

Chapter 12

Phasing Out Methyl Bromide

This chapter discusses the process by which the ozone-depleting chemical, methyl bromide, an effective fumigant, is being phased out. An important innovation of the Montreal Protocol was the creation of a special fund to help finance efforts to find substitute products and have them adopted. However, an unintended consequence of accelerated research on finding alternatives is new pesticide/crop combinations for which associated import tolerances (residue limits) have in a number of cases not yet been established.

Introduction

Methyl bromide is a fumigant used in agriculture for killing nematode worms, weeds and other soil pests, to control pests in structures and around stored commodities (especially grains), and for quarantine and pre-shipment uses. Although cost-effective as a broad-spectrum biocide, it is also highly toxic to humans and a potent ozone-depleting chemical, with a potential — atom for atom — for destroying 60 times more stratospheric ozone than chlorine from chlorofluorocarbons (CFCs). Among other consequences, ozone depletion contributes to human health problems caused by increased exposure to ultraviolet-B radiation (UV-B).

Recognising the threat represented by methyl bromide to the ozone layer, the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer agreed in 1997 to a global phase-out schedule for methyl bromide. This schedule requires that developed countries phase out the chemical by 2005 and that developing countries freeze its consumption by 2002, achieve a 20% reduction by 2005, and phase it out completely by 2015.

This action presents a major technical challenge, since for many uses methyl bromide is still the cheapest and most reliable fumigant on the market. It could also present difficulties for trade. For one, developed countries, as they phase out methyl bromide for use within their own borders, may come under pressure to prohibit the importation of crops grown with the help of methyl bromide. Already, several OECD member countries have phased out the use of methyl bromide entirely or in particular applications, and some non-governmental organisations (NGOs) have called for the labelling of particular products as methyl-bromide-free. Ironically, developing countries use very little methyl bromide in the production of food that is consumed within their borders; almost all of it is consumed to grow and treat cash crops for export, such as tobacco, cut flowers, strawberries and bananas. The Parties to the Montreal Protocol anticipated that developing countries would need assistance in adjusting to the methyl-bromide ban and created a special Multilateral Fund to help find and develop alternative chemicals and production technologies. However, as they apply substitutes for methyl bromide in new pesticide/crop combinations, exporting countries will need to ensure that the import tolerances for residues of those substitutes are established in the countries to which they plan to export, and that they can indeed meet those tolerances.

Development of the environmental measure

In 1992, the 128 Parties to the Montreal Protocol (hereafter, “the Parties”), having examined the scientific evidence on the ozone-depleting potential of methyl bromide, decided to list it as an ozone-depleting substance (ODS). As set out in the Copenhagen Amendment, the Parties also agreed to freeze production in 1995 at 1991 levels, and to study the matter further. At the 1995 meeting of the Parties, global methyl bromide controls were added, calling for a phase-out for industrial nations in 2010, and a freeze in 2002 based upon an average of the years 1995-98 for developing nations. Within two years, however (at their ninth meeting), the Parties had accelerated global controls (reductions in consumption¹) on methyl bromide for developed countries, and set a date for a complete phase-out for developing countries.

1. Under the control measures of the Montreal Protocol, “consumption” is defined as production plus imports minus exports.

The 1997 Montreal Amendment (which has 63 Parties) sets separate schedules for industrialised [“non-Article 5(1)”] and developing [“Article 5(1)”] countries. Article 5(1) countries are those whose annual per-capita consumption and production of ODS is less than 0.3 kg. Currently, 130 of the 175 Parties to the Montreal Protocol meet these criteria, including three OECD member countries: Korea, Mexico and Turkey. The two sets of schedules commit:

- Developed, or non-Article 5(1), countries to achieving a 25% reduction by 1999 (based on 1991 consumption levels), a 50% reduction by 2001, a 70% reduction by 2003, and full phase-out by 2005.
- Article 5(1) countries that have become Parties to the Montreal Amendment to freezing their use of methyl bromide by 2002 (based on average 1995-98 consumption), achieving a 20% reduction in its use by 2005, and phasing it out completely by 2015.

Table 12.1. Critical use exemptions for methyl bromide in 2005

Kilogrammes

Country	Initial permitted critical use exemptions	Additional permitted critical use exemptions	Total
United States	7 659 000	610 665	8 269 665
Italy	2 133 000	165 225	2 298 225
Israel	0	1 074 000	1 074 000
Spain	1 059 000	0	1 059 000
Japan	284 000	464 000	748 000
France	407 000	67 635	474 635
Greece	186 000	41 280	227 280
Australia	145 000	1 900	146 900
United Kingdom	128 000	6 330	134 330
Canada	55 000	6 840	61 840
Belgium	47 000	12 824	59 824
Portugal	50 000	0	50 000
Germany	0	45	45 250
Poland	0	44	44 100
New Zealand	0	40	40 500
Switzerland	0	8	8 700
Netherlands	0	120	120
Total	12 153 000	2 589 369	14 742 369

Sources: First column: UNEP, “Report of the First Extraordinary Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer”, Doc. No. UNEP/OzL.Pro.ExMP/1/3, UNEP, Nairobi, 27 March 2004, p. 26; www.unep.org/ozone/Meeting_Documents/mop/Ex_mop/1ex_mop-3.e.pdf; second column: UNEP, “Report of the Sixteenth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (Advance copy)”, Doc. No. UNEP/OzL.Pro.16/17, UNEP, Nairobi, November 2004, pp. 34-45, www.unep.org/ozone/Meeting_Documents/mop/16mop/16mop-17.e.pdf.

A process was also created to allow exemptions from the methyl-bromide phase-out schedule for “critical uses”. In August 2003 the Methyl Bromide Technical Options Committee of the United Nations Environment Programme’s (UNEP) Technology and Economic Assessment Panel (TEAP) released a draft (version 3) of a “Handbook on Critical Use Nominations for Methyl Bromide” (UNEP, 2003), and in March 2004 the meeting of the Parties approved, on recommendation of the MBTOC, 12 153 tonnes of critical use exemptions for 2005. By comparison, in 2001 total consumption of methyl bromide by all 34 developed countries was 23 488 tonnes (developing countries consumed 18 058 tonnes). On top of these exemptions, in November 2004 the Parties to the Protocol agreed to permit an additional 2 589 tonnes worth of exemptions in 2005. In all, 17 developed countries received critical-use exemptions, of which more than half were allocated to the United States (Table 12.1). At the same time, the Parties approved a total of just over 11 700 tonnes worth of exemptions in 2006, and “provisionally” approved a further 3 000 tonnes worth of exemptions, subject to a review by scientific and technical experts.

Soon after the Copenhagen Amendment was adopted, several OECD member countries developed regulations banning the use of methyl bromide for certain uses, and, in some cases, altogether (Table 12.2). The US Environmental Protection Agency at one point considered accelerating the phasing out of methyl bromide in the United States, but in light of the 1997 Montreal Amendment to the Protocol (and changes to the Clean Air Act enacted in 1998), it conformed the US methyl bromide phase-down schedule to that specified for all industrialised nations under the Protocol. The possible trade effects of a ban were, and remain, a major issue for the agricultural sector, as summarised in an industry newsletter published before the multilateral targets were adopted (Babb, 1995):

First, although domestic farmers will be banned from using methyl bromide, *no limitations will be imposed on the importation of crops* and other products that have been treated with methyl bromide outside the United States. This inequality has angered opponents of the phase-out, who feel it makes US farmers less competitive because, they claim, alternatives to methyl bromide are less effective and more expensive. Second, because some countries require methyl bromide treatment as a condition of entry for agricultural products, *a ban on the chemical will preclude exporting to certain markets....* Third, *large quantities of products imported by the United States* and formerly treated with methyl bromide upon entry *will have to be banned*, re-exported, destroyed, or treated with alternative pest control methods to make them safe for consumption. [emphasis added]

Because the use of methyl bromide for the purposes of quarantine and pre-shipment was exempted from the Montreal Amendment’s phase-out schedule, concerns about possible trade effects stemming from a total ban have become moot. However, such “critical uses” (which also include some preharvest uses as well) have yet to be fully defined and enumerated under the Protocol.

Meanwhile, anti-methyl bromide advocacy and lobby groups in several countries have begun to ask supermarkets and other retail outlets to label products that were produced without methyl bromide. Since 1998, for example, Australian campaigners have been developing a scheme to label fruit and other products sold in that country as “methyl-bromide-free”. The Food Commission, a UK-based consumer advocacy group, has called for a similar labelling schemes in the United Kingdom, and has asked supermarkets to label fruits and other produce as “Grown without use of methyl bromide” (Ojanji, 2001). Meanwhile, various eco-labelling schemes in northern Europe (see

Chapter 17) have made strict avoidance of methyl bromide and other soil fumigants a criterion for the use of their seals. Changes in importers' laws relating to the labelling of produce as "organic" have also meant that fruits and vegetables fumigated with methyl bromide to control for pests after harvesting could not be sold as organic.²

Table 12.2. OECD countries restricting or phasing out methyl bromide before Montreal Protocol deadlines

Country	Action	Other restrictions
Canada	25% reduction in 1998; phase out by 1 January 2005, with intermediate steps.	—
European Union	Accelerated schedule: 60% reduction by 2001, 75% reduction by 2003	Quarantine and pre-shipment uses capped at 1996-98 levels; "critical use" exemptions to be re-examined annually
Austria	Prohibited as of 1 January 1998	—
Denmark	Prohibited as of 1 January 1998	Phase-out includes quarantine and pre-shipment uses
Finland	Prohibited as of 1 January 1999	Phase-out includes quarantine and pre-shipment uses
Germany	Soil uses not permitted since the 1970s. Treatments for foodcrops and stored grains have been phased out	—
Italy	Use prohibited in region of Lake Bracciano; Fields may be fumigated only one year in two in all other regions; allowable application rates reduced	—
The Netherlands	Soil uses not permitted since 1992	—
Sweden	Soil uses prohibited in 1993; structural and post-harvest uses prohibited as of 1 January 1998	—
Iceland	All uses prohibited since 1994	—
New Zealand	25% reduction in 1998, 35% reduction in 1999, 45% reduction in 2000, 60% reduction in 2002, 75% reduction in 2004, phase-out by 2005	—
Switzerland	Soil uses not permitted since the 1970s	—

Source: Schafer (1999).

Trade issues and the responses of developing countries

The responses of developing countries to the setting of multilateral targets for phasing out methyl bromide have been mixed. Some developing countries, such as Jordan and Guinea, have voluntarily set time frames to phase out the chemical by 2005, *i.e.* within the same time-frame as developed countries. One incentive for Jordanian agriculture is to try to expand its export base. But its motivation also appears to be accelerated by the numerous injuries that are caused each year by improper handling of the toxic chemical.

Those countries that have resisted the targets have generally expressed concern about the cost-effectiveness of alternatives. This has been a central issue among affected user groups in countries as diverse as Chile, Indonesia, Kenya, Myanmar, Paraguay and Sri

2. See, for example the article by Philippa Stevenson, "Organic Growers Get Helping Hand", *The New Zealand Herald*, 6 May 2002, www.nzherald.co.nz/storydisplay.cfm?storyID=1843614&thesection=business&thesubsection=agriculture.

Lanka, but also among users in many OECD countries. Another concern frequently voiced by developing-country exporters is that even though they would like to phase out the substance, they are still required by several OECD countries to use it for pre-treating commodities (or the wooden packing crates in which they are shipped) prior to export (Schafer, 1999). Finally, some in the industry worry that, having found an alternative to methyl bromide in a particular use, they may be unable to export to certain countries because those countries will have not yet adopted an import tolerance for the particular pesticide/crop combination.

As the production and consumption of methyl bromide is phased out and banned in more developed countries, some have predicted that manufacturers of the substance will be tempted to sell increasing quantities to developing countries that do not have vast resources to invest in researching safer alternatives. Commercial farms in Africa producing cut flowers and specialty fruits and vegetables for export to developed countries are some of the most intensive users of methyl bromide in the world. Kenya, for example, uses 5% of its foreign exchange earnings to import methyl bromide (mainly from Israel); exports of cut flowers — the main crop, along with strawberries on which methyl bromide is used — account for 13% of the country's export revenue. Methyl bromide is used not only as a soil fumigant, but also as a post-harvest pest control measure in order to meet the phytosanitary requirements of its import markets. If cost-efficient alternatives to the pesticide are not found before it is completely banned, farmers in Kenya and elsewhere may have no other choice than to stop producing these export products completely.³

Responses to developing-countries' concerns

Multilateral responses

Initially, there was no special mechanism to assist developing country parties to the Montreal Protocol to comply with its control measures. At their second meeting (London, June 1990), however, the Parties established The Multilateral Fund for the Implementation of the Montreal Protocol to provide financial and technical assistance, including the transfer of technologies, to meet that need. The Multilateral Fund, which began operating in 1991, is financed by contributions from industrialised countries. As of 28 February 2001 the contributions made to the Fund had amounted to USD 1.22 billion. Projects to find or develop alternatives to methyl bromide became eligible for support from the Fund in 1995, when developing countries were given a target date (2002) for freezing the use of methyl bromide (Schafer, 1999).

The Multilateral Fund is currently financing 58 methyl bromide alternatives projects in 36 countries to help those countries efficiently and cost-effectively phase out methyl bromide. Multilateral Fund projects are implemented in partnership with the governments of developing countries by the United Nations Development Programme (UNDP), its Environment Programme (UNEP) and its Industrial Development Organisation (UNIDO), along with the World Bank and the development agencies of industrialised countries. In addition, the Food and Agriculture Organization (FAO) is assisting UNEP to create awareness among farmers on this issue. Among the recent products of this collaboration are a manual for training extension workers and farmers on alternatives to methyl bromide for soil fumigation, and a report on validated alternatives to the use of methyl

3. "Danger Chemical Behind Nation's Multi-billion Cut Flower Industry", *The East African Standard* (Nairobi), 18 March 2002, <http://allafrica.com/stories/200203180130.html>, accessed 30 July 2002.

bromide for soil fumigation (www.uneptie.org/ozonaction/library/reports/main.html; www.efi.fi/cis/english/creports/netherlands.html).

To communicate the results of their demonstration projects, UNEP and UNIDO have jointly established a special web-site, "MAP to a Healthy Harvest" (www.uneptie.org/unido-harvest). The Web site is the first to provide information on the experiences and results of methyl-bromide alternative projects and is intended to be used as a tool in efforts to adopt more environmentally sustainable agricultural practices. As more information from these projects becomes available, the Web portal will be updated regularly and support other OzonAction Programme efforts, such as the Regular Update on Methyl Bromide Alternatives (RUMBA). A selection of UNEP and UNIDO activities is described below.

UNEP

In 1992 UNEP established a Methyl Bromide Technical Options Committee (MBTOC) to identify existing and potential alternatives to methyl bromide. The MBTOC reports to the TEAP, which advises the Parties on scientific, technical and economic matters related to the control of ODS and alternatives. The Committee currently consists of 39 members from 23 countries representing a wide range of methyl-bromide-related expertise, including scientists, users, NGOs and government representatives. UNEP also provides various clearinghouse services (*e.g.* the training and networking of ODS officers), as well as assistance with the development of national ODS phase-out strategies and support for the strengthening of institutions.

Early in 2001, UNEP and representatives of ten environmental and agricultural NGOs from around the globe convened in Paris to launch a joint initiative that will raise awareness about methyl bromide in ten developing countries. UNEP's Methyl Bromide Communication Programme is the first project under the Montreal Protocol for which funds have been provided to utilise the expertise of NGOs in phasing out ozone-depleting chemicals. At the meeting, NGOs developed strategies for reaching farmers and other pesticide users, including organising workshops with farmers, meeting with government officials and developing press strategies. These organisations are now carrying out the communication programmes in their own countries.

UNIDO

UNIDO's role involves setting up demonstration projects to evaluate various chemical and non-chemical alternative technologies, generally as part of an Integrated Pest Management (IPM) programme tailored to local farming conditions. The first of these projects began to take shape in 1997 and now cover 12 different crops and eight different commodities and structural applications. Although these projects do not lead to a direct reduction of methyl bromide, the evaluation of alternatives under local conditions paves the way for successful future investment projects. As of August 2000, 32 projects had been completed. The main emphasis of this assistance lies in:

- Providing policy advice, and capacity building to the governments and various key players of the relevant industries.
- Creating and enhancing awareness of the environmental hazard posed by methyl bromide.

- Training and development of skills in using cleaner production technologies, as well as in testing, quality control and standardisation.
- Technical and financial support to enterprises in converting their production lines to ozone-friendly technologies.
- Replacing or retrofitting equipment for adaptation to the new substances.

National responses

In addition to contributing to the Multilateral Fund, several OECD countries have also helped developing countries through other mechanisms. Several have created Web sites dedicated specifically to disseminating information on their regulations affecting methyl bromide and on alternatives to its use.⁴ Many are supporting research into methyl bromide alternatives for crops that are also grown by developing countries, and a few of their development agencies are rendering more direct assistance. For example, Germany's Agency for Technical Co-operation (*Gesellschaft für Technische Zusammenarbeit* [GTZ]), which implements technical co-operation projects with developing countries on behalf of the German Federal Ministry for Economic Co-operation and Development, has given a high priority to the rapid phase-out of methyl bromide. GTZ has undertaken a variety of agricultural projects with developing country partners and agricultural agencies. They include:

- IPM projects in Argentina, China, Egypt, El Salvador, Ghana, Honduras, Jordan, Madagascar, Malawi, Mauritania, Morocco, Panama, Syria, Tanzania and Thailand.
- Pesticide projects in Brazil, China, Jamaica and Mozambique.
- Regional projects in biological plant protection for food crops in 26 countries in Africa: IPM for vegetables and fruit crops in six countries; post-harvest protection in for countries; research and development projects on a variety of agricultural issues; and pesticide control and disposal services worldwide.⁵

Concluding observations

The process by which the ozone-depleting chemical, methyl bromide, is being phased out provides an example of the benefits of reaching multilateral consensus on the banning of a substance that is harmful to the environment at a global scale. First, participation in the development of the measure itself was open to all countries, including developing countries. Second, developing countries were given extra time to implement the measure. From the start, the Parties to the agreement anticipated the adjustment problems that developing countries would face in finding alternatives to the banned substance and learning how to use apply them in a cost-effective manner, and created a special fund to finance research, information dissemination activities and technology transfer. These activities are already catalysing the phase-out in developing countries, to the benefit of all. However, as farmers replace methyl bromide with other pesticides, exporters and development agencies will need to work closely with regulators from importing countries to make sure that the new pesticide/crop combinations are compatible with the importers' residue tolerances for those products.

4. See, for example, those listed at www.unepie.org/ozonaction/library/otherpubs.html - national.

5. For more information see www.gtz.de/de/4030.htm.

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Chapter 13. Standards for Organic Foods and Beverages

Chapter 14. The EU's Import Procedures for Organic Foods and Beverages

Chapter 15. Japan's Regulations Affecting the Labelling of Organic Plant Products

Chapter 16. Regulating "Organic" Food Labels in the United States

Acronyms

APHIS	Animal and Plant Health Inspection Service (US)
AQIS	Australian Quarantine and Inspection Service
ASEAN	Association of South-East Asian Nations
BAuA	Federal Institute for Occupational Safety and Health (Germany)
BGA	Federal Health Office (Germany)
BMZ	Ministry of Economic Co-operation and Development (Germany)
CAA	Clean Air Act (US)
CASCO	Committee on Conformity Assessment (ISO)
CBI	Centre for the Promotion of Imports from Developing Countries (Netherlands)
CFC	Common Fund for Commodities
CFC	Chlorofluorocarbons
COLEACP	Europe-Africa-Caribbean-Pacific Liaison Committee
CREM	Consultancy and Research for Environmental Management (Netherlands)
CsC	Commonwealth Science Council
CSE	Centre for Science and Environment (India)
CTE	Committee on Trade and Environment (WTO)
CTF	Consultative Task Force (UNCTAD)
DSB	durian seed borer
EEA	European Economic Area
EFTA	European Free Trade Association
EIA	environmental impact assessment
EPA	Environmental Protection Agency (US)
EPE	European Partners for the Environment
ESA	Endangered Species Act (US)
FAO	Food and Agriculture Organization (UN)
FDA	Food and Drug Administration (US)
FDI	foreign direct investment
FSC	Forest Stewardship Council
GAA	Global Aquaculture Alliance
GATS	General Agreement on Trade in Services

GATT	General Agreement on Tariffs and Trade
GTZ	Agency for Technical Co-operation (Germany)
HACCP	Hazard Analysis and Critical Control Point
IAF	International Accreditation Forum
ICSF	International Collective in Support of Fishworkers
IDM	integrated disease management
IFC	International Finance Corporation
IFCO	International Fruit Container Organisation
IFOAM	International Federation of Organic Agricultural Movements
IGEP	Indo-German Export Promotion Project
IGG	Intergovernmental Group on Tea (FAO)
IGO	intergovernmental organisation
IIED	International Institute for Environment and Development
ILAC	International Laboratory Accreditation Cooperation
ILO	International Labour Organization
IOAS	International Organic Accreditation Service
IPCS	International Programme on Chemical Safety
IPM	integrated pest management
IPPC	integrated pollution prevention and control
IRA	import risk analysis
ISEAL	International Social and Environmental Accreditation and Labelling Alliance
ISO	International Organization for Standardization
ITF	International Task Force on Harmonisation and Equivalence in Organic Agriculture
ITTO	International Tropical Timber Organization
IUC	International Union Chemical testing
JAS	Japan Agriculture Standards
JETRO	Japan External Trade Organization
JWPTE	Joint Working Party on Trade and Environment (OECD)
LDC	least-developed country
LOD	lower limit of analytical determination (or limit of detection)
MAFF	Ministry of Agriculture, Forestry and Fisheries (Japan)
MAP	Mangrove Action Project
MEA	multilateral environmental agreement
MLV	maximum limit value
MRA	mutual recognition agreement
MRL	maximum residue limit

MSC	Marine Stewardship Council
NGO	non-governmental organisation
NMFS	National Marine Fisheries Service (US)
NOP	National Organic Program (US)
NOSB	National Organic Standards Board (US)
NTAE	non-traditional agricultural export
ODS	ozone-depleting substance
OFPA	Organic Foods Production Act (US)
PCP	pentachlorophenol
ppm	parts per million
PVC	polyvinyl chloride
RCO	Registered Certification Organisation (Japan)
RFCOs	Registered Foreign Certification Organisations (Japan)
RIA	regulatory impact analysis
SCS	Scientific Certification Systems, Inc.
SGS	Société Générale de Surveillance S.A.
SMEs	small and medium-sized enterprises
SPS	(WTO Agreement on) Sanitary and Phytosanitary Measures
STIC	Sustainable Trade and Innovation Centre
TBT	(WTO Agreement on) Technical Barriers to Trade
TEAP	Technology and Economic Assessment Panel (UNEP)
TED	turtle-excluder device
UNCED	United Nations Conference on Environment and Development
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USAID	US Agency for International Development
USDA	US Department of Agriculture
VOC	volatile organic compound
WHO	World Health Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WTTC	World Travel and Tourism Council

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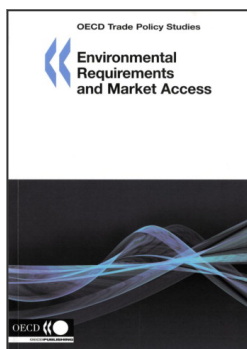
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