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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Twenty-fourth Meeting
Montreal, 25-27 March 1998

PROJECT PROPOSAL: KOREA, DPR

Fumigant

- Demonstration project - alternatives to the use of methyl bromide in the preparation of seedbeds for the cultivation of rice and maize at Agro-chemical Research Institute - ACRI

UNIDO

PROJECT EVALUATION SHEET **KOREA (DPR)**

SECTOR: Fumigant ODS use in sector (1997): 70 ODP tonnes
 (Methyl bromide)

Project Title:

Demonstration project - alternatives to the use of methyl bromide in the preparation of seedbeds for the cultivation of rice and maize at ACRI

Project Data	Methyl Bromide
	ACRI
ODS phase-out (ODP tonnes)	N/A
Proposed project duration (months)	24
Incremental capital cost (US \$)	356,400
- including contingency (%)	10
Incremental operational cost (US \$)	N/A
Total project cost (US \$)	356,400
Local ownership (%)	-
Export component (%)	-
Amount requested (US \$) {Original}	356,400
{Revised}	
Cost effectiveness (US \$/kg)	
National Coordinating Agency	National Coordinating Committee for Environment
Implementing Agency	UNIDO
Technical review completed?	-

<i>Secretariat's Recommendations:</i>	
Amount recommended (US \$)	
Project impact (ODP tonnes)	N/A
Cost effectiveness (US \$/kg)	N/A
Implementing Agency support cost (US \$)	
Total cost to Multilateral Fund (US \$)	

PROJECT DESCRIPTION

Demonstration project - alternatives to the use of methyl bromide in the preparation of seedbeds for the cultivation of rice and maize at ACRI

1. The project is to demonstrate the technical and economic feasibility of three alternative methods to the use of methyl bromide as a fumigant in seedbeds for rice and maize. The chosen alternatives include the use of chemicals in low doses, direct seeding and bio-fumigation, all in combination with an Integrated Pest Management (IPM) programme.
2. In 1994, annual consumption of methyl bromide in Korea in was estimated at 250 metric tonnes. By 1996, through measures taken by the Government methyl bromide consumption was reduced to 70 tonnes. However, in 1996 the cereal yields were 50 per cent lower than in 1995 because of adverse climatological conditions which shortened the growing season and lack of suitable alternatives to the use of methyl bromide.
3. Today, about 40,000 ha of rice seedbeds and 50,000 ha of maize seedbeds require fumigation, and thus, suitable alternatives to the use of methyl bromide is of paramount importance in order to avoid further yield losses.
4. Integrated Pest Management (IPM) programme for crop protection utilizes a combination of cultural practices, including crop rotation, cover crops, fertilization and plant nutrition; physical methods, including steam, solarization, direct seeding and use of chemical compounds.
5. Direct seeding in combination with an IPM programme is a technique widely used in the world since 1960, mainly in Europe (Spain, Italy) and the United States. It consists in soaking the seeds for a maximum of 48 hours, in a solution of a fungicide in water, after which the seeds are sown directly in the final planting ground, instead of having to be transplanted. With this technique, sowing will not be required until the end of April or beginning of May.
6. Bio-fumigation combined with an IPM programme is an old technique that has been recently improved with the use of plastic sheets that trap the gases generated by the fermentation of organic residues below the surface of the soil that are lethal for many microorganisms. In countries with a temperate climate, this cheap technique has been successfully tested and is now in use on a full commercial scale.
7. The project will be implemented in Ryongsong experimental farm and Dae Song cooperative farm, located in Pyongyang province. For comparison purposes, soil preparation will be carried out utilizing the same methodology used in the area. Methyl bromide and alternative technologies to methyl bromide will be applied simultaneously. Bio-fumigation and low dose chemical techniques will be applied with sufficient time to allow the seeding to be completed in their normal time. The tests will be performed three times in plots of 5 pyongs (local unit equivalent to 3.3 square meters). The most promising technologies will be tested on a full commercial scale during the second year.

8. During project implementation, soil samples will be analyzed before and after soil treatment and during the entire crop cycle. Levels of pathogens and pest count will be used as indicators to assess the effectiveness of treatments. The data will be processed and analyzed in terms of effectiveness, productivity and cost.

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

10. The National Coordinating Committee for the Environment will be responsible for the implementation of the project. The Agrochemical Research Institute (ACRI) will be responsible for implementation of the field work. The total costs of human resources is US \$282,000 including a subcontract for field trials (US \$95,000), study tours (US \$24,000), internal travel (US \$2,000) representing 87 per cent of the cost of the project. The total cost of the equipment is US \$42,000.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Fund Secretariat reviewed the project in the context of the Executive Committee's interim guidelines on methyl bromide projects (adopted at the 20th Meeting), the demonstration projects approved at the 22nd and 23rd Meetings of the Committee, the report of the Methyl Bromide Technical Options Committee (MBTOC), several publications on methyl bromide and in the light of the two-day meeting held in the Fund Secretariat (3-4 February) to develop a strategy and guidelines for projects in the methyl bromide sector (to be submitted for consideration of the Executive Committee at the 24th Meeting).

3. The projects states that adequate care was taken by the Agrochemical Research Institute and UNIDO to identify the most relevant crops and the climatological areas representative of Korea's ecological conditions.

4. The Secretariat discussed with UNIDO issues regarding the use of methyl bromide for treatment of rice or maize in seed-beds, inconsistencies in figures given on consumption and the importance of methyl bromide to Korean agriculture, the cost of equipment and laboratory tests being requested, and the salaries of international and national experts.

5. UNIDO indicated that the use of methyl bromide in corn and rice seedbed is extraordinary and is not used anywhere in the world. The project has to be put in the context of an isolated country, using its own technology and using large amounts of methyl bromide.



PROJECT DOCUMENT

COUNTRY:	Democratic People's Republic of Korea
PROJECT TITLE:	Demonstration Project. Alternatives to the use of Methyl Bromide in the Preparation of Seedbeds for the Cultivation of Rice and Maize
SECTOR COVERED:	Cereals
ODS USE BY SECTOR:	70 tons in 1997
PROJECT DURATION:	24 months
TOTAL PROJECT COSTS:	US\$ 356,400
IMPLEMENTING AGENCY OVERHEAD:	US\$ 46,332
PROPOSED FINANCING BY MULTILATERAL FUND:	US\$ 402,732
IMPLEMENTING AGENCY:	UNIDO
COORDINATING INSTITUTION	National Coordinating Committee for Environment
COUNTERPART INSTITUTION	Agro-chemical Research Institute. (ACRI)

PROJECT IMPACT: The project has been designed to demonstrate three proven alternatives to the use of methyl bromide as a fumigant in seedbeds for rice and maize. The chosen alternatives are the use of chemicals in low doses, direct seeding and bio-fumigation, all in combination with an Integrated Pest Management system (IPM). Implementation of the project will involve providing equipment for direct seeding and bio-fumigation, chemicals, and training in all three technologies. It will also include the preparation of technical and economical assessment of the technologies used and the dissemination of the results at a national workshop.

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1. BACKGROUND

Agriculture in the Democratic People's Republic of Korea, is a vital and very important sector. It represents 29.5% of the country's GDP.

GDP DISTRIBUTION

SECTOR	N \$ million	%
Industrial manufacturing	8,500	42.5
Agriculture & stockbreeding	5,900	29.5
Commerce & Services	5,600	28

Source: The Economist

The sector has two main components: (a) traditional crops such as cereals, fruits, and vegetables and (b) animal husbandry, cattle, poultry and fish.

About 40% of the total population lives in rural areas, yet rice and maize cultivation provides jobs for 1,500,000 persons which is about 7.5% of the total population of 21 million people. This gives a clear indication of the social and economic importance of these two cereals.

It is estimated that about 600,000 hectares are planted with rice and about 700,000 hectares are planted with maize.

METHYL BROMIDE CONSUMPTION IN DRK (metric tons)

1994	1995	1996	1997
250	250	250	70

Source: National Coordinating Committee for Environment (NCCE)

As the above table shows, annual consumption of methyl bromide in the People's Democratic Republic of Korea in 1994 was 250 tons. In 1996, the Government took measures to reduce it. The measures taken were so effective, that consumption was reduced to only 70 tons in 1997.

However, the 1996 agricultural campaign was characterized by a severe reduction in cereal yields which were 50 % lower than in 1995. Yield's reduction might be explained by the following facts:

- adverse climatological conditions which shortened the growing season.
- severe losses due to the lack of suitable alternatives to the use of methyl bromide.

As there are about 40,000 hectares of rice seedbeds and around 50,000 hectares of maize seedbeds, the need to find-out suitable alternatives to the use of methyl bromide is of paramount importance in order to avoid a reversal in the declining consumption pattern.

2. PROJECT OBJECTIVE

The object of the project is to demonstrate and disseminate the technical and economic feasibility of three alternative methods to the use of methyl bromide, i. e., low dose chemicals, direct seeding and bio-fumigation, all in combination with the use of an integrated pest management.

The main crops targeted are rice and maize seedbeds.

3. PROJECT DESCRIPTION

3.1. Proposed Technologies

3.1.1. Low chemical dosage with IPM

The application of an Integrated Pest Management program greatly reduces the dosage of mixtures of certified pesticides, nematicides, herbicides, and fungicides applied. This chemical mixture has to be elaborated according to the ecology and climate of the area and in accordance with the chemical production and with the country's policy of self-sufficiency.

The integrated pest management (IPM) makes use of all possible resources--not just chemical control--to reduce and prevent the incidence and effects of a given disease or pest. It includes crop sanitation, disease-free plant material, physical and cultural controls, disease or pest resistant varieties, scouting for diseases and record keeping, sanitary barriers separating nurseries from production facilities, etc. IPM leads to far less usage of chemical pesticides and, according to the specialists, it is at present the only real and lasting solution against severe diseases and pests attacking many crops.

3.1.2. Direct seeding with IPM

This technique is widely used in the world since 1960, mainly in Europe, Spain, Italy and the U.S.A. It consists in soaking the seeds for a maximum of 48 hours, in a solution of a systemic fungicide in water, after which the seeds are sown directly in the final planting ground, instead of having to be transplanted. A precision seed drill will be needed for maize. With this method sowing will not be necessary until the end of April or the beginning of May. Another advantage will be that it will leave for cultivation land that was used for seedbeds.

3.1.3. Bio-fumigation with IPM

Fermentation of organic residues below the surface of the soil generates gases which are lethal to many microorganisms. This ancient technique has been recently improved by a much better mixture of the organic matter with the soil by means of rototillers, and by the use of plastic sheets that trap the gases generated by the fermentation of organic waste.

3.2. Evaluation of alternative techniques

There are basically five well-proven alternative techniques available:

(a) The use of a combination of various fumigants, the cost of which is relatively low, but which requires a waiting period before replanting. This technique must be used with an Integrated Pest Management System.

(b) Direct seeding is the only method of cultivation used in Italy, Spain, the USA and other countries. Its main advantages are that it liberates land and shortens the cycle because sowing can be performed later.

(c) The use of steam to pasteurize the soil, which is expensive but does not require a waiting period and can be graduated according to the intensity of the incidence of the disease. This technique also needs the framework of an Integrated Pest Management System.

(d) Bio-fumigation which has been improved lately by mixing the soil better, by using rototillers and by covering the ground with plastic to hold in the maximum amount of gases generated by the fermentation of organic matter. This increases the soil temperature, accelerates the exothermic fermentation of organic wastes and increases the release of lethal gases. Bio-fumigation must be carried out 15 days prior to sowing.

(e) The use of non-soil culture media, organic or inert, which has been widely utilized in greenhouse cultures in Holland, where the use of methyl bromide was banned some years ago, as well as in other European countries, Japan, and the USA. It is also widely used in seedbeds, particularly in tobacco, in the U.S.A., Spain and other countries. However, the cost and the logistic aspects of this particular technology prevents its use in low value-added agricultural products.

3.3. Project Implementation

3.3.1. Location of the Project

The project will be implemented in two locations:

Ryongsong experimental farm, province of Pyongyang
Dae Song cooperative farm, province of Pyongyang

Adequate care has been taken by ACRI and UNIDO to select the crops and areas representative of DPRK conditions. They are shown below:

CROPS, SITES, AND ALTERNATIVE TECHNOLOGIES

AREA	CLIMATE	CROP	ALTERNATIVES
Ryongsong Experimental farm	Continental	Rice	Low chemicals Direct seeding Bio-fumigation Steaming Soilless
Dae Song Cooperative farm	Continental	Maize	Low chemicals Direct seeding Bio-fumigation Steaming Soilless

3.3.2. Methodology

For the sake of comparison, soil preparation will be carried out utilizing the same methodology used in the area. When the time comes for methyl bromide to be applied, the project will apply the alternative treatment so as to have a control field. In the cases of bio-fumigation and chemical treatments, treatments will be done in enough time to allow the seeding to be completed in their normal time.

All tests will be performed three times (replicated) in plots having a surface of 5 pyongs (local unit equivalent to 3.3 m²), except for the tests with the direct seeding alternative which will be performed on a surface equal to the area covered by the seedlings of 5 pyongs.

The most promising technologies will be tested on a full commercial scale in the second year.

The data will be processed and analyzed in terms of effectiveness, productivity and cost. The monitoring phase and the collection of data will start with the soil preparation and will end after the harvest.

Soil samples will be analyzed before and after soil treatment and during the entire crop cycle. Levels of pathogens and pest count will be indicators used in assessing the effectiveness of treatments.

During the second cultivation season, the surface of the most successful trials will be considerably expanded up to the common surface area used at the same location.

3.3.3. Project Coordination

The project will be implemented by UNIDO in cooperation with the two national institutions. UNIDO will draw up a subcontracts with one national institution for the

implementation of field activities as well as for the services of one project coordinator preferably an agro-economist and two full-time agronomists, to conduct the field work in the selected farms in cooperation with the international experts.

In close cooperation with the local agronomists, the international experts will propose the alternate technologies, design the tests to be carried out in the plots made available by each farm, and establish the analytical methods to be used for monitoring pests and diseases.

A national project coordinator will be responsible for managing and supervising the entire demonstration project and for evaluating the results. He will also be responsible for collecting and analyzing the data, supervising field activities and coordinating the services of project personnel. He is expected to establish a good working relationship with the farmers, the field agronomist, government authorities, experts and implementing agency officers.

Project activities will start with a study tour organized to enable the project coordinator and the local agronomists to become familiar with the technologies that will be used.

The project coordinator will be responsible for the technical and economical analysis of the final results and the logistics of the project, including arrangements for a suitable institution where the biological and chemical analyses can be carried out. If necessary, and on a very exceptional basis, he/she might have them done abroad.

This technical and economical analysis of the alternate technologies will be published and discussed at a workshop to be held at the end of the project.

3.3.4. Institutional Arrangements

The National Coordinating Committee for the Environment will be the counterpart institution. The Agrochemical Research Institute (ACRI) will be responsible for implementation of the project in the field. Final specifications for equipment required on a work plan will be elaborated after an agreement has been reached between UNIDO and the National Coordinating Committee for Environment. (NCCE)

4. **OUTPUTS**

4.1. **Output and Activities**

OUTPUT 1: A practical, technical and economic analysis, on a commercial scale, of the utilization of 3 alternatives to methyl bromide, namely; direct seeding, bio-fumigation, and the use of various other chemicals in combination with an Integrated Pest Management.		
Activities	Month of completion	Responsible
Equipment - purchase, delivery and installation, as per annex A	6	UNIDO; 11-01
Preparation of an IPM programme	3	11-01
Application of low-dose chemicals on a small scale	12	11-01; Subcontract
Application of direct seeding on a small scale	12	11-01; 11-02 Subcontract
Application of bio-fumigation on a small scale	12	11-01;11-03 Subcontract
Application of the tests on a full commercial basis	21	11-01; Subcontract
Preparation of the technical/economical analysis of the results	24	Subcontract

OUTPUT 2: At least two agronomists and/or farmers fully trained in the technologies implemented during the course of the demonstration project		
Activities	Month of completion	Responsible
Two week study tour	6	UNIDO
On-the-job training in IPM	21	11-01; Subcontract
On-the-job training for direct seeding	21	11-01; Subcontract
On-the-job training on bio-fumigation	21	11-03; Subcontract

OUTPUT 3: Local dissemination of the results of the demonstration project		
Activities	Month of completion	Responsible
Preparation of a publication with the results of the project	24	11-01; Subcontract
Editing and distribution of 200 copies of the report	24	Subcontract
Organization of a one-day workshop to present the results of the project	24	Subcontract; UNIDO

4.2. Project Implementation

The project will be coordinated by NCCE and will be implemented by UNIDO in close cooperation with ACRI. Final specifications for the equipment and work plan can only be elaborated after an agreement on the project proposal has been reached with NCCE and ACRI.

As the implementation agency, UNIDO has the necessary experience and capabilities for the successful implementation of projects at the enterprise level. Upon approval by the Multilateral Fund for the Implementation of the Montreal Protocol, the project budget will be transferred to UNIDO. The corresponding project allotment document will then be issued by UNIDO's Financial Services. Any substantial financial deviation will be subject to approval by an Executive Committee of the Unilateral Fund for the Implementation of the Montreal Protocol.

4.3. Milestones

YEAR	First				Second			
QUARTER	1	2	3	4	1	2	3	4
1. Equipment purchase& installation	✖	✖						
2. Work plan	✖							
3. Study tour		✖						
4. Field tests (small scale)		✖	✖	✖				
5. Selection of alternatives				✖				
6. Field tests (full scale)				✖	✖	✖	✖	
7. On-the-job training	✖	✖	✖	✖	✖	✖	✖	✖
8. Technical/economical analysis							✖	✖
7. Publication								✖
8. Workshop								✖

5. PROJECT COSTS

TOTAL INCREMENTAL COSTS	324,000
Contingency allowance (10%)	32,400
TOTAL PROJECT COSTS	356,400
Overhead Costs (13%)	46,332
FUNDING FROM THE MULTILATERAL FUND REQUESTED	402,732

6. PRE-REQUISITES

In accordance with the rules and regulations of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol, project funds will cover only incremental capital costs related to the project. All other expenses, particularly those related to civil and construction work, provision of additional equipment, machinery, tools, services instrumentation, etc., will have to be covered by the counterpart.

Therefore, prior to the start of the implementation of the project, a memorandum of understanding has to be prepared and approved by the project or government authorities concerned and UNIDO. The memorandum will specify all the counterpart's responsibilities and will be considered as an integral part of the project document.

ANNEX A

PRELIMINARY EQUIPMENT SPECIFICATIONS AND COST

Line	Description	US\$
41-00	Computerized temperature recording system	5,000
41-00	Chemical soil analysis (100 samples)	3,000
41-00	Analysis of nematodes, fungi and bacterial diseases (500 samples)	20,000
41-00	Pesticides, chemicals, small equipment, tools, seeds, fuel, etc.	6,000
42-00	One 24 elements Rototiller for bio-fumigation.(1275 mm)	3,500
42-00	One precision seed drill for maize.(3 elements)	2,500
42-00	Ph meter	2,000
	TOTAL	42,000

ANNEX B**PRELIMINARY TERMS OF REFERENCE FOR THE SUBCONTRACT**

1. Provide a part-time project coordinator (agro-economist) to follow project activities on a day-to-day basis and serve as a coordinator of the project activities, interacting with the different institutions involved, namely, the National Coordinating Committee for Environment (NCCE) and the Agro-chemical Research Institute. (ACRI)
2. Provide the services of two qualified field agronomists specialized in maize and rice for the entire duration of the project. (24 m/m each)
3. Organize all the necessary preparatory work at each of the sites selected for the demonstration trials. The crops selected are maize and rice.
4. Make the necessary arrangements to transport the equipment and supplies purchased by the project from the premises of the Agro-chemical Research Institute. (ACRI) to the Ryongsong Experimental Farm and the Dae Song Cooperative Farm, both in the province of Pyongyang.
5. Provide free transportation for the local experts from the premises to the demonstration fields.
6. Provide free transportation for the international experts from the central premises to the demonstration fields.
7. Provide quality seeds and seedlings.
8. At the Ryongsong Experimental Farm, implement the tests and trials according to the specifications given by the International Consultants. At least three demonstration trials with the three alternative technologies and one control test using methyl bromide will be performed. Each test will be performed three times (for control purposes) in seedbeds 5- to 10-pyong large. When these seedbeds are trasplanted to the field, the average size of the plots will be between 206 and 412 square meters.
9. At the Dae Song Cooperative Farm, implement the tests and trials according to the specifications given by the International Consultants. At least three demonstration trials with the three alternative technologies and one control test using methyl bromide will be performed. Each test will be performed three times (for control purposes) in seedbeds 5- to 10-pyong large. When these seedbeds are trasplanted to the field, the average size of the plots will be between 206 and 412 square meters.
10. Collect the samples for the analyses according to the protocol specified by the international experts.
11. Make the necessary arrangements for the biological and chemical analysis of soil and plants either in the subcontractor facilities if found adequate by the international experts or elsewhere. The cost of the analyses will be borne by the project.

12. Submit every six months a detailed report, in English, of the activities performed and the results obtained.
13. Submit a consolidated report containing a technical and an economical analysis of the results obtained.
14. Make all organizational arrangements, including finding a suitable venue, for a national workshop where the results of the demonstration project will be presented and disseminated.

ANNEX C

PROJECT BUDGET

Line	Description	W/M	US\$
11-01	International Expert IPM specialist	6	85,000
11-02	International Expert direct seeding specialist	2	34,000
11-03	International Expert in bio-fumigation	2	34,000
15-00	Internal travel		2,000
21-00	Subcontract for field trials as per Annex B		95,000
32-00	Study tour for four participants		24,000
35-01	Workshop		8,000
41-00	Expendable equipment and supplies		34,000
42-00	Equipment, as per Annex A		8,000
	Subtotal		324,000
51-00	Contingencies (10%)		32,400
	TOTAL PROJECT COSTS		356,400
	Overhead costs		46,332
	TOTAL PROJECT BUDGET		402,732

ANNEX D
JOB DESCRIPTIONS

UNIDO
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

JOB DESCRIPTION

MP/DRK/98/XXX/11-01

Post title: Consultant, specialist in Integrated Pest Management

Duration: Six months in five split missions

Date required: 1998

Duty station: Pyongyang, People's Democratic Republic of Korea

Purpose of project: The object of the project is to demonstrate and disseminate the technical and economic feasibility of three alternative methods to the use of methyl bromide, i. e., low-dose chemicals, direct seeding and biofumigation, all in combination with the use of an integrated pest management.

The Consultant is expected to:

1. Prepare a detailed project workplan.
2. Coordinate the whole demonstration programme in cooperation with the national and international experts and the National Institutions.
3. Prepare an IPM programme for implementation in combination with the three alternative methods chosen
4. Design and monitor the implementation of the demonstration tests on a small and a full-scale commercial basis.
5. Design the demonstration protocol for the implementation of the alternatives to methyl bromide using other low-dose chemicals.
4. Monitor and coordinate the implementation of the demonstration programmes for direct seeding and biofumigation prepared by the other international consultants.
5. Design and execute a practical training programme on IPM directed to the National Counterparts.

6. Review the draft document with the technical and economic data resulting from the demonstration cases of the alternative technologies.

8. Prepare a final mission report.

Qualifications:

University degree in agriculture or related field, with experience in Integrated Pest Management.

Language requirements:

English

UNIDO
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

JOB DESCRIPTION

MP/DRK/98/XXX/11-02

Post title:	Consultant, specialist in direct seeding of rice and maize
Duration:	Two months in three split-missions
Date required:	1998
Duty station:	Pyongyang, People's Democratic Republic of Korea
Purpose of project:	The object of the project is to demonstrate and disseminate the technical and economic feasibility of three alternative methods to the use of methyl bromide, i. e., low-dose chemicals, direct seeding and biofumigation, all in combination with the use of an integrated pest management.
Duties:	In cooperation with the expert on IPM, the Consultant is expected to: 1. Design and monitor the implementation by a subcontractor of a programme to demonstrate the use of direct seeding as an alternative to the use of methyl bromide in maize and rice seedbeds. 3. Design and monitor the implementation of the demonstration tests on a small and a full-scale basis. 4. Design and execute a practical training programme on direct seeding directed to the National Counterparts. 6. Review the draft document with the technical and economic data resulting from the demonstration cases. 7. Prepare a succinct mission report.
Qualifications:	University degree in agriculture or related field, with large experience in direct seeding of cereals.
Language requirements:	English

UNIDO
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

JOB DESCRIPTION

MP/DRK/98/XXX/11-03

Post title:	Consultant, specialist in bio-fumigation
Duration:	Two months in three split missions
Date required:	1998
Duty station:	Pyongyang, People's Democratic Republic of Korea
Purpose of project:	The object of the project is to demonstrate and disseminate the technical and economic feasibility of three alternative methods to the use of methyl bromide, i. e., low-dose chemicals, direct seeding and biofumigation, all in combination with the use of an integrated pest management.
Duties:	In cooperation with the expert on IPM, the Consultant is expected to: 1. Design and monitor the implementation by a subcontractor of a programme to demonstrate the use of bio-fumigation techniques in combination with IPM as an alternative to the use of methyl bromide. 2. Design and monitor the implementation of the demonstration tests on a small and a full-scale basis. 3. Design and execute a practical training programme on bio-fumigation directed to the National Counterparts. 4. Review the draft document with the technical and economic data resulting from the demonstration cases of the alternative technologies. 5. Prepare a succinct mission report.
Qualifications:	University degree in agriculture or related field, with large experience in bio-fumigation techniques
Language requirements:	English

ANNEX E

JOB DESCRIPTIONS FOR SUBCONTRACTED PERSONNEL

JOB DESCRIPTION # 1

Post title:	Project Coordinator, Specialist in agro-economics
Duration:	Two years (Part-time)
Date required:	1998
Duty station:	Pyongyang, People's Democratic Republic of Korea
Purpose of project:	The object of the project is to demonstrate and disseminate the technical and economic feasibility of three alternative methods to the use of methyl bromide, i. e., low-dose chemicals, direct seeding and biofumigation, all in combination with the use of an integrated pest management.
Duties:	The Project Coordinator is expected to: 1. Execute and coordinate the entire demonstration programme in cooperation with the other national and international experts and the staff of subcontracted institution. 2. Cooperate in the preparation of an IPM programme which will be implemented in combination with the alternative methods chosen. 3. Cooperate in the design, implementation and monitoring of a programme to demonstrate the use low-dose chemicals in combination with IPM as an alternative to the use of methyl bromide. 4. Cooperate in the design and implementation of a programme to demonstrate the direct seeding technique in combination with IPM and monitor its implementation by the subcontracted institution. 5. Cooperate in the design and implementation of a programme to demonstrate the bio-fumigation technique in combination with IPM and monitor its implementation by the subcontracted institution. 6. Monitor the implementation of the demonstration tests on a small, medium and full-scale commercial basis. 7. Participate in the training programmes.

8. Prepare an economic analysis of the demonstration tests with alternative technologies as compared to the use of methyl bromide.

9. Prepare a comprehensive document with the technical and economic data resulting from the demonstration cases of the alternative technologies.

10. Organize and conduct a seminar where a presentation of the results will be made.

Qualifications:

University degree in agriculture or related field, with large experience in agro-economics.

Language requirements:

English

JOB DESCRIPTION # 2

Post title:	Crop Specialist
Duration:	Two years
Date required:	1998
Duty station:	The project sites, which are located about 50 km away from Pyongyang, People's Democratic Republic of Korea
Purpose of project:	The object of the project is to demonstrate and disseminate the technical and economic feasibility of three alternative methods to the use of methyl bromide, i. e., low-dose chemicals, direct seeding and biofumigation, all in combination with the use of an integrated pest management.
Duties:	The crop specialist is expected to: 1. Supervise in the field the implementation of the demonstration programme according to the protocols that have been established for each test. He/she will be responsible for the collection of samples and for the analyses that have to be performed. 2. Record and keep all data related to the demonstration tests. 3. Cooperate in the preparation of a comprehensive document with the technical and economic data resulting from the demonstration cases of the alternative technologies. 4. Cooperate in the organization of a seminar, where a presentation of the results will be made.
Qualifications:	Agro-technologist, with vast experience in cereals
Language requirements:	English

ANNEX F
OFFICIAL GOVERNMENT REQUEST

PERMANENT MISSION OF THE
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA
TO THE INTERNATIONAL ORGANIZATIONS IN VIENNA
Beckmannngasse 10-12, A-1140 Vienna, Austria tel. 894 23 11/13, Fax: 894 31 74

To: Mr. Antonio SABATER
UNIDO

From: KIM Yong U
Permanent Mission of
DPR Korea

Date: 19 January 1998

Subject: Methyl Bromide Demonstration Project

Dear Mr. SABATER,

With refer to your letter concerning the above-mentioned subject, I have the honour to inform you that we agreed with you for project.

Sincerely yours



KIM Yong U