# METHYL BROMIDE ALTERNTIVES IN DEVELOPING COUNTRIES

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The Montreal Protocol is a fund that offers financial assistance to developing countries to help demonstrate alternatives and to phase out of ozone depleting substances. The Ozone office in each country can request assistance from the United Nations. Experts are then invited to visit the country and write a project document that is carefully reviewed by the Executive Committee of the Montreal Protocol every six months. If the project is approved, the implementation of the project begins with reporting timelines to insure accountability.

Two types of projects exist: Demonstration projects were funded to developing countries to research alternatives in local conditions and climates. This was necessary to be able to pick the alternative(s) that would fit best for this country and this industry group. An example of this was in Thailand and Vietnam for stored rice. Some countries write projects that contained a demonstration project for the first year and then a phase-out project (investment project) for the next two years. An example of this is the fumigation of wood and cut timber in Malaysia

Currently only phase out projects are being submitted and funded by the Multi Lateral Fund. This project asks that the country make a commitment to sustainable elimination of methyl bromide in that particular sector. Examples of this are methyl bromide alternatives on tobacco in Zimbabwe, Malawi, Brazil, and Argentina.

Here are a few of the Methyl Bromide Alternative Projects that I worked on that will be discussed:

**Vietnam:** Stored Rice. A new concept on a fumigation warehouse using cylinderized phosphine fumigant to reduce the detention time of fumigating.
Maize in steel bins recirculated and fumigated with cylinderized phosphine. (Methyl bromide replacement; 500 tons.)

**Thailand:** Stored Rice. Cylinderized phosphine was introduced for the first time in Asia to fumigate stored rice in Bangkok. Methyl bromide is used on small shipping vessel. The safety of the families on these ships was identified as dangerous and air monitoring was recommended. Large warehouses of tapioca were inspected and a pest management strategy was recommended. (Methyl bromide replace; 1,000 tons)

**Cote d' Ivories**: Cocoa Beans. Vacuum chambers were examined to see if the conversion to high pressure and carbon dioxide was feasible. Phosphine is used on all long-term storage of Cocoa beans. Artificial substrates (shredded coconut fiber) are replacing methyl bromide in cut flower plantations. (Methyl bromide replacement 50 tons)

**Jamaica:** Tobacco. Tobacco is treated with methyl bromide. Vacuum chambers treat all finished cigars prior to export. This project was never completed due to the lack of local ownership.

**Malaysia:** Wood and cut lumber. Because of the rainy season that slows transportation of lumber for export, fumigation is necessary to kill the tropical wood pests. The kilns are an excellent way to disinfest lumber with 56° C for 30 minutes. Lumber is a US$ 5 billion business for Malaysia. Sulfuryl fluoride was suggested as an alternative in the demonstration project. Dow is working with the Department of Agriculture and FRIM to develop protocols for Sulfuryl fluoride in Malaysia. The capacity of the kilns is being examined to maximize this viable alternative. (Methyl bromide replacement 60 tons)

**Philippines:** Bananas. The Moko disease (*Ralsonia solanacearum*) is a devastating disease of banana plantations. Methyl bromide is used to kill Moko in infected areas. This project reviewed the use of Basamet and rice hull burning as alternatives to methyl bromide. The rice hull burning is a local practice that is effective. Diagnostic tools to detect these pathogens were discovered and used to detect when to replant. (Methyl bromide replacement 100 tons)

**Turkey:** Dried Figs and Nuts. Methyl bromide was used to disinfest the dried figs and tree nuts after they were harvested. Phosphine could be an alternative but it is too slow. The best choice was this project was the installation of a combination system that treated the figs with 100% carbon dioxide and high pressure (20-30 bars). This treatment was effective and took only 2-4 hours. The time of the treatment is an important factor. Most dates are shipped to a central cooperative storage location in Izmir. Here is where the German made pressure chamber will be installed. (Methyl bromide replacement 48 tons)

**Zimbabwe:** Stored Grain. Strategic storage of white corn (maize) is sacked and stacked in 63 locations in Zimbabwe. This grain is in 50-kilo bags and covered with fumigation tarps. Phosphine is a drop in replacement for methyl bromide. The economic conditions of this developing country requested funding to purchase additional tarpaulins to help with the slower phosphine fumigation. Treating with pirmiphos methyl was demonstrated at one facility where phosphine resistance was suspected. This project is still waiting for approval from the MLF. (Methyl bromide replacement 20 tons).

**Poland:** Countries in transition don't qualify for funding under the Montreal Protocol. However, UNEP of Paris organized a methyl bromide alternatives program in Warsaw in November 2000. Fourteen countries of the Central and Eastern Europe attended and participated in a workshop that outlined potential alternatives in their countries. Many of these countries had already started phasing out uses of methyl bromide.

USA: Fumigation Service & Supply, Inc. is a commercial fumigation company in Indianapolis, Indiana. Since 1993 it has worked to develop methyl bromide alternatives to the milling and food processing industries in North America. They perform a combination fumigation method that uses low levels of phosphine in combination with

heat and carbon dioxide to replace methyl bromide. To date, FSS has performed 60 replacement fumigations and substituted about 260,000 lbs. of methyl bromide. This 130 tons, along with providing training for over 5000 people in the fumigation industry from around the world, is beginning to have an impact on methyl bromide usage in the field stored product protection.

The coming years will be important as the uses of methyl bromide reach record levels in developing countries. They will be reaching record levels because China and other countries have discovered that yields are greatly increased when soil is fumigated with methyl bromide. Feeding people efficiently is essential.

Today over 25% of all methyl bromide is used in developing countries. This number is increasing. The Multi Lateral Fund will be taxed to implement the many projects that will bring these many countries inline to the required 2003 reduction of 20% and stop the pattern of increased use of methyl bromide. The phase out of 2015 will offer new challenges. The funding of the Montreal Protocol will surely be debated in the coming years.