NOMINATING PARTY: The United States of America

FILE NAME: USA CUN 11 SOIL **EGGPLANT** GROWN IN OPEN FIELDS

BRIEF DESCRIPTIVE TITLE OF NOMINATION: Methyl Bromide Critical Use Nomination for Pre-plant Soil Use for Eggplants Grown in Open Fields (Submitted in 2009 for 2011 Use Season)

CROP NAME (OPEN FIELD OR PROTECTED): Pre-plant Soil Use for Eggplant Grown in Open Fields

QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION:

TABLE 1: QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION

YEAR	NOMINATION AMOUNT
2011	**21,561 kilograms**

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Following the requirements of Decision IX/6 paragraph (a)(1) The United States of America has determined that the specific use detailed in this Critical Use Nomination is critical because the lack of availability of methyl bromide for this use would result in a significant market disruption. ■ Yes ☐ No

____________________ ____________________ __________

Signature Name Date

Title: ____________________________________

(Details on this page are requested under Decision Ex. I/4(7), for posting on the Ozone Secretariat website under Decision Ex. I/4(8).)

In assessing nominations submitted in this format, TEAP and MBTOC will also refer to the original nomination on which the Party's first-year exemption was approved, as well as any supplementary information provided by the Party in relation to that original nomination. As this earlier information is retained by MBTOC, a Party need not re-submit that earlier information.

CONTACT OR EXPERT(S) FOR FURTHER TECHNICAL DETAILS:

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LIST OF DOCUMENTS SENT TO THE OZONE SECRETARIAT IN OFFICIAL NOMINATION PACKAGE:

1. PAPER DOCUMENTS: **Title of paper documents and appendices**	**No. of pages**	**Date sent to Ozone Secretariat**
USA CUN11 SOIL EGG PLANT GROWN IN OPEN FIELDS	15	
2. ELECTRONIC COPIES OF ALL PAPER DOCUMENTS: ***Title of each electronic file (for naming convention see notes above)**	**No. of kilobytes**	**Date sent to Ozone Secretariat**
USA CUN11 Soil Eggplant Open Field		

* Identical to paper documents

METHYL BROMIDE CRITICAL USE RENOMINATION FOR PREPLANT SOIL USE (OPEN FIELD OR PROTECTED ENVIRONMENT)

EGGPLANT

1. SUMMARY OF THE NEED FOR METHYL BROMIDE AS A CRITICAL USE

This nomination covers eggplant grown for fresh market in the States of Florida and Georgia. The crop is generally grown in open fields and followed by various other crops. Harvest is mainly for fresh market.

Georgia

Continued efforts are underway in Georgia to implement effective and economical alternatives to methyl bromide. Three-way fumigation system developed by University of Georgia and Dimethyl disulfide (DMDS) are the two alternatives appeared as potential replacements for methyl bromide During the spring of 2008, at least 40% of the land fumigated for vegetable crops in the spring was treated with the 3-WAY which includes a systems approach of 1,3-dichloropropene, chloropicrin, and metam sodium. It is likely that 30 to 40% of Georgia's total crop will be treated with this alternative during 2008. Dimethyl disulfide (DMDS) plus chloropicrin also proven to be effective in managing many pests and has the potential to be adopted once the price structure is known.

Although both the 3-WAY and DMDS appear promising, neither fumigant system will stand alone in managing pests. An effective herbicide program must be developed to compliment these fumigant systems. The 3-WAY does not provide adequate nutsedge control with summer/fall fumigations and the DMDS system does not adequately control grasses or *Amaranthus* species. Until a program using fumigants and herbicides is developed, having methyl bromide available is essential.

The two aforementioned fumigant systems also pose significant challenges when determining the time interval needed between fumigating and planting. Initial research results suggest the plant back interval for the 3-WAY will be at least 3 times longer than that noted with methyl bromide. Early indications suggest that the plant back interval for DMDS plus chloropicrin applied under a high barrier mulch will be similar to the 3-WAY fumigation system.

The latest research information indicates that 3-way system continues to perform well in the spring, but perform poorly on nutsedge control in the fall. Applications of mixture of DMDS chloropicrin (79:21), 45 to 50 gallons/acre in spring and 50 to 60 gallons/acre in fall seems effective in controlling the nutsedge. Future research will focus on developing and implementing a herbicide program to compliment both the 3-WAY and DMDS fumigant systems as well as determining the amount of time that must pass between fumigating with these alternatives and planting.

Florida

The nutsedge, root-knot nematodes, and fungal diseases like phytopthora blight, and southern blights are continued to be major problems in eggplant production in Florida. In this State, eggplant is grown year-round, and often double cropped with pepper or cucumber following the eggplant harvest. The crop that follows eggplant in a double cropping production system depends upon prevailing environmental and economic factors. Growers in Florida often plant eggplant as an extra crop and grow okra, squash, or cucumbers after eggplant has been harvested. A spring crop of eggplant may follow as a second crop after a fall crop of pepper or tomato. Eggplant does best on well-drained, fertile, sandy-loam soils at a pH of 6.0-6.5. Poorly drained soils may result in slow plant growth, reduced root systems, and low yields. Eggplant requires a long, warm, frost-free growing season, usually of 14-16 weeks. Cold temperatures below 5^{o}C injure this crop. The best temperatures are 27-32^{o}C during the day and 21-32^{o}C during the night. Plant growth is curtailed at temperatures below 16^{o}C. Additionally, soil temperature below 16^{o}C restricts germination. However, most of the eggplant is started in the field from transplants. Methyl bromide is always used in the full-bed mulch process.

Until 1999, the chemical formulation primarily used was 98 percent methyl bromide and two percent chloropicrin. Since then, growers have shifted to formulations with lower concentrations of methyl bromide and higher amounts of chloropicrin due to the phase-out schedule of methyl bromide. At present, the standard formulation contains 50% methyl bromide in Florida.
The best alternative, 1,3-D (Telone), may not be applied in Florida in the areas overlying karst geology, which is common throughout the Southeastern States. There is also a 21-day planting delay (vs. 14 days for MB) due to regulatory restrictions for 1,3-D + chloropicrin.

Currently, the best alternatives to use of methyl bromide in Florida seems to be applying Telone C-35 (1,3-Dichloropropene + 35% Chloropicrin), applied at prebed 35 gal./acre rate 3 to 5 wks before transplanting. This fumigant application is supplemented by a herbicide treatment (tank mixed treatment of 2 lbs of napropamide with 0.5 lbs of trifluralin per acre to achieve a proper weed control. However, the use of Telone in 63% of Florida eggplant production land is restricted due to the presence of Kast topography.

Iodomethane, a new methyl bromide alternative, was registered in the U.S., in October, 2007. Iodomethane, however, is not registered for use on eggplant. EPA feels that it is appropriate not to include iodomethane as a methyl bromide substitute for eggplant at this time. The U.S. nomination is only for those areas in Georgia and Florida where the alternatives are not feasible.

If methyl bromide were to be unavailable for U.S. eggplant, growers in the regions cited in this nomination would have to discontinue growing this crop or suffer substantial losses. Growers would either leave agriculture entirely or switch to other crops that do not rely on pre-plant fumigation to control soil pests. The extent of this impact on the affected growers is debatable, but given the early state of commercial deployment of methyl bromide alternatives, it is possible that growers who currently use methyl bromide would face this outcome.

2. SUMMARIZE WHY KEY ALTERNATIVES ARE NOT FEASIBLE

Although both the 3-WAY and DMDS (Dimethyl disulfide (DMDS) plus chloropicrin) appear promising, neither fumigant system will stand alone in managing pests. An effective herbicide program must be developed to compliment these fumigant systems. Current review of available research indicate that the 3-WAY does not provide adequate nutsedge control with summer/fall fumigations and the DMDS system does not adequately control grasses or *Amaranthus* species. The most recent studies have reported that a 79:21 mixture of DMDS and chloropicrin is effective than the other mixtures of these 2 chemicals (Culpepper et al., 2008). In the Southern U.S., mainly in Florida and Georgia, where nutsedge is a main methyl bromide target pest, 1,3-D or metam sodium, alone or in combination, may not adequately control this weed. In karst topographical feature areas, which include 31 counties in Florida, Telone is highly restricted and metam sodium or metam potassium is the best alternatives available. However, further testing of these chemicals in large scale commercial fields is needed. In Florida and Georgia, farmers using 1,3-D and metam sodium in the fall would require longer waiting periods for planting. Metam sodium or 1,3-D requires waiting periods of 28 and 21 days, respectively, whereas only 14 days are needed for methyl bromide. Such delays could result in missed market windows. Metam sodium efficacy appears to decline where it is applied repeatedly due to enhanced degradation of its active ingredient, methyl isothiocyanate, by soil microorganisms (Ashley, et al., 1963; Ou et al., 1995; Verhagen et al., 1996; Gamlied et al., 2003).

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3 IS THE USE COVERED BY A CERTIFICATION STANDARD?

Methyl bromide is not used to meet a certification standard for eggplant production

4 IF PART OF THE CROP AREA IS TREATED WITH METHYL BROMIDE, INDICATE THE REASON WHY METHYL BROMIDE IS NOT USED IN THE OTHER AREA, AND IDENTIFY WHAT ALTERNATIVE STRATEGIES ARE USED TO CONTROL THE TARGET PATHOGENS AND WEEDS WITHOUT METHYL BROMIDE.

Three-way fumigation system developed by University of Georgia and Dimethyl disulfide (DMDS) are the two alternatives appeared as potential replacements for methyl bromide During the spring of 2008, at least 40% of the land fumigated for vegetable crops in the spring was treated with the 3-WAY which includes a systems approach of 1,3-dichloropropene, chloropicrin, and metam sodium. It is likely that 30 to 40% of Georgia's total crop will be treated with this alternative during 2008. Dimethyl disulfide (DMDS) plus chloropicrin also proven to be effective in managing many pests and has the potential to be adopted once the price structure is known. Although both the 3-WAY and DMDS appear promising, neither fumigant system will stand alone in managing pests. An effective herbicide program must be developed to compliment these fumigant systems. The 3-WAY does not provide adequate nutsedge control with summer/fall fumigations and the DMDS system does not adequately control grasses or

Amaranthus species. Until a program using fumigants and herbicides is developed, having methyl bromide available is essential.

In karst topographical feature areas, which include 31 counties in Florida, Telone is highly restricted and metam sodium or metam potassium is the best alternatives available. However, further testing of these chemicals in large scale commercial fields is needed. In Florida and Georgia, farmers using 1,3-D and metam sodium in the fall would require longer waiting periods for planting. Metam sodium or 1,3-D requires waiting periods of 28 and 21 days, respectively, whereas only 14 days are needed for methyl bromide. Such delays could result in missed market windows. Metam sodium efficacy appears to decline where it is applied repeatedly due to enhanced degradation of its active ingredient, methyl isothiocyanate, by soil microorganisms (Ashley, et al., 1963; Ou et al., 1995; Verhagen et al., 1996; Gamlied et al., 2003).

5. WOULD IT BE FEASIBLE TO EXPAND THE USE OF THESE METHODS TO COVER AT LEAST PART OF THE CROP THAT HAS REQUESTED USE OF METHYL BROMIDE? WHAT CHANGES WOULD BE NECESSARY TO ENABLE THIS?

As described under item number 5, development of a suitable fumigant herbicide program is essential for expansion of methods to other areas.

6. STATE RELATIVE EFFECTIVENESS OF RELEVANT ALTERNATIVES COMPARED TO methyl bromide FOR THE SPECIFIC KEY TARGET PESTS AND WEEDS FOR WHICH IT IS BEING REQUESTED

A: KEY PATHOGENS: *Phytophthora capsici*, *Pythium* spp. and nematodes (*Meloidogyne* spp.)

Summary of studies relevant to key pathogens

New research information on use of soil fumigants, specifically in eggplant production is not available in the public domain. Hausbeck and Cortright (2004) conducted a small-plot field trial on several vegetables, including eggplant. Results, submitted with the 2007 CUE request, indicate that 1,3 D + 35 % chloropicrin treatments (shank-injected at 56.7 liters/ha) for control of *Phytophthora* and *Fusarium* resulted in a 44% yield loss, compared to methyl bromide plots. Chloropicrin plots alone (shank-injected at 233.6 l/ha) showed a 15.5% loss compared to methyl bromide plots. Metam-potassium + chloropicrin plots showed yields similar to those treated with methyl bromide. Metam-sodium was not tested, but can be assumed to be equivalent to metam-potassium since the active ingredient is the same. Even large differences in average yields across various treatments were often not statistically significant.

In studies with other vegetable crops, fumigation with 1, 3 D + chloropicrin has generally provided better control of fungi than metam-sodium , though still not as good as control with methyl bromide. For example, in a study using a bell pepper - squash rotation in small plots, Webster et al. (2001) found significantly lower fungal populations with 1,3 D + 35 %

chloropicrin (drip applied, 146 kg/ha of 1,3 D), as compared to the untreated control. However, methyl bromide (440 kg/ha, shank-injected) reduced fungal populations even more. *P. capsici* was not present in test plots, though *Fusarium* spp. were. However, as compared to the methyl bromide standard treatment plots, squash fruit weight was 63 % lower in the 1,3 D plots. The proportion of marketable squash fruit in the 1,3 D plots was 30 % lower than that in the methyl bromide plots. In another study, conducted on tomatoes, Gilreath et al. (1994) found that metam-sodium treatments did not match methyl bromide in terms of plant vigor at the end of the season. *Fusarium* (but not *P. capsici*) was one of several pests present.

These studies indicate that, trials show promise for metam-sodium/potassium + chloropicrin, there is inconsistency in efficacy and protection from yield losses. However, the trials were conducted in June, and it is unclear whether these results would hold if fumigation were done under cooler spring temperatures. Further, no large scale field trials have yet been performed to demonstrate consistent pest control similar to that provided by methyl bromide.

Culpepper and Langston (2004) compared the effectiveness of several soil fumigants on nematodes affecting peppers in Tifton, Georgia. Since eggplants were not included in these tests, data from peppers are again used to “bridge” a discussion. Results show that 1,3-D followed by chloropicrin was as effective as methyl bromide against nematodes. Spring and fall crop yield in these plots were similar to yield in methyl bromide plots.

Root knot nematodes *Meloidogyne* spp., also affect Georgia eggplants. Their damage to the root may facilitate plant invasion by fungal pathogens, which can lead to wilt, loss of plant vigor, and yield losses. Fumigant alternatives such as metam-sodium have proven inconsistent (Noling, 2003; FFVA, 2002).

Diseases caused by soil-borne fungi, (e.g., *Phytophthora* spp., *Pythium* spp. and *Sclerotium rolfsii*) are endemic in many vegetable production areas in Georgia. Fungicides such as chlorothalonil and azoxystrobilurin are only used prophylactically and may not offer sufficient plant protection. Resistance of *Phytophthora* spp. to metalaxyl and mefenoxam has been reported in tomato and pepper (Lamour and Hausbeck, 2003)

The use of 1,3-D and metam sodium in the fall is impractical because of the long waiting periods for planting following application under plastic mulch. For 1,3-D there is a 28 day waiting period; for metam sodium, there is a 21-day waiting period. Such delays would cost growers at least half of the harvest season, thereby missing the higher market windows. Thus, since the fall crop is dependent upon timely planting, the required waiting period would cost growers at least half of the harvest season, thereby missing the higher market windows (Kelley, 2003).

B: KEY WEEDs: Nutsedges

TABLE 2: DATA ON TRIALS OF FUMIGANT ALTERNATIVES TO METHYL BROMIDE FOR POLYETHYLENE-MULCHED TOMATO (LOCASCIO ET AL. 1997)

Chemicals	Rate (kg/ha)	Average Nutsedge Density (#/m^2)	Average Marketable Yield (ton/ha)	% Yield Loss (compared to methyl bromide)
Untreated (control)	-	300 [ab]	20.1 [a]	59.1
methyl bromide + Pic (67-33), chisel-injected	390 kg	90 [c]	49.1 [b]	---
1,3 D + Pic (83-17), chisel-injected	327 l	340 [a]	34.6 [c]	29.5
Metam Na, Flat Fumigation	300 l	320 [a]	22.6 [a]	54.0
Metam Na, drip irrigated	300 l	220 [b]	32.3 [c]	34.2

Narrative description of studies relevant to target weeds

For nutsedge, which is widespread in all requesting regions, growers do not have technically feasible alternatives to methyl bromide use at planting. Metam-sodium and 1,3 D + chloropicrin have shown some efficacy in small-plot trials in other vegetable crops (e.g, tomato). However, metam sodium use may result in a 44% yield loss, while use of 1,3 D may result in a 29% loss. These fumigants often provide less control of nutsedges than methyl bromide. Furthermore, there is evidence that both 1,3 D and methyl isothiocynate levels decline more rapidly due to enhanced degradation of these chemicals by soil microorganisms, thus further compromising efficacy, in areas where these are repeatedly applied (Smelt et al., 1989; Ou et al., 1995; Gamliel et al., 2003; Dungan and Yates, 2003).

Results from small plot studies conducted in Tifton, Georgia, by Culpepper and Langston (2004) show that 1,3-D followed by chloropicrin was significantly less effective than methyl bromide against both purple and yellow nutsedge, although this treatment performed as well as methyl bromide relative to spring and fall crop yield. 1,3-D + chloropicrin, followed by more chloropicrin was more effective than methyl bromide against yellow nutsedge, but less effective against purple nutsedge. This treatment performed as well as methyl bromide in terms of spring yield, but poorly in terms of fall yield. 1,3-D + chloropicrin, followed by metam sodium was 36% less effective than methyl bromide for purple nutsedge control, but as effective as methyl bromide against yellow nutsedge. However, test plots were small, and it is unclear if these results will hold in commercial fields, considering the variable results reported elsewhere for these alternatives. The nutsedge populations in this study were dominated by yellow nutsedge (90% of the total). It is not clear if populations where purple nutsedge is dominant would be controlled as effectively, since other studies have shown that purple nutsedge is a hardier species. Current review of available research indicate that the 3-WAY does not provide adequate nutsedge control with summer/fall fumigations and the DMDS system does not adequately control grasses or *Amaranthus* species. The most recent studies have reported that a 79:21 mixture of DMDS and chloropicrin is effective than the other mixtures of these 2 chemicals (Culpepper et al., 2008). Future research will focus on developing and implementing a herbicide program to compliment both the 3-WAY and DMDS fumigant systems as well as determining the amount of time that must pass between fumigating with these alternatives and planting.

In Florida, the best currently available alternative for eggplant production (which cannot be used in areas containing karst topographical features) is an application of Telone C-35 (1,3-D + 35% chloropicrin), at 35 gallons per acre, 3-5 weeks before transplanting, followed by an application of a herbicide mix of napropamide and trifluralin to the top of the raised bed at the time of tarp laying (Noling and Botts, 2007).

A soil treatment recently developed by the University of Georgia appears to be promising as a methyl bromide replacement for Georgia's eggplant spring crop, although not for the summer or fall crops. This treatment, known as the "UGA 3-WAY", consists of three successive soil fumigations, beginning with 1,3-D + chloropicrin application, followed by a chloropicrin application, followed by a metam-sodium or metam-potassium application (Culpepper, 2007a). In 2006, Culpepper *et al*. (2007a) tested the effectiveness of fall applications of methyl bromide alternatives, including the UGA 3 WAY treatment, on nutsedges infesting the spring bell pepper crop in TyTy, Georgia. Results of this small-plot study show that the UGA 3-WAY alternative (see above) performed as well as the standard methyl bromide application. Similarly, reducing the standard rates of methyl bromide by 50%, from 392 kg/ha under standard LDPE film to 196 kg/ha under metalized film, also provided excellent purple nutsedge control. Pepper yields were comparable in all treated plots.

In a related small plot trial, conducted by Culpepper (2007b) in Echols County, Georgia, during the spring of 2006, excellent purple nutsedge control was achieved with 484 kg of methyl bromide/ha under standard film and 336 kg of methyl bromide/ha under metalized film. However, further reducing the methyl bromide rate by 50% to 224 kg/ha, under metalized film, resulted in poor nutsedge control. Soil fumigation took place in February. Culpepper concludes that, based on research conducted over the past three years with methyl bromide applied under metalized film, a 33% reduction of the standard 67:33 formulation is possible in fields heavily infested with weeds, and a 40% reduction in fields with light weed infestations, whereas reducing the methyl bromide rate by 50% would be unsustainable for weed control.

Although these results are promising, results from small plot research need to be verified at the commercial level, in on-farm trials. Furthermore, most research in Georgia has so far focused on nutsedge. Additional work is needed to determine the efficacy of alternatives on other weed species, such as morning glory and pigweed. Finally, the economics of transitioning to alternatives has not been fully worked out, including the cost and durability of films and the modification of fumigation equipment.

7. ECONOMIC FEASIBILITY OF ALTERNATIVES

The following economic analysis is organized by methyl bromide critical use application regions.

Readers please note that in this study net revenue is calculated as gross revenue minus operating costs. This is a good measure as to the direct losses of income that may be suffered by the users. It should be noted that net revenue does not represent net income to the users. Net income, which indicates profitability of an operation of an enterprise, is gross revenue minus the sum of operating and fixed costs. Net income should be smaller than the net revenue measured in this study. We did not include fixed costs because it is often difficult to measure and verify.

Summary of Economic Feasibility

The economic analysis of eggplant applications compared data on the yields, crop prices, revenues and costs of using methyl bromide or alternative pest control regimens. This was done in order to estimate impacts on eggplant growers with the decreasing availability of methyl bromide. The Georgia 3-Way (1,3-Dichloropicrin with Chloropicrin followed by metam sodium) was identified as being a technically feasible alternative (in cases of low pest infestation[1]) to methyl bromide in Georgia and Florida eggplant production. 1,3-D + chloropicrin is also being recognized as an alternative to methyl bromide; however, it is not considered technically feasible as yield losses are expected.

The economic reviewers analyzed crop budgets for pre-plant sectors to determine the likely economic impact if methyl bromide were unavailable. Various measures were used to quantify the impacts, including the following:

(1) **Loss per Hectare.** For crops, this measure is closely tied to income. It is relatively easy to measure, but may be difficult to interpret in isolation.

(2) **Loss per Kilogram of Methyl Bromide**. This measure indicates the value of methyl bromide to crop production.

(3) **Loss as a Percentage of Gross Revenue.** This measure has the advantage that gross revenues are usually easy to measure, at least over some unit, *e.g.*, a hectare of land or a storage operation. However, high value commodities or crops may provide high revenues but may also entail high costs. Losses of even a small percentage of gross revenues could have important impacts on the profitability of the activity.

(4) **Loss as a Percentage of Net Operating Revenue**. We define net cash revenues as gross revenues minus operating costs. This is a very good indicator as to the direct losses of income that may be suffered by the owners or operators of an enterprise. However, operating costs can often be difficult to measure and verify.

(5) **Operating Profit Margin**. We define operating profit margin to be net operating revenue divided by gross revenue per hectare. This measure would provide the best indication of the total impact of the loss of methyl bromide to an enterprise. Again, operating costs may be difficult to measure and fixed costs even more difficult, therefore fixed costs were not included in the analysis.

These measures represent different ways to assess the economic feasibility of methyl bromide alternatives for methyl bromide users, who are eggplant producers in this case. Because producers (suppliers) represent an integral part of any definition of a market, we interpret the threshold of significant market disruption to be met if there is a significant impact on commodity

[1] It should be noted that the USG does not request methyl bromide for use in areas of low to moderate pest pressure. Only cases where key pests are present at moderate to high levels require methyl bromide for pest pressure.

suppliers using methyl bromide. The economic measures provide the basis for making that determination.

Georgia and Florida

In Georgia and Florida, using the Georgia 3-Way on spring plantings is believed to be a technically (and thus economically) feasible alternative to methyl bromide, although some limitations exist. Referring to Table 4 and 5, the loss of gross revenue using the Georgia 3-Way is negligible for Florida in comparison to methyl bromide, while gains in gross revenue are expected in Georgia. Unlike spring plantings, however, yield losses are expected in fall plantings, with studies in Georgia's application show a 50% yield loss. The Georgia 3-Way also cannot be used on eggplants that are grown in karst soils since it contains 1,3-D. Therefore, for fall plantings and areas with karst soils, the use of methyl bromide is critical to Georgia's and Florida's eggplant production. Note that data describing Georgia eggplant production is based on double cropping production practices.

<u>Florida Analytical Notes:</u>

Florida's application for methyl bromide critical use indicated that more than one crop is typically grown per growing season but did not provide specific production and sales data for this crop. As a result of this gap in data, economic assessment of Florida eggplant production was based on a single crop production system. This characterization of growing conditions could result in the critical need for methyl bromide appearing smaller than it actually is, because the value the second crop derives from methyl bromide is not included in the analysis.

TABLE 3: GEORGIA - ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

GEORGIA EGGPLANT	METHYL BROMIDE	GEORGIA 3-WAY: SPRING APPLICATION	GEORGIA 3-WAY: FALL APPLICATION
PRODUCTION LOSS (%)	0%	0%	50%
PRODUCTION PER HECTARE	7,070	7,070	3,535
* PRICE PER UNIT (US$)	$8	$8	$8
= GROSS REVENUE PER HECTARE (US$)	$57,547	$57,547	$28,774
- OPERATING COST PER HECTARE (US$)	$45,271	$34,610	$34,610
= NET REVENUE PER HECTARE (US$)	$12,277	$22,938	-$5,836
LOSS MEASURES *			
1. LOSS PER HECTARE (US$)	$0	($10,661)	$18,113
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	$0	($71)	$121
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0%	-19%	31%
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0%	-87%	148%
5. OPERATING PROFIT MARGIN (%)	21%	40%	-20%

Note: Georgia eggplant revenue and cost measures were calculated using data from a two crop per growing season production system.

- Interpret the loss measures with caution. Negative numbers presented in rows indicating a "loss" should be interpreted as a "gain". Positive numbers can be interpreted as losses.

TABLE 4: FLORIDA - ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

FLORIDA EGGPLANT	METHYL BROMIDE	GEORGIA 3-WAY: SPRING APPLICATION	1,3-D + CHLOROPICRIN
PRODUCTION LOSS (%)	0%	0%	29%
PRODUCTION PER HECTARE	1,764	1,764	1,252
* PRICE PER UNIT (US$)	$11	$11	$11
= GROSS REVENUE PER HECTARE (US$)	$19,983	$19,983	$14,188
- OPERATING COST PER HECTARE (US$)	$17,891	$17,976	$17,303
= NET REVENUE PER HECTARE (US$)	$2,092	$2,007	-$3,116
LOSS MEASURES *			
1. LOSS PER HECTARE (US$)	$0	$85	$5,208
2. LOSS PER KILOGRAM OF METHYL BROMIDE (US$)	$0	$1	$70
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0%	0%	26%
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0%	4%	249%
5. OPERATING PROFIT MARGIN (%)	10%	10%	-22%

* Interpret the loss measures with caution. Negative numbers presented in rows indicating a "loss" should be interpreted as a "gain". Positive numbers can be interpreted as losses.

8. RESULTANT CHANGES TO REQUESTED EXEMPTION QUANTITIES

The USG has applied an aggressive transition rate which is reflected in the nomination amount and detailed in Table 5.

TABLE 5. NOMINATION AMOUNT: 2011 Methyl Bromide Usage Newer Numerical Index (BUNNI) – Transition Use Reduction Description Spreadsheet.

SECTOR		EGGPLANT		
		Florida Eggplant	Georgia Eggplant	Sector Total / Average
Quantity Requested for 2010:	Amount (kgs)	18,843	13,147	31,990
Quantity Recommended by MBTOC/TEAP for 2010 :	Amount (kgs)	18,843	11,235	30,078
Quantity Approved by Parties for 2010:	Amount (kgs)	18,843	11,235	30,078
	Area (ha)	114	68	182
	Rate	165	165	165
Transition from 2010 Baseline Adjusted Value	Percentage (%)	-47%	-50%	-48%
Quantity Required for 2011 Nomination:	Amount (kgs)	12,813	8,748	21,561
	Area (ha)	78	53	131
	Rate	164	165	165

CITATIONS

Aerts, M. 2003. Asst. Director, Environmental and Pest Management Division, Florida Fruit and Vegetable Association. Personal Communication with G. Tomimatsu, December 2, 2003.

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