Workshop Report

Regional Workshop on the Use of MB
Alternatives evaluated under The Multilateral Fund’s demonstration projects for Asia and the Pacific

25-27 September 2002
Pattaya, Thailand
I. EXECUTIVE SUMMARY

The Regional Workshop on the Use of MB Alternatives evaluated under The Multilateral Fund’s demonstration projects for Asia and the Pacific was held in Pattaya, Thailand on 25-27 September 2002.

Three representatives each from 9 countries in the Asia and the Pacific region participated in this workshop. A representative from Australia, who is also the co-chair of the UNEP Methyl Bromide Technical Options Committee (MBTOC), provided expert advice.

Workshop presentations were structured around sessions with the following specific topics:

Session I  Status of Methyl Bromide Phase out in Asia and the Pacific
Session II  Experience in implementing MB Alternatives demonstration projects in Asia and the Pacific
Session III: Communicating results of demonstration projects: the NGO experience
Session IV  MB Phase out through a strategic and sectoral approach
Session V  QPS Uses of MB and its Alternatives

The topics discussed during the workshop were timely considering that some countries in the region could be in potential non-compliance with the methyl bromide freeze which starts beginning of 2003.

Presentations were made by some countries on the progress of the demonstration projects implemented in their specific country, and they provided information on the difficulties and achievements that have been done under each of these projects.

A session was devoted to the discussion of Quarantine and Pre-shipment (QPS) issues, particularly on their definitions under the Montreal Protocol. Specific case studies of situations where there applications of MB were unclear whether it falls under QPS or not were analysed and discussed in detail.

A field trip was also organized as part of the workshop, and gave the participants the opportunity to see first hand how a demonstration project was implemented, including the problems encountered and how they found solutions for these.

The Conclusions and Recommendations (Annex 1) that came out of the meeting showed the need for continued dissemination of information on alternatives, and on specific cases where alternatives worked well, and where they did not. The meeting also expressed the need to have specific country activities for MB, and includes the establishment of a MB working group in each country to oversee activities towards MB phase out.
II. BACKGROUND

Methyl bromide is a fumigant that has been used to control a range of pests in agriculture and for disinfestation of durable and perishable commodities. However, it is also one of the chemicals that deplete the stratospheric ozone layer, a protective shield that filters out harmful ultraviolet (UV) radiation from the sun. The Meeting of the Parties (MOP) to the Montreal Protocol called for the control of methyl bromide in 1992. In 1997, the MOP requiring that developing countries phase out methyl bromide by 2015, established a global phase-out schedule for methyl bromide.

The Asia and the Pacific region is the second largest user of MB for developing countries. Methyl bromide is also produced in this region. The 1998 report of the MBTOC shows that methyl bromide is mainly used for grain storage and for other durables in these countries, although there are a few countries that have a large consumption in soil. Post harvest and pre-shipment and quarantine uses are also users of MB for crops that are exported within the region, and the US and Australia, and to some parts of Europe.

As the QPS uses of MB in the region is rising, and as the issues surrounding QPS are not very well understood by many of these countries, there is also a possibility that such uses are not being monitored and reported as they should be.

To date, over 34 methyl bromide phases out projects have been approved for the Asia and the Pacific region. Ten of these are demonstration projects to evaluate methyl bromide alternatives for major crops and commodities using methyl bromide in seven countries (China, Indonesia, Malaysia, Vietnam, Philippines, Sri Lanka and Thailand). As of January 2002, four of these projects were completed; two are on going, while one has been cancelled. These projects evaluated the performance of a wide range of alternatives especially for durable commodities, which is a main use of MB in this region. Some alternatives for soil particularly for China have also been evaluated in a variety of climatic conditions.

Many of the alternatives that have proven effective in one country can be adapted and used successfully in other countries, and it is important that the valuable experiences and lessons learned from these projects are shared with key stakeholders in other countries involved in phasing out methyl bromide. This workshop to disseminate the results and share experiences will play an important role in helping countries further identify appropriate methyl bromide alternatives and develop strategies for implementing them, in accordance with the Revised Guidelines for Methyl Bromide Projects as approved at the 31st ExCom.

The UNEP MBTOC 1998 report identifies alternatives for the vast majority of methyl bromide uses. Although no single, in-kind alternative to methyl bromide was identified, effective alternatives involve the use of Integrated Pest Management (IPM) systems that utilize a combination of pest management techniques, including crop rotation, natural substrates and compost, bio fumigation, soil-less culture, solarization, steam, resistant varieties, plant extracts, biological controls and pesticides. Alternatives for the treatment of durables (grains, fruits and nuts, timber) include physical control methods (heat treatments, cold treatments, sanitation and preventative practices) and the use of fumigants and gases (phosphine, controlled and modified
Alternatives for treatment of perishables include pre-harvest practices and inspection procedures, non-chemical treatments and chemical treatments.

**III. WORKSHOP OBJECTIVES**

The objectives of the workshop were the following:

- To widely disseminate information about effective alternatives that have been identified in demonstration projects carried out under the Multilateral Fund.
- To raise awareness about effective alternatives to methyl bromide that have been identified in completed demonstration projects and how they can be adopted on the regional level.
- To promote the adoption of methyl bromide alternatives that have been identified in the demonstration projects to enable countries to meet the 2002 methyl bromide freeze.

**IV. EXPECTED OUTPUTS**

It is expected that after the workshop, and the workshop report is completed and disseminated that there will be:
- Better understanding of QPS issues
- Increased awareness among regulators about alternatives to methyl bromide how these can be adopted in each participating country

**V. PARTICIPANTS**

Representatives of selected countries from the South Asia and SEAP networks were invited to the workshop. Five countries participated from SEAP (Indonesia, Thailand, Malaysia, Philippines, Vietnam) and 4 from South Asia (China, India, Pakistan, Sri Lanka). Iran and Singapore were also invited, but were unable to send a representative to the workshop. A complete list of participants is included as Annex 2.

Representation from the participating countries consisted of a representative from the Ministry of Agriculture and/or Pesticide Board, the National Ozone Unit and a representative from the enterprise or organization involved in the demonstration project being implemented in the country.

A technical expert from Australia on durable commodities and grain storage, who is at the same time the co-chair of the UNEP Methyl Bromide Technical Options Committee was also invited to the meeting to provide technical advice and inputs.

**VI. METHODOLOGY**

The 3-day workshop was structured in such a way that allowed all participants to interact and share experiences on their MB phase out projects, particularly on the demonstration projects being implemented in their countries. It was divided into specific sessions that gave opportunities for discussion and open forum.
The workshop was also complemented by a field visit to one of the enterprises that received funding from the Multilateral Fund for a demonstration project. This visit provided the participants with a chance to see how Capital Rice, Thailand’s largest rice exporter, as an alternative to methyl bromide, applied the Integrated Commodity Approach (ICM).

VII. CONTENTS

7.1 General

Mr. Soodsakorn Putho, Advisor on the Treaties and International Cooperation of the Thailand’s Department of Industrial Works, opened the Workshop. In his Opening Remarks he stressed the need to phase out MB, and the need for countries to meet obligations under the Montreal Protocol. He also mentioned that the Government of Thailand is doing its utmost to ensure that their use of ozone depleting substances (ODS), particularly methyl bromide be within the target set by the Montreal Protocol.

He also expressed appreciation to UNEP for giving the Thai government, through the Department of Industrial Works (DIW) the privilege of hosting this regional workshop in the city of Pattaya.

7.2 Status of Methyl Bromide Phaseout in Asia and the Pacific

7.2.1 Ms. Cecilia T. Mercado presented a brief overview of the MeBr phaseout requirements under the Montreal Protocol and compliance situation of Asia and the Pacific countries. The presentation provided a background of the Vienna Convention, Montreal Protocol. The Montreal Protocol included 8 controlled chemicals and only modest control measures. To date, there are 183 countries having ratified the Montreal Protocol.

7.2.2 MeBr provisions under the Montreal Protocol apply only to countries that have ratified the Copenhagen Amendment. The Article (5) Countries having ratified or indicating its progress towards ratifications of such Amendment is considered eligible for the funding for demonstration projects and/or investment projects. However, funding activities related to the information dissemination and policy development could be available for those countries that have not ratified the Copenhagen Amendment.

7.2.3 A grace period of 10 years has been given to the developing countries to phaseout ODS including MeBr. The first obligation for Article (5) Countries to phase out MeBr is freezing the baseline consumption (1995-1998) in 2002, 20% reduction in 2005 and 100% reduction in 2015 (except for critical uses). However, it is noted that the control measures for MeBr will be reviewed at the Meeting of the Parties in 2003 and list of critical uses is under development by the MBTOC.

7.2.4 Definition of quarantine (Decision VII/5) and pre-shipment (Decision VII/5 and XI/12) were also mentioned in the presentation. Dr. Jonathan
Banks provided a more detailed explanation on these definitions to the workshop in a later session.

7.2.5 **Dr. Thanavat Junchaya** of UNEP ROAP reported on current MeBr consumption in Asia and the Pacific and potential future use. Based on 1999 data, the followings were summarized:

<table>
<thead>
<tr>
<th></th>
<th>Non Article (5) Countries</th>
<th>Article (5) Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption</td>
<td>21,085 ODP MT</td>
<td>8,229 ODP MT</td>
</tr>
<tr>
<td>Production</td>
<td>28,258 ODP MT</td>
<td>889 ODP MT</td>
</tr>
</tbody>
</table>

7.2.6 The presentation also showed the consumption analysis of each country, China, India, Indonesia, Iran, Malaysia, Pakistan, Sri Lanka, Thailand and Vietnam. This analysis would enable the countries to know where they are in relation to MB phase out. There was no data for the Philippines, as the country reported zero Non-QPS to the Ozone Secretariat in 1999.

7.2.7 Given the analysis presented by Dr. Junchaya, it was found that there is several countries whose 1999 consumption was more than the 2002 freeze level. These countries are China, India, Malaysia, Pakistan, Sri Lanka and Thailand. China and India have not ratified the Copenhagen Amendment. For the others, there should be some actions from the relevant agencies to ensure the 2002 compliance.

7.2.8 Even Indonesia’s 1999 consumption was zero; representatives from Indonesia expressed his concern with regard to verification of the amount of MeBr used for QPS. Given the existing regulation requiring the total amount to be import, not to provide list of the user. In response to this, the Indonesia will cooperate with the importer of MeBr to seek specific information from the importer.

7.2.9 Given the absence of representative from the Multilateral Fund Secretariat, **Ms. Cecilia T. Mercado** therefore made a presentation on the Methyl Bromide Sector under the Multilateral Fund. The presentation described methyl bromide provisions and its obligations of the Montreal Protocol. The countries (National Ozone Unit) should assure that the reported consumption to the multilateral fund Secretariat is accurate, as the report consumption will be used as a basis for determining annual consumption, baseline consumption. Most importantly, the technical and financial to be provided to the countries will be based on the reported consumption. The in-country counterpart and the implementing agencies should make their efforts to collect data of MeBr.

7.2.10 The presentation also provided information with regard to the preliminary results from the implementation of demonstration project as indicated in the presentation material. As for available alternatives to MeBr, the presentation also indicated that the alternative technology should be commercial available and can be adapted to local conditions. It is noted
that there is no a single alternative that can replace the use of MeBr in all applications.

- **Soil Treatment**
  - Floating Tray System
  - Hydroponics
  - Steam Pasteurization
  - IPM Programme for Control of Soil Borne Pest and Disease

- **Commodities and Structure Fumigation**
  - Heat Treatment
  - Phosphine Alone or Phosphine with CO₂ and Heat
  - Sulphuryl Fluoride
  - Pest Management Practice

7.2.11 The presentation also provided categories of possible incremental costs associated with MeBr phase out which includes, among others (i) the transfer of skill, knowledge on alternative technology, (ii) equipment or farm input material that are need for the implementation of alternative technologies, (iii) incremental operating cost or operating saving. Ms. Mercado has provided an example for the investment project for the tobacco sub-sector in Brazil which resulting in the operating saving. The employed technology is Floating Tray System, which had the high investment capital, cost at the beginning, however, there will be the operating saving in this technology.

7.3 Experience in Implementing MeBr Alternatives Demonstration Projects in Asia and the Pacific

7.3.1 **Dr. Jonathan Banks** of the Methyl Bromide-Technical Options Committee (MBTOC) provided updated information pertaining to the replenishment discussions currently underway, in particular with respect to funding for continued MB phase out activities under the Multilateral Fund. Dr. Banks informed the parties that the November 2002 Meeting of the Parties in Rome will decide on the full replenishment for the 2003-2005 triennium.

7.3.2 For the countries that would like to access to the Methyl Bromide Report, it can be reached through the Ozone Secretariat, Nairobi or the website [www.ieap.org](http://www.ieap.org). In addition, it is expected that there will be the new MeBr assessment report published by the end of December 2002. Dr. Banks also provided figure that the average cost of MeBr phaseout from the previously approved investment projects is $US 18/ODP kg, but with wide variation between projects.

7.3.3 **Ms. Kusmulyani Sugiarto** from the Indonesia’s Ministry of Environment made a presentation on Alternatives to the Use of Methyl Bromide in Stored Products. There were three commodities under this demonstration project, (i) rice milled in storage room, (ii) coffee, and (iii) wood while the fumigants used in the project are (i) ECO₂ Fume, (ii) Cylinderized Phosphine with Physical Barrier, (iii) Phosphine Tablet, and (iv) MeBr.
7.3.4 The experiments found that liquid phosphine gives better fumigant distribution through out the stack as it could achieve the intended level of concentration faster than phosphine tablets. In addition, the liquid phosphine could maintain the level of gas at high level until exposure period. Therefore, the phosphine in liquid form gave the most promising application as alternative to MeBr based on the distribution of fumigant gas, reduce exposure period, and prevent deterioration of stored commodity. However, due to its high cost, the cost reduction would certainly enhance the possibility to use this technology by making available locally.

7.3.5 Mr. Sumit Sangburimtis from the Capital Rice Co., Ltd, Thailand made a presentation on Integrated Commodity Management (ICM). This is a part of Thailand’s Demonstration Project on Methyl Bromide Alternative implemented through the UNIDO. Mr. Sangburimtis provided brief information that the Capital Rice is a major rice exporter in Thailand. More than 1 million tonnes of rice were exported in 1999 and 2000. The Capital Rice started this program 2 years ago.

7.3.6 The ICM comprises (i) Assessment, (ii) Development of ICM Plan, (iii) Implementation of the Plan, (iv) Evaluation of the Plan, and (v) Adjustment. The Cold Treatment and Aeration for controlling the temperature in rice pile seeds to be less than –15 C have been applied in order to stock the rice product. This range of temperature would not enable the insects to grow and will ultimately die. Result from the use of ICM found that the number of insect population at its warehouse is significantly reduced from that prior to the use of ICM method.

7.3.7 Ms. Nguyen Bach Tuyet from Vietnam Fumigation Company made a presentation on Alternatives to the Use of Methyl Bromide on Stacked Bags of Rice, Grain in Silos, and Timber in Warehouse. Like the presentation above, this is the demonstration project implemented through UNIDO. The fumigants used in the project were phosphine in tablet form and phosphine in liquid form.

7.3.8 The first method is “Integrated Storage Pest Management (ISPM)” aiming to employ proper storage and sanitation management (“first in first out” principle). Control and monitoring measures such as checking the number of insects on a weekly/monthly basis is also necessary for this method. In addition, the supportive method such as computerized system is also essential to enhance the effectiveness of the program. The second method is “Fumigation in Silos” which uses liquefied phosphine in cylinder and J system low airflow method as the alternative. However, it was found that this method still has the difficulty regarding the leakage of the phosphine. The third method is “Fumigation in Warehouse” which will be implemented during October 2002-December 2002. In this method, the 200 tonnes of rice will be used with the liquefied phosphine and MeBr.

7.3.9 However, the representative from Vietnam informed the participants that the there is no alternative that can be compared in all fields with MeBr. In
addition, the insect resistance to phosphine is one disadvantage of using these alternatives, and she wanted to find out more information on what can be done to reduce insect resistance.

7.3.10 Mr. Kee Seng Gan from Malaysia made a presentation on Alternatives to the use of Methyl Bromide in Malaysian Timber. The project aimed to demonstrate the technical and economic feasibility of the non-chemical and chemical methods to the use of MeBr. The rubber wood timber was used as the experimental material in the project. It was reported that 80% of MeBr consumption in Malaysia used in the timber sector.

7.3.11 The alternatives for chemical method are Sulfuric Fluoride, Phosphate Cyanogens, and Carbonyl Sulfide. For non-chemical method, the dry heat treatment and wet heat treatment will be employed under the program. As the project has just been started, therefore, there is no result to show in the workshop.

7.3.12 Prof. Aocheng CAO, representative from China made a presentation on Experience and Lessons from UNIDO, GTZ, Italy, and the World Banks Projects (four projects). Methyl bromide was introduced for the China’s soil fumigation in 1992 due to reformulation and development of economy. Crops using MeBr are mainly tobacco, strawberry, tomato, cucumber, eggplant, nursery, and medicinal herbs.

7.3.13 Under the UNIDO project, alternatives for the following crops were tested: (I) tobacco, (ii) strawberry, (iii) vegetable in tunnels, and ginseng. The experiments showed that the floating seed tray was a good alternative to MeBr for tobacco. The strawberry experimental showed that the (i) artificial substrate, (ii) resistant cultivars, and (iii) steam pasteurization has its advantages and disadvantages. Like strawberry, the alternatives for vegetable in tunnels have its own advantages and disadvantages. For ginseng, the dazomet, chloropicrin and metham sodium applications showed phytotoxicity and they need further testing. The efficiency of using trichoderma with ginseng was poor. There were no alternatives that worked well for ginseng.

7.3.14 The presentation also included the China-GTZ project and Italy project. The former aimed to pilot a technology transfer process to enable farmers who currently use MeBr to test alternatives on their own farms and the experimental crops were cucumber and tomato while the experimental crops of the later were strawberry. The crop tested for the project implemented through the World Bank were tobacco seedling, strawberry and tomato and cucumber.

7.3.15 Representative from China also provided the workshop with the prospects of alternatives in China for the followings:

- Tobacco Seedling
- Tomato and Cucumber
- Strawberry
The remaining challenge in China is still the need to find effective alternatives for ginseng and propagation materials.

### 7.4 Field Trip to Demonstration Project Site

A field trip was made to the demonstration project site at Capital Rice Co., Ltd. located in Prapang, Samutprakarn, Thailand. Tel: 662-748-5331-5. Fax: 662-393-9264 E-mail: export@capitalrice.com Website: www.capitalrice.com

The participants were welcomed at Capital Rice by Mr. Wanlop Pichpongsa, representative of Capital Rice’s Managing Director. At this opening session, the Capital Rice representative discussed the achievements of Capital Rice. UNEP and DIW then jointly presented Capital Rice with a Certificate of Appreciation for showing leadership in phasing out MB in Thailand, and for being hosts to this trip. The presentation on company’s profile and ICM at Capital Rice Co., Ltd. were also presented to the delegations. After the presentation, the participants were divided into groups for the factory site visit at the following areas: (i) Laboratory, (ii) Grain Receiving Area, (iii) Hopper, (iv) Control Room and Quality Control Process, and (v) Loading Areas for Export.

### 7.5 Overview of Alternatives to MeBr for Stored Products

#### 7.5.1 Dr. Jonathan Banks

made the presentation on Alternatives to Methyl Bromide for Durables in the afternoon session. Durables are classified into 2 categories (i) Durable Foodstuffs and (ii) Non-food Durable. MeBr is used in the traditional technology, rapid disinfection treatment and quarantine for control of insects, mites, snails, devitalisation and elimination of fungi. However, Dr. Banks explained that MeBr is probably not the best process, but one with the long history of success and acceptence, which result in the difficulty in replacing MeBr with alternatives. In addition, the MeBr is a by-product chemical so the price is not expensive.

#### 7.5.2 Dr. Banks also informed the workshop that there are technically feasible alternatives to MeBr for almost all non-QPS treatment of durables and its main alternative is phosphine. However, the use of phosphine will take 5 or more days for effective fumigation and at least 10 days to achieve fully control against many species. In addition, phosphine should not be used as a single alternatives, by itself as insect resistance to phosphine is increasing. Other alternatives for durable are heat treatments, and other the non-chemical method where is no resistance-increasing problem. The insects will die within 10 seconds for temperature of 62 C and within 30 minutes for temperature of 56 C.

#### 7.5.3 For timber and timber products, the following alternatives could be used: Debarking, Drying, Heat, Immersion, Phosphine and Sulfuryl Fluoride.
7.6 Experience in Implementing MeBr Alternatives Demonstration Projects in Asia and the Pacific (Cont.)

7.6.1 Ms. Rohini Ekanayake from Sri Lanka made a presentation on Alternatives to Methyl Bromide Against Tea Nematodes in Sri Lanka. The most economically important of the tea nematodes are

- Root-lesion Nematode – Pratylenchus Loosi
- Burrowing Nematode – Radopholus Similis
- Root-knot Nematode – Meloidogyne Brevicauda

These tea nematodes can cause heavy casualties in tea nurseries and young tea, and severely debilitate the older tea. Tools of control for various age of the tea are as follows:

(a) Old Tea Land Rehabilitation under a non-host

(b) Tea Nursery
   (1) Fumigation
   (2) Thermal Treatment
   (3) Soil Substitutes

(c) New Plantings
   (1) Chemicals at Planting
   (2) Intercropping with nematocidal plants

(d) Mature Tea Field
   (1) Chemical Treatment
   (2) Intercropping with nematocidal plants

7.6.2 There were three chemicals used as chemical fumigation in the nursery (i) MeBr (gas), (ii) Dazomet (granular), and (iii) Metham Sodium (liquid). Dazomet is more effective than MeBr in up country while the use of MeBr is more beneficial in lower elevation particularly in mid country. The Metham Sodium has been compared to the use of MeBr and more beneficial in mid country in terms of enhancement of plant growth.

7.6.3 Soil substitutions like (i) Refuse Tea (Tea Waste), (ii) Coir Dust, and (iii) Paddy Husk have been tested for their nematicidal activity and growth boosting effect on nursery plant. All three materials were found to be equally good as nematicidal agents and they can be used as partial or total soil substitutes in tea nurseries.

7.6.4 Soil solarization under PE film method, which is one of the thermal treatment by arranging the soil, bags in the bed. A few soil bags will be kept horizontally on the bed and the clear polyethylene sheet will cover the bed. The study found that the soil solarization of area supplemented soil over a period of 6 weeks was proven to be effective in terms of nematicidal activity.
as well as growth boosting effect on nursery plants under all agro-climate conditions.

7.6.5 Dr. R.S. Sharma representative from India made a last presentation of the 2nd day on India Alternatives to Methyl Bromide. India has its national legislation to control the import and the use of MeBr which was clarified as insecticides/pesticides under the Insecticides Act, 1968. MeBr is used for fumigating at all international airports and seaports and land frontiers.

At seaport: There is mandatory quarantine treatment with MeBr/HCN of all imported Cotton. All the agricultural item imported from aboard is fumigated with MeBr, if required.

At airport: The plant/plant materials including seeds, fresh/dry fruits are fumigated with MeBr, if found infested.

7.6.6 Dr. Sharma also provide information with regard to the use of MeBr alternatives that they must be already available in the Schedule to Insecticides Act, 1968 by the approval of the Chairman of Central Insecticides Board. In addition, the new alternative can be registered provisionally for a period of two years. During the validity of provisional registration, the alternative may be allowed for commercialization.

7.6.7 A single replacement to MeBr in India for all application is not available. The variety of options is available, depending on the crop or application. The farmers would use a system of Integrated Pest Management (IPM) for some fruit and vegetable crops.

7.7 Communication Results of Demonstration Project: The NGO Experience

7.7.1 The last day of the workshop started with a presentation made by the Philippines representative, Ms. Sampaguita Dumo Quijano from Pesticide Action Network (PAN) on the Philippines Methyl Bromide Communication Programme. The objective of this programme is to reach the largest MeBr user in the country and raise their awareness about the MeBr phaseout activities. The implementation of the programme comprises (i) Survey on the Use of Methyl Bromide through initial data from Fertilizer and Pesticide Authority (FPA), major importers, and phone and fax interview, (ii) Public Awareness Activities through the PR materials (brochure, newsletter, press release), coordination with relevant agencies, and conducting 6 workshops (iii) Media Campaign through the radio interview and print media coverage, and (iv) Final Survey and Workshop.

7.7.2 Results from the survey indicated that 53.3% of the respondents use MeBr and 82.6% of which use MeBr for QPS. 34.8% of the MeBr used is for structural fumigation. Approximately 78.3% of MeBr users know that the MeBr will be phased out under the Montreal protocol, while 73.9% of MeBr users know alternatives to MeBr. It was noticed from the final survey that 56% of the respondents learn more about the MeBr from the effort/activities of the PAN
while only 6% of the respondents could receive information regarding MeBr from newspaper/radio.

7.7.3 As a result of the communication programme, the MeBr users and the Milling companies began to consider alternative to MeBr for fumigating their building, but they need assistance in identifying the most appropriate method for them. In addition, the FPA is now considering the quota requirement for the import of MeBr. It was found that the imported amount of MeBr in the Philippines has been decreased from 67,164 kgs in 2000 to 58,212 kgs in 2001. However, such import amount is still higher than the baseline level of the Philippines.

7.7.4 Mr. Chamlong Lapasatukul representative from Thailand made a presentation on Methyl Bromide Communication Programme in Thailand. The Thailand Communication Programme comprised the acquisition of solid data, existing knowledge, existing awareness, and practical and believe, identification of alternatives, and development of activities and materials. It was found that most of the MeBr used in Thailand are for storage fumigation (47%) and QPS (49%). Less than 10% of the MeBr used in Thailand are for soil and structural fumigation. After the new definition of QPS, it was found that the amount of MeBr used for QPS in light of the new definition was decreased while that of the storage fumigation was increased.

7.7.5 For existing knowledge, the questionnaires were distributed to the various business groups and it was found that approximately 91.4% of the respondents use MeBr as a fumigant agent. The non-fumigate method, phosphine, and CO₂ method were also used by the respondents respectively. In term of awareness, it was found that only 5% of the respondents have the good understanding on the phaseout of MeBr under the Montreal Protocol. 54% have poor knowledge and 41% have never know with regard to the phaseout of MeBr. As for practice and belief, the MeBr is the highly effective in Thailand as it is utilized to control a wide range of pests and can guarantee the customer that all the pests have been eliminated.

7.7.6 Results from the Communication Programme indicated that 63% of respondents had the inspiration to reduce the use of MeBr. 72.6% of respondents are interested in following the alternatives to MeBr and express their willingness to have the trial and error on those alternatives. In term of the knowledge that can be transferred to the public, it was found that the matter of MeBr alternative is the most increasing knowledge following with ODS, phaseout schedule. The most preferable additional requirement for MeBr phaseout program is the availability of effective alternatives, technical expertise and support, government policy and government support, respectively. In term of alternatives, it was found that the most interesting alternative to MeBr is Integrated Commodity Management (ICM). Temperature treatment is the least interesting alternative in Thailand.

7.8 Communication Results of Demonstration Project: The NGO Experience

7.8.1 Mr. Lubiao Zhang from the Institute of Agricultural Economics of China made the subsequent presentation on the Economic Impact of Phasing out
Methyl Bromide on Chinese Agriculture. The main objective of this program is to analyze the economic impacts of banning the use of MeBr on Chinese agriculture and to identify feasible options of phasing out MeBr in China. Methodologies employed under the program are (i) Farmer Survey, (ii) Key Informant Interviews, (iii) Field Experiments, (iv) Questionnaire Survey, (v) Econometrics Modeling, and (vi) International Consultation. Scope of research would include the investigation in 10 provinces in China focusing on the following crops:- Tomato, Eggplant, Pepper, Cucumber, Strawberry and Ginseng.

7.8.2 To date, this research is on-going with data analysis and modeling. It is expected that the research will be completed by the end of December 2002.

7.8.3 Mr. Eueychai Smitasiri from Thailand’s Ministry of Agriculture made a presentation on Thailand’s Perspective for Sectoral Methyl Bromide Phaseout Plan. Mr. Smitasiri informed the parties that the Department of Agriculture (DOA), in close consultation with the Department of Industrial Works (DIW) has developed the Term of Reference (TOR) for the consultants to assist DOA and DIW in carrying out the nation wide survey for detailed MeBr used in Thailand. With these data, the consultant, in close consultation with DOA and DIW, will develop MeBr phaseout strategy for the country. The strategy will subsequently be submitted to the Executive Committee for its consideration for the approval of financial assistance to Thailand to implemented the activities as proposed in the strategy.

7.8.4 Scope of work for the consultant indicated in the TOR for development of MeBr Phaseout Strategy can be classified into 5 stages as follows:

Stage 1 – Strategy and Preparation for Data Collection: The consultat will develop a detailed plan of action to collect data on MeBr consumption in Thailand.

Stage 2 – Data Collection and Analysis: The consultant will focus on data collection, verification and analysis according to the plan and agreements reached during the first stage. Consultation with Government Agencies, Identification of the MeBr distribution networks, Identification of Stakeholders, and Identification of Alternatives and Potential MeBr Users are necessary for this stage to achieve the accurate data.

Stage 3 – Consultation and Feedback: To develop the key elements of a MeBr strategy based on data results and feedback from Government and stakeholders

Stage 4 – Draft Strategy and Proposal: The consultant will assist the relevant agencies to draw together results from stakeholder workshops and meetings and the recommendations on a MeBr strategy to come up with a final action plan which includes costing of proposed investment and non-investment activities. It will be the basis for formulating the strategy.

Stage 5 – Finalization of the Strategy and Proposal for the submission to the ExCom.
7.8.5 **Mr. Lee Choong Min** from Malaysia Department of Environment (DOE) made the presentation on the Malaysia’s Approach to Methyl Bromide Phaseout. The presentation started with the background of MeBr use in the country. There are currently 3 that are companies allowed to import Methyl Bromide into Malaysia. These companies are registered with the Pesticide Board of the Department of Agriculture. In addition, the use of MeBr in Malaysia is also strictly regulated by the Ministry of Health for the process of operator licensing and through the pesticide registration. In terms of MeBr imported amount, it was found that the amount of MeBr imported to Malaysia is gradually increase from 1997 (46.34 tonnes) – 2001 (120.36 tonnes).

7.8.6 The presentation provided information that approximately 78.5% of MeBr imported is used for QPS, while about 20% is for durable commodities and structural treatment. The remaining are for soil treatment (1%) and perishable commodities (0.5%). To date, there are more than 40 companies in Malaysia having license as operator or officers for MeBr applications (fumigators).

7.8.7 Malaysia has received the financial assistance of $US 10,000 from the ExCom for the preparation of MeBr Phaseout in Soil Fumigation Sector to be implemented by UNDP. Approaches for Malaysia to phaseout the use of MeBr could be done by labeling regulation and activities reducing pesticide risk. In addition, financial and technical assistance, awareness campaign, and the licensing system for MeBr will also necessary for the Government of Malaysia to phaseout the use of MeBr in non-QPS sector.

7.9 **QPS Uses of Methyl Bromide and its Alternatives**

7.9.1 **Dr. Jonathan Banks** made the presentation addressing on the definition of Quarantine and Pre-shipment under the Montreal Protocol. Given the change of the definition of the pre-shipment at the Eleventh Meeting of the Parties, it is essential that the countries define the quarantine and pre-shipment carefully. The definition of the QPS as of so far is as follows:

- **Quarantine is defined as “Treatments against officially controlled quarantine pest”**

- **Pre-shipment is defined as “Treatments made within 21 days prior to export to meet the official phytosanitary or sanitary requirements of either the exporting country or the importing country”**

In case the requirement to fumigate with MeBr is made only by one private company and is not an official government requirement, even if this is done within 21 days of export, the use of MeBr for such treatment cannot be considered as pre-shipment in light of this new definition. Countries should be careful in ensuring that their reported quantities of MB used for QPS strictly follow these definitions, otherwise this could cause problems when they have to actually phase out non-QPS applications.

7.9.2 Dr. Banks also informed the workshop that there is a growing use of MeBr for QPS, threatening gains made in reduction of MeBr in other areas. Therefore,
there are some expectations for the restriction on QPS use in the future. However this decision can only be made by the Meeting of the Parties to the Montreal Protocol.

7.9.3 Alternatives for QPS are generally the same for non-QPS perishables and durables, but usually require a higher degree of effectiveness. Speed of action may also be important. Dr. Banks also presented in-kind alternative (gases) and not in-kind alternatives. However, there were constraints on adoption of the MeBr alternatives, in particularly time and effort, which is considered a major constraint.

7.9.4 Decision XI/11(7) also urges the parties to adopt the use of recovery technology for MeBr. To date, there is the available technology providing that the MeBr can be recaptured on carbon after use. This would enable the elimination of emission to the atmosphere and to protect the ozone layer.

7.9.5 Dr. Banks also explained the QPS logic diagram, which will assist in deciding whether a treatment should be categorized as a “quarantine”, “pre-shipment” or neither. It is noted that the definition of pre-shipment will be applied in case that phytosanitary or sanitary requirement was enforced prior to December 3, 1999. The requirement after the said day onward will not meet the criteria for pre-shipment. After the explanation on the logic diagram, the example for deciding the QPS were also explained to the workshop.

VIII. RESULTS, CONCLUSIONS AND RECOMMENDATIONS AND LESSONS LEARNED

8.1 The main conclusions and recommendations that were agreed upon during the meeting were in the areas of policy, training, awareness raising, what to do with results of demonstration projects, and on QPS. The final recommendations and Conclusions are attached as Annex 1.

IX. EVALUATION BY PARTICIPANTS

An evaluation using a standard workshop evaluation form prepared by UNEP was conducted at the end of the workshop. Participants in general rated the workshop as “excellent” and the presentations as “very good”. Some comments for better improving future workshops included the need for having more updated data, that the firls trip and the continuing discussion after could have been better scheduled.

Overall, the participants rating and comments showed that it was a successful workshop.

A summary of the responses are included as Annex IV of this document.
Annex 1:

Conclusions and Recommendations of the Workshop

Results of Demonstration Projects
- Demonstration projects implemented in individual countries in the Asia and the Pacific region have shown very good results and these alternatives should be adapted by other countries to suit site specific applications

Training
- Specific and practical training is essential for greater adoption and wider acceptance of the MB alternatives

Awareness
- Awareness on MB and its alternatives is an essential prerequisite to promote activities that lead to phase out of MB.

Use of Phosphine for Durables
- The use of phosphine as a leading alternative for durables and stored products is widespread in the region. However, there are cases of phosphine resistance and misconceptions associated with phosphine use. The meeting recommends that a regional workshop on correct application of phosphine and other chemical and non-chemical agents as an alternative, is needed in order for these technical issues to be resolved.

Policy
- The phase out of MB has to be supported by a strong regulatory/policy framework in each country (i.e. ban on MB uses). The meeting agrees that MB phase-out working groups (consisting of relevant stakeholders) should be set up in each country to identify short, medium and long-term policy options for the phase-out, and encourage use of alternatives.

- A mechanism for registration of MB alternatives should be set in motion.

QPS
- Countries should undertake extensive review of the QPS definition (Decision VII/5 and XI/12) and clarify what constitutes “official requirements” to simplify interpretation and implementation of this decision. A document on the subject should be compiled at national level as a reference guide.

- Countries should also ensure that they report official QPS data as part of Article 7 requirements under the Montreal Protocol. A clearer understanding and application of the definition of QPS would assist in getting more accurate data
Annex II

Agenda

Regional Workshop on the Use of MB Alternatives evaluated under
The Multilateral Fund’s demonstration projects for Asia and the Pacific

Organized by UNEP-ROAP

Hosted by the Government of Thailand

25-27 September 2002

Pattaya, Thailand

Day 1

08:30-09:30 Registration

0930-1000 Opening Session

- Welcome Remarks
- Keynote Opening Address by Thailand Minister of Agriculture or Environment or DIW
- UNEP Opening Remarks
- Main Objectives of the Workshop

10:30-1100 COFFEE BREAK

Session I Status of Methyl Bromide Phase out in Asia and the Pacific

11:00- 11:30 Brief overview of MB Phase out requirements under the Montreal Protocol and compliance situation of Asia and the Pacific countries
   Ms. Cecilia T. Mercado UNEP ROAP

11:30- 12:00 Current Methyl Bromide Consumption in Asia and the Pacific and potential future use
   Mr. Thanavat Junchaya, UNEP ROAP

1200-1230 Review of assistance provided by the Multilateral Fund to promote the phase out of Methyl Bromide in the region, and discussion on new ExCom guidelines for MB phase out projects
   representative from the Multilateral Fund Secretariat

12:30-13:00 Discussion
13:00-14:00 Lunch

Session II Experience in implementing MB Alternatives demonstration projects in Asia and the Pacific

14:00-14:30 Overview of demonstration projects and status of implementation representative from the Multilateral Fund Secretariat

1430-1700 Case study presentations on results/status of demonstration projects

1430-1530 ICM/IPM in combination with phosphine for treatment of stored grain and other stored products
Representative from Indonesia (30 minutes)
Representative of Thailand (30 minutes)

1500-1530 Alternatives to the use of MB for stacked grain and timber in Vietnam
Representative of Vietnam (30 minutes)

1530-1545 COFFEE BREAK

1545-1615 Sulfuryl Fluoride as an Alternative to methyl bromide for treatment of Malaysian timber
Representative of Malaysia (30 minutes)

1615-1645 Alternatives to the use of methyl bromide in soil fumigation
Representative of China (30 minutes)

1645-1730 Discussion

1730-1745 Summary of the Day’s discussions

Day 2:

7:00-12:00 Field trip to demonstration project site (details will be provided later)

12:00-1330 Lunch.

1330-1430 Overview of alternatives to
(1) MB for stored products ----- Dr. Jonathan Banks, Co-chair MBTOC
(2) Soil applications ---- Prof. Cao Aocheng, MBTOC

1430-1500 Discussion

15:00-15:30 Coffee Break.
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<tr>
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<tbody>
<tr>
<td>1530-1600</td>
<td>Continuation of Session II</td>
<td>Alternatives to MB for the treatment of tea nematodes in Sri Lanka.</td>
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<td><em>Representative of Sri Lanka (30 minutes)</em></td>
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<tr>
<td>1600-1630</td>
<td>Discussion</td>
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<tr>
<td>1630-1700</td>
<td>Summary of the Day’s Discussions</td>
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**Day 3**

**Session III** : Communicating results of demonstration projects: the NGO experience

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<tbody>
<tr>
<td>09:00-09:30</td>
<td>Experience of PAN-Philippines in raising awareness on MB, including lessons learned</td>
<td>Mr. Romy Quijano, PAN-Philippines</td>
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<tr>
<td>09:30-1000</td>
<td>Thailand’s approach communicating MB alternatives.</td>
<td>Representative of Rice Exporters’ Association (REA), Thailand</td>
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<tr>
<td>1000-10:30</td>
<td>Discussion/Questions and Answer</td>
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<tr>
<td>1030-1045</td>
<td>Coffee Break.</td>
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**Session IV** : MB Phase out through a strategic and sectoral approach

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<tr>
<td>10:45-11:05</td>
<td>Experience of China in developing a Strategic Framework to MB Phaseout</td>
<td>Representative from China</td>
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<tr>
<td>11:05-11:35</td>
<td>Sectoral MB Phase out Plan: Thailand’s perspective</td>
<td>Representative from Thailand Ministry of Agriculture [still to be confirmed]</td>
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<tr>
<td>11:35-12:00</td>
<td>Malaysia’s approach to MB phaseout</td>
<td>Representative from Malaysia</td>
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<tr>
<td>1200-1245</td>
<td>Plenary discussions on best approaches to disseminate MB project results and preparation of action plan</td>
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<td>12:45-14:00</td>
<td>Lunch</td>
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**Session V** : QPS Uses of MB and its Alternatives

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<tbody>
<tr>
<td>14:00-14:45</td>
<td>Definition of QPS under the Montreal Protocol and case study examples</td>
<td>Dr. Jonathan Banks, Co-chair, UNEP MBTOC</td>
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</tbody>
</table>
Summary of possible alternatives to MB for QPS

*Dr. Jonathan Banks, Co-chair, UNEP MBTOC*

1445-1530 **Working Session 1**: how to identify whether MB use is QPS or non-QPS through specific examples

1530-1545 Coffee Break

1545-1615 **Plenary Session to discuss understanding of QPS issues.**

1630-1730 Conclusions and Closing of Workshop.
Closure Remarks from:

- UNEP
- DIW
Annex III

LIST OF PARTICIPANTS
REGIONAL METHYL BROMIDE WORKSHOP
PATTAYA, THAILAND, 25-27 SEPTEMBER 2002

<table>
<thead>
<tr>
<th>COUNTRY / ORGANIZATION</th>
<th>NAME AND ADDRESS</th>
</tr>
</thead>
</table>
| AUSTRALIA               | Dr. Jonathan Banks  
Methyl Bromide – Technical Options Committee  
10 Beltana Road, Pialligo ACT 2609  
Australia  
Tel:  61-2-62489228  
Fax:  61-2-62489228  
E-mail: apples3@bigpond.com |
|                         | Ms. Li Lei  
Department of the pollution control  
State Environmental Protection Administration (SEPA)  
No. 115, Nanxiaojie, Xizhimennei  
Beijing 100035  
China  
Tel: 86-10-66154879  
Fax: 86-10-66154879  
e-mail: daqichu@sina.com |
|                         | Mr. Lubiao Zhang  
Institute of Agricultural Economic,  
Chinese Academy of Agric Sciences  
No. 12, Zhongguancun Nandajie  
Beijing 100081  
Tel: (86 10) 689 19792  
Fax: (81 10) 689 76148  
E-mail: zhanglb@lead.org.cn |
|                         | Mr. Cao Aocheng  
Institute of Plan Protection  
Chinese Academy of Agricultural Sciences  
Beijing 100094, China  
Tel: (86 10) 62815940  
Fax: (86 10) 62894863  
E-mail: nopt@95777.com |
| INDONESIA               | Ms. Kusmulyani Sugiarto  
Ministry of Environment  
JL.D.I. Panjaitan kav.24, Kebon Nanas,  
Jakarta 13410, Indonesia |
<table>
<thead>
<tr>
<th>COUNTRY / ORGANIZATION</th>
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<tr>
<td><strong>INDONESIA</strong></td>
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<tr>
<td></td>
<td>Mr. Joeli Hartono</td>
</tr>
<tr>
<td></td>
<td>Directorate of Fertilizer and Pesticide,</td>
</tr>
<tr>
<td></td>
<td>Pesticides Committee</td>
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<td></td>
<td>Ministry of Agriculture,</td>
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<td></td>
<td>JL.Harsono R.M. No3</td>
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<td></td>
<td>Raqunan, Jakarta</td>
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<tr>
<td></td>
<td>Indoneisa</td>
</tr>
<tr>
<td></td>
<td>Tel: (62 21) 7816086</td>
</tr>
<tr>
<td></td>
<td>Fax: (62 21) 781 6086</td>
</tr>
<tr>
<td></td>
<td>E-mail: <a href="mailto:joeli@indo.net.id">joeli@indo.net.id</a></td>
</tr>
<tr>
<td><strong>INDIA</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dr. Ram Sanehi Sharma</td>
</tr>
<tr>
<td></td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td></td>
<td>Dept of Agriculture &amp; Cooperation</td>
</tr>
<tr>
<td></td>
<td>Directorate of Plant Protection, Quarantine &amp; Storage</td>
</tr>
<tr>
<td></td>
<td>Central Insecticide Laboratory</td>
</tr>
<tr>
<td></td>
<td>Tel: 91-129-5413014, 5418507, 5418502, 5418505, 5427610</td>
</tr>
<tr>
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<td>Fax: 91-129-5413014, 91-129-5412125</td>
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<tr>
<td><strong>MALAYSIA</strong></td>
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</tr>
<tr>
<td></td>
<td>Mr. Lee Choong Min</td>
</tr>
<tr>
<td></td>
<td>Principal Assistant Director</td>
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<tr>
<td></td>
<td>Chief of Ozone Protection Unit</td>
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<td></td>
<td>Dept. of Environment Malaysia</td>
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<tr>
<td></td>
<td>Ministry of Science, Technology &amp; Environment</td>
</tr>
<tr>
<td></td>
<td>Level 5, Block C4</td>
</tr>
<tr>
<td></td>
<td>Federal Government Administration Centre</td>
</tr>
<tr>
<td></td>
<td>62502 Putrajaya</td>
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<td></td>
<td>Malaysia</td>
</tr>
<tr>
<td></td>
<td>Tel: (603) 8885 8219</td>
</tr>
<tr>
<td></td>
<td>Fax: (603) 8889 1042, 8889 2575</td>
</tr>
<tr>
<td></td>
<td>e-mail: <a href="mailto:lcm@jas.sains.my">lcm@jas.sains.my</a></td>
</tr>
<tr>
<td></td>
<td>Mr. Gan Kee Seng</td>
</tr>
<tr>
<td></td>
<td>Forest Research Institute Malaysia</td>
</tr>
<tr>
<td></td>
<td>Kepong, 52109 Kuala Lumpur</td>
</tr>
<tr>
<td></td>
<td>Malaysia</td>
</tr>
<tr>
<td></td>
<td>Tel: (603) 62797395</td>
</tr>
<tr>
<td></td>
<td>Fax: (603) 62797878</td>
</tr>
<tr>
<td></td>
<td>E-mail: <a href="mailto:ganks@frim.gov.my">ganks@frim.gov.my</a></td>
</tr>
<tr>
<td></td>
<td>Mr. Muhamad Omar</td>
</tr>
<tr>
<td></td>
<td>Crop Protection &amp; Plant Quarantine Unit,</td>
</tr>
<tr>
<td></td>
<td>State Dept. of Agri., Selangor</td>
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<td>COUNTRY / ORGANIZATION</td>
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</table>
| 4<sup>th</sup> Floor, Bangunan Darul Ehsan  
No 3, Jalan Indah, Section 14  
40632 Shah Alam, Selangor, Malaysia  
Tel: 05-55445427, 55445435  
Fax: 05-55105044  
e-mail: omar4199@yahoo.com | PAKISTAN  
Mr. Chaudhry Zahoor Sardar  
Ozone Cell Ministry of Environment  
Room No. 1, 2<sup>nd</sup> Floor Hajvairy Plaza, Blue Area  
Islamabad, Pakistan  
Tel: 92-519205884, 9203760  
Fax: 92-51- 920 5883  
e-mail: ozonecell@comsats.net.pk |
<table>
<thead>
<tr>
<th>COUNTRY / ORGANIZATION</th>
<th>NAME AND ADDRESS</th>
</tr>
</thead>
</table>
| PHILIPPINES            | Mr. Prudencio E. Calado, III  
OIC Project Manager, Philippine Ozone Desk  
Environmental Management Bureau  
Dept of Environment & Natural Resources  
DENR CPD., Visayas Avenue  
Diliman, Quezon City  
Philippines  
Tele fax: (63 2) 9252344, 9281244  
E-mail: ozonewatch@vasia.com |
|                        | Dr. Dario C. Sabularse  
Deputy Executive Director  
Fertilizer and Pesticide Authority  
Department of Agriculture  
4th Floor, Building B, NIA Complex,  
EDSA, Quezon City  
Philippines  
Tel: 63-2-9265877, 9223368  
Fax: 63-2-9223364, 9223355  
e-mail: fpa_77@yahoo.com |
|                        | Ms. Cecile A. Hernandez  
Project Evaluation Officer  
Fertilizer and Pesticide Authority  
Department of Agriculture  
4th Floor, Building B, NIA Complex,  
EDSA, Quezon City  
Philippines  
Tel: 63-2-9265877, 9223368, 9223371  
Fax: 63-2-9223364, 9223355  
e-mail: fpa_77@yahoo.com or  
cecilehernandez@yahoo.com |
|                        | Ms. Sampaguita Dumo Quijano  
Pesticide Action Network (PAN) Philippines  
L2B30 P5 Salome Tan St.  
BF Executive Village  
Las Pinas, Metro Manila  
Philippines 1740 |
| SRI LANKA              | Mrs. Sushila Iranganie Vitarana  
Tea Research Institute of Sri Lanka  
TRI Low Country Station, Ratnapura  
Sri Lanka  
Tel: 94-45-28514  
Fax: 94-45-28628  
E-mail: vitaranasi@hotmail.com or triratn@lanka.com.lk |
<p>|                        | Mr. Kiribathgodage Indrapriya Ajithalal Kularatne |</p>
<table>
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<tr>
<th>COUNTRY / ORGANIZATION</th>
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</table>
| Montreal Protocol Unit | Ministry of Environment & Natural Resources  
104, Robert Gunawardene Mawatha,  
Battaramulla, Sri Lanka  
Tel: 94-1-871764, 887455  
Fax: 94-1-887455  
e-mail: unmpu@sri.lanka.net |
| Dr (Mrs) Rohini Ekanayake  
Department of Agriculture  
National Plant Quarantine Service  
Canada Friendship Road, Katunayake  
Sri Lanka  
Tel: 094-01-252028/9  
Fax: 094-01-253709  
e-mail: ubeka@sltnet.lk or npqs@sltnet.lk |
| THAILAND | Ms. Bongkoch Kittisompun  
OPU Manager  
Hazardous Substances Control Bureau  
Department of Industrial Works, Ministry of Industry  
75/6 Rama VI Road, Rajthewi District  
Bangkok 10400, Thailand  
Tel: (66 2) 2024228  
Fax: (66 2) 2024015  
e-mail: ozone@narai.diw.go.th |
| Ms. Sirakarn Srilekha  
Hazardous Substances Control Bureau  
Department of Industrial Works, Ministry of Industry  
75/6 Rama VI Road, Rajthewi District  
Bangkok 10400, Thailand  
Tel: (66 2) 2024228  
Fax: (66 2) 2024015  
e-mail: ozone@narai.diw.go.th |
| Ms. Somsri Suwanjarus  
Hazardous Substances Control Bureau  
Department of Industrial Works, Ministry of Industry  
75/6 Rama VI Road, Rajthewi District  
Bangkok 10400, Thailand  
Tel: (66 2) 2024228  
Fax: (66 2) 2024015  
e-mail: ozone@narai.diw.go.th |
| Mr. Sumit Sangburimtis  
Capital Rice Co. Ltd.  
118 Moo 9 Soi Watmahawong,  
Poochou Road, Samrong, |
<table>
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<tr>
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<tr>
<td>Prapradang, Samutprakarn Thailand Tel: (66 2) 7485331-5 Fax: (66 2) 3939264 e-mail: <a href="mailto:cessnal82th@yahoo.com">cessnal82th@yahoo.com</a></td>
<td>Mr. Eueychai Smitasiri Agricultural Regulatory Division Department of Agriculture Paholyotin Road, Chatuchak Bangkok 10900, Thailand Tel: (66 2) 9406466-8 Fax: (66 2) 5793576 e-mail: <a href="mailto:eueychai@hotmail.com">eueychai@hotmail.com</a></td>
</tr>
<tr>
<td></td>
<td>Mr. Chamlong Lapasatukul Agricultural Regulatory Division Department of Agriculture Paholyotin Road, Chatuchak Bangkok 10900, Thailand Tel: (66 2) 5792145 Fax: (66 2) 5794129 e-mail: <a href="mailto:llong@ksc.th.com">llong@ksc.th.com</a></td>
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</table>
| VIET NAM               | Mr. Luong Duc Khoa  
ODS Officer  
National Office on Climate Change and Ozone Protection  
Hydrometeorological Service of VN  
57 Nguyen Du St, Hanoi  
Viet Nam  
Tel: (84 4) 8228974  
Fax: (84 4) 8263847  
e-mail: ozoneoffice@fpt.vn |
|                        | Ms. Vu Thi Nga  
National Office on Climate Change and Ozone Protection  
Hydrometeorological Service of VN  
57 Nguyen Du St, Hanoi  
Viet Nam  
Tel: (84 4) 8228974  
Fax: (84 4) 8263847  
e-mail: ozoneoffice@fpt.vn |
|                        | Mr. Dao Dinh Truong  
Ministry of Agriculture and Rural Development  
57 Nguyen Du  
Hanoi, Viet Nam  
Tel: (84 4) 8228974  
Fax: (84 4) 8263847  
e-mail: ozoneoffice@fpt.vn |
|                        | Mrs. Nguyen Bach Tuyet  
International Inspection Fumigation Join-Stock Company  
29 Ton Duc Thang Street, Dist.I  
Ho Chi Minh City, Viet Nam  
Tel: (84 8) 9100596  
Fax: (84 8) 9100595  
e-mail: vfc-son@hcm.vnn.vn |
|                        | Mrs. Vu Thu Lan  
International Inspection Fumigation Join-Stock Company  
29 Ton Duc Thang Street, Dist.I  
Ho Chi Minh City, Viet Nam  
Tel: (84 8) 9100596  
Fax: (84 8) 9100595  
e-mail: vfc-son@hcm.vnn.vn |
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<td><strong>UNEP</strong></td>
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<tr>
<td>Ms. Cecilia T. Mercado</td>
<td>Programme Officer</td>
</tr>
<tr>
<td>UNEP/ROAP</td>
<td></td>
</tr>
<tr>
<td>10th Floor Block B,</td>
<td></td>
</tr>
<tr>
<td>UN Building,</td>
<td></td>
</tr>
<tr>
<td>Rajadamnern Nok Avenue</td>
<td></td>
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<tr>
<td>Bangkok 10200</td>
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<td>Thailand</td>
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<tr>
<td>Tel: 66-2-2881136</td>
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<tr>
<td>Fax: 66-2-2803829</td>
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<tr>
<td>e-mail: <a href="mailto:mercadoc@un.org">mercadoc@un.org</a></td>
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<tr>
<td>Dr. Thanavat Junchaya</td>
<td>Regional Network Coordinator</td>
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<tr>
<td>UNEP/ROAP</td>
<td></td>
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<tr>
<td>10th Floor Block B,</td>
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<td>UN Building,</td>
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<td>Rajadamnern Nok Avenue</td>
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<td>Bangkok 10200</td>
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<tr>
<td>Thailand</td>
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<tr>
<td>Tel: 66-2-2882128</td>
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<tr>
<td>Fax: 66-2-2803829</td>
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<tr>
<td>e-mail: <a href="mailto:junchaya@un.org">junchaya@un.org</a></td>
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<tr>
<td>Pattra Mahattanawongwarn</td>
<td>Secretary</td>
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<tr>
<td>UNEP/ROAP</td>
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<td>10th Floor Block B,</td>
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<td>e-mail: <a href="mailto:mahattanawongwarn@un.org">mahattanawongwarn@un.org</a></td>
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Annex IV:

Evaluation of Participants to the
Regional Workshop on the Use of Methyl Bromide Alternatives
Evaluated under the Multilateral Fund’s demonstration projects
Pattaya, Thailand
25-27 September 2002

1. What is your overall impression of the presentations?

2. Which presentations or sessions did you find the most useful and why?

   - ICM for treatment of stored grain and other stored products – Thailand their successful application for pest control is very inspiring and a good proof that ICM can be need to replace MB. This is information will be very useful in the pris since MB’s use in stored grains or facilities in the most common non QPS apply of MB.
   - Session II topics
   - Identification of QPS and non QPS
   - The presentations from the Dr. Jonathan Banks, because he had a new concept for MB alternatives
   - Definition of QPS possible alternatives to MB for QPS
   - Session II: Experience in implementing MB alternatives demonstration projects. Session V: QPS uses of MB and its alternatives & working session 1 + QPS & Non QPS why?” they provided useful information.
   - QPS definition & alternatives presentation by Dr. Banks, if clarified a lot of grey areas. Sectoral MB phase out plan of Thailand could give us ideas for Philippines own phase out plan
   - Sri Lankas’ presentation for showing practical problems and its solutions of their Tea project. China for showing the financial problems & Jonathan QPS
   - All because the situation of Asia and the Pacific countries, consumption and demonstration projects are useful and important in formation.
   - Session II, we also need to take the finding to the general public effectively what difficult task.
• How to identify whether MB use is QPS or non-QPS through specific example.
• By UNEP/ROAP and by UNEP MBTOC
• Session 1 – is the most useful for those who are nearly exposed to the current status of MB which is on very of phase out
• The session of alternatives to MB is most useful because it is the key to successfully phase out MB.
• Philippines NGO – good presentation of problems and good data survey by sector and year. India – sheved HCN use cotton. Thailand (Chamlong) was an excellent outreach program
• All
• Definition of QPS & Alternative for MB in various applications because directly related to the compliance program.
• Dr. Bank from Australia – good presentation

3. Were there presentations or sessions which you did not find useful and why?

• All sessions are useful

4. How do you rate the technical content of the presentations?

5. What suggestions do you have about improving the usefulness and technical content of the presentations at future workshops?

• Updating the data in future presentations.
• More technical data should be included
• More information on alternatives the MB for each application, such as use phosphine for fumigation ECO 2 fume gas.
• More pictures and video format in presentation if it is possible to make available.
• Invitations should be well in time to enable all the participants to process the formation accordingly.
• Focus on the topic and try to get some conclusion, focus on the barriers and problems, and how to overcome the barriers in own country
• Should include more pictures, graph or charts table.
• We all need practical solutions for each project. Find some of them have not been finished, future should concentrate more on disadvantage/advantage/solutions and follow-up action
• The original authors of work carried out in any country should be presenting their work.
• Standard outline/format might help in understanding the presentation better.
• Need more specific topics to identify the problems in each member countries.
• Results & Recommendation of documentation projects are not sufficient for others to complement effective alternatives.
• The notice for conference may kindly be given well in advance

6. What is your overall impression of this workshop?

7. Did the country presentations on the demonstration project results provide you with the information needed to move forward with using these alternatives? (If no, what information do you think was lacking)?

• Accurate data on how much MB is used in QPS and non-QPS
• An example of a regulation/policy that was able to regulate the movement of MB to ensure or ensuring that it is need for QPS and not on non-QPS.
• The ICM demonstration project was really an eye-opener, we really needed the information on the alternative for structural fumigation.
• New and useful information. Most of information is old. We hope to get some update and new technology
• More information on specific details on the use of bio-control agents in soil treatment work in the soil pests.
• Availability of alternatives. Application in the field because in the demonstration scale can be done, does not mean can be applied easily in the widely scale.

8. Time allocated for resource persons

9. Time allocated for discussion with resource persons
10. Time allocated for country presentations

11. Time allocated for discussion after each presentation.

12. Logistics arrangements during the meeting (i.e availability of presentations, etc)
13. How do you rate the quality of the field visit?

![Bar chart showing ratings of field visit quality]

14. Did this visit provide you with adequate information on the use of alternatives to MB (i.e. ICM) for rice mills?

![Bar chart showing responses to information adequacy]

15. Did the workshop meet its objectives of outreaching information on the results of demonstration projects?

![Bar chart showing responses to workshop objectives]

16. Which aspects of the meeting have been particularly successful or useful and why?

- Demonstration of the ICM’s success in Capital rice in the best part since it should/process that effective pest control in stored grains in possible without MB.  
- OPS uses of MB and it alternatives.  
- Working session: how to identify whether MB use in QPS or non QPS through specific example because many of the participant confuse about QPS and Non QPS.  
- Field visit  
- Working session with active interaction of participant with experienced resource persons, site visit for on site transpection & Outline job explanation.  
- An effort to introduce the alternatives of MB.  
- Exchanging information and get some ideas on policy and techniques, knowing more each other and what’s happened in other countries, benefiting the further communication each other after the meeting.  
- Sharing the country experience information among the members of the region.  
- Communicating result of projects  
- The meeting’s organization is very good and the option of place is very good. The most of the presentation are useful for us.  
- Generally all aspects are useful because they provide understanding and procedures as to the fate of MB future.  
- Excellent development of contacts in the region.  
- All are useful.  
- The fullest cooperation by the Host Country & UNEP.

17. Which aspects of the workshop should be improved and what are your suggestions for improving similar future workshops?

- Scheduling the field trip and continuing discussions after the field trip could better be done for next time.  
- The moderators should be briefed as to what should be the outcome of each session so as to generate more active participation  
- I think we could also benefit using small group discussions on MB phase out.  
- Still a cost effective alternative need to be explored while should also be easily feasible and practicable.  
- If workshop is organized by sector, such as by crops, the alternatives in same crop will be discussed deeply. Some more useful conclusions will be obtained of the meeting which will benefit the further work.  
- Participation of experts from developed countries (to share the experience AS countries)  
- The materials of some of the presentation should be more detail and may be have the same form structure for every countries.  
- No comments – everything is excellent.  
- Not for now, we would like more specific info and study results regarding alternatives to MB.