable water proof case EC meter.
- d) No. 1 portable water proof case photometer.

**Technical specifications:**

**A. water proof case temperature data logger**

- a) 1 wire probe (wire probe: minimum 5 meters) for air temperature monitoring (minimum range  $-20^{\circ}\text{C} \pm 0.1$   $+90^{\circ}\text{C} \pm 0.1$ )
- b) 2 wire probes (wire probe: minimum 5 meters) for soil temperature monitoring (minimum range  $-20^{\circ}\text{C} \pm 0.1$   $+90^{\circ}\text{C} \pm 0.1$ ).
- c) USB plug and related accessories for data download (Windows Office Excel compatible).
- d) Battery: minimum 1 year of duration.
- e) Low battery charge alarm.
- f) Software Windows compatible for data logger settings (n° of samples for each probe per hour.
- g) Minimum 30 samples/hour per probe.
- h) Digital display with current sampled data check.
- i) Memory: minimum 15,000 data (5,000 per probe).
- j) Nonvolatile EEPROM memory retains data even when the battery has been removed.

**B. portable water proof case PH meter.**

- a) Automatic calibration at 1 or 2 points with 4 memorized buffers to assure reliable readings over the entire measurement range.
- b) Storage of a minimum of 200 measurements, complete with date and time (transfer to the computer an RS232 serial port, using cable and windows compatible software).
- c) 1 pH electrode with protector sleeve
- d) 1 temperature probe,
- e) pH4 and pH 7 buffer sachets,
- f) electrode cleaning solution,
- g) batteries,
- h) rugged carrying case and instructions.
- i) PH range  $0-14 \pm 0.01$  at  $-10^{\circ}\text{C} + 100^{\circ}\text{C}$ .
- j) Automatic and manual temperature compensation.

k) Battery life: minimum 200 hours, rechargeable throughout with a direct cable connection.

l) Auto off.

**C. portable water proof case EC meter.**

a) Rugged waterproof conductivity meter.

b) Storage of a minimum of 200 measurements, complete with date and time (transfer to the computer an RS232 serial port, using cable and windows compatible software).

c) 1 EC probe (potentiometric 4-ring probe) and temperature probe;

d) stainless steel sensors and 1.5 m screened cable.

e) EC range 0 – 200 ± 0.01 mS/cm at +10°C + 100°C.

f) Automatic and manual temperature compensation.

g) Battery life: minimum 200 hours, rechargeable throughout with a direct cable connection.

h) Auto off

**D. portable water proof case photometer.**

a) Measurement of light levels with result display in Lux and Watt/m<sup>2</sup>.

b) The light sensor connected to the meter/data logger on a 5m cable.

c) Measurement ranges: 0.001 to 1.999Klux; 0.01 to 19.99 Klux; 0.1 to 199.9 Klux.

d) Storage of a minimum of 200 measurements, complete with date and time (transfer to the computer an RS232 serial port, using cable and windows compatible software).

e) Rugged water resistant case with protected keyboard.

f) Battery life: minimum 200 hours, rechargeable throughout with a direct cable connection.

g) Auto off

**List of potential supplier:**

**A) MICRODAQ.COM, LTD.**

PO Box 249

Warner, NH 03278

U.S.A.

Tel: 603-746-5524

Fax: 603-746-5384

**B) MILWAUKEE B.V.B.A.**

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E-mail: [milwaukee@skynet.be](mailto:milwaukee@skynet.be)

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Tel.: +39 0331 26 80 09  
Fax: +39 0331 26 80 33  
E-mail: [sales@milwaukee.191.it](mailto:sales@milwaukee.191.it)

**D) SPECTRUM TECHNOLOGIES, INC.**

12360 South Industrial Dr.  
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United States  
Tel: +1 (815) 436-4440  
Fax: +1 (815) 436-4460

**E) ANALYTIKA**

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GREECE  
Tel: (+30) 2105785970-2  
Fax: (+30) 2105785973  
Email : [contact@analytika.gr](mailto:contact@analytika.gr)  
Contact person : Mr. Andreas Kyriakouleas

**F) FISHER BIOBLOCK SCIENTIFIC**

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67403 Illkirch  
Cedex, France  
Tel: 33 3 88 67 14 14  
Fax: 33 3 88 67 11 68  
Website: [www.bioblock.com](http://www.bioblock.com)

**G) FISHER SCIENTIFIC UK, LIMITED**

Bishop Meadow Road  
Loughborough, Leicestershire LE11 5RG  
UK  
Tel: 44 150 923 1166  
Fax: 44 150 923 1893

Website: [www.fisher.co.uk](http://www.fisher.co.uk)

**H) Fisher Scientific GmbH**

Im Heiligen Feld 17  
Schwerte, D-58239 Germany  
Tel: 49 (0) 2304 932 5  
Fax: 49 (0) 2304 932 950  
Website: [www.de.fishersci.com](http://www.de.fishersci.com)

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470 MacArthur Blvd.  
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Fax: + 1-800-508-759-9100  
Web: [www.onsetcomp.com](http://www.onsetcomp.com)  
e-mail: [onsales@cape.com](mailto:onsales@cape.com)

**J) SHAMBHAVI IMPEX**

493, "B-Wing", 2nd Floor,  
Vashi Plaza, Sector-17, Vashi  
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Fax: + (91)-(22)-27621281  
Web: [www.shambhaviimpex.com](http://www.shambhaviimpex.com)  
e-mail: [info@shambhaviimpex.com](mailto:info@shambhaviimpex.com)  
Contact Person: Mr. Shekhar Narain

**k) Rajco Scientific and Engineering Products**

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Behind Tilak Nagar, Police Station,  
New Delhi- 110018  
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Phone: +(91)-(11)-25130328  
Fax: + (91)-(11)-2510329/25529384  
Web: <http://www.rajcoscientific.com>  
e-mail: [info@rajcoscientific.com](mailto:info@rajcoscientific.com)  
Contact Person : Mr. P.K.Sethi

**L) Thermo Electron Austria**

wissenschaftliche Gerate GmbH  
Wehlstrasse 27b

A-1200 Wien  
Austria  
Tel: (+43)(1) 333 50 34-0  
Fax: (+43)(1) 333 50 34 - 26

**M) LZS-CONCEPT Handels- und Service GmbH**

Wirtschaftspark Poettelsdorf, Viktor Kaplan Allee 5  
A-7023 Poettelsdorf  
AUSTRIA  
Phone: +43 (0) 2626 20090  
Fax: +43 (0) 2626 2009030

**N) GRANT INSTRUMENTS (Cambridge) Ltd**

29 Station Road  
Shepreth  
Cambridgeshire  
SG8 6GB  
UK  
Tel: +44 (0)1763 260811  
Fax: +44 (0)1763 262410

**O) HANNA INSTRUMENTS DEUTSCHLAND GMBH**

Lazarus-Mannheimer Str. 2-6,  
D-77694 Kehf am Rhein,  
Germany  
Tel: +49 (7851) 9129-0  
Fax: +49 (7851) 9129-99  
Hanna instruments  
<http://www.hannainst.com/>  
<http://www.hannainst.cn/>

**P) Tecnovetro srl.**

Via Gabriele D'Annunzio, 19, 20052 Monza (Italy)  
Phone + 39 039 2006017  
<http://www.tecnovetro.it/>

**Q) Nordealer Italy**

<http://www.nordealer.com/html/english.htm>

**R) MECSTRUMENTI di Filippo Rossi**

[www.mecstrumenti.com](http://www.mecstrumenti.com)  
[info@mecstrumenti.com](mailto:info@mecstrumenti.com)

**26.No. 1 portable water proof case meteor station, see reference No. 29.2**

**Technical specifications**

- a) Air temperature  $-30 + 90 \text{ }^{\circ}\text{C} \pm 0.1$ ;
- b) Relative humidity  $0 - 100 \% \pm 0.1$ ;
- c) Rain (presence/absence and mm/day);
- d) Light radiation (Lux and  $\text{Watt/m}^2$ );
- e) Soil temperature  $30 + 90 \text{ }^{\circ}\text{C} \pm 0.1$ ;
- f) Wind speed ( $0 - 50 \text{ m/s}$ );
- g) Wind direction;
- h) Pressure (mBar or mm Hg).
- i) Data logger for data storage
  - ✓ Battery life: minimum 1 year, with alarm for low battery level, rechargeable throughout with a direct cable connection.
  - ✓ Software Windows compatible for data logger settings ( $n^{\circ}$  of samples for each probe per hour. Minimum 30 samples/hour per parameter).
  - ✓ Digital display with current sampled data.
  - ✓ Memory: minimum 40,000 data (5,000 per probe).
  - ✓ Memory storage not erased in case of power supply cut off.
  - ✓ USB plug and related accessories for data download (Windows Office Excel compatible).
  - ✓ Fully equipped with stainless steel support.
  - ✓ Non-volatile EEPROM memory retains data even when the battery has been removed.

**List of potential supplier**

**A) MicroDAQ.com, Ltd.**

PO Box 249

Warner, NH 03278

U.S.A.

Tel: 603-746-5524

Fax: 603-746-5384

**B) Milwaukee b.v.b.a.**

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Tel.: +32 3 569 00 28

Fax: +32 3 569 09 28

E-mail: [milwaukee@skynet.be](mailto:milwaukee@skynet.be)

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**D) Spectrum Technologies, Inc.**

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East - Plainfield, Illinois 60585  
United States  
Tel: +1 (815) 436-4440  
Fax: +1 (815) 436-4460

**E) Analytika**

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Fax: (+30) 2105785973  
Email : [contact@analytika.gr](mailto:contact@analytika.gr)  
Contact person : Mr. Andreas Kyriakouleas

**F) Fisher Bioblock Scientific**

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67403 Illkirch  
Cedex, France  
Tel: 33 3 88 67 14 14  
Fax: 33 3 88 67 11 68  
Website: [www.bioblock.com](http://www.bioblock.com)

**G) Fisher Scientific UK, Limited**

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**H) Fisher Scientific GmbH**

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**L) THERMO ELECTRON AUSTRIA**

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Hanna instruments  
<http://www.hannainst.com/>  
<http://www.hannainst.cn/>

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Phone + 39 039 2006017  
<http://www.tecnovetro.it/>

**Q) NORDEADER ITALY**

<http://www.nordealer.com/html/english.htm>

**R) MECSTRUMENTI DI FILIPPO ROSSI**

[www.mecstrumenti.com](http://www.mecstrumenti.com)  
[info@mecstrumenti.com](mailto:info@mecstrumenti.com)

**27.No. 60 Scales, see reference 29.4**

**Technical specifications:**

- a) Accuracy: 10g
- b) Maximum load: 50 Kg.
- c) Minimum load: 0,5 Kg
- d) Water proof case easily cleanable
- e) Stainless steel platform, removable and easily cleanable
- f) Digital weight meter; zero adjustment;
- g) Battery life: minimum 200 hours, rechargeable throughout with a direct cable connection.

**List of potential supplier:**

**A) MICRODAQ.COM, LTD.**

PO Box 249  
Warner, NH 03278  
U.S.A.  
Tel: 603-746-5524  
Fax: 603-746-5384

**B) Milwaukee b.v.b.a.**

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Contact person : Mr. Andreas Kyriakouleas

**F) Fisher Bioblock Scientific**

Parc D'Innovation, BP 50111

67403 Illkirch

Cedex, France

Tel: 33 3 88 67 14 14

Fax: 33 3 88 67 11 68

Website: [www.bioblock.com](http://www.bioblock.com)

**G) Fisher Scientific UK, Limited**

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Website: [www.fisher.co.uk](http://www.fisher.co.uk)

**H) Fisher Scientific GmbH**

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Germany

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Fax: 49 (0) 2304 932 950

Website: [www.de.fishersci.com](http://www.de.fishersci.com)

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Contact Person : Mr. P.K.Sethi

**L) THERMO ELECTRON AUSTRIA**

wissenschaftliche Gerate GmbH

Wehlistrasse 27b

A-1200 Wien

AUSTRIA

Tel: (+43)(1) 333 50 34-0

Fax: (+43)(1) 333 50 34 - 26

**M) LZS-CONCEPT Handels- und Service GmbH**

Wirtschaftspark Poettelsdorf, Viktor Kaplan Allee 5

A-7023 Poettelsdorf

AUSTRIA

Phone: +43 (0) 2626 20090

Fax: +43 (0) 2626 2009030

**N) GRANT INSTRUMENTS (Cambridge) Ltd**

29 Station Road

Shepreth

Cambridgeshire

SG8 6GB

UK

Tel: +44 (0)1763 260811

Fax: +44 (0)1763 262410

**O) HANNA INSTRUMENTS DEUTSCHLAND GMBH**

Lazarus-Mannheimer Str. 2-6,

D-77694 Kehl am Rhein,

Germany

Tel: +49 (7851) 9129-0

Fax: +49 (7851) 9129-99

Hanna instruments

<http://www.hannainst.com/>

<http://www.hannainst.cn/>

**P) Tecnovetro srl.**

Via Gabriele D'Annunzio, 19, 20052 Monza (Italy)

Phone + 39 039 2006017

<http://www.tecnovetro.it/>

**Q) Nordealer Italy**

<http://www.nordealer.com/html/english.htm>

**R) BEIJING FEIMUSI TECHNOLOGY COMPANY**

2F Electricity Building, NO2, Majiabao east Road, Fengtai

District, Beijing, 100077, China

TEL: 010-67238335

Web: [www.114mama.cn](http://www.114mama.cn)

**S) Chengdu Precision counting scale company**

6F Ronghua Building, No45 4-ring north, 2-ring Road, Chengdu City, Sichuan

Tel: 028-83251651

Fax: 028-83254031

**28. No. 3 sets of Diagnostics equipment, see reference No.29.3**

**Each set is composed by:**

- a) No. 1 Binocular Stereo Microscope with built in camera.
- b) No. 1 Binocular microscope with built in camera.

**Technical specifications:**

**A. Binocular Stereo Microscope.**

- a) Magnification: 0,6-0,8x to 4,5x
- b) Zoom ratio: min. 5:1
- c) Tube inclination angle: 45°-60°
- d) Eyepieces: Eyepieces must be 10X, available ranging from 10X to 30X
- e) No 1 auxiliary objectives 2X or 5X
- f) Illumination Systems: Up (with articulated arm) and down (transmitted light illumination with reflector) lightning with halogen lamp 6 V 20W
- g) Light source input rating: 200-240 V
- h) Digital camera system for video and image must be attached (Camera specification: Camera adepter systems for the microscope, Memory card: minimum 256 MB, Output for digital images and videos to PC, Zoom for calibration purposes, digital camera's zoom must have wide, medium and narrow angle modes)

**B. Binocular microscope.**

- a) Viewing Head: Binocular heads rotate 360° with 30° inclined eye tubes interpupillary and dioptically adjustments.
- b) Eyepieces: 10X Wide Field (DIN) Field number 18
- c) Nosepiece: Quintuple, reversed, extra-large, ball bearing nosepiece with a wide, knurled grip for easy operation Features high-grade lubricant and positive stops
- d) Objectives: plan Achromatic 4x, 10x, 40x, 100x oil (All objectives are manufactured to DIN standards and are coated)
- e) Stage: Delivering a high level of fluid motion control and longevity, the stage measures 140mm x 140mm. Featuring a removable spring-clip slide holder and a chemical-resistant finish. Motion is controlled with a right-hand, low-position, rack and pinion coaxial control.
- f) Focusing Movement: Coaxial, ultra low-position coarse and fine focus controls Graduated to 2 microns per division, 40mm focusing range with safety up stop feature.
- g) Transmitted Illumination: 20W variable quartz halogen light source. Comes with blue, green and neutral density (frosted) filters.
- h) Base: Stable design is fitted with anti-skid rubber feet.

- i) Body: Cast metal, ergonomic body with stain-resistant enamel finish.
- j) Approximate dimensions: 225mm(L) x 160mm(W) x 400mm(H) 8.3 kg.
- k) Digital camera system for video and image must be attached (Camera specification: Camera adapter systems for the microscope, Memory card: minimum 256 MB, Output for digital images and videos to PC, Zoom for calibration purposes, digital camera's zoom must have wide, medium and narrow angle modes).

**C. After sale service**

For all the equipments, after sale service office has to be available in China widely.

**List of potential supplier:**

**A) Carl Zeiss Shanghai Co. Ltd., Guangzhou**

Guangzhou Representative Office

Phone: +86 20 8775 5770

Fax: +86 20 8769 0609 gro@zeiss.com.cn

[www.zeiss.com.cn](http://www.zeiss.com.cn)

**B) Carl Zeiss Shanghai Co. Ltd., Shanghai**

Phone: +86 21 5048 1717

Fax: +86 21 5048 1193 sro@zeiss.com.cn

[www.zeiss.com.cn](http://www.zeiss.com.cn)

**C) Carl Zeiss Shanghai Co. Ltd., Beijing**

Beijing Representative Office

Phone: +86 10 6566 3316

Fax: +86 10 6566 3319 czfe@zeiss.com.hk

[www.zeiss.com.cn](http://www.zeiss.com.cn)

**D) Harry Fein World Precision Instruments**

Liegnitzer Strasse 15

D-10999 Berlin

Germany

**Tel:** +49 (0)30 6188845

**Fax:** +49 (0)30 6188670

**Email:** [wpide@wpi-europe.com](mailto:wpide@wpi-europe.com)

[www.wpi-europe.com](http://www.wpi-europe.com)

**E) AGENTEK (1987) LTD.**

Atidim Scientific Park

P.O.Box 58008

Tel-Aviv 61580

ISRAEL

Tel: +972-3-649 31 11

Fax: +972-3-648 12 57

**F) OPTOTEAM GES.MBH.**

Neulerchenfelder Strasse 83

1162 Vienna

AUSTRIA

Tel: +43-(0)1-484 49 00-0

Fax: +43-(0)1-484 49 00-20

E-mail: [office@optoteam.at](mailto:office@optoteam.at)

Company Website: [www.optoteam.at](http://www.optoteam.at)

**G) OLYMPUS AUSTRIA GES.M.B.H.**

Shuttleworthstrasse 25

1210 Wien

AUSTRIA

Tel. +43 1 29 101-0

Fax +43 1 29 101-222

Email [sonja.klement@olympus.at](mailto:sonja.klement@olympus.at)

Website [www.olympus.at](http://www.olympus.at)

**H) OLYMPUS CHINA**

<http://cn.olympus.com/about.html>

**I) INCEKARA A.S.**

25 Sok. # 16, N Akar Mah., Balgat

06520 Ankara

TURKEY

Tel. 0090-312-2952525

Fax 0090-312-2952500

Email [oincekara@incekara.com.tr](mailto:oincekara@incekara.com.tr)

**J) GANTENBEIN TICARET**

Kosuyolu Caddesi No 44

Istanbul , 34718 Kosuyolu

Turkey

Phone +90 216 325 57 05

phone II +90 216 325 57 06 / 07

telefax +90 216 325 57 08

**K) LEICA MIKROSYSTEME HANDELSGES.M.B.H.**

Hernalser Hauptstrasse 219

4th floor

A-1170 Vienna  
Austria  
Tel.: +43 1 486 80 50 0  
Fax.: +43 1 486 80 50 30

**L) M.A.D. Apparecchiature Scientifiche**  
Via Rigla, 32 - 24010 Ponteranica (Bg) - Italy  
Phone +39 035 571392 (6 Linee r.a)  
Fax +39 035 571435 - R.E.A. 316531  
<http://www.optikamicroscopes.com/group.asp>

**M) SPECK ANALYTICAL LIMITED**

Alva Industrial Estate  
Alva  
FK12 5DQ  
UNITED KINGDOM  
Tel: +44 1259 222600  
Fax: +44 1259 222618

**N) LZS-CONCEPT HANDELS- UND SERVICE GMBH**

Wirtschaftspark Poettelsdorf, Viktor Kaplan Allee 5  
A-7023 Poettelsdorf  
AUSTRIA  
Phone: +43 (0) 2626 20090  
Fax: +43 (0) 2626 2009030

**O) MDS SCIEX**

71 Four Valley Drive  
Concord, ON  
L4K 4V8  
CANADA  
Tel: +1 (905) 660-9005  
Fax: +1 (905) 660-2600

**29.N. 240 Soil pathogens and nematodes analysis kits, see reference No. 35**

**Technical specifications:**

Fast kit (lateral flow, express kit or other similar diagnostic test) singly packed (max 2 test for each single pack) in water and humidity proof pack. The kit must contain all needed material for the diagnostic procedure excepting commonly available tools (cutters, knives, ...). An instruction manual must be included (English, Chinese language).

List of pest disease and virus detected by the tests

a) Diseases

*Rhizoctonia* sp.

*Sclerotinia* sp.

*Pythium* sp.

*Phytophthora* sp.

*Botrytis cinerea*

Other soilborne and airborne fungi to infect tomato, cucumber, ginger.

b) Virus

*Tomato mosaic virus*

*Cucumber mosaic virus*

*Tobacco mosaic virus*

Other virus able to infect tomato, cucumber, ginger.

c) Bacteria

*Ralstonia solanacearum*

*Clavibacter michiganensis* subsp *michiganensis*

*Erwinia carotovora*

Other bacteria able to infect tomato, cucumber, ginger.

**List of potential supplier:**

**A) Eco Diagnostics**

Dr Andrew Groenhof

23 Orchard Way,

Kenton,

Exeter,

EX6 8JU,

Tel./Fax: 01626 899098

e-mail: [info@soilsense.net](mailto:info@soilsense.net)

<http://www.soilsense.net/contact.php>



**B) EnviroLogix do Brasil Diagnósticos Ltda.**

F3306, Yuan Chen Xin Office Building

No. 12 Yumin Road

Beijing, 100029

CHINA

Contacts: Mr. Marc Wong

Ms. Jessica Li

Phone: +86 10 82251883 or 82251884

Fax: +86 10 82250447

**C) Hai Kang Life Corporation Ltd.**

8/F, Hang Tung Resources Centre

18 A-Kung Ngam Village Road

Shau Kei Wan, Hong Kong SAR, China

Contact: Terence L. T. Lau, Ph.D.

Executive Director and Chief Operating Officer

Phone: +852 2111 2123

Fax: +852 2111 9762

Email: [terence.lau@dnachip.com.hk](mailto:terence.lau@dnachip.com.hk)

URL: [www.dnachip.com.hk](http://www.dnachip.com.hk)

**D) BEI JING HAI KANG DAN CHIPS LIMITED**

Building Beigongda Software Park, 2No 1 Disheng North Street, Economic and Technological Development Zone Beijing, 100176, China

Tel: (86) 10 5802 2266 ext 575

Fax: (86) 10 5802 2500

**E) Neogen Europe, Ltd.**

Cunningham Building

Auchincruive

Ayr, KA6 5HW

Scotland, UK

Phone, UK: 01292 525 275

International: ++ 44 1292 525 275

Fax, UK: 01292 525 477

International Fax: ++ 44 1292 525 477

[info@neogeneurope.com](mailto:info@neogeneurope.com)

**F) Mybatec**

Mybatec S.R.L. Bovio, 6 I-28100 Novara (NO)

Phone: +39 0321697174

Fax: +39 0321696332

e-mail. [info@mybatec.eu](mailto:info@mybatec.eu)

**G) FLORILAB srl,**

Voc. Soriano 7, Doglio - 06057 Montecastello di Vibio, (PG) ITALIA

Phone +39 075 8950046

fax +39 075 8950077

e-mail [florilab@tin.it](mailto:florilab@tin.it)