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The final report of Phase II of UNIDO project MP/GEO/02/074 "Phase-Out of Methyl Bromide in Soil Fumigation sector" (Phase II)

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Introduction

The issue of the depletion of the Ozone Layer become the great challenge of the XX and XXI centuries. It has now been established scientifically that the stratospheric ozone layer which protects the Earth from dangerously high level of ultraviolet radiation from the Sun is being destroyed by human activity. The list of ozone depleting substances has been identifies and agreed under the international agreement – Montreal Protocol on Substance that Deplete the Ozone Layer. One of the ozone depleting chemical with high ozone depleting potential is Methyl bromide. This chemical is mainly used as a fumigant in agriculture, for pest control in structures and stored commodities, and for quarantine treatment.

The Parties of the Montreal Protocol agreed on the global phase out schedule of Methyl Bromide. Georgia confirmed its willingness to phase out the consumption of MB in the soil fumigation sector by the year of 2007.

UNIDO project MP/GEO/02/074 "Phase-Out of Methyl Bromide in Soil Fumigation sector» was approved by the Executive Committee of the Multilateral Fund at 37th meeting in July of 2002. The main objective of this project is to phasing out 12.8 tons of Methyl Bromide, which representing the entire consumption for soil fumigation.

There have been implemented the following activities under the phase II of the programme from 1 March of 2005 to 1 September of 2006:

- ✓ The Action Plan was developed for the implementation of the phase II of the programme. The main objective of the plan was to introduce Methyl bromide identified alternatives in the soil fumigation sector;

- ✓ Unrecognized barriers were identified for the rapid adoption of alternative technologies of Methyl Bromide. This concern was further assessed by the team of the programme through the evaluation of experiences of European countries with regard to the use of drip irrigation systems and appropriate dosages of applied chemicals.

- ✓ The selection of farmers for participation in the investment component based on the high consumption of Methyl Bromide as well as the willingness to introduce alternatives of Methyl Bromide in combination with IPM was done in 5 regions of Georgia. The Government of Georgia changed the policy in one of the selected

region Kazbegi region (high mountain region) with regard to supply of natural gas. There was finished the donation from the Government on the using of natural gas for heating of greenhouses. The business to run greenhouses was not attractive any more since not profitability of crop production. A majority of farmers agreed to get a compensation and destruction of greenhouses were performed at the end of the summer of 2005. Therefore, the team instead of Kazbegi region expanded activities in East Georgia through participation in the programme activities of the following villages: Misakcieli, Dzalisi, Patara Gldani and Patardzeuli (Kakheti region) and Ulianovka (Lagodekhi region). These villages were selected by the team due to the high consumption of MB and theirs active motivation to introduce alternative technologies. The team organised an extra workshop since there were not done trials in this region under the first phase I of the programme. The programme coordinator and IPM specialist gave additional explanation in details for applying of Dazomet and Metham Sodium.

✓ The team continued procedures for the registration of alternative chemicals to Methyl Bromide successfully tested during the first phase of the programme such as Metham Sodium (the commercial name is Nemasol) and Dazomet. There should be underlined the major obstacle for registration of alternatives MB in the soil fumigation sector: an absence of a group "soil fumigants" as registered chemicals. A new chemical might be registered only as a fungicide or insecticide or herbicide or nematicide. The Department of Plant Protection insisted to register Metham Sodium and Dazomet in all four groups and it was initially linked with the issue of increasing of registration fees four times per chemical. After the long negotiations, the Department of Plant Protection agreed to register Metham Sodium as a fungicide as well as Dazomet as a nematicide from 2005. The registration of these substances was expanded in 2006 and other areas were covered through the registration: Metham Sodium as an insecticide, herbicide and nematicide as well as Dazomet as an insecticide, herbicide and fungicide.

✓ Drip irrigation systems for greenhouses were introduced by CSP in Georgia. The team distributed about 9950 m^2 and the first feedback was received from farmers (a) the process of applying the right amount of water slowly and evenly to the root zones of plants is very useful. This could keep the level of moisture in the soil within the optimum range for healthy growth and minimum stress. (b) Saving time. Timers could be installed to ensure that watering was done at the right time and in the desired amount. (3) High quality of crops are produced due to the slow, regular, uniform application of water.

✓ The information campaign concerning the available alternatives of Methyl Bromide in the soil fumigation sector was carried out through mass media and local NGOs as well as the network of CSP in these regions. There was developed a special label for products that are produced with alternatives of MB. This label is used for public awareness purposes as well as the promotion of crops produced

without MB. The label placed to each tomato or cucumber or other crops and send to the market place for selling. The significant issue was that producers of crops approached the team since the competition is high within the local market. The label indicates that crops were produced through ozone friendly technologies. There was also reflected a contact address of CSP where further information might be obtained. The team already introduced to the market above-mentioned products and there is a steady interest expressed by customers to these crops. The article for the newspaper was developed by experts of CSP concerning activities in the introduction of alternative technologies of Methyl Bromide. The internet web-page (http://www.csp.org.ge) highlighted achieved results under the programme as well as recommendations and guidelines for introduction of IPM system. The information about the programme activities was put forward to the Association of Land owners' rights protection (http://www.apl.org).

The detailed information concerning the implementation of the phase II of the programme is done within this report.

The phase II of UNIDO project MP/GEO/02/074 "Phase-Out of Methyl Bromide in Soil Fumigation sector" was started with little delay due to the international tender and procedures for contracting a sub-contractor. The contract with Civil Society for Peasants was signed at 24 February of 2005.

The registration of alternatives of Methyl Bromide in Georgia

Activities under the contract started at 1 March of 2005 according to the agreed workplan and timetable. The first step was to commence the registration procedures for chemicals successfully tested during the first phase of the programme such as Metham Sodium (the commercial name is Nemasol) and Dazomet. The work programme for registration of alternatives was being carried out through whole programme.

There should be underlined the major obstacle for registration of alternatives MB in the soil fumigation sector. There was an absence of a group "soil fumigants" as registered chemicals. A new chemical might be registered only as a fungicide or insecticide or herbicide or nematicide. The Department of Plant Protection insisted to register Metham Sodium and Dazomet in all four groups and it was initially linked with the issue of increasing of registration fees four times 3960GELX4=15840GEL (about 8753USD) per chemical. This was entirely not acceptable for the team.

After complicated discussion, the Department of Plant Protection agreed to register Metham Sodium as a fungicide as well as Dazomet as a nematicide from 2005. The cost was 3960 GELX2=7920GEL (about 4351,5USD for both chemicals). There should be pointed out that the producer companies made a decision (following two months negotiations) to provide funds for the registration Metham Sodium and Dazomet in 2005.

Mr. Zurab Loladze was hired as the IPM expert under the programme and he submitted results of applying Metham Sodium and Dazomet in greenhouses from three selected areas: Kutaisi, Agara and Digomi. In case of Dazomet, he identified that a damage of plants (Meloidogyne incognita) was not more then 1% of the total capacity. At the same time, the control application showed a damage of plants about 27-28% of the total capacity. In case of Metham Sodium, there was showed the following results with reference to soil borne pathogens such as Fusarium oxysporum and Verticilium dahlae: a damage of plants was not more then 1,5-2% of the total capacity. At the same time, the control plots demonstrated about 18% of damage of plants.

The team decided to submit to the Plant Protection Department all documents for registration of Bazamid (Dazomet) and Nemasol-510 (Metham Sodium) as an herbicide in 2006. In case of acceptance of the request these chemicals would be fully registered and the registration would cover all areas: insecticide, nematicide, fungicide and herbicide.

The Plant Protection Department of the Minjistry of Agriculture of Georgia was aggred to review all required documents for further registration of Bazamid (Dazomet) and Nemasol-510 (Metham Sodium) after a long discussion and debates.

The registration of these substances was expanded in 2006 and other areas were covered through the registration. The cost was also confirmed and consisted of 1360 GELX3(areas)=4080GEL (about 2242USD) per chemical. The recourses were utilised from the programme budget.

Consequently, the certificates were issued by the Plant Protection Department for Bazamid (Dazomet) and Nemasol-510 (Metham Sodium) as an insecticide, nematicide and fungicide. Copies of certificates were sent to UNIDO. The original versions were sent to producer companies of above mentioned chenmicals - "Kanesho Soil Treatment (KST)" and "Taminco".

There should be pointed out that Bazamid (Dazomet) and Nemasol-510 (Metham Sodium) can be imported to Georgia according to the exist certificates since 1 January of 2006.

The company "Agritechnics" under the supervision of the team imported to the country Dazomet for phase II of the programme. This chemical was purchased from the company on the later stage for the reason that there was no final decision on the subject of total treated area under phase II.

The purchase of Metham Sodium was being under negotiation process of the Civil Society for Peasants and "Taminco" International. The major issue was that the market for fumigants considered by companies to be very small and there is no

interests to introduce companies' new production to the Georgian market. Consequently, the high price of Metham Sodium was proposed and a team put additional effort in order to reduce a fixed price. The contract was developed and the authorisation letter for purchasing of Metham Sodium was received from UNIDO.

Seeds for the phase II of the programme were purchased from the company Beho Zaden (The Netherlands). The agreement was reached with the company for purchasing seeds of tomato and cucumber. In addition, the team worked to introduce drip irrigation system in selected green houses as it was agreed during the first phase. The final cost required for establishment of drip irrigation system was known by the end of July of 2005.

A fumigation team received additional instructions with reference to the application quantity to be used during the fumigation process. Workers health and safety should be guaranteed throughout the fumigation process by new chemicals. The training workshop will be organised in August with the intention of ensuring the effective and safe fumigation of selected areas.

Non-chemical approaches were under the evaluation and Biofumigation+solarisaton was set up within sleeted greenhouses.

There were selected farmers during the phase I of the programme for participation in the investment component based on the high consumption of Methyl Bromide as well as the willingness to introduce alternatives of Methyl Bromide in combination with IPM. The team worked for re-confirmation of farmers wishing to participate in the programme activities.

The implementation of the investment component of the programme

The following activities were carried out in selected greenhouses for the introduction of alternatives of Methyl Bromide (MB) such as Dazomet (D), Metham Sodium (MS) and Biofumigation (B):

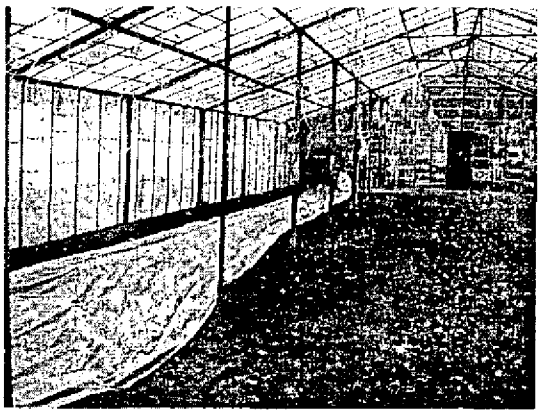
- The team organised consultative meetings in five regions of Georgia with the intention of identification of farmers willing to participate in the programme activities.
- There were created groups of farmers and calculated a required amount of Dazomet and Metham Sodium taking into account the size of selected greenhouses.

First of all, the implementation of the programme was started in villages of Tskhaltubo region near Kutaisi: Partskhanakanebi, Tkachiri, Sakulia, Mukhiani, Geguti, Kvitiri and Banoja. There were organised brief working sessions for farmers with the purpose of introduction of the issue concerning the Preservation of the Ozone Layer and activities for phasing out of MB within the country. Experts visited all greenhouses chosen for the investment component and explained on sight methods

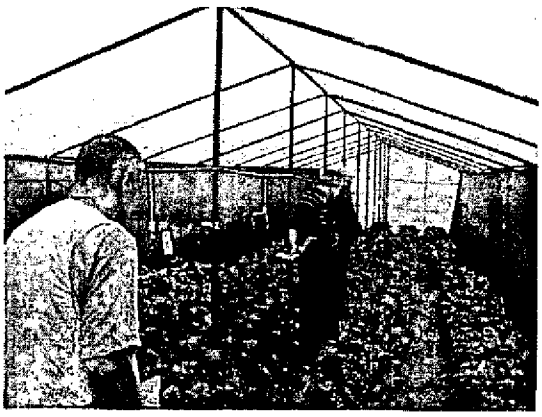
of applying the alternative chemicals. There was made a decision to select the expert from the region for monitoring of fumigation procedures and other activities (Mr. Merab Baratashvili).

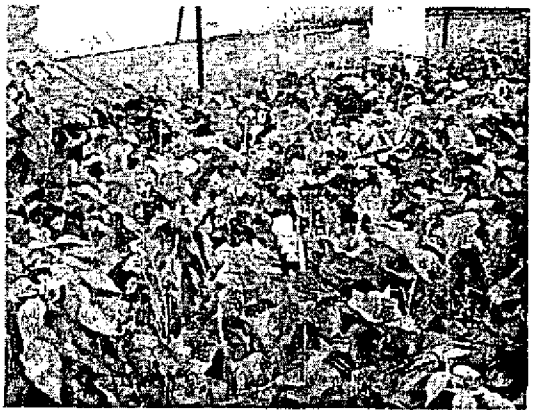
The fumigation group was send to the region (Head of the group was Mr. Suliko Dularidze) and the work was carried out from 15 August to 10 September of 2005 in the following villages:

#	Farmers	Village	m^2	Crop	Fumigant
1	Kublashvili Gocha	Tskhaltubo, v. Parchkhanakanebi	300	Green/tomato/cucumber	Dazomet
2	Biliseishvili Demuri	Tskhaltubo, v. Tkachiri	500	Green/tomato/cucumber	Dazomet
3	Jintsvelashvili Tengiz	Tskhaltubo, v. Sakulia	500	Green/tomato/cucumber	Dazomet
4	Berdzenadze Godezi	Tskhaltubo, v. Mukhiani	250	Green/tomato/cucumber	Dazomet
5	Chitiashvili Gocha	Tskhaltubo, v. Mukhiani	400	Green/tomato/cucumber	Dazomet
6	Iashvili Tariel	Tskhaltubo, v. Tkachiri	300	Green/tomato/cucumber	Dazomet
7	Tevzadze Vaja	Tskhaltubo, v. Sakulia	306.7	Green/tomato/cucumber	Dazomet
8	Gigiadze Tariel	Tskhaltubo, v. Geguti	500	Green/tomato/cucumber	Dazomet
9	Chitiashvili Omari	Tskhaltubo, v. Mukhiani	400	Green/tomato/cucumber	Dazomet
10	Tsikoridze Mikheil	Tskhaltubo, v. Geguti	350	Green/tomato/cucumber	Dazomet
11	Gabunia Malkhazi	Tskhaltubo, v. Geguti	500	Green/tomato/cucumber	Dazomet
12	Abzianidze Otari	Tskhaltubo, v. Kvitiri	300	Green/tomato/cucumber	Dazomet
13	Balanchivadze Vano	Tskhaltubo, v. Banodja	60	Green/tomato/cucumber	Dazomet
14	Atsashvili Nodari	Khoni, v. Gubi	500	Tomato/cucumber	Biofum
15	Gureshidze Koba	Tskhaltubo, v. Gubra	500	Tomato/cucumber	Biofum
Total m^2			5666.7		



There should be highlighted that the farmers Mr. Nodar Tsatsashvili from village Gubi of Khoni region and Mr. Koba Gureshidze from the village Gumbra of Tskhaltubo region introduced the biofumigation as alternative techniques of MB based on the experience gained from the field visit in Almaria (Spain). In particular, manure was applied to the soil in an amount of 12-20 kg on 1 m^2 and watered for the duration of two weeks.





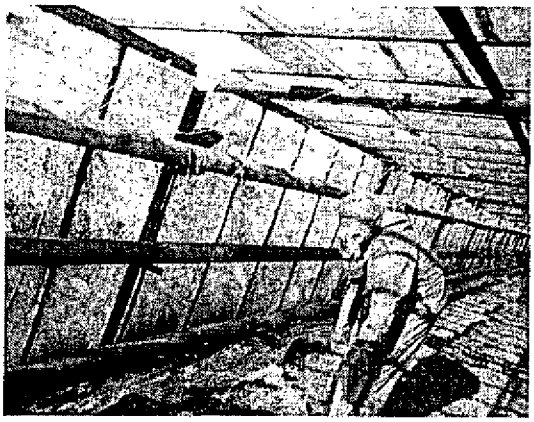
The team received a confirmation from the farmer Mr. Dimitry Gotsiridze (the village Terjola) for the treatment of the soil in grapes nurseries with Metham Sodium in March of 2006.

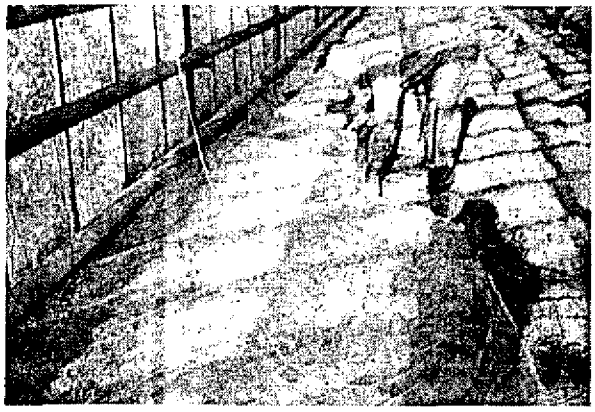
The significant point was that Mr. Baratashvili permanently provided an information concerning main soil-borne pathogens and the vegetation of plants (healthiness and phitotoxicity of plants).

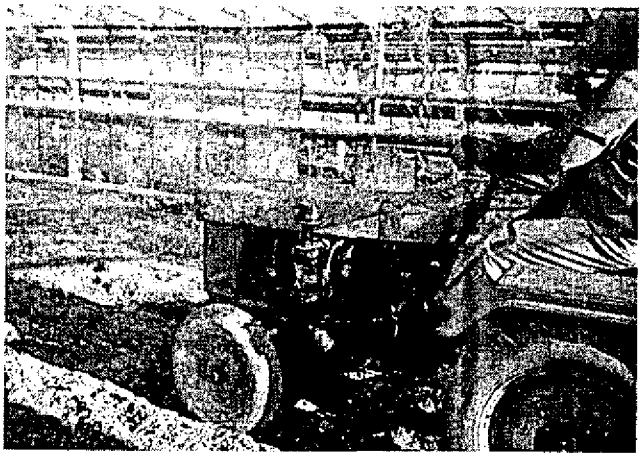
There were organised meetings in Kareli region ant its villages Agara and Bredza with farmers to facilitate the introduction of alternatives of MB. Farmers were trained by the team for using alternative technologies such as Metham Sodium, Dazomet and Biofumigation. There was selected the expert from the region for monitoring of fumigation procedures and other activities (Mr. George Gongliashvili).

The same fumigation group worked in this region (Head of the group was Mr. Suliko Dularidze) and the work was executed from 25 August to 15 September of 2005 in the following villages:

№	Farmers	Village	m^2	Crop	Fumigant
1	Basishvili Mirian	Kareli	336.7	Tomato/cucumber	Dazomet
2	Godeladze Ioseb	Kareli	383.3	Tomato/cucumber	Dazomet
3	Gongliashvili Giorgi	Kareli	500	Tomato/cucumber	Dazomet
4	Gongliashvili Giorgi	Kareli	700	Tomato/cucumber	Biofum
5	Barbakadze Giorgi	Kareli	200	Fruit nursery	Metham Sodium
6	Bakradze Temuri	Kareli	150	Tomato/cucumber	Metham Sodium
7	Barbakadze Zurabi	Kareli	150	Fruit nursery	Metham Sodium
8	Gogichashvili Manana	Kareli	200	Fruit nursery	Metham Sodium
9	Bortishvili Kekela	v. Bredza	300	flowers/tomato	Metham Sodium
10	Gelashvili Mariami	v. Bredza	366.7	flowers/tomato	Metham Sodium
11	Kochashvili Basurmani	v. Bredza	300	flowers/tomato	Metham Sodium
12	Shubitidze Valeri	v. Bredza	333.3	flowers/tomato	Metham Sodium
Total m^2			3920		

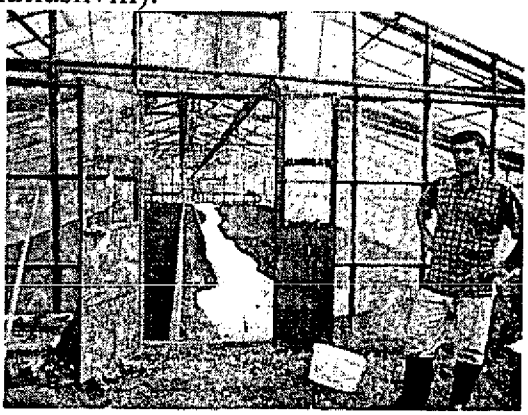


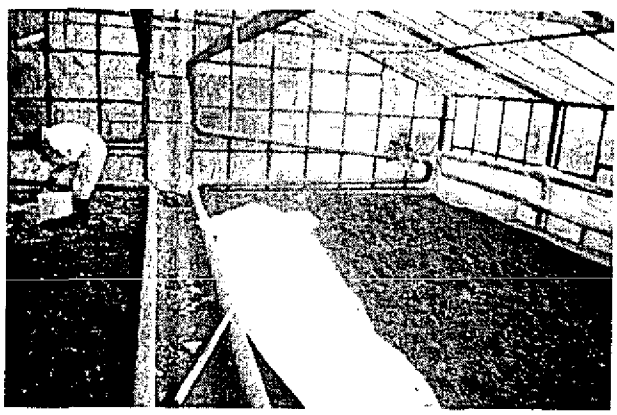




Mr. Gongliashvili permanently submitted reports related to main soil-borne pathogens and the vegetation of plants (healthiness and phitotoxicity of plants).

The training workshops were organised in the village Digomi near Tbilisi for farmers wishing to introduce ozone friendly technologies and chemicals (MS, D and Biofum). The team developed special instructions for using of Metham Sodium and Dazomet and distributed them between farmers. Farmers were also advised to use environment friendly technologies for plants growing. There was also selected the expert from the region for monitoring of fumigation procedures and other activities (Mr. Mate Matiashvili).





№	Farmers	Village	m^2	Crop	Fumigant
1	Topchishvili Sulkhan	Digomi	300	Tomato/cucumber	Dazomet
2	Kanadashvili Borisi	Digomi	300	Tomato/cucumber	Dazomet
3	Mamuchashvili Dato	Digomi	240	Tomato/cucumber	Dazomet
4	Janiashvili Konstantine	Digomi	300	Tomato/cucumber	Dazomet
5	Kuchiniashvili Malkhai	Digomi	300	Tomato/cucumber	Dazomet
6	Khelashvili Givi	Digomi	250	Tomato/cucumber	Dazomet
7	Khositashvili Tamaz	Digomi	500	Tomato/cucumber	Metham Sodium
8	Khositashvili Ilarion	Digomi	250	Tomato/cucumber	Metham Sodium
9	Khositashvili Klimenti	Digomi	250	Tomato/cucumber	Metham Sodium
10	Kvakhadze Mikheil	Digomi	500	Tomato/cucumber	Metham Sodium
11	Runiashvili Nodar	Digomi	500	Tomato/cucumber	Metham Sodium
12	Tetrashvili Vaja	Digomi	500	Tomato/cucumber	Metham Sodium
Total m^2			4190		

The team organised an extra workshop since there was identified some delay in the implementation of the workprogramme. The programme coordinator and IPM specialist gave additional explanation in details for applying of Dazomet and Metham Sodium. Mr. Mateishvili permanently getting in touch with the programme coordinator and provided reports related to main soil-borne pathogens and the vegetation of plants (healthiness and phitotoxicity of plants).

The government of Georgia changed the own policy in Kazbegi region (high mountain region) with regard to supply of natural gas. There was finished the donation from the Government on the using of natural gas for heating of greenhouses. The business to run greenhouses was not attractive any more since not profitability of crop production. Moreover, the Government initiated the compensation for destruction of greenhouse in the amount of 35 GEL (about 20 USD) for 1 m^2. Farmers were advised to start a development of new business activities such as bee-keeping and animal husbandry. A majority of farmers agreed to get a compensation and destruction of greenhouses were performed at the end of the summer of 2005. Therefore, the team made a conclusion to close the programme in this region and expand a participation of farmers from other regions such as Mtskheta and Kakheti region. There were selected the following additional villages: Misakcieli, Dzalisi, Little Gldani and Patardzeuli:

№	Farmers	Village	m^2	Crop	Fumigant
1	Nazraidze Bagrati	Litle Gldani	250	Tomato/cucumber	Dazomet
2	Calagashvili Avtandil	v. Misakcieli	300	Tomato/cucumber	Dazomet
3	Nozadze Malkhaz	v. Misakcieli	250	Tomato/cucumber	Dazomet
4	Bodaveli Emzar	v. Misakcieli	500	Tomato/cucumber	Metham Sodium
5	Akhlouri Avksenti	v. Dzalisi	500	Tomato/cucumber	Metham Sodium
6	Ustiashvili Teimuraz	v. Patardzeuli	290	Tomato/cucumber	Dazomet
Total m^2			1800		

Training sessions were organised in the village Ulianovka near Lagodekhi of Kakheti region for farmers wishing to introduce ozone friendly technologies and chemicals (MS, D and Biofum). There should be highlighted that farmers using plastic houses in

this region. IPM specialist delivered the lecture on the control of soil born pathogens in plastic houses and IPM approach. The team worked out a timetable for supplying of Dazomet and Metham Sodium in order to start a fumigation at the second half of November. In general, the treatment of the soil was conducted with Dazomet – 60 gr. for 1 m^2; Metham Sodium (Nemasol - 510) - 120 mg for 1 m^2 through using of the plastic sheet for 5-10 days. The biofumigation was carried out with 12-20 kg of fresh manure for 1 m^2 and farmers were advised to water plots throughout 15 days.

Supply of inputs:

The team purchased 520 kg of Bazamid (Dazomet) from the company "Agrotechniks" and 1620 litres of Nemasol (Metham Sodium) was delivered by the CSP from Belgium. Moreover, "Monro" variety seeds were purchased from "Garemo da Analitika" (20 packs with 1000 units per pack and 19 packs with 250 units per pack). In addition, backsparayers were purchased in the quantity of seven units and manure was distributed to farmers wishing to apply Biofumigation method as the alternative to Methyl Bromide. The solarisation materials were arranged for a total area of greenhouses - 4456 m^2.

Farmers from the village Ulianovka near Lagodekhi of Kakheti region expressed the wish to introduce ozone friendly technologies and chemicals (MS, D and Biofum) in plastic houses. One farmer was selected from the village Apheni of the same region since he expressed the willingness to shift from MB to one of alternatives.

№	Farmers	Village	m^2	Crop	Fumigant
1	Tsukhishvili Nodar	Ulianovka	500	Tomato/cucumber	Metham Sodium
2	Bakhturidze Mazuri	Ulianovka	500	Tomato/cucumber	Metham Sodium
3	Sulaberidze Valeri	Ulianovka	450	Tomato/cucumber	Metham Sodium
4	Kimadze Gia	Ulianovka	490	Tomato/cucumber	Metham Sodium
5	Koguradze Omar	Ulianovka	500	Tomato/cucumber	Metham Sodium
6	Kusiani Ketevan and Ramaz	Ulianovka	500	Tomato/cucumber	Metham Sodium
7	Bakhturidze Zurabi	Ulianovka	500	Tomato/cucumber	Metham Sodium
8	Bakhturidze Nugzar	Ulianovka	500	Tomato/cucumber	Metham Sodium
9	Bakhturidze Petre	Ulianovka	500	Tomato/cucumber	Metham Sodium
10	Sulaberidze Murman	Ulianovka	520	Tomato/cucumber	Metham Sodium
11	Jokhadze Avtandil	Ulianovka	470	Tomato/cucumber	Metham Sodium
12	Kimadze Tariel	Ulianovka	500	Tomato/cucumber	Metham Sodium
13	Mishvelidze Nugzar	Apheni	500	Tomato/cucumber	Metham Sodium
Total m^2			6430		

The fumigation materials were delivered to the village. The fumigation was started at the beginning of November when eight plastic houses were fumigated by Metham Sodium. The fumigation process had been interrupted by the heavy snow and terrible whether conditions. Therefore, the team continued the fumigation in the middle of February in five plastic houses. Farmers generally grow curcumber in this region for spring and autumn harvesting.

The team were additionally selected five families wishing to introduce Metham Sodium and Dazomet in the village Digomi near Tbilisi. The fumigation team comleted the work in three greenhouses by the middle of February.

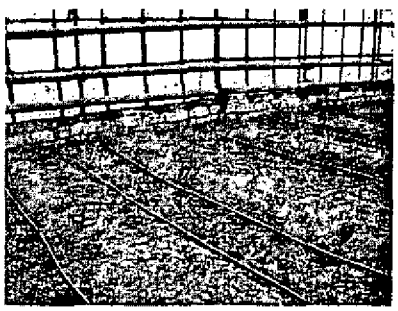
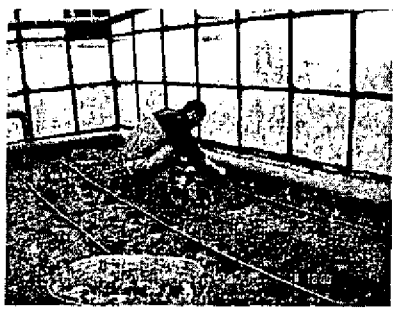
№	Farmers	Village	m^2	Crop	Fumigant
1	Gilauri Ana	Digomi	500	Tomato/cucumber	Metham Sodium
2	Likhutashvili Manana	Digomi	500	Tomato/cucumber	Metham Sodium
3	Mzareulashvili Meri	Digomi	300	Tomato/cucumber	Metham Sodium
4	Topchishvili Tsitsino	Digomi	300	Tomato/cucumber	Metham Sodium
5	Songulashvili Jondo	Digomi	300	Tomato/cucumber	Metham Sodium
Total m^2			1900		

The team started to installation the dreep irregation systems for the demonstration purposes. There should be emphasised that the drip irrigation is the most efficient method of irrigating. The high efficiency of drip irrigation results from two primary factors. The first is that the water soaks into the soil before it can evaporate or run off. The second is that the water is only applied where it is needed, (at the plant's roots) rather than sprayed everywhere. It is easy to install, easy to design, can be very inexpensive, and can reduce disease problems associated with high levels of moisture on plants.

There were selected the farmers actively particiapating in the implementation of alternatives of MB in Georgia.

- Mr. Gocha Chitaishvili – the village Mikhiani near Kutais. The size of a greenhouse is 300 m^2;
- Mr. Sulkhan Topchishvili – the village Digomi near Tbilisi. The size of a greenhouse is 300 m^2;
- Mr. Zurab Bakhturidze – the village Ulianovka near Lagodekhi. The size of a plastic house is 500 m^2.

The CSP sighned the contract with LTD "Agrotechnics" for the purchaseing of low pressure drip irregation systems for selected farmers. The company assisted farmers in instalation of the systems and provided the training for effective operation.

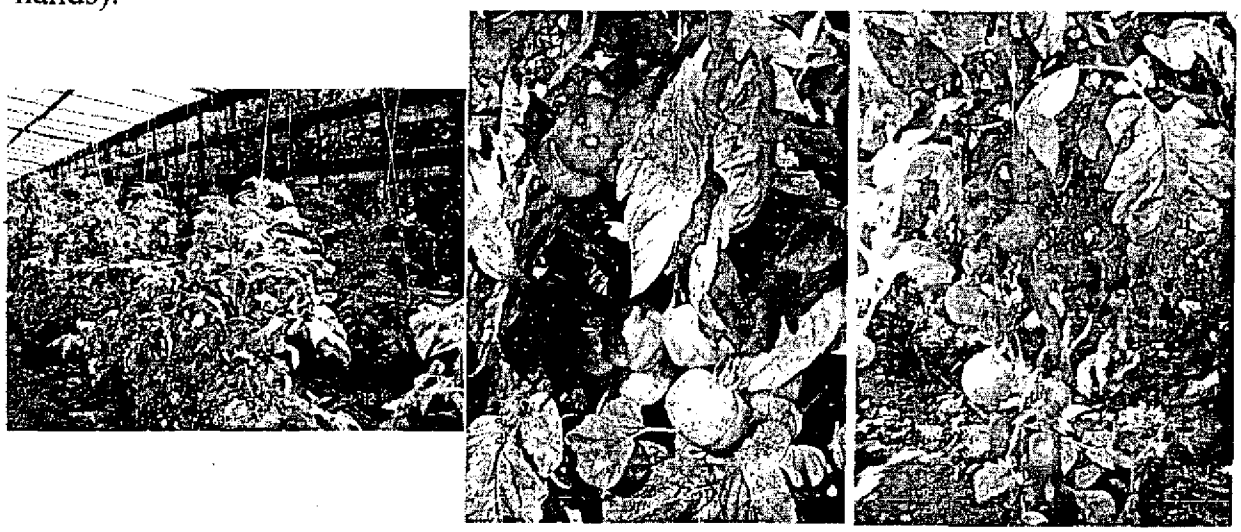




There should be unerlined that the existing methods of the application of Metham sodium and Dazomet are connected with high doses of chemicals and considered to be relatively expencive. Besides, Methyl Bromide has a feature to steep extremely deeply and quiqly to the soil in compare with alternative methods. In order to rich the

same efficience the team proposed to improve the application methods. One of the option is to apply Metham Sodium through the drip irregation system that would keep the cost-effectivness of MS in compare with MB and, conciquenntely, decrease the level of aplication. The team worked in close cooperation with with the company "Taminco" for obtaining additional information.

The CSP was approached by the company Georgian Wine and Spirit (GWS) and Individual Farmer Simon Batiashvili with the request to assist in the introduction of Metham Sodium as an alternative chemical of MB in production of grape seedlings. The CSP used as a source of information the expirienece of companies in France using the same methods. The fumigation was started in the middle of March of 2006 in East Georgia (Kakheti).

On sight monitoring was being conducted through authorised experts in the greenhouses and they provided permanent training for farmers working under the umbrella of the programme. A treated soil was regularly tested and there were practically not identified the soil pathogens in the areas treated by MS and Dazomet. One of the key points was that the amount of weeds was significantly decreased after the treatment and it reduced the cost of labour (weeds are usually taken out by hands).



The Biofumigation treatment was done in three greenhouses using the cow manuar. 12-20 kg of fresh manuare was incorporated to the $1m^2$ of the soil. The experts reported that the visual inspections showed satisfactory results of the quality of plants. However, the possible illustration of cost-effectivness of biofumigation is to be evaluated after the harvesting.

Drip irrigation systems for greenhouses were introduced by CSP in Georgia. The team distributed about 9950 m^2 and the first feedback was received from farmers (a) the process of applying the right amount of water slowly and evenly to the root zones of plants is very useful. This could keep the level of moisture in the soil within the optimum range for healthy growth and minimum stress. (b) Saving time. Timers could be installed to ensure that watering was done at the right time and in the desired

amount. (3) High quality of crops is produced due to the slow, regular, uniform application of water.

According to this information, the drip irrigation systems allow farmers to keep time and improve the phytosanitary conditions within greenhouses. One of the big advantages is that the water soaks into the soil before it can evaporate or run off and, therefore, the critical level of the moisture is decreased. The table bellow shows names of farmers who received the drip irrigation system under auspices of the program.

1.	Mamuchashvili Davit	250m^2	Mtskheta region,	vill. Digomi
2.	Topchishvili Marina	320m^2	Mtskheta region,	vill. Digomi
3.	Mzareulishvili Salome	320m^2	Mtskheta region,	vill. Digomi
4.	Gilauri Ana	320m^2	Mtskheta region,	vill. Digomi
5.	Tsiklauri Badri	300m^2	Mtskheta region,	vill. Misaktsieli
6.	Tsikoridze Mikheil	400m^2	Tskaltubo region,	vill. Geguti
7.	Tskhaoshvili Jemal	500m^2	Tbilisi,	vill. Zahesi
8.	Vadachkoria Archil	550m^2	Tskaltubo region,	vill. Banoja
9.	Berdzenishvili Levan	500m^2	Tbilisi,	vill. Gldani
10.	Mamadashvili Mevlud	500m^2	Tbilisi,	vill. Gldani
11.	Chalagashvili Avtandil	300m^2	Mtskheta region,	vill. Misaktsieli
12.	Karkusashvili Gia	250m^2	Tbilisi,	vill. Gldani
13.	Nazgaidze Bagrat	270m^2	Tbilisi,	vill. Gldani
14.	Nozadze Malxaz	300m^2	Mtskheta region,	vill. Misaktsieli
15.	Badalashvili Giorgi	440m^2	Tbilisi,	vill. Avchala
16.	Bodokia Amiran	540m^2	Tskaltubo region,	vill. Geguti
17.	Lekvinadze Sergo	450m^2	Kutaisi	
18.	Kakhidze Avtandil	450m^2	Kutaisi	
19.	Khargelia Giorgi	720m^2	Kutaisi	
20.	Jojua Kote	260m^2	Senaki region,	vill. Ledzadzame
21.	Gongliashvili Giorgi	600m^2	Kareli region,	vill. Agara
22.	Akhlouri Avtandil	460m^2	Mtskheta region,	vill. Dzalisi
23.	Ustiashvili Teimuraz	450m^2	Sagarejo region,	vill. Patardzeuli
24.	Jguniashvili Nodar	500m^2	Mtskheta region,	vill. Digomi

There was used Metham Sodium in the production of grapes seedlings in the open field by the end of April. Metham Sodium was applied at the level of 0,12L/m2 and it was immediately incorporated into the soil.

According to the visual estimation, the majority of plants were healthy. The problem was only the weed - Sorghum Helepenca. The team considers that there is a need to make the injection deeper into the soil.

The information campaign concerning the fumigation of the soil in the field of grapes seedlings by Metham Sodium was carried out through the local NGOs of the East Georgia as well as the network of CSP in this region.

There was developed a special label for products that are produced with alternatives of MB. This label is used for public awareness purposes as well as the

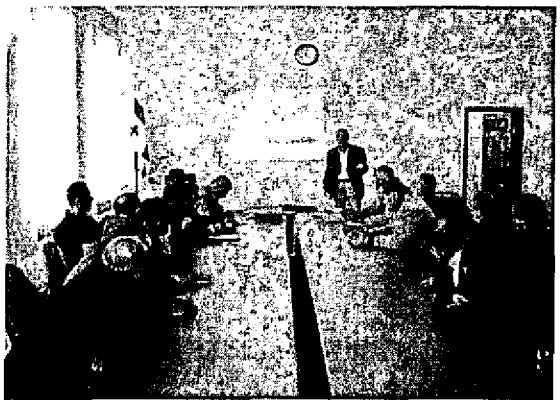
promotion of crops produced without MB. The label placed to each tomato or cucumber or other crops and send to the market place for selling. The significant issue was that producers of crops approached the team since the competition is high within the local market.

The label indicates that crops were produced through ozone friendly technologies. There was also reflected a contact address of CSP where further information might be obtained. The team already introduced to the market above-mentioned products and there is a steady interest expressed by customers to these crops.

The team carried out the explanatory work with producers as well as managers of supermarkets in order to promote this imitation. The significant message was to encourage producers to switch for alternatives of MB as soon as possible. This initiation in line with the program objectives to phase out MB in the soil fumigation sector by 1 January of 2007.

There was developed a publication with reference to the phasing out of MB in Georgia. The publication contains a concrete information about activities under the MB phase out program and results obtained during the implementation demonstration part and the first part of phase II.

The team organized four workshops with regard to the further expansion of MB alternatives in the soil fumigation sector in different regions of Georgia. The workshops were organized at 10 of May in Kutaisi, 03 of June in Agara and 15 of June of 2006 in village Digomi near Tbilisi, 14 of September of 2006 in village Ulianovka, Lagodekhi region.




Workshop, Kutaisi, 10 May of 2006

The objectives of the workshops were the following:

1. To widely disseminate the information about effective alternatives that have been identified during the demonstration part of the program (Metham Sodium, Dazomet and Biofumigation) carried out through the assistance of UNIDO;
2. To raise awareness of farmers with regard to the phasing out of Ozone Depleting Substances in Georgia;
3. To introduce new technologies: Drip Irrigation Systems and the possibility to utilize these systems for fumigation processes;
4. To further promote the alternatives of MB such as Metham Sodium and Dazomet and to introduce Integrated Pest Management Systems throughout the country.


Workshop, Kareli, 03 June of 2006

There was highlighted that the Montreal Protocol provisions imply to phase out MB and the country needs to identify violable alternatives to replace the present use of MB. The tested alternatives (Metham Sodium and Dazomet) within the country are considered to be technically effective in controlling soil-born pathogens, environmentally safe, easy to use and economically feasible for farmers.

Workshop, Digomi, 10 June of 2006

During the workshops participants were acquainted with methods to assess soil born pests, aspects related to farm production, labeling and marketing as well as agro-ecosystem with emphasize to IPM.

Workshop, village Ulianovka, Lagodekhi region, 14 September of 2006

The final conclusions:

1. The alternatives of Methyl Bromide (Metham Sodium and Dazomet) are successfully tested and introduced in Georgia;
2. These chemicals are registered as insecticides, herbicides, fungicides and nematicides by the Ministry of Agriculture and Food of Georgia;
3. It was very difficult to convince farmers to shift to new technologies during the phase I of the programme. However, once alternatives showed the good efficiency the number of farmers volunteering for the new technology rapidly increased during the phase II of the programme;
4. Drip irrigation systems for greenhouses were first time introduced by CSP in Georgia;
5. Integrated Pest Management Systems were applied in greenhouses throughout the country;
6. Intensive training programme for farmers were implemented in four regions of Georgia;
7. The information campaign concerning the fumigation of the soil by Metham Sodium and Dazomet was carried out through the local NGOs of the East and West Georgia as well as the network of CSP in these regions;
8. The programme was implemented in close cooperation between all institutions involved. CSP kept informed on a regular basis the Ministries of Environment and Agriculture as well as AgroCommittee of the Parliament of Georgia concerning the implementation of activities under the programme;
9. Consumption of Methyl bromide in the soil fumigation sector was significantly decreased in 2006. The team considers that the consumption of Methyl bromide in this sector shall be entirely phased out within the country by the year of 2007.

The first workshop for further expansion of MB alternatives in the soil fumigation sector under the phase II of the UNIDO program

Kutaisi, 10 May of 2006

Agenda

11:30-12:00 The registration of participants

12:00-12:30 Welcome address. The implementation of the phase II of the UNIDO program for phasing out of MB in the soil fumigation sector in Kutaisi region (West Georgia) – Mr. Merab Baratashvili, the team leader of the program in Kutaisi region

12:30-13:30 Overcoming of difficulties in the introduction of MB alternatives in Georgia. Upgrading of technologies for applying MB alternatives in greenhouses. Increasing of the production and the improvement of a quality of crops. Available alternatives of MB for grape seedlings – Dr. Koba Khutsishvili – the project manager and the president of CSP

13:30-14:00 Coffee break

14:00-14:30 Integrated Pest Management – Dr. Zurab Loladze, IPM expert

14:30-15:00 Drip Irrigation Systems and the possibility to utilize these systems for fumigation processes - Mr. Mamuka Mekokishvili, Drip Irrigation Systems Expert

15:00-15:30 The marketing of crops produced without ozone depleting substances (alternatives of MB). The introduction of the labeling system and its importance for marketing - Dr. Koba Khutsishvili – the project manager and the president of CSP

15:30-16:00 Discussion and Q/A Session

16:00 Refreshments

The first workshop for further expansion of MB alternatives in the soil fumigation sector under the phase II of the UNIDO program

Kutaisi, 10 May of 2006

The list of participants

1.	Mr. Chitaishvili Gocha	Farmer
2.	Mr. Gordeladze Temur	Georgian Technical University
3.	Mr. Kashibadze Otar	Privite enterprise
4.	Mr. Samashuridze Mindia	APLR
5.	Mr. Oniani Eldar	Georgian Technical University
6.	Mr. Jinjikhadze Nugzar	GIPA
7.	Mr. Gureshidze Rezo	Farmer
8.	Mr. Tsikoridze Mikheil	Association. "Geguti 2005",
9.	Mr. Mamiseishvili David	Association. "Geguti 2005"
10.	Mr. Sagareishvili Mamuka	Private enterprise
11.	Mr. Kharmelia George	The director of Agrarian-Economical School in Senaki (West Georgia)
12.	Mr. Kavakhadze Lasha	The farmer (unexperienced)
13.	Mr. Kurtsikidze Lasha	The farmer (unexperienced)
14.	Mr. Baratashvili Merab	The Association for the protection of rights of land owners
15.	Mr. Pestvenidze Merab	The farmer (unexperienced)
16.	Mr. Beradze Rugeri	The farmer (unexperienced)
17.	Mr. Kublashvili Gocha	Farmer
18.	Mr. Vadachkoria Archil	Farmer
19.	Mr. Loladze Andro	UNDP

The second workshop for further expansion of MB alternatives in the soil fumigation sector under the phase II of the UNIDO program

Agara, 03 June of 2006

Agenda

11:30-12:00 The registration of participants

12:00-12:30 Welcome address. The implementation of the phase II of the UNIDO program for phasing out of MB in the soil fumigation sector in Agara (Kareli region) – Mr. George Gongliashvili, the farmer and the team leader of the program in Kareli region

12:30-13:00 The overview of the conditions for introduction of alternatives of MB in Kareli region. The additional information on safety procedures for applying alternatives chemicals. The fumigation of fruits seedlings by Metham Sodium. Biofumigation: pro and cons. Dr. Koba Khutsishvili – the project manager and the president of CSP

13:00-13:30 Coffee break

13:30-14:00 The introduction of Integrated Pest Management System during the vegetation - Dr. Zurab Loladze, IPM expert

14:00-14:30 Drip Irrigation Systems and the possibility to utilize these systems for fumigation processes - Mr. Mamuka Mekokishvili, Drip Irrigation Systems Expert

14:30-15:00 The marketing of crops produced without ozone depleting substances (alternatives of MB). The introduction of the labeling system and its importance for marketing - Dr. Koba Khutsishvili – the project manager and the president of CSP

15:00-15:30 Discussion and Q/A Session

16:00 Refreshments

The second workshop for further expansion of MB alternatives in the soil fumigation sector under the phase II of the UNIDO program

Agara, 03 June of 2006

The list of participants

1.	Mr. Kochishvili Besarion	Farmer	Vill. Bredza
2.	Mr. Mzekalashvili David	Farmer	Vill. Bredza
3.	Mr. Kutkhashvili Nikoloz	Farmer	Vill. Bredza
4.	Mr. Elbakidze Murmani	Farmer	Vill. Bredza
5.	Mr. Mudishvili David	Farmer	Vill. Bredza
6.	Mr. Gelashvili Emzari	Farmer	Vill. Kareli
7.	Besishvili Mirian	Farmer	Vill. Kareli
8.	Godeladze Ioseb	Farmer	Vill. Kareli
9.	Barbakqdze Giorgi	Farmer	Vill. Kareli
10.	Gongliashvili Giorgi	Farmer	Vill. Kareli
11.	Bakradze Temuri	Farmer	Vill. Kareli
12.	Barbakqdze Zurabi	Farmer	Vill. Kareli
13.	Gogichashvili Manana	Farmer	Vill. Bredza
14.	Bortishvili Kekela	Farmer	Vill. Bredza
15.	Kochashvili Basurmani	Farmer	Vill. Bredza
16.	Shubitidze Valeri	Farmer	Vill. Bredza

The third workshop for further expansion of MB alternatives in the soil fumigation sector under the phase II of the UNIDO program

Digomi village, 15 June of 2006

Agenda

11:00-11:30 The registration of participants

11:30-12:00 Welcome address. The implementation of the phase II of the UNIDO program for phasing out of MB in the soil fumigation sector in villages around Tbilisi (East Georgia) – Ms. Thisana Topchishvili, the farmer

12:00-13:00 The integration of Georgia into the global programs for phasing out of MB in the soil fumigation sector. The protection of the ozone layer through phasing out of ozone depleting substances (MB). The importance of production environmentally friendly products - Dr. Koba Khutsishvili – the project manager and the president of CSP

13:00-13:30 The upgrading of the Georgian legislation with regard to the promotion of environmentally friendly products - Mr. Iveri Akhalbedashvili, the Senior Specialist of the Agrarian Committee of the Parliament of Georgia

13:30-14:00 Coffee break

14:00-14:30 Integrated Pest Management – Dr. Zurab Loladze, IPM expert

14:30-15:00 Drip Irrigation Systems and the possibility to utilize these systems for fumigation processes - Mr. Mamuka Mekokishvili, Drip Irrigation Systems Expert

15:00-15:30 The marketing of crops produced without ozone depleting substances (alternatives of MB). The introduction of the labeling system and its importance for marketing - Dr. Koba Khutsishvili – the project manager and the president of CSP

15:30-16:00 Discussion and Q/A Session

16:00 Refreshments

The third workshop for further expansion of MB alternatives in the soil fumigation sector under the phase II of the UNIDO program

Digomi village, 15 June of 2006

The list of participants

1.	Mr. Karkusashvili George	Vill. Patara Gldani
2.	Ms. Gabinashvili Lela	Vill. Digomi
3.	Ms. Songulashvili Marina	Vill. Digomi
4.	Mr. Nozadze Malkhaz	Vill. Misaktsieli
5.	Mr. Chalagashvili Avtandil	Vill. Misaktsieli
6.	Ms. Topchishvili Ketevan	Vill. Digomi
7.	Ms. Topchishvili Marine	Vill. Digomi
8.	Mr. Khositashvili Tamaz	Vill. Digomi
9.	Mr. Tsiklauri Badri	Vill. Digomi
10.	Mr. Khositashvili Ilia	Vill. Digomi
11.	Mr. Khositashvili Klimenti	Vill. Digomi
12.	Ms. Broladze Tsitso	Vill. Digomi
13.	Mr. Songulashvili Archil	Vill. Digomi
14.	Mr. Topchishvili Iveri	Vill. Digomi
15.	Mr. Badalashvili George	Vill. Digomi
16.	Mr. Kotorashvili Shalva	Vill. Digomi
17.	Ms. Badalashvili Lia	Vill. Digomi
18.	Mr. Gilauri Nugzar	Vill. Digomi
19.	Ms. Khelashvili Meri	Vill. Digomi
20.	Ms. Mzareulishvili Salome	Vill. Digomi

The fourth workshop for further expansion of MB alternatives in the soil fumigation sector under the phase II of the UNIDO program

Vill. Ulianovka, Lagodekhi region, 14 September 2006

Agenda

11:00-11:30 The registration of participants

11:30-12:00 Welcome address. The implementation of the phase II of the UNIDO program for phasing out of MB in the soil fumigation sector in Vill. Ulianovka Lagodekhi region – Mr. Macharashvili Ambrosi, the farmer.

12:00-13:00 The integration of Georgia into the global programs for phasing out of MB in the soil fumigation sector. The protection of the ozone layer through phasing out of ozone depleting substances (MB). The importance of production environmentally friendly products - Dr. Koba Khutsishvili – the project manager and the president of CSP

13:00-13:30 Coffee break

13:30-14:00 Integrated Pest Management – Dr. Zurab Loladze, IPM expert

14:00-14:30 Drip Irrigation Systems and the results of it using-Mr.Bkhturidze Zurabi, the farmer.

14:30-15:30 The marketing of crops produced without ozone depleting substances (alternatives of MB). The introduction of the labeling system and its importance for marketing - Dr. Koba Khutsishvili – the project manager and the president of CSP

15:30-16:00 Discussion and Q/A Session

16:00 Refreshments

The fourth workshop for further expansion of MB alternatives in the soil fumigation sector under the phase II of the UNIDO program

Vill. Ulianovka, Lagodekhi region, 14 September 2006

The list of participants

1.	Qimidze Givi	Vill. Ulianovka
2.	Tabatadze Givi	Vill. Ulianovka
3.	Kusiani Zaliko	Vill. Ulianovka
4.	Jokhadze Avto	Vill. Ulianovka
5.	Gachechiladze Zurabi	Vill. Ulianovka
6.	Bakhturidze Judu	Vill. Ulianovka
7.	Bakhturidze Rostomi	Vill. Ulianovka
8.	Bakhturidze Olegi	Vill. Ulianovka
9.	Bakhturidze Petre	Vill. Ulianovka
10.	Tkemaladze Tamazi	Vill. Ulianovka
11.	Sulaberidze Valeri	Vill. Ulianovka
12.	Kusiani Tarzani	Vill. Ulianovka
13.	Bakhturidze Nugzari	Vill. Ulianovka
14.	Qimadze Avtandili	Vill. Ulianovka
15.	Bakhturidze Zurabi	Vill. Ulianovka
16.	Kusiani Judu	Vill. Ulianovka
17.	Qimadze Tarieli	Vill. Ulianovka
18.	Bakhturidze Mazuri	Vill. Ulianovka
19.	Jokhadze Tito	Vill. Ulianovka