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UNEP INFORMATION PAPER

(Report submitted by UNEP-TIE)

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Executive Summary of the Strategic Framework to Control Methyl Bromide in China

1. Introduction:

The Executive Summary of the draft strategic framework to control methyl bromide growth in China is being submitted as an Information Note for consideration by the Executive Committee to provide an update on the project's progress so far, and its future activities. A copy of the full document is available from UNEP upon request and will be provided to the members of the Executive Committee for the 29th Meeting.

2. Background

The State Environmental Protection Administration (SEPA) in China is committed to comply with the provisions of the Montreal Protocol. In order to proceed strategically to control Methyl Bromide (MB) use in China while maintaining agricultural productivity, SEPA approached UNEP for assistance for the development of a Strategic Framework to Control Methyl Bromide in China.

At the 24th Meeting of the Executive Committee in March 1998, UNEP was requested to develop a sectoral policy plan to control the growth of methyl bromide consumption in China in close cooperation with SEPA. Canada, France and Germany indicated their interest to be involved in this project.

In undertaking this project, UNEP is also working closely with Dr. Ian Porter of the Institute for Horticultural Development, Australia using their experience of developing a national strategy for methyl bromide phase out in Australia.

The first mission for this project was undertaken in early March 1999 where an action plan to put together the data needed for the development of the strategy was prepared, including consultations with the various ministries within the Chinese government and other stakeholders. Short, medium and long term policy and research options were also discussed to see how these would fit in within China's regulatory structure.

In July 1999, a Consultative Workshop was convened to provide an opportunity for the methyl bromide stakeholders in China to be consulted on the various policy options that may be implemented in China. Participants to this workshop included representatives from bilateral agencies, the USA, Canada, Germany, France, the World Bank, UNIDO and other invited experts. The main recommendation during this workshop was that China should ratify the Copenhagen Amendment to the Montreal Protocol in order for the strategic framework to be effective, and for the activities included therein to be implemented.

It was also recommended that this report be submitted to the ExCom for information in order that progress on the project is known and understood and known by the members.

3. Main Objective of the Strategic Framework

The preparation of this strategic framework will provide China with an action plan to prevent the growth of methyl bromide use. Considering that China is both a producer and a large consumer of methyl bromide with a potential for rapid growth, a coordinated plan is critical to ensure that China meets its obligations under the Montreal Protocol to phase out methyl bromide, upon ratification of the Copenhagen amendment.

4. Executive Summary (see attached)

STRATEGIC FRAMEWORK FOR THE CONTROL OF METHYL BROMIDE GROWTH IN CHINA

EXECUTIVE SUMMARY

1 BACKGROUND

This strategic framework was prepared by UNEP in close cooperation with the State Environment Protection Administration of China (SEPA). Information contained in this strategy was compiled by SEPA through a working group organized for this purpose, in close coordination with the Ministry of Agriculture, the Chinese Academy of Sciences for Agriculture and other relevant institutions in China related to the use of methyl bromide. Bilateral countries (Canada, Germany and France) provided specific inputs related to their experience on methyl bromide work in other developing countries. The data obtained is relevant only to mainland China. Future surveys may be required to include information for Hong Kong and Taiwan, although MB use in these provinces is considered to be relatively small (200-300 tonnes) and predominantly for quarantine and pre-shipment uses (QPS).

- 1.1 The 9th Meeting of the Parties to the Montreal Protocol in September 1997 set new control measures for methyl bromide phase-out. These Adjustments specify that Article 2 Countries are required to phase-out methyl bromide by 2005, with interim reductions prior to phase-out. Article 5 countries will freeze consumption and production of methyl bromide by 2002 at average 1995-98 levels, with a 20% reduction by 2005 and a phase-out by 2015. Critical agricultural use exemptions will be allowed after phase out, but only for certain significant uses where no viable, proven alternatives are available. QPS uses which comprise 22% of global methyl bromide use, are currently exempt from these controls.
- 1.2 At the 24th Meeting of the Executive Committee in March 1998, UNEP was requested to develop a sectoral policy plan to control the growth of methyl bromide consumption in China in close cooperation with SEPA. Bilateral countries Canada, France and Germany indicated their interest to be involved in this project.
- 1.3 Following a meeting held between SEPA, UNEP TIE and its lead consultant, representatives from Canada and Germany, in Cairo in November 1998, the scope of the project was redefined to develop a sectoral plan which considered past and future production and consumption of MB in China within an overall strategic framework on how MB could be controlled. The emphasis of the plan was on those MB uses that would become regulated following the guidelines set by the Montreal Protocol at the Ninth Meeting of Parties in September 1997.
- 1.4 As part of their response to the project, China organised a Methyl Bromide Steering Group and Working Group composed of 15 Chinese experts to assist in gathering data and to provide overall coordination for the development of the strategic framework. The Steering Group has the main responsibility for approving recommendations made by the working group.
- 1.5 An initial report with data on past, present and future consumption of methyl bromide was prepared and reviewed in March 1999, in preparation for a consultative workshop on the strategy held in Beijing in July 1999. This meeting provided an opportunity to

review the identified policy options including research and training, and prioritise short, medium and long term options that will enable China to control MB growth, and its eventual phase out.

- 1.6 Ratification of the Copenhagen Amendment was considered the utmost priority for China, in order that future projects be eligible for financial assistance from the Multilateral Fund

2 Production, importation and consumption of MB

- 2.1 China is both a consumer and producer of methyl bromide. Its current production capacity from two production facilities is 3400 tonnes annually, and it imports approximately 1500 tonnes annually from Israel, mostly in small canisters. In 1995, a joint venture between Israel and the Lianyungang Seawater Chemical Industry Plant was agreed to produce these canisters in China.
- 2.2 In 1998, 2300 tonnes of methyl bromide was used for preplant soil disinfestation, 230 tonnes for durable and other non QPS commodities, 150 tonnes as chemical feedstock and 570 tonnes for quarantine and preshipment uses (QPS).
- 2.3 Methyl Bromide production and use in China is controlled through the State Ministry of Agriculture. Registration is required for producers and importers, and production facilities require a certificate from the Head Office of the State Bureau of Petroleum and Chemical Industry. The sale and production of methyl bromide is prohibited in China without a production and registration certificate (Ref: Order No. 216, State Council, 1977).
- 2.4 Methyl bromide is registered and mainly used as a soil treatment for four main crops, tobacco seedlings (48%), strawberries (29%), and tomatoes and cucumbers (18%). A smaller amount (5%) is also used for other crops (including melons, flowers, Chinese medicinal crops, turf, etc.). However, the use of methyl bromide is not registered for these crops, and could be considered illegal in China. Most of preplant soil disinfestation is in plastic houses (approximately 80-90%). The main commodities treated include grain and cotton. The main QPS uses are for imported timbers and softwood packaging materials used for exporting commodities.

3 Future consumption of MB

- 3.1 Without controls and assuming recent trends, China's consumption of MB is predicted to increase dramatically over the next few years, from 3,250 tonnes in 1998 to approx. 6,400 tonnes in 2002. Soil fumigation uses are predicted to increase by 80% from 1998 to 2002, durables by 8% and chemical feedstock by 27%. The large predicted increase in use for soils is mainly attributable to the product's effectiveness, relative low cost, short replant periods and ease of application.
- 3.2 Quarantine use is expected to increase by 215%, mainly because of; i) new legislation (effective from November 1998), for China to treat all softwood packaging material exported to USA and Canada, and ii) the need to treat an increased amount of imported wooden products due to restrictions on deforestation in China. The former use alone has increased MB consumption by approximately 100 tonnes per month.

4 Overview of alternatives

- 4.1 To date, UNIDO is the only implementing agency that has conducted a demonstration project assessing the suitability of alternatives for preplant soil disinfestation in China. This project commenced in 1997 and has successfully identified that whilst there are a number of potential alternatives in China, no single alternative can replace the use of MB for all soil applications, although a number of potential combinations have shown promising possibilities. Further demonstration projects of this kind is seen as essential if China is to control consumption of MB.
- 4.2 The UNIDO program also demonstrated that due to the special characteristics of some medicinal plants especially ginseng, finding alternatives for preplant soil treatments of medicinal herbs appears to be the most difficult task at present as no alternatives have shown the potential to replace MB.
- 4.3 The promising alternatives demonstrated include alternative fumigants (ie. dazomet, metham sodium, chloropicrin) applied alone or as mixtures, specific pesticides: (eg. Avermectin), solarisation, resistant varieties and changed production practices using substrates and/or floating trays for specific crops, such as tobacco.
- 4.4 China's capacity to produce alternative fumigants, often at a lower cost than in developed countries, will be a key factor in its capacity to control MB. Several key alternatives, chloropicrin, metham sodium, dazomet and methyl iodide are either produced or could be produced in China, however, their full potential as a cost effective replacement to MB has yet to be determined.
- 4.5 A number of unique technical, social, economic and regulatory barriers exist in China that constrain the immediate adoption of many of these alternatives without further research. These include the low average income of farmers (US\$260/month), small farm size (average size of farms is approximately 1mu= 1/15th ha), the lack of power and water in many areas, the hazards and difficulty of applying fumigant alternatives in the semi permanent plastic tunnels due to lack of training, the lack and cost of adopting mechanisation, and the difficulties in getting technology to the application sites, due to poor road conditions.
- 4.6 The major alternatives for grain fumigation in China include phosphine through improved application, carbon disulphide, chloropicrin, protectants including dichlorvos, cold and insect pest management, inert dusts, heat and exclusion. Some of these alternatives are already in use in China, and some are in adaptation or improvement.
- 4.7 The main MB use in durables that is difficult to replace is where rapid action is required. The suggested alternatives for these include heat, new fumigants and avoiding pests.
- 4.8 Use of methyl bromide in perishables in China is almost all for quarantine purposes. The possible use of alternatives almost always require bilateral agreement and long test protocols between countries. Local adaptation of alternatives for QPS is also needed. Some of the possible alternatives include heat and vapour treatment, hot water dips,

cold treatments, pre-harvest IPM, other fumigants such as phosphine and carbon dioxide for cut flowers, irradiation, physical removal of pests and insecticide dips.

5 Action Plan for Demonstration and Training Programmes

- 5.1 Financial support from the Multilateral Fund will be necessary to address the adoption of alternatives for soils and non QPS uses in China.
- 5.2 High priority projects on alternatives to MB for preplant soil disinfestation includes (i) annual surveys on MB use and adoption of alternatives; (ii) consideration of farmer and regional production systems using substrates and/or floating trays for specific crops, such as tobacco, (iii) continued evaluation of new methods of applying alternative fumigants (ie. dazomet, metham sodium, chloropicrin) either alone or as mixtures, (iv) effect of increased use of specific pesticides (eg. avermectin), (v) use of solarisation in plastic houses in summer, and (vi) the increased use of imported high yielding pest resistant varieties.
- 5.3 The priority programs for durables (eg. mostly grain) and perishables include (i) improvement in phosphine fumigation technology (i.e. gas tightness and circumfluence), (ii) combinations of Phosphine and CO₂ for cut flowers, (iii) use of protectants such as dichlorvos; (iv) evaluation of heat and vapour treatments, (v) hot water dips and cold treatments, (vi) use of inert dusts for food protection, (vii) mechanical refrigeration for stored produce, (viii) controlled atmospheres using CO₂ and Nitrogen, (ix) consideration of alternative fumigants including carbon bisulphide and carbon oxysulphide, and (x) the use of sulphuryl fluoride for cotton. Some of these alternatives are already in use in China, and some need adaptation for China or improvement. It is important to note that adoption of alternatives almost always requires bilateral agreements between countries and a long trial period.
- 5.4 A QPS program to address alternative treatments for softwood packaging material and imported wood is an urgent priority for China. Issues to be addressed include the demonstration, application and extension of kiln treatments for wooden packing, research and extension of sulphuryl fluoride fumigation and development and extension of paper packing. It is however recognized that the current exemptions of QPS from control measures make projects specifically directed at QPS alternatives ineligible for MLF funding.
- 5.5 Technology programs which encompass information distribution, national and provincial extension information, train the trainer groups and farmer training are essential to the adoption of alternatives in China. Existing training programmes developed by bilateral agencies in other developing countries can be used as a model for such programmes.

6 Action Plan for Policy Controls on Methyl Bromide

- 6.1 The Consultative Meeting in Beijing in July, 1999, identified possible policy controls on MB production, importation and use, and the timelines and responsible agencies that could assist implementation of these controls. The action plan uses the date when China ratifies the Copenhagen Amendment as a reference period for commencement of activities. The prioritisation was based on policies presently being used in other

developing countries, although these have been specifically adapted to China's needs. Only those policies with a moderate to high priority of adoption have been considered in the plan.

- 6.2 The possible policies that could be put in place include legislative and regulatory controls on production and imports, economic incentives or subsidies and voluntary initiatives/incentives.
- 6.3 One important outcome from the July meeting is the agreement from the Government of China to set up a Leader Group responsible for ensuring that policy priorities are followed through, particularly the ratification of the Copenhagen Amendment. There was general consensus at the same meeting, that most benefit to China would be gained if this could occur at or before the 11th Meeting of the Parties of the Montreal Protocol in Beijing.
- 6.4 China had suggested that the most ideal approach for methyl bromide phase out in the country would be following the sector approach that has been proven successful in both the halon and production sector. It was however emphasised that this should be done jointly between the World Bank and UNEP for certain specific activities.

7 Policy Controls on Production

- 7.1 SEPA and the Petrochemical Bureau are the agencies in China responsible for policy controls on production.
- 7.2 The policy controls on production which were considered most appropriate were (i) a restriction on the number of factories able to produce MB, and (ii) the imposition of a quota on the quantity produced in each factory. An immediate restriction could limit production to the present capacity in China to 3400 tonnes per year. Together with restrictions on imports of MB, this would provide a most practical and feasible way of limiting of production until 2003, when the freeze on MB would be imposed under the Montreal Protocol guidelines. The benefits of this outcome are that consumption of MB would also be restricted, thus enabling growers an easier transition to alternatives.
- 7.3 Production factories presently pay a licence fee in China. Limiting approval of production licences could also restrict any increase in production. An increase in licence fees would also be a disincentive to further production.

8 Policy Controls on Importation

- 8.1 SEPA, the Petrochemical Bureau and the Ministry of Foreign Trade are the agencies in China responsible for imposing policy controls on importation.
- 8.2 Despite the fact that imported methyl bromide is ten percent more expensive than locally produced methyl bromide, imports from Israel continue due to its better quality, and effectiveness of imported methyl bromide, is often preferred in China. Farmers compensate by using application rates approximately 10% less for this product.
- 8.3 In spite of the slight difference in efficacy, controls on methyl bromide imports, either a complete ban, a restriction or the introduction of tariffs, are considered feasible and

could be implemented provided they are is within World Trade Organisation Rules. (Under such a rule, restrictions could not be applied on importers without similar restrictions also applying to domestic producers).

9 Policy Controls on Use

- 9.1 The AE Group of the Ministry of Agriculture, is the agency responsible for most of the policy controls that could be imposed on use of MB in China.
- 9.2 The policy controls which were considered most appropriate include; (a) mandatory buffer zones for preplant soil uses, (b) rate limits and limitation by region. Present limits for use of methyl bromide already exist in China, however the potential exists to further restrict rates. At present, MB applications at 60-80g/m² for tobacco, 75g/m² for cucumber and tomato, and 50-80g/m² for strawberry are permitted under the register for preplant MB treatment.
- 9.3 The use of methyl bromide in China is presently limited by regulation to crops and uses specified on the label of the methyl bromide canister. However, it is unclear whether farmers strictly follow this regulation. Monitoring should be done to ensure that methyl bromide is used only for those as specified. In addition, there appears to be no strict guidelines for the language used when labelling MB products so that the directions can be understood by Chinese farmers.
- 9.4 Another policy option for control of MB use is the mandatory use of VIF barrier films. Constraints to implementing this option, however, would be the cost of the film, and the fact that this is not produced in China. It is also possible that such a change may require legislation so adoption is not considered likely in the near future.
- 9.5 Tax exemptions for effective alternatives and deregistration of MB uses when effective alternatives become available are other possible options that should be considered in the future.
- 9.6 Taxes and levies on sales of methyl bromide were not considered an appropriate option as they would only increase the price of methyl bromide and thus reduce farmer income at least until competitive-priced alternatives were widely available. The Chinese government is also opposed to the introduction of fees as it can lead to corruption and most fees are being converted into taxes so that a fairer system operates in China.
- 9.7 Limitations on use by region are possible, but it would need to follow a planned strategy in line with a staged legislative approach that restricted use for crops where alternatives were found to be effective.

10 Conclusions

- 10.1 Two possible scenarios emerge for China once it ratifies the Copenhagen Amendment;
- (a) China agrees to phase out methyl bromide following the control measures under the Montreal Protocol. This means that China would freeze MB use in 2003 using average consumption of 1995-1998 as a baseline, but no other action would be necessary before

the freeze date. This could then be a burden to MB users as they would have to make drastic reductions in current MB use by 2003.

(b) China immediately imposes voluntary domestic controls on importation and production of methyl bromide for all regulated uses in advance of, and to prepare for the freeze in 2003, at production and consumption levels on or close to the baseline, or as decided by the Chinese government. This will send important signals to both the MB industry and the MB users that the Government is serious about shifting to alternative technologies. Some measures such as reorganising methyl bromide production plants and stopping importation could be imposed by China to execute a quick phase-out of methyl bromide efficiently

10.2 Option B is considered to be the most realistic option, as the adoption of policy options to restrict the possible increase in consumption of methyl bromide for soil and non QPS commodity uses before 2003 will bring most benefit to China. This will ensure that alternatives will be adopted and better developed to allow them to meet the freeze on the baseline, which, is calculated at 1670 tonnes.

10.3 The following aspects are considered by the Chinese working group to be important in the development and subsequent implementation of this strategic framework:

- The Strategy should not have negative effects on either the producers and users.
- That producers and consumers be equally eligible for financial assistance from the Multilateral Fund of the Montreal Protocol in order for the phase out to be easily implemented.

10.4 The Chinese working group also recommended that following the ratification of the Copenhagen Amendment:

- The World Bank & UNEP jointly coordinate a sector approach similar to the halon and production sector approaches, to phaseout methyl bromide.
- Funds be made available either from the Multilateral Fund or bilateral agencies to continue the research, demonstration, extension and training programs identified in this strategy to assist adoption of alternatives.
- Sector subgroups by crop/commodity be set up with bilateral assistance to assist adoption of alternatives.
- A communication support system be created to ensure effective delivery of information about alternatives.
- A framework be developed for setting import tariffs on methyl bromide.
- That Chinese experts be given the opportunity to observe the successful implementation of alternatives in other developing countries.