

# US phase out of methyl bromide lags far behind rest of world

*Methyl bromide, a highly toxic pesticide and ozone depleting substance, is being phased out globally under the Montreal Protocol. A controversial Protocol decision last year allowed the US to use excessive quantities. They allowed even more in 2008 than in 2007 in six sectors. The US industry and government continue to demand large quantities while many other countries have adopted alternatives and eliminated its use. Nick Mole reports.*

The Montreal Protocol, which targets methyl bromide (MB) under the convention addressing ozone depletion, has achieved remarkable success in reducing MB use from the 1991 levels of over 56,000 tonnes<sup>1</sup> to under 8,473 tonnes in 2007.

Nevertheless it is behind target. Use of MB in industrialised countries was due to be phased out by January 2005 (Boxes 1 and 2 explain the need for urgent action) with temporary exceptions only allowed for specific uses (so-called Critical Use Exemptions, CUEs) where other economically-feasible pest control methods are not available.

CUEs have been granted for controlling pests in soil before planting high-value crops such as strawberries, tomatoes, peppers, egg-plant, melons, flowers and nursery crops in specific countries. MB is also permitted for insect and rodent control in flour mills, food processing factories and stored foods such as dried fruit, nuts, cocoa beans, coffee beans, herbs and spices, in specific countries only.

In 2005, 17 countries were granted exemptions amounting to more than 16,000 tonnes. However, they subsequently reported actual use of about 11,546 tonnes for that

year, indicating that MB users had exaggerated their claims about requirements. For 2008 the anticipated MB use is under 7,554 tonnes in seven countries; the only remaining industrialised country users (Table 1).

## The US lags behind

The amount used by the US in 2005 was about 28% of their historical use (25,529 tonnes in 1991), and was disproportionately high compared to most other industrialised countries. For example, in 2005 the European Union (EU) used 13% of the amount it used in 1991 (19,697 tonnes). The greatest reductions have been achieved in the EU, which reduced exemptions to 3% of historical use in 2007 (520 tonnes), and requested only 1% for 2008. Currently the US exemptions stand at 24% of its historical use (6,230 tonnes in 2007). Interestingly the largest exemptions remain in the three countries where major MB manufacturers are located: the US, Israel and Japan (Table 1). MB manufacturers and large fumigation companies, along with US groups such as the Crop Protection Coalition, North American Millers Association, National Pest

Management Association, Florida Fruit and Vegetable Association, and California Strawberry Commission, have expended considerable resources in lobbying to obtain large exemptions.

## EC allowed large US exemptions

The Montreal Protocol meeting in November 2006 discussed the size of exemptions to be granted for 2008. The Protocol's advisory body, Methyl Bromide Technical Options Committee (MBTOC), discussed its recommendations on CUEs with delegates and concluded that there were technical grounds for slightly increasing the tonnage of several proposed exemptions for Israel, Australia and New Zealand (five of the 81 proposed exemptions). But MBTOC did not find any technical grounds for raising the tonnage of 15 proposed US exemptions. However, on the final day of the meeting, to the great surprise of many European delegates, the European Commission (EC) allowed the US exemptions that were 22% higher than the quantity recommended by the advisory body. In fact, six specific US uses of MB ended up with larger tonnages authorised for 2008 than 2007. The Commission also failed to insist that the quantity of permitted new manufacture of MB should be reduced substantially to take account of existing US stockpiles.

The decision reached between the Commission and the US contradicted the EU's policy of promoting significant reductions in exemptions, and flew in the face of the EU's stated position to accept the advisory body's recommendations as a sound basis for decisions on MB for 2008<sup>6</sup>.

## Failure to address US stockpiles

During the Protocol meeting the US delegation announced that there were stockpiles of about 10,000 tonnes MB in the US at the beginning of 2006, equivalent to 40% of the MB consumed in the country in 1991. In contrast, the EU and other countries held very small stocks, varying from zero to 117 tonnes, which amounted to 0-2% of the amounts consumed in 1991. In the EU all stocks left at the end of the year must be used in the following year, for CUEs only, and new production and imports were reduced to take full account of stocks. But the US failed to comply with the Protocol Decision to use stockpiles - for CUEs only.

Based on the US data, several delegates calculated that the US would be expected to have stocks of 5,000 to 6,600 tonnes in 2008. Decision IX/6 of the Protocol states that manufacture of MB for CUEs should be permitted only if MB is not available from existing stocks. It was therefore necessary for the meeting to deduct about 5,000-6,600 tonnes of MB when calculating the quantity of 'new' MB that the US is allowed to manufacture or import in 2008. The total exemptions recommended by MBTOC were smaller than the stockpile, so the quantity of MB manufacture and imports authorised by the Protocol meeting should have been negligi-

## Box 1. Health hazards of methyl bromide

- MB is a highly toxic chemical, classed in the US as a Category I acute toxin and as a mutagen in the EU
- The WHO classifies MB as neurotoxic and points out that 'methyl bromide gas can be fatal if inhaled'<sup>2</sup>
- A study of pesticide-related illness in California (1949-1988) found that MB and cholinesterase-inhibitors were most often involved in serious occupational poisonings<sup>3</sup>
- There are more than 30 published papers documenting hundreds of cases of accidental MB poisonings and a number of deaths
- A large epidemiological study of 55,300 male pesticide applicators in the US found a strong correlation between MB use and increased incidence of prostate cancer<sup>4</sup>
- A recent European review of MB safety found a number of serious problems<sup>5</sup>:
  - bystander exposure can often exceed the recommended limit
  - current occupational exposure limits are too high; limits of 0.08 ppm were recommended for 7-hour repeated exposures (92% lower than current limit)
  - consumer intakes of methyl bromide residues are considered unacceptable: intakes can exceed the acceptable daily intake by 7-30 times (calculated using UK government and WHO methods for foods treated post-harvest)
  - many MB uses are expected to exceed the EU limit on residues in drinking water. MB water contamination has led to fish mortalities
  - safety data was insufficient in a number of areas and many studies failed to meet Good Laboratory Practice

**Box 2. Methyl bromide damages the ozone layer**

- The stratosphere circling the earth contains a layer of ozone gas which shields us from a lot of harmful UV radiation emitted by the sun, especially UV-B radiation
- MB is a potent ozone-damaging chemical, destroying millions of ozone molecules
- In the atmosphere, each atom of bromine from MB destroys about 60 times more ozone molecules than each atom of chlorine from CFCs.<sup>9</sup>
- MB reacts rapidly, inflicting damage at a time when the ozone layer is most vulnerable
- About 38% of the observed reduction in ozone depleting chemicals in the lower atmosphere from 2000 to 2004 was due to recent reductions in MB use<sup>9</sup>.
- A recent UNEP Scientific Assessment of ozone depletion concluded that MB is a more potent ozone-depleter than previously estimated.<sup>9</sup>
- Eliminating MB use is the only major way to reduce the ozone depletion occurring this decade

**Why does ozone depletion matter?**

- Chemicals like MB and CFCs make the ozone layer thinner, so additional UV-B from the sun passes through the ozone layer and reaches earth
- The extra UV-B increases cases of eye cataracts, skin cancer and infectious diseases in humans and animals; it reduces fish stocks and disrupts the growth of certain types of forest trees and crops
- A recent US EPA report estimated that if the USA continues to use a lot of MB for CUEs until 2017 there will be more than 24,200 additional cases of skin cancer in the US population alone<sup>10</sup>. No estimates were made for the other countries of the world

ble. The European Commission, on behalf of 25 member states, stressed concern about the scale of the US stocks during the meeting and stated that 'in line with Decision IX/6, the stocks should be taken fully into account when determining critical-use exemptions.'<sup>6</sup> Although there were strong legal and technical grounds for deducting substantial stocks, the EC representatives on the final day agreed only minor reductions in US stocks. As a result of this action, the US will be able to produce up to 4,595 tonnes of new MB, representing 18% of the 1991 level, in addition to existing stocks. This means the US is expected to have an available supply amounting to more than 10,000 tonnes MB in 2008, despite the fact that the advisory body estimated a 'need' for less than 4,340 tonnes for CUEs. Protocol advisory bodies have previously pointed out that ready supplies of ozone-depleting chemicals on the market deter adoption of available alternatives. Excessive supplies of MB in the US will continue to hinder the uptake of alternative pest control methods and services.

**EC representatives rebuked**

After the meeting, European NGOs (Environmental Investigation Agency, Pesticide Action Network Europe and Friends of the Earth Europe) expressed strong concern in a letter to Environment Commissioner Dimas<sup>7</sup>, and pointed out that the EC's action at the meeting was damaging for the following reasons:

- the action failed to legally comply with the Protocol's criteria for CUEs
- it contravened the established policies of the EC and Member States
- it set a damaging precedent by undermining recommendations made by the Protocol's advisory bodies
- it undermines the market for alternative products and services
- it allows unjustified production/use of an ozone-damaging substance, contributing to the on-going problem of ozone depletion.

The NGOs concluded that the EC needs to strengthen its role at the coming Protocol meetings and give priority to environmental protection<sup>7</sup>.

The Commission's action at the Protocol meeting was particularly surprising in the light of the progressive and rapid reductions in MB achieved by EU countries (Table 1).

**Progress towards targets**

Around 80% of global MB use has been eliminated to date. In 1991 Europe used almost as much MB as the US. In the period between 2005 and 2008 Europeans reduced their CUEs from 23% to 1% of the quantity they used in 1991. Meanwhile the US has moved from 28% to 23% in the same period.

Yet Europe faced a much larger challenge than the US because agricultural production systems in Europe are much more diverse from region to region. Europe had to identify alternatives for a much larger number of situations (76 uses) than in the USA (19 uses).

**What Europe did differently**

Europe made far better progress towards eliminating MB use for a number of reasons. Europe set targets for earlier reductions than required by the Protocol. The EC compiled a database identifying many alternative pest control methods that are used in commercial practice. They conducted a more thorough assessment than the Protocol to identify the economically feasible alternatives for each CUE. (The EC assessment method in fact provides a useful model that can be applied to other pesticides when implementing substitution policies.) The EC also banned the use of MB except for authorised CUEs and quarantine. This activity fostered useful technical innovations and new ways to manage pests. They found ways to make techniques economically feasible. For example, grafted plants or resistant varieties combined with IPM have been adopted by many MB users who grow tomatoes, eggplant and melons. But in the US very little attention has been paid to grafted plants, resistance and non-chemical methods so far. The differences highlight the fact that the large CUEs in the US are due to a lack of genuine effort.

However, some individual farms and companies in the US did make the effort and phased-out MB. The owner of a pest control company in the US, who eliminated more than 100 tonnes of MB since 1997, recently said 'I still hear comments like *there are no viable alternatives!* or *food production is*

**Table 1. Trends in use of methyl bromide in industrialised countries (metric tonnes)**

	1991	2002	2004	2005	2006	2007	2008
						(a)	anticipated
Australia	704	323	207	115	55	49	49 (b)
Canada	200	96	58	45	54 (a)	53	42 (b)
EU	19,697	6,973	4,789	2,530	1,519 (c)	520	245 (b)
Israel	3,580	1,874	1,071	1,089	880 (a)	967	890 (b)
Japan	6,107	2,950	1,698	547	540	636	444 (b)
New Zealand	135	44	28	45	42 (a)	18	0
Switzerland	43	20	12	5	4	0	0
USA	25,529	5,085	10,589	7,170	7,168	6,230	5,884 (b)
All indust. countries	56,045	17,677	18,450	11,546	<10,262	<8,473	<7,554 (b)

1991-2004 shows official consumption data; 2005-2006 shows amount of MB used for CUEs; 2007 shows quantities authorised by the Montreal Protocol or national governments to date; 2008 includes amounts recently recommended by MBTOC<sup>11</sup>. (a) consumption authorised by the Montreal Protocol or at national level; final data on use are not yet available; (b) authorised to date by Montreal Protocol and amounts recommended by MBTOC or classed as 'unable to assess' by MBTOC; (c) estimated.

**Box 3. Strawberries and tomatoes in Europe**

Until recently the major EU uses of MB were tomatoes (Italy) and strawberry fruit (Spain). During 2007 MB is allowed to be used in the EU on tomatoes (in Italy), strawberry nursery plants (France, Italy, Netherlands, Poland, Spain), peppers (Italy), flowers (France, Italy, Spain), carrots (France), forest nurseries (France), cocoa and coffee beans (Poland), chestnuts (France), medicinal herbs (Poland), and mills (Italy). The EU's requested CUEs for 2008 are in Spain and Poland only, amounting to 1% of historical EU use. In the past, 26 of 27 EU countries used MB; but in 2008 it will be only two. NGOs including PAN-Europe have urged the EU to phase-out all MB as soon as possible and have congratulated the EU for setting a positive example of rapid phase-out of CUEs so far.<sup>7</sup>

**Alternatives**

Many users faced with the loss of MB have just adopted the next-available pesticides. However, many MB users in Europe adopted IPM or non-chemical methods, despite the additional know-how or investment entailed. Such alternatives for crops include combinations of grafted plants, resistant varieties, solarisation, biofumigation, substrates, steam, heat treatments, IPM and pesticides. Alternatives for mills, food factories and stored foods include treatments with inert gases (e.g. nitrogen), controlled atmospheres, hermetic storage, heat treatments, cold treatments, mechanical methods, sanitation programmes, other IPM methods, and pesticides. NGOs have stressed the importance of using non-toxic alternatives<sup>8</sup>.

*impossible without MB.* But the reality is that many thousands of former MB users around the world – and many in the US – have progressively eliminated MB and are still operating successful businesses as before. Their world did not fall apart when they said farewell to MB. In fact, many of us have found that alternatives offer different and greater advantages than MB.<sup>9</sup>

**Progress in southern countries**

With technical and financial assistance from the Montreal Protocol fund, developing countries have also made real progress in reducing their use of MB, and many have

made greater progress than the US:

- 47 (50%) of the 95 southern countries that used MB reduced consumption to zero in 2005
- By 2004, 80% of countries in the south had reduced their MB consumption to less than 50% of the quantity used in 1991
- MB consumption peaked at more than 18,000 tonnes in 1998 and fell to less than 9,300 tonnes in 2005, a 48% reduction
- In the past, 14 countries in the south consumed MB in the range of 500-3500 tonnes per year. By 2005 only six countries consumed more than 500 tonnes per year: China, Guatemala, Honduras, Mexico, Morocco and South Africa<sup>11</sup>. (NM)

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**Box 4. What you can do to help**

Consumers can help by buying strawberries, melons, tomatoes, flour products and pasta from countries that do not use MB.

Major MB uses	Countries that do not use MB for producing strawberries, melons, tomatoes and milling flour	Countries where some farms or companies still use MB
Strawberries	Austria, Belgium, Bulgaria, Cyprus, Czech Rep., Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Japan, Latvia, Lithuania, Luxembourg, Malta, Norway, Portugal, Romania, Russia, Slovakia, Slovenia, Sweden, Switzerland, UK, Ukraine and 17 other industrialized countries.  More than 60 developing countries, e.g. Algeria, Brazil, Indonesia, Dominican Republic, Kenya, Mozambique, Nigeria, Thailand, Turkey, Tunisia, Vietnam, Zimbabwe.	For strawberry fruit production: only USA, Israel and New Zealand. For nursery plants: Italy, Australia, Canada, France, Israel, Spain, Netherlands, New Zealand, Poland, USA  Argentina, Chile, China, Egypt, Mexico, Morocco, South Africa
Melons	All industrialised countries except USA, Israel and Japan More than 60 developing countries e.g. Brazil, Kenya, South Africa, Turkey, Vietnam.	For melon production: USA, Israel, Japan, China, Costa Rica, Egypt, Honduras, Guatemala, Mexico, Morocco
Tomatoes	Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Ireland, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Spain, Sweden, Switzerland, UK and 13 other industrialized countries.  More than 60 developing countries, e.g. Algeria, Brazil, Indonesia, Turkey, Vietnam, Dominican Republic, Mozambique, Nigeria, Thailand, Tunisia.	For tomato production: USA, Israel, Italy  Argentina, China, Egypt, Libya, Mexico, Morocco, Syria
Flour and milled products	Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Ireland, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Spain, Sweden, Switzerland, UK and 14 other industrialized countries.	For flour mills, pasta mills and food processing facilities: USA, Canada, Israel, Italy