



PERFORMANCE AUDIT REPORT





State Audit Office of Georgia

„Approved”

Head of Economic Activities Sphere Audit Department
Tornike Shermadini

**Performance audit of Activities
Against Brown Marmorated
Stink Bug and other Harmful
organisms**

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DEFINITIONS AND ABBREVIATIONS

Customs Department – Customs Department of Revenue Service - LEPL of the Ministry of Finance

Ministry – Ministry of Environmental Protection and Agriculture

Agency – National Food Agency – LEPL of the Ministry of Environmental Protection and Agriculture

List of pests – List of quarantine pests of plants for Georgia including the complete list of types of pests not registered or not widely spread throughout the country

BMSB – Brown Marmorated Stink Bug (*Halyomorpha halys*)

Annual Control Plan – State Phytosanitary Control Program of the LEPL National Food Agency, approved under the Order of the Minister of Environmental Protection and Agriculture, which is the set of preventive methods against outbreak and spread of risk-bearing pests throughout the country

Pheromone – substance for attracting a particular pest

Biological agent – natural enemy or other organism used against harmful organisms

Biologics – biological preparations and biological agents

Mechanical appliances – traps to attract pests by using pheromones and insecticides

Pesticide – chemical compounds used against harmful organisms of plants

Insecticide – one of the categories of pesticides used against harmful insects

Risky culture – plant that is eaten and damaged by pest

Harmful organisms – disease-causing agents that damage plant or products of plant origin and make them into the source of infection spread. Harmful organisms are: pests, weeds, diseases etc.

CBD – Convention on Biological Diversity

EPPO – European and Mediterranean Plant Protection Organization

WHO – World Health Organization



EXECUTIVE SUMMARY

Damage caused by pests to agriculture affects the social and economic situation of population. In recent years the problem of BMSB outbreak and prevalence has become especially crucial, which has been especially negatively affecting the amount of harvested hazelnut crops and export rate.

The government in 2018, as compared to 2017, significantly enlarged the size of measures against BMSB and as a result pest population has reduced. Moreover, increase of the prevalence area of BMSB is not observed. Despite the progress, it was still possible to have certain measures planned and more effectively implemented.

The audit covers the issues on the effectiveness of preventive and response measures against outbreak and prevalence of pests throughout the country by identifying the gaps and providing the recommendations. Namely:

GAPS IN PREVENTIVE MECHANISMS OF OUTBREAK AND PREVALENCE OF PESTS THROUGHOUT THE COUNTRY

To ensure prevention of outbreak and prevalence of pests throughout the country, it is important to develop effective annual program based on phytosanitary control methodology. Often, full prevention of penetration of pests on the country's territory is not possible, but its timely identification and instant implementation of actions enables the reduction of pest population, the localization within smaller prevalence and the reduction of damage.

There are gaps in the pest outbreak and prevalence prevention mechanisms in the country. BMSB was reported by the Agency in September 2016, after its wide spread on Georgia's territory, with damage already caused by BMSB to the agro cultures. The **monitoring mechanisms** in place have not been sufficient and efficient for timely identification of the threat of spread of BMSB. Therefore, anti-pest measures taken were not of prevalence preventive nature but of further response.

The Agency's phytosanitary control methodology being one of the most important preconditions for timely identification and prevention of pest outbreak and prevalence throughout the country, is of general nature and requires detailed specification.

Had the threat of BMSB outbreak and spread been timely identified, the government would have been able to earlier start the anti-BMSB actions and it would have enabled the localization of pest population on a smaller prevalence area.

RECOMMENDATION GIVEN:

- › To prevent outbreak and prevalence of pests throughout the country, the Ministry of Environmental Protection and Agriculture, together with National Food Agency, should develop detailed methodology of national phytosanitary control and/or standard operating procedures laying down the mechanisms of identifying the pest outbreak risks and planning and implementing the risk-response measures.



GAPS IN THE ANTI-BMSB MEASURES TAKEN

GAPS IN THE STRATEGY

Effective pest control is achievable by developing the relevant strategy and action plan covering the specific result-oriented **detailed** measures, rational grounds for setting the periods of their implementation, optimal estimation of resources, outputs to be delivered and their indicators. This will facilitate ongoing monitoring of the measures taken.

In implementing the measures against BMSB in 2017, the only main action plan of the Ministry of Environmental Protection and Agriculture and National Food Agency was US experts' recommendations and the Governmental Decree. In 2017, the Decree was supplemented by the action plan of fight against BMSB approved by the Governmental Commission, which is not detailed enough and allows for inconsistent interpretation and does not provide for outputs assessment indicators.

Moreover, measures, laid down under the Governmental Decree, to be implemented against the pest initially, in 2017, only covered three areas: monitoring, control measures and awareness raising, and in 2018 it was added the R&D works being one of the crucial components for fight against pest in a long-term.

RECOMMENDATION GIVEN:

- › For effective operation, the Ministry of Environmental Protection and Agriculture together with the National Food Agency should develop a detailed action plan, which, alongside other important topics, would provide for risk-bearing cultures, environment impact, and factors of maximum coverage of BMSB prevalence area, and outputs assessment indicators. This will facilitate the following: effective control of pest population, reduction of damage to environment, monitoring of complete implementation of the planned measures and evaluation of effectiveness of the results achieved.

GAPS IN THE AREA OF ENVIRONMENTAL PROTECTION

It is important that anti-pest mechanisms are both **effective** and **safe** for the environment, humans and agriculture, which would be facilitated by using less toxic and effective chemicals as well as biological and mechanical appliances. Main means used against BMSB are pesticides. In general, chemicals, together with target pest, affect healthy insects and create threat to ecological equilibrium. Of note that during pest prevalence, to reduce population in a force majeure situation, fight with chemical method is the most successful one.

Experts from the USA provided information to the Agency on most effective insecticides against BMSB and recommended to determine their effectiveness in a local setting. In addition, they shared their experience that Bifenthrin is the most effective chemical and actively used in the US as it has both high destructive effect on the pest and the longest residual action¹ taking the priority over other chemical substances.

¹ If spraying method is used, insecticide stays on a plant for up to two weeks and affects migrated new pests too.



Among anti-BMSB pesticides, Bifenthrin has been selected based only on the US experts' advice, and deltamethrin - based on the Agency's experience. Discussion of individual factors for selection of Bifenthrin are provided in various sources, including: presentation of American expert, video recordings of working meetings held with foreign experts, emails and guidance files. As for selection of deltamethrin-containing insecticide, the discussion is provided in the Agency's internal official document demonstrating that thermal fogging has been effective in the past against Fall webworm moth. Moreover, the Agency conducted experimentation of deltamethrin-containing insecticide which showed positive assessment of biological effectiveness of thermal fogging against BMSB.

A single summarizing document showing the impact of each of the factors on final decision-making, to be considered in selection of optimal insecticides has not been drafted. This is important for institutional memory as well as for analysis and assessments to be performed by all stakeholders.

The scope of application of mechanical appliances and biologics, compared to chemical, is low. Out of mechanical appliances, mainly the so-called "attract-and-kill" traps are used.

It is important to note that by reduction of chemical measures, application of biological preparations, biological agents and mechanical appliances will support reduction of the risk of damage to the environment.

RECOMMENDATIONS GIVEN:

- › To minimize damage to environment, the National Food Agency should evaluate the effectiveness of environmentally safe mechanisms and, if found reasonable, increase the application of biologics and mechanical appliances.
- › In planning the use of pesticides, based on the recommendations of foreign experts, the National Food Agency should conduct documented analysis and provide for the rationale of selecting the optimal option pesticide in terms of effectiveness, cost-effectiveness and toxicity.

GAPS IN THE AREA OF COMPLEX CONTROL

Effective control of pest population and minimization of economic loss is possible by **as full as possible control** of the prevalence area to prevent migration of a pest from untreated areas to adjacent premises.

Despite the annual increase of the size of measures taken by the Agency against BMSB, and improved results generated in comparison to the previous year, there is a need for improvement of mechanisms applied for achieving integrated control.

Measures implemented against BMSB failed to cover certain part of the pest prevalence area and thus was less effective as evidenced by the following factors:

- › The 2017 plan provided for treatment of only hazelnut culture and only the lands with less than 5 ha area. However, it should be noted that additionally part of maize lands



were also treated. As explained by the Agency, according to the 2017 plan, treatment of hazelnut lands with more than 5 ha area was not foreseen for the following reasons: "Their owners are large entrepreneurs and they should take plant protection measures with their own efforts. Measures to be taken by the Government covered main vulnerable group of population, majority of whom possessed hazelnut plantations from 0 to 5 ha area". However, there are no controls of assurance that large entrepreneurs treated their own lands.

- › In 2017, it was planned to give insecticides to the population. Based on the results of the Agency's survey (734 beneficiaries surveyed) we could presume that out of 230 000 households in 2017 approximately 25% of them have not used the pesticides given to them at all.
- › In 2018, mainly hazelnut and maize lands were sprayed, and residents' homestead lands were treated only on nearby roadsides, within 150-meter radius.
- › Mainly thermal fogging was used through respiratory exposure to pest and has no residual action. Based on the above-mentioned circumstances, there were remaining some untreated lands from where the risk of migration of BMSB to treated areas was high.

As explained by the Agency: „It should be noted, that based on the program approved under the Decree No 224 of the Government of Georgia dated 30 January 2019 on Measures to be taken in the country against BMSB, the Government has not assumed the obligation that it would be able to solve the problem of BMSB with its own efforts only and without active involvement of public. Consequently, as much as possible involvement of public was foreseen in the course of taking the measures, under the slogan "Let's fight BMSB together". With specialized equipment available for the Agency intended for treatment of large areas, it is not permissible to take mass spraying works with residual-action bifenthrin in homestead lands of the residents where various agricultural and decorative cultures as well as domestic animals are present".

RECOMMENDATION GIVEN:

- › To enhance control on pest population and minimize the migration risk, the Ministry of Environmental Protection and Agriculture together with the National Food Agency should develop, plan and put in practice the controls and their monitoring system enabling as much as possible coverage of prevalence sites through combined and complex methods of fight against pests.

GAPS IN THE AREA OF PUBLIC AWARENESS RAISING

In fighting against pests, community involvement and understanding of their role is crucially important since major part of agro cultures are enclosed in the yards. BMSB overwinters in buildings. Destroying the hibernation phase is the precondition for preventing the increase in the quantity of pest for the coming year. Raising of public awareness will facilitate their increased involvement and positively affect reduction of the quantity of BMSB.

Public awareness raising activities implemented by the Agency during 2017-2018 cost about GEL 900 000. The main source of information campaign was media, social networks, printed material and direct interactions with the population.



Despite supplying the information to the population through various means, the awareness level is low. Awareness mechanisms used by the Agency are necessary but insufficient.

About 230 000 households are benefiting from the program. Out of 945 recordings provided by the Agency, in 270 instances (29%) the population is not informed about the methods of fighting the pests, instructions for use of pesticides, and measures to be taken by the Agency. It is also important to note that from the incoming calls in 590 cases (62%) the population is requesting that Government should take response actions and treat their orchards. This points out that the population does not have the understanding of its role in fighting the pests although every household was given one-liter pesticide and printed information material concerning fight against pests including the methods of fighting pests, use of pesticides and safety measures in household settings.

Therefore, in these terms, effective mechanisms need to be developed, measures enhanced and better community involvement assured. To improve level of public awareness on plant protection and health safety, it might be more helpful and effective to directly provide information to them, to identify focus groups by priorities and deliver trainings on the importance of public involvement and the methods of fighting not only against BMSB but against pests in general.

RECOMMENDATION GIVEN:

- › To raise the level of public awareness, the National Food Agency should plan and deliver large-scale campaign through which the public will be directly informed on the methods of fighting pests and will understand the importance of their involvement. This will ensure increased participation of the community in anti-pest actions.



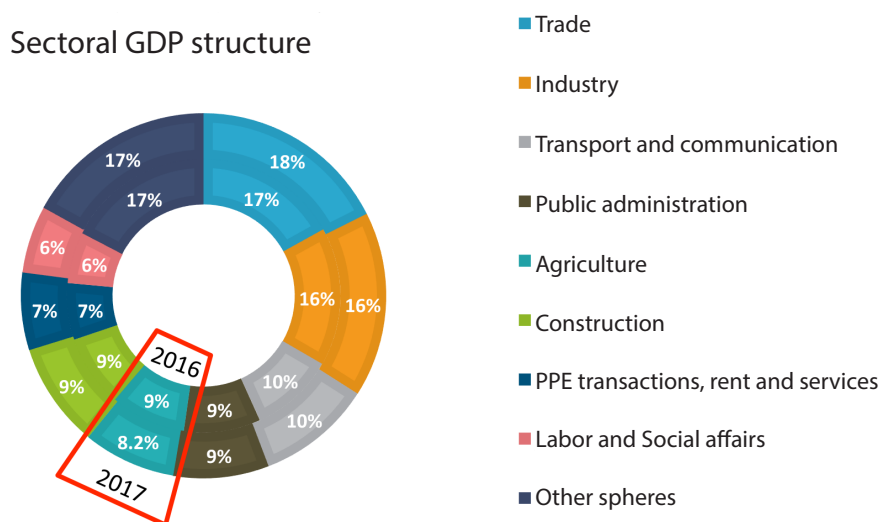
INTRODUCTION

THE GROUNDS OF AUDIT

Agriculture is a particularly important sector for the country's population. About 43% of Georgia's total territory is considered as farming lands (სოფლის მეურნეობის სამინისტრო) (Ministry of Agriculture). In addition, about 42% of total population lives in rural areas (საქსტატი) (GeoStat). Consequently, maximum use of agricultural potential is important for the population for improving both economic and social status.

According to 2016 data, in the sectoral GDP structure, agriculture took 9% of GDP, and in 2017 – 8.2%. Production of agricultural products in 2017 ranked 5 in the country's economy:

Diagram N1. Share of Agriculture in GDP (საქსტატი) (GeoStat)

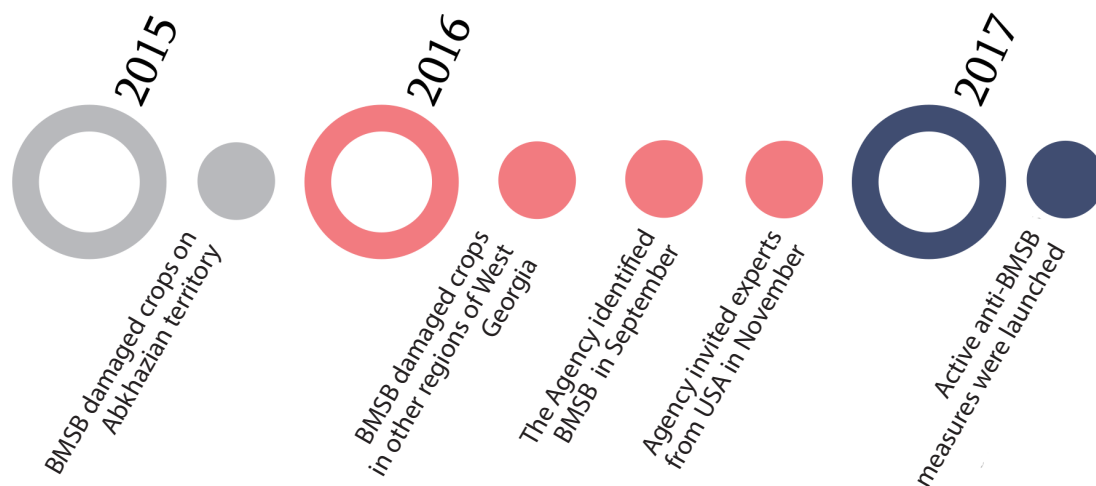


One of the key components in increasing the quantity and quality of agricultural products is plant protection against exposure of harmful organisms. Harmful organisms are: **pests, weeds, diseases**. In recent years, prevalence of pests in Georgia has become crucial, such as: Fall web-worm moth, grasshopper etc. (სურსათის ეროვნული სააგენტო) (National Food Agency), which not only damage but destroy agro cultures. Especially important is the problem of outbreak and prevalence of **BMSB** and measures against it.

BMSB was first reported in Georgia in 2015 (largely on Abkhazian territory) and in 2016 already caused significant damage to agro cultures in various regions of the West Georgia (NCDC)². Government started the planning of anti-pest measures at the end of 2016, and active actions were started to be implemented in 2017.

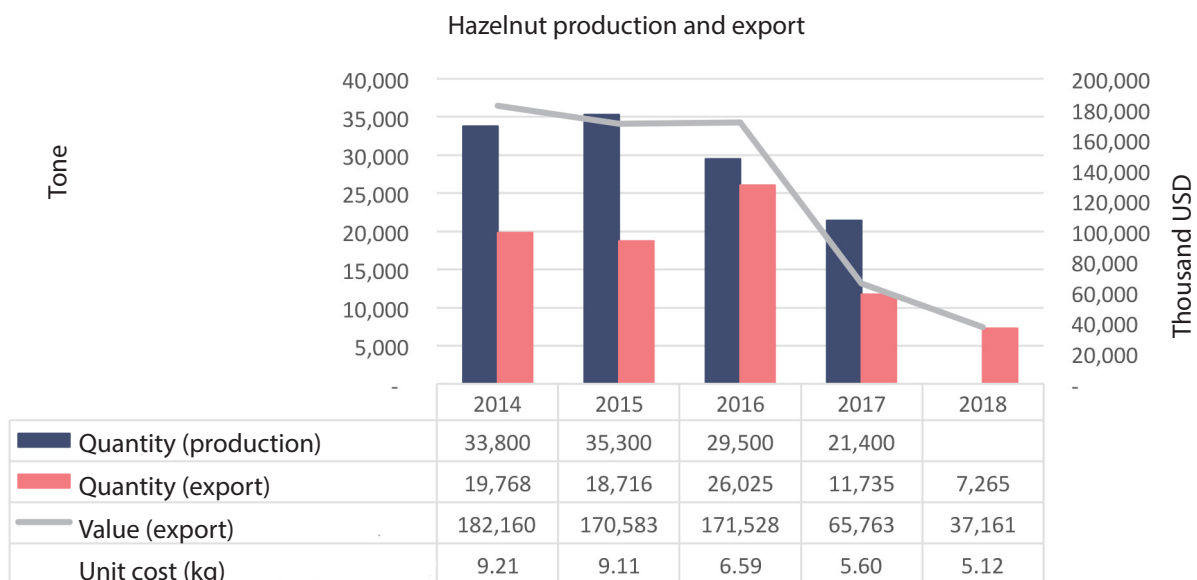
2 National Center for Disease Control and Public Health.

Figure N1. On starting the stages related to BMSB in Georgia



BMSB caused particular damage to hazelnut culture. Crops reduced by 16% in 2016 and by 27% in 2017. Damage caused to manufacturers and exporters made USD 53-69 mln in 2016. Hazelnut export which ranked 2nd by size in 2016, drastically decreased in the next period both in terms of overall quantity and overall value. Of note that reduced hazelnut crops in 2016 reflected on the 2017 export rate.

Diagram N2. Hazelnut crops (საქსტატი, 2018) (GeoStat 2018)³ and export value ⁴ (საბაჟო დეპარტამენტი, 2014-2018) (Customs Department, 2014-2018) statistics.



Moreover, export price of one kilogram hazelnut has also decreased. One of the reasons presumed is the deteriorated quality due to damage caused by BMSB. BMSB perforates the hazelnut shell, thinning the nutmeat, sucks and creates cork-like decaying stains. It is believed that BMSB

³ By the approval date of the Audit Report, statistical data on 2018 harvest of hazelnut crops had not been published.

⁴ Weighted average price of shelled and unshelled hazelnut.

damages the nutmeat in the early stage of formation due to which kernel is not developing and rotting (აგრონიუს.გე, 2017) (Agronews.ge, 2017). As explained by Georgian scientists, mechanical damage helps development of decay-causing fungus at all periods of formation (ქართველი მეცნიერები UNDP-ის მხარდაჭერით, 2016) (Georgian scholars through UNDP support, 2016). Despite individual statements, we were not able to obtain scientific study that would confirm or deny that damage caused by BMSB is the immediate cause of fungus diseases.

Besides hazelnuts, BMSB destroys pomaceous- and stone-fruits, berries, vegetable cultures, primarily damaging apple, peach, nectarine, pear, raspberry, tomato, pepper, sunflower and maize. During Enhanced prevalence of the pest the crops loss can reach 70% (სურსათის ეროვნული სააგენტო, 2018) (National Food Agency, 2018). Unless effective measures are implemented, there is a risk that BMSB could spread out in East Georgia too.

During 2017-2018 the Government funded the measures against BMSB with about GEL 60 mln. Moreover, in 2019 GEL 45 mln is foreseen in the state budget.

Table N1. Funds allocated during 2017 - 2019 as part of fight against BMSB.

Year	GEL
2017	20,261,823
2018	39,365,082
2019	45,000,000

Plant protection against harmful organisms is one of the items of the Association Agreement with the EU. Georgia has assumed the obligation (under the Directive 2000/29/EC) in the area of plant protection the objective of which is prevention of entry of harmful organisms on the territory of the EU and thus parties have the obligation to preclude penetration and spread of harmful organisms in the country.

AUDIT OBJECTIVE AND KEY QUESTION

The objective of the audit is to assess effectiveness of the **preventive and response measures** against outbreak and prevalence of agricultural plant pests throughout the country, identify the damage caused by pests to agriculture and the **causes** of decreased crops and to give relevant recommendations.

How effective are the measures taken against BMSB and other pests?

- › To what extent the mechanisms in place enables prevention of outbreak and prevalence of pests throughout the country.
- › How complex is the strategy developed against BMSB?
- › How prompt and appropriate are the measures taken against BMSB?



AUDIT SCOPE AND METHODOLOGY

The audit period has been defined the period from BMSB spread (2016) until the end of the audit.

Auditees:

- › **Ministry of Environmental Protection and Agriculture** (hereinafter “the Ministry”);
- › **LEPL National Food Agency** (hereinafter :the Agency”);
- › **LEPL Revenue Service Customs Department** (Hereinafter “the Customs Department”).

Because BMSB widely prevailed in Georgia, the audit team has also studied the effectiveness of country’s preventive phytosanitary methodology as well as of measures planned and implemented against BMSB.

When assessing the preventive mechanisms against pests, the audit team examined whether the risks are identified in a timely and effective manner when developing the annual control plan.

The issues of environment safety, together with achieved objective of BMSB population reduction, have been also examined.

Government procurement compliance issues has not been the subject of audit.

The following methodology has been used for audit procedures:

- › Study EU directives and international practice;
- › Review the information supplied by auditees (strategy, action plan, measures implemented, and financial figures);
- › Interviewing the auditees’ relevant persons in charge and other stakeholders;
- › Working meetings with subject-matter specialists, to analyse the problems identified by them and the relevant recommendations;
- › Quantitative and statistical analysis.

ASSESSMENT CRITERIA

The legislative acts regulating the government control of pests have been applied as audit criteria.

LAWS:

- › Law of Georgia Food Products/Animal Feed Safety, Veterinary and Plant Protection Code;
- › Law of Georgia on Pesticides and Agrichemicals.



ORDINANCES:

- › Ordinance No 429 of the Government of Georgia dated 31 December 2010 on approval of the procedure of phytosanitary border-quarantine and veterinary border-quarantine control;
- › Ordinance No 343 of the Government of Georgia dated 05 May 2014 on approval of 2014-2020 Bio Diversity Strategy and Action Plan of Georgia.

ORDERS:

- › Joint Order N2-7–N33 of the Minister of Agriculture of Georgia and Minister of Finance of Georgia dated 25 January 2010 on approval of the rules of phytosanitary protection of Georgia's territory against penetration and spread of quarantine and other hazardous harmful organisms;
- › Order N2-235 of the Minister of Agriculture of Georgia dated 29 October 2013 on approval of state catalogue of pesticides permitted for use in Georgia;
- › Order N309/N of the Minister of Labour, Health and Social Affairs of Georgia dated 16 May 2001 on approval of hygienic norms of pesticides contents in environmental facilities;
- › Order of the Minister of Agriculture of Georgia N2-272 (2016), N2-14 (2017) and N2-22 (2018) on approval of food safety, veterinary and phytosanitary state control of the Legal Entity of Public Law National Food Agency.

DECREES:

- › Decree No 588 of the Government of Georgia dated 24 March 2017 on measures to be implemented against BMSB;
- › Decree No 224 of the Government of Georgia dated 30 January 2018 on measures to be implemented in the country against BMSB.

Best practice examples as well as standards developed by the international organization have been also used for evaluating the performance of auditees:

- › EC (European Commission);
- › World Health Organization (WHO);
- › Convention on Biological Diversity (CBD);
- › European and Mediterranean Plant Protection Organization (EPPO);
- › US Department of Agriculture (USDA);
- › Government of Canada;
- › Government of Australia;
- › Government of New Zealand.

Considering that the topic of audit is specific and requires expertise, the audit team also based upon the studies of the entomology scholars, their knowledge and experience.



BACKGROUND

In the area of plant protection, Government requirements are as follows (საქართველოს კანონი): (Law of Georgia)

- › Protection of country's territory against outbreak, entry and spread of quarantine harmful organisms;
- › Protection of plants, products of plant origin, other regulated phytosanitary objects against harmful organisms through phytosanitary measures;
- › Prevention of harmful effects of pesticides and agrochemicals on human and animal health and the environment.

Phytosanitary protection of Georgia's territory against penetration of harmful organisms to the country at the Customs Checkpoints during importation of products of plant origin is carried out by the *Customs Department*, and in the rest of the country – control is implemented by the *Agency*.

Image N1. Customs Department Checkpoints



The terms and conditions for importation of goods subject to phytosanitary control are prescribed by the Agency, and border-quarantine **control** under the phytosanitary rule **is carried out** by the *Customs Department* (საქართველოს მთავრობა) (Government of Georgia).

LEPL – CUSTOMS DEPARTMENT OF REVENUE SERVICE

At border checkpoints, control is carried out in compliance with the rule of implementing phytosanitary border-quarantine control (საქართველოს მთავრობა)(Government of Georgia), setting out the procedures of phytosanitary control. Cargo intended for entry into Georgia is subject to the following at the border inspection point:

- › Document verification;
- › Identity verification;
- › Plant health control;
- › Sampling for on-site inspection or laboratory test.

Revenue Service approves the Monitoring Plan laying down the frequency of sampling for each commodity and quarantine harmful organisms, by countries of origin. Before its approval, the Monitoring Plan is to be agreed with the Agency.

Table N2. Number of phytosanitary products checked and deviations detected at Customs Checkpoints (საბაჟო დეპარტამენტი, 2016-2018) (Customs Department 2016-2018)

Year	Inspected cargo	Detected harmful organism	Detected harmful organism %
2018	2,478	43	1.74%
2017	1,281	12	0.94%
2016	732	15	2.05%

In case if violation is detected, imported product is returned back, destroyed or permitted to enter if it is subject to handling, sorting, package modification or processing and this eliminates the detected risk.

Table N3. Number of decisions made on harmful organisms detected as a result of phytosanitary border-quarantine control during 2016-2018 (საბაჟო დეპარტამენტი, 2016-2018) (Customs Department, 2016-2018)

Year	Returned	Import permitted
2018	42	1
2017	8	4
2016	13	2

LEPL – NATIONAL FOOD AGENCY

State plant protection control under the annual program is carried out by the Agency. The following are the tasks of the Agency:

- › Organizing a plant quarantine, protecting country's territory against entry and spread of harmful organisms;
- › Developing annual program of phytosanitary state control;
- › Phytosanitary diagnostics of cultivable lands, forecasting of harmful organisms and implementing measures against them;
- › Phytosanitary monitoring;
- › Risk management and communication based on risk assessment in accordance with the legislation.

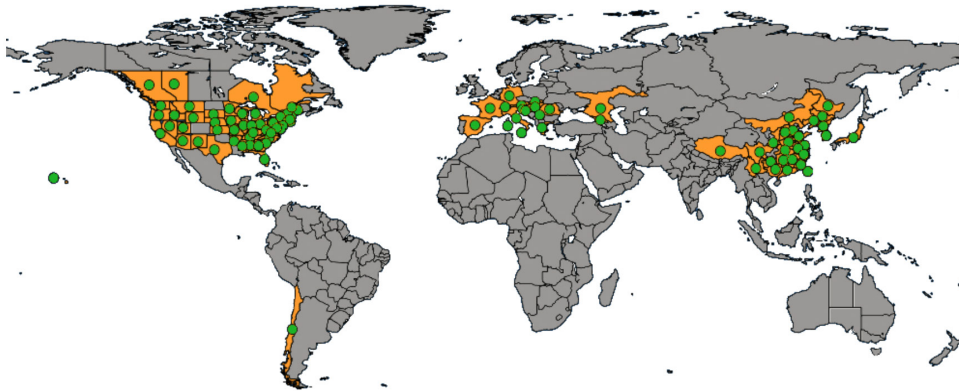
In the area of phytosanitary during 2017-2018 the Agency's top activity was fight against BMSB. A subprogram "Measures to be implemented Against BMSB" was developed in 2017 based on the Decree No 588 of the Government.



BROWN MARMORATED STINK BUG

BMSB is native to south-east Asian countries from where it has spread.

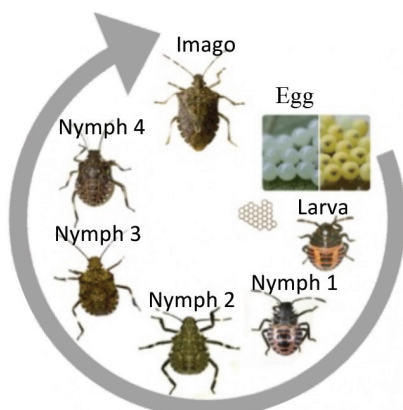
Image N2. Prevalence area of BMSB globally. (EPPO)



BMSB (in Latin - *Halyomorpha halys*) is a pest insect that is eating the so-called "host" plants. BMSB begins eating of plants from spring and continues until late autumn. Pest eats leaves, shoots and juice of the fruit of a plant. With the help of strong proboscis drills the fruit of a plant, thins its filling and creates cork-like decaying stains. The pest overwinters in residential homes, crawls in cracks, attics, door and window holes, as well as under the thick layer of leaves falling in the woods and in the tree hollows.

After overwintering BMSB starts additional eating and grouped egg laying on the bottom of the leaves. In 4-5 days reddish nymphs (worms) are born that gradually change color (in the next phase become blackish and later whitish-brownish), after passing 5 different phases they become adult pests – imago (სურსათის ეროვნული სააგენტო, 2018) (National Food Agency, 2018).

Figure N3. Life cycle of BMSB



BMSB was spread in Sochi in 2014 and in 2015 it has widely prevailed in Abkhazia (EPPO). Consequently, it is less probable that the cause for prevalence of BMSB in the West Georgia was from products imported from customs checkpoints (see. image N1). However, the official sources do not identify the ways of penetration of BMSB.

AUDIT FINDINGS

1. GAPS IN THE PREVENTIVE MECHANISMS OF OUTBREAK AND PREVALENCE OF PESTS THROUGHOUT THE COUNTRY

For prevention of outbreak and prevalence of pests throughout the country, it is important **to develop and implement effective annual state control program based on phytosanitary control methodology**. Phytosanitary control methodology lays down the **mechanisms** for effective functioning of prevention, timely detection, rapid response and management of pests outbreak and prevalence in the country (კანადის მთავრობა). (Government of Canada).

Prevention of outbreak and prevalence implies not only complete elimination of pest outbreak, where possible it also covers timely identification of the risk of outbreak, and readiness for fighting it, being the precondition for terminating the rapid spread of population. It should be emphasized that based on the pest's biological features, sometimes it is impossible to fully prevent its penetration in the territory.

The following steps should be considered when planning the effective phytosanitary control (ევროკომისია) (European Commission):

Figure N1.1 Phytosanitary control planning process



Monitoring of the types of pests – Collection of complete data on pests existing throughout the country's territory, as well as inquiry from various sources and review of the information on pests spread globally and especially on the neighboring countries' territory. This is necessary to draft the list of nonregistered and not widely spread pests.

Different countries enhance the monitoring mechanism already for a far future threat, one of the best ways for preventing outbreak and prevalence of pest on the territory. For instance, in Australia BMSB is not spread, but the Department of Agriculture of Australia has assessed the risk of outbreak of BMSB on country's territory as high and made prompt effective steps (ავსტრალიის მთავრობა). (Government of Australia)

The respective Department has drafted various material, which assesses the risks and channels of pest outbreak, and reviews the experience that can be shared from other countries' examples, lays down future action plan drafting methodology, provides explanation to the public on how to differentiate between local species (that is not as harmful as BMSB) and BSMB with illustrated documents.

In addition, the Department advises the public to immediately notify if such insect is observed (ავსტრალიის მთავრობა, 2018) (Government of Australia). Similar measures were also taken by the Government of New Zealand (ახალი ზელანდიის მთავრობა, 2018) (Government of New Zealand).

List of pests – complete list of the types⁵ of pests **nonregistered and not widely spread** throughout the country's territory. Ongoing update of similar list is the precondition for effective state phytosanitary control, because the pests to be inspected within the Agency's annual program (სოფლის მეურნეობის მინისტრის ბრძანება, 2016-2018), Order of the Minister of Agriculture) and as part of border-quarantine control, are defined on the basis of this very list.

Identification of risks – Based on the list of pests and the monitoring, timely detection of the pests with high probability to penetrate or spread from the neighboring countries, and prioritization of the types. In addition, timely identification (early warning systems) of pests spread on adjacent territories of Georgia and prompt response against penetration in the country.

Annual control program – set of preventive methods against outbreak and prevalence of risk-bearing pests throughout the country.

The Agency drafts annual control program based on the list of pests, which was last updated in 2014. There are 13 non-registered and not widely spread 13 pests not including BMSB. According to the Agency, the list of quarantine harmful organisms is updated in consideration of the lists of European and Mediterranean Plant Protection Organization (EPPO).

Based on EPPO's data, BMSB was first reported in 2014 and in 2015 widely spread in Abkhazia. However, this information was officially published by the organization in August 2016. It turned out to be belated for the Agency to take timely measure of prevention of prevalence of BMSB.

Second source of information based on which the Agency can learn from pest migration and spread, is the monitoring system in place in the organization. The Agency has identified the pest in September 2016 where BMSB had already caused damage to hazelnut culture in the West Georgia. Detection of the spread of unknown pest was the fact that harvested crops were damaged. As explained by the organization, presumably the entry of BMSB from Abkhazia to Samegrelo's territory started from spring 2016, when hibernation period ended and it reactivated.

Based on the above, in 2016 BMSB was not included in the annual control program because it did not end up in the plan from the list and neither monitoring mechanisms detected timely the threat of prevalence of the pest.

⁵ This list includes pests that are not observed in Georgia, or is scarcely present in some specific regions. Preventive measures should definitely be intended against outbreak and prevalence of such pests.

THEREFORE:

- › *The existing monitoring mechanisms against outbreak and prevalence of pests are not sufficient and effective because they do not assure timely identification of risks causing delayed planning and launching of appropriate measures.*

One of the causes of these problems is the shortcomings of national-level phytosanitary methodology. The complete methodology would have provided in detail the effective mechanisms of prevention of pest outbreak and **prevalence and management** and standard operating procedures for their implementation.

According to the best practice, the methodology highlights that development of mechanisms should provide for the following: identifying the points of penetration of pests in the country, ways of entry and spread, the risk of spread from neighboring countries, level of impact and threat, early warning systems, prevention and reduction methods and their effectiveness (ევროკომისია) (European Commission).

As explained by the Agency, phytosanitary control is planned according to the rules of phytosanitary protection of the Georgian territory against outbreak and spread of phytosanitary border-quarantine control (საქართველოს მთავრობა) (Government of Georgia, as well as quarantine and other hazardous harmful organisms (სოფლის მეურნეობის და ფინანსთა მინისტრები, 2010) (Ministers of Agriculture and Finance). These documents provide for the phytosanitary control rules at customs checkpoints and the rules of control of products, material, sites and vehicles subject to phytosanitary control. However, **it can not be considered as comprehensive methodology for identifying the risk-bearing pests, updating the list and preventing their outbreak and prevalence through different ways in the country.**

Clearly, due to BMSB's biological features, its full prevention against its outbreak was impossible, but had the problem been identified earlier, preliminary preparation of anti-pest measures, early planning and launching would have significantly simplified the fight against BMSB and the control of its population.

CONCLUSION

Preventive measures of outbreak and prevalence of pests on the country's territory has certain shortcomings.

Agency's phytosanitary control methodology, being one of the most important preconditions for timely identification and prevention of outbreak and prevalence of pests on the country's territory is of general nature and requires detailed specification.

BMSB was reported by the Agency after its wide spread on Georgia's territory, with damage already caused by BMSB to agro cultures. Therefore, the measures taken against the pest were not of prevalence preventive nature but of further response.



Had the threat of BMSB outbreak and spread been timely identified, the Government would have been able to earlier start the actions against BMSB and it would have enabled the localization and control of pest population on a smaller prevalence area.

RECOMMENDATION

- › To prevent outbreak and prevalence of pests throughout the country, the Ministry of Environmental Protection and Agriculture, together with National Food Agency, should develop detailed methodology of national phytosanitary control and/or standard operating procedures laying down the mechanisms of identifying the pest outbreak risks and planning and implementing the risk-response measures.



2. GAPS IN MEASURES TAKEN AGAINST BMSB

2.1 GAPS IN THE STRATEGY

The objective of the fight against BMSB is pest population control and management to minimize the economic loss caused by it.

Effective pest control is achievable by developing the relevant strategy and action plan covering the specific result-oriented **detailed measures**, methods of their implementation, optimal estimation of resource expenditure, outputs to be delivered and their indicators. This will facilitate ongoing monitoring of the measures taken.

In drafting the action plan, environmental, economic, social and human health threats are also considered in addition to the reduced quantity of pest. Consequently, it is necessary to develop mechanisms that provide for the following forms of assessment of effectiveness of protection of agro cultures (განათლების ხარისხის განვითარების ეროვნული ცენტრი) (National Education Quality Development Center):

1. **Biological** – quantity of pests before and after pesticide spraying.
2. **Environmental** – status of healthy fauna before and after pesticide spraying.
3. **Commercial** – potential yield of plant and actual outcome after taking the measures.
4. **Economical** – input and output assessment.

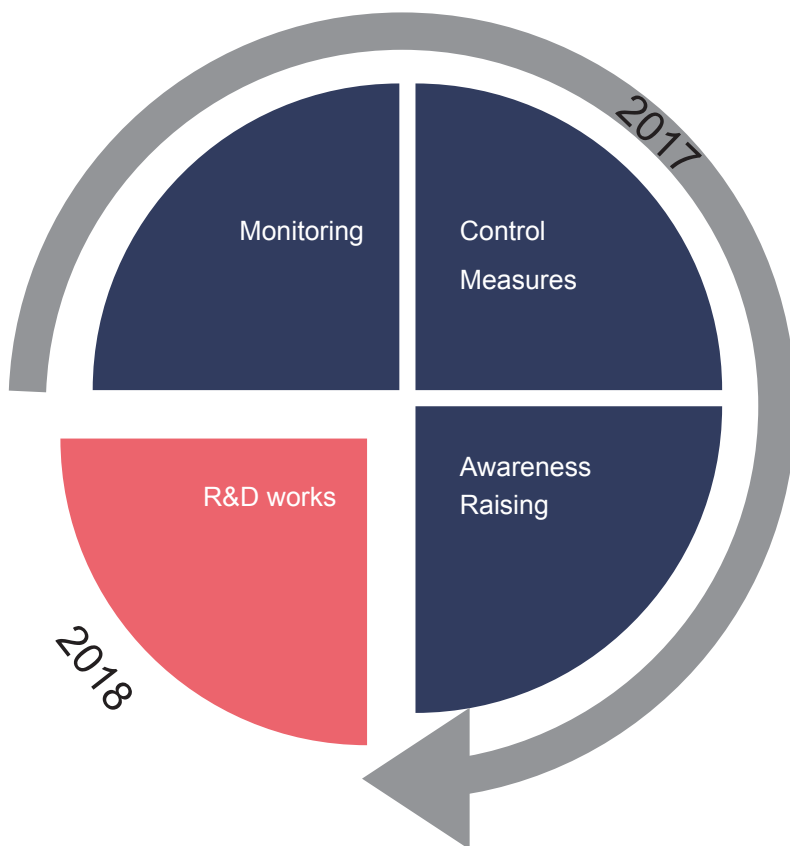
In order to determine area of prevalence, forecast the size of measures and define the period of implementation scientifically found **biological and environmental features** and behavior of pests should be taken into account in the development of strategy/action plan: number of generations during the year, and population gender proportion; drafting of phenological development guide scheme (phenogram) laying down the types of “host” plants and the organs of the plants where pest inhabits and feeds itself, hibernation phase, beginning of hibernation, mass hibernation and end, place of hibernation, period of first and mass waking from hibernation, pest’s feeding length, egg-laying period, beginning and end of larva hatching, periods of new generation, various ages of larva in the nature etc. All these factors are different in different periods and depend on: climate conditions, prevailing flora, fauna etc. To this end, BMSB requires observation and detailed study in Georgian setting.

US experts invited by the Agency in November 2016 gave the recommendations to conduct survey of area of prevalence of BMSB, biology and behaviour in Georgia. To set up database and prevalence map. This will enable for observation of BMSB’s behaviour and movement (invited foreign experts).

Nevertheless, the program against BMSB in 2017 covered only monitoring, control measures and awareness raising, and **R&D works** were added in 2018 (საქართველოს მთავრობა, 2018) (Government of Georgia), (see Figure N2.1.1). It is important to mention that in 2017 Georgian

scholars conducted a study on behaviour of BMSB in two experimental hazelnut orchards. And in 2018 the Agency started certain R&D works to studying the biology and behaviour of pest.

Figure N2.1.1 Areas of measures against BMSB (2017-2018)



In 2017, the organizations in charge were acting based only on US experts' recommendations and Governmental Decree, and in 2018 it was also supplemented by action plan approved by the Commission ⁶. The following assignments and information is contained in these documents:

- › Under the Decree issued in **2017** (საქართველოს მთავრობა, 2017) (Government of Georgia, 2017), for municipalities and government of AR Abkhazia, funds were allocated for remuneration of workers needed for treatment of hazelnut lands accounted for by them. Municipalities were assigned to conduct double spraying of hazelnut lands of the persons who were treating the hazelnut lands up to 1.5 ha area, and the possessors of the lands from 1.5 ha to 5 ha area were given bifenthrin-containing insecticides and pheromones. Of note that any actions for the possessors of hazelnut lands with more than 5 ha area were not foreseen on grounds that they are large entrepreneurs and should have implemented the plant protection actions with their own efforts.
- › The Decree adopted in **2018** (საქართველოს მთავრობა, 2018) (Government of Georgia, 2018) concerning the measures to be implemented in the country against BMSB, covers the

⁶ Governmental Commission set up for coordinating the planning and implementation of measures against BMSB – Decree N224 of the Government of Georgia dated January 30 2018.

following areas of program: information campaign, monitoring system, controls and R&D works. The Commission, set up as part of the above-mentioned Decree, approved the action plan that certain responsible agencies guided with, including the Ministry of Environmental Protection and Agriculture and National Food Agency. The action plan prescribes only the following: titles of the measures, organizations in charge and periods of implementation by months.

THEREFORE:

- › *Already in the first year the Governmental Decree did not provide for R&D works for studying (locally) the biological and ecological features of BMSB, but laid down them only in 2018;*
- › *Some activities provided for under the action plan ⁷ on fight against BMSB are not sufficiently detailed, and certain measures required development and official documenting/approval of individual action plan and/or methodology (for example: plan of trainings, plan of R&D activities).*

Action plan is not detailed, does not provide for assessment criteria and allows for inconsistent interpretation. For example: 1. Training activities does not foresee the amount of public to be trained, 2. What are the basis for identifying the territories and areas to be treated, 3. In the case of R&D – frequency of ongoing monitoring of selected demonstration lands is not defined etc.

Detailed specification of action plan and precise determination of assessment indicators will facilitate systemic and consistent approaches being the precondition for effective implementation of the actions.

CONCLUSION

Measures to be implemented against the pest as defined under the 2017 Governmental Decree covered three areas: monitoring, control measures and awareness raising, and only in 2018 it was added the R&D works being one of the crucial components of fight against pest in a long-term period.

In 2017, the only main action plan for the Ministry and Agency to implement measures against BMSB was the Governmental Decree. In 2018, the Decree was added the action plan for fight against BMSB, which in 2018, in comparison to 2017, improved the organization of fight against pest and it could have been one of the important factors to reduce BMSB population. Nevertheless, some of the activities of action plan are of general nature and requires detailed specification. For example: the plan is missing the output assessment indicators.

⁷ Action Plan on fight against BMSB but as approved by the Governmental Commission.



RECOMMENDATION

- For effective operation, the Ministry of Environmental Protection and Agriculture together with the National Food Agency should develop a detailed action plan which, alongside other important topics, would provide for risk-bearing cultures, environment impact, and factors of maximum coverage of prevalence area of BMSB, and output assessment indicators. This will facilitate the following: effective control of pest population, reduction of damage to environment, monitoring of complete implementation of the planned measures and evaluation of effectiveness of the results achieved

2.2 GAPS IN THE AREA OF ENVIRONMENTAL PROTECTION

According to the principles of the Convention on Biological Diversity, it is important that anti-pest mechanisms are both **effective** and **safe** for the environment, humans and agriculture (CBD, Principle 12).

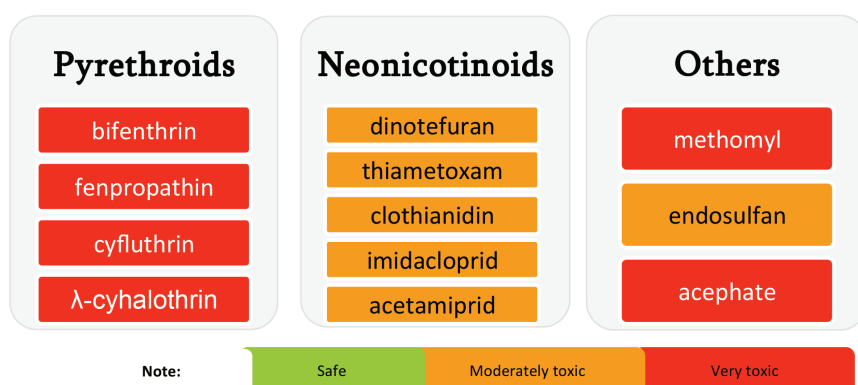
The following issues need to be considered in planning the safe and effective measures:

- In the case of prevalence of pest, **often chemical measures are effective as a short-term decision** (CBD). In general, chemicals are characterized by high fatality rate for various insects and can damage not only BMSB but healthy insects as well (preys and parasitoids). Nevertheless, to achieve immediate effect in a force majeure, anti-pest chemical method can be selected in which case the safety measures should be followed.

In the case of fight with chemical method, an optimal insecticide should be selected in consideration of the following key factors: toxicity level, effect of exposure on pest, duration of action, concentration and quality.

The experts from USA and Italy presented to the Agency the most effective anti-BMSB insecticides and gave recommendation to conduct a study in Georgian setting for evaluating their effectiveness (მონვეული უცხოელი ექსპერტები) (invited foreign experts), as the effectiveness of insecticides can modify due to climate conditions and diverse behaviour of BMSB in different environments.

Figure N2.2.1 The experts have presented the most effective insecticides against BMSB



In addition to the recommendation of conduction of studies in local settings, experts invited from USA shared the US practical experience with the Agency. Preparation of up to 60 different classes have been independently tested in three US laboratories in the following terms: residual action of pesticide on pest, contact action and exposure during eating. The results of the studies showed that Bifenthrin is the most effective chemical substance because it has both high destructive effect on the pest and the longest residual action⁸ taking the priority over other chemical substances. Bifenthrin-containing insecticides are actively used in the USA against BMSB.

Anti-BMSB chemical measures were implemented with insecticides that contained bifenthrin and deltamethrine which, according to the WHO international classification, are toxic (WHO).

According to the Agency, use of Bifenthrine-containing insecticides started on the basis of US expert's recommendation as they believed that their multiyear experience would be the best option considering the existing critical situation ⁹. The decision to use deltamethrine was mainly based on the previous years' experience of the Agency against fall webworm moth

Discussions held on individual factors in selecting the bifenthrine is provided in various sources, including in the presentation delivered by American expert, video recordings of working meetings with foreign experts, emails and guidance files.

A single summarizing document showing the impact of each of the factors on final decision-making, to be considered in selection of optimal insecticides has not been drafted. This is important for institutional memory as well as for analysis and assessments to be performed by all stakeholders.

As for selection of deltamethrin-containing insecticide, the discussion is provided in the Agency's internal official document demonstrating that thermal fogging has been effective in the past against Fall webworm moth. Moreover, the Agency conducted experimentation of deltamethrin-containing insecticide, which showed positive assessment of biological effectiveness of thermal fogging against BMSB (number of pests before and after spraying).

2. In a short-term period fight with chemical method to reduce population is more effective than classical biological control. However, biological method is ecologically safe. Biological control, due to ecologically clean nature, is reasonable in places where use of pesticides are especially hazardous (CBD). To maintain ecological safety, unlike chemical measures, biological agents as well as **biological preparations and mechanical appliances are used.**

In 2018, the Government of Georgia has defined R&D works as one of the areas for fight against BMSB. The objective of these works is to **identify biological enemies (bioagents), define their possible use and rationale and study the effectiveness of biologics** (საქართველოს

8 If spraying method is used, insecticide remains on the plant for up to two weeks and affects new migrated pests too.

9 Bifenthrin-containing preparations were registered in Georgia in 2004 and by that time the experience in their use was available.

მთავრობა, 2018) (Government of Georgia, 2018). For these purposes, in May 2018 GEL 500 000 was allocated to pay grants to the LEPL – Shota Rustaveli National Scientific Foundation, and on 30 October winners of the competition were identified. Therefore, significant results have not been achieved yet in this matter.

According to the Agency, in 2018 insect *Anastatus* was detected which after observation was considered as bioagent of BMSB (მედიი, 2018) (Media, 2018). However, it is necessary to facilitate its proportionate reproduction to regulate pest population.

As part of the anti-BMSB program, from mechanical appliances only the so-called “attract and kill” traps are used. However, the scope of this mechanism is limited (see subsection N2.3). Moreover, in the form of booklets the Agency provided the information to public on methods of fight with various mechanical appliances, such as nets and boxes.

3. For environmental safety it is also important to define hygienic norms of pesticide content in the environment per all components presented in the Table (სოფლის მეურნეობის სამინისტრო) (Ministry of Agriculture):

Table N2.2.1 Norms of pesticide content in the environment

	Bifenthrin	Deltamethrin
Soil	0.1000 mg/kg	0.010 mg/kg
Water	0.0050 mg/cubic dm	0.006 mg/cubic dm
Working zone air	0.0150 mg/cubic m	0.010 mg/cubic dm
Ambient air	0.0015 mg/cubic m	0.030 mg/cubic m
Products	0.04-0.5 mg/kg	0.01-5.0 mg/kg

It is to note that in samples taken by the Agency to define residual amounts of pesticides, the amounts of residues of bifenthrine and deltamethrine does not exceed the **standard norms**. However, if in future chemical substances are more intensely used, contamination of the above-mentioned components might become problematic. To this end it is necessary for the Agency to continue ongoing monitoring of the degree of contamination.

THEREFORE:

- › *Insecticides are selected after analysing individual factors reviewed in various sources. However, single summarizing document giving detailed description of decision-making factors has not been drafted.*
- › *Although in 2018 the Government allocated GEL 500 000 from the budget to activate the fight with biological methods, significant results have not been achieved yet in this area.*

CONCLUSION

Anti-pest measures are mainly implemented by use of pesticides. In general, chemicals, together with target pest, affect healthy insects and create threat to ecological equilibrium. Of note that initial rapid reduction of prevailed pest population is feasible only with chemical substances. Out of insecticides used against BMSB, bifenthrin was selected based on US experience, and the decision on the use of deltamethrin was taken based on the Agency's past experience.

Discussions held on individual factors in selecting the insecticides is provided in various sources, but a single summarizing document showing the impact of each of the factors on final decision making, to be considered in selection of optimal insecticides has not been drafted.

Use of biological preparations, bioagents and mechanical appliances, together with the reduced chemical measures, will facilitate reduction of risk of damage to the environment.

RECOMMENDATIONS

- › To minimize damage to the environment, the National Food Agency should evaluate the effectiveness of environmentally safe mechanisms and, if found reasonable, increase the application of biologics and mechanical appliances.
- › In planning the use of pesticides, based on the recommendations of foreign experts, the National Food Agency should conduct documented analysis to provide for the rationale of selecting the optimal option pesticide in terms of effectiveness, cost-effectiveness and toxicity.

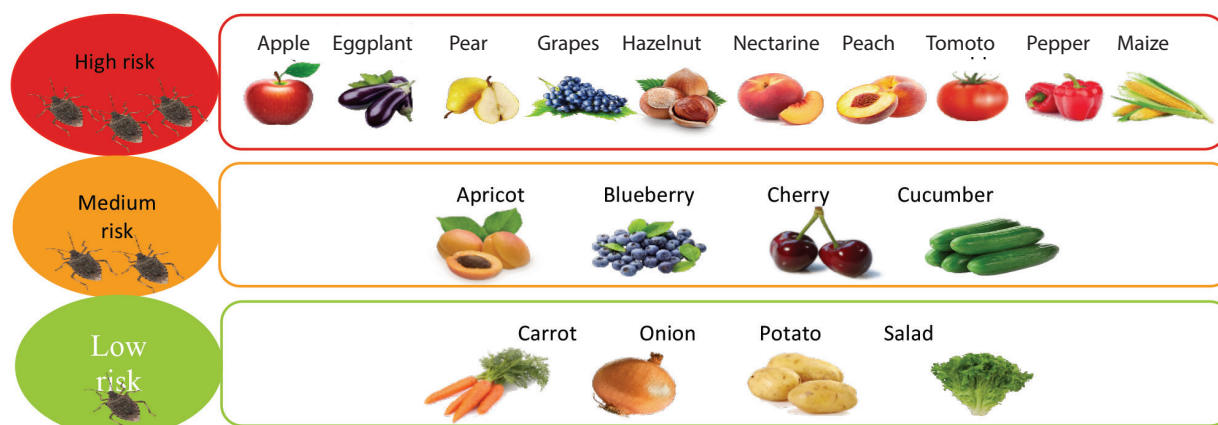
2.3 GAPS IN THE AREA OF COMPLEX CONTROL

To ensure pest population control and minimization of economic loss, as full **as possible control** of the area of prevalence is necessary. Anti-pest measures should be planned based on their, the so-called "host" plants; quantity (მონვეული უცხოელი ექსპერტები) (invited foreign experts) and on forecasting of the area of prevalence. It is possible that BMSBs migrate from untreated territories, where BMSBs will not be eliminated, to already treated lands.

There are more than 300 so-called "host" plants of BMSBs identified globally and the levels of risk of damage to them by BMSB has been also defined (მონვეული უცხოელი ექსპერტები) (invited foreign experts).



Image N2.3.1 Types of plants by levels of risk of damage by BMSB



According to the Agency's data, 80% of hazelnut orchards are in densely populated areas. Moreover, agro cultures bearing the risk of being damaged by BMSB are enclosed within homestead lands. Therefore, based on safety standards, simultaneous and different approaches are needed for integrated management of pest population (invited foreign experts).

For integrated control which also implies control of pests on inaccessible territories where treatment with pesticides is not feasible, or use of toxic substances is not recommended, especially effective are biological agents and mechanical appliances.

MEASURES IMPLEMENTED IN 2017

In 2017 the first anti-BMSB stage provided for double treatment of **only hazelnut lands** for persons possessing up to 1.5 ha hazelnut area, and providing of bifenthrin-containing insecticide and pheromone to persons possessing 1.5 ha to 5 ha hazelnut land areas. Of note that it was not foreseen to treat with anti-BMSB insecticide more than 5 ha land areas employed for hazelnut and other cultures because their possessors are large entrepreneurs and they should have taken plant protection measures with their own efforts. However, there is no mechanism that would control whether the areas with more than 5 ha had been treated or not.

To treat hazelnut land areas, municipalities were given bifenthrin-containing insecticides, as well as the remuneration for fuel and workforce. Based on the Governmental Decree, the Agency allocated the resources according to the hazelnut areas provided by the municipalities because there is no accurate official data about hazelnut plantation areas.

Decree was amended several times, including, **instead of double spraying it was defined to treat hazelnut areas one time**. Despite the Agency's logical clarification, because of BMSB's behaviour, due to further movement and reproduction of unsprayed pests, the risk of ineffectiveness increases.

Agency's clarification: „In 2017 anti-BMSB spraying works started on 12 June and lasted until 10 July. We should consider that due to low temperature, BMSB awakening from hibernation places was late. In addition, precipitation was unusually high which obstructed launching of spraying. Second spraying

foreseen by the program was not conducted in July because the waiting period (time from last spraying until harvesting) of the used agent (bifenthrine) coincided with harvesting period and the threat of residual accumulation of the drug was possible. Consequently, instead of double spraying of hazelnut areas, single spraying did have objective reasons. After harvesting of hazelnut crops, the Agency conducted the works at the sites of pest prevalence with thermal fogging and small-size spraying technologies, which covered hazelnut areas as well. Therefore, these territories were not left untreated”.

At the second stage (September), in total about 23 000 ha maize area was treated by pesticides, with **43% of maize sown areas in west Georgia**¹⁰ (საქსტატი) (GeoStat). In addition, about 230 000 households were given bifenthrin-containing insecticides, pheromones and awareness material (one litre of insecticide and one pheromone per household).

Regarding the resources given by the Agency on the basis of the Decree (საქართველოს მთავრობა, 2017) (Government of Georgia, 2017), municipalities presented only the breakdown of costs and total indicator of actually treated areas.

As for the use of insecticides given to the public, according to the information supplied by the Agency, interview with 734 beneficiaries shows that 75% of beneficiaries used the pesticide. In a situation where pesticide was given to 230 000 households, extrapolation gives us 57 500 households who reported in their interviews that haven't used pesticide at all.

MEASURES IMPLEMENTED IN 2018

MONITORING

The 2018 Governmental Decree does not provide for the types and areas of untreated agro cultures. Decision on untreated territory is made on the basis of monitoring program. In total 7895 monitoring traps are installed, of which monitoring is implemented at 2269 points as of August, with 29% of total traps. As explained by the Agency, due to high population or absence of pest at several traps in specific areas, other traps were not checked.

Table N2.3.2 Data generated from the last monitoring in traps¹¹ (გარემოს დაცვის და სოფლის მეურნეობის სამინისტრო, 2018) (Ministry of Environmental Protection and Agriculture, 2018)

Result of last monitoring	Number of traps	% of traps
More than 10 BMSB	329	4.2%
1-9 BMSB	686	8.7%
Nymph	11	0.1%
Other insects	721	9.1%
Trap is empty	522	6.6%
No monitoring conducted	5,626	71.3%
Total:	7,895	100%

¹⁰ Maize sown area in 2017 in West Georgia was 55 800 ha.

¹¹ August 2018

CHEMICAL MEASURES

In 2018 the key pest control measures were: spraying of destamethrin-containing pesticide with thermal fogging and treating of “attract and kill” traps with bifenthrin-containing insecticides. Thermal fogging is a respiratory exposure to pests, and spreads over 150 meters, and has no effect of residual action. In 2018, treating of homestead lands was not foreseen and mainly hazelnut and maize areas were treated. However, for more effectiveness, the Agency treated homestead lands nearby roadsides by thermal fogging. In comparison to 2017 the indicator of used resources significantly increased, especially the equipment needed for chemical treating and the size of treated areas consequently increased.

Table N2.3.3 Information on areas treated and pesticide used in 2018 (as of 10 September)

Municipality	Thermal fogging	Cold spraying	heavy equipment	Total
Area (ha)	470,140	75,076	50,298	595,514
Samegrelo	184,710	31,136	35,996	251,841
Imereti	156,660	25,984	7,373	190,017
Guria	108,690	15,504	6,929	131,123
Ajara	17,950	2,299	-	20,249
Racha-Lechkhumi	2,130	153	-	2,284
Pesticide (Litre)	208,565	28,184	17,824	254,573

GPS systems are installed on vehicles, data from which is entered into the program and this way their routes are controlled. In the program it is separately viewed each vehicle's, each route's report and does not allow for consolidated data in the program. Availability of such data would have simplified to get overall picture and get accurate information on territories remaining untreated to reduce the human factor risk (the routes passed are controlled by the employees through GPS data). Since the machine appliance can not access all places, different approaches and mechanisms should be used.

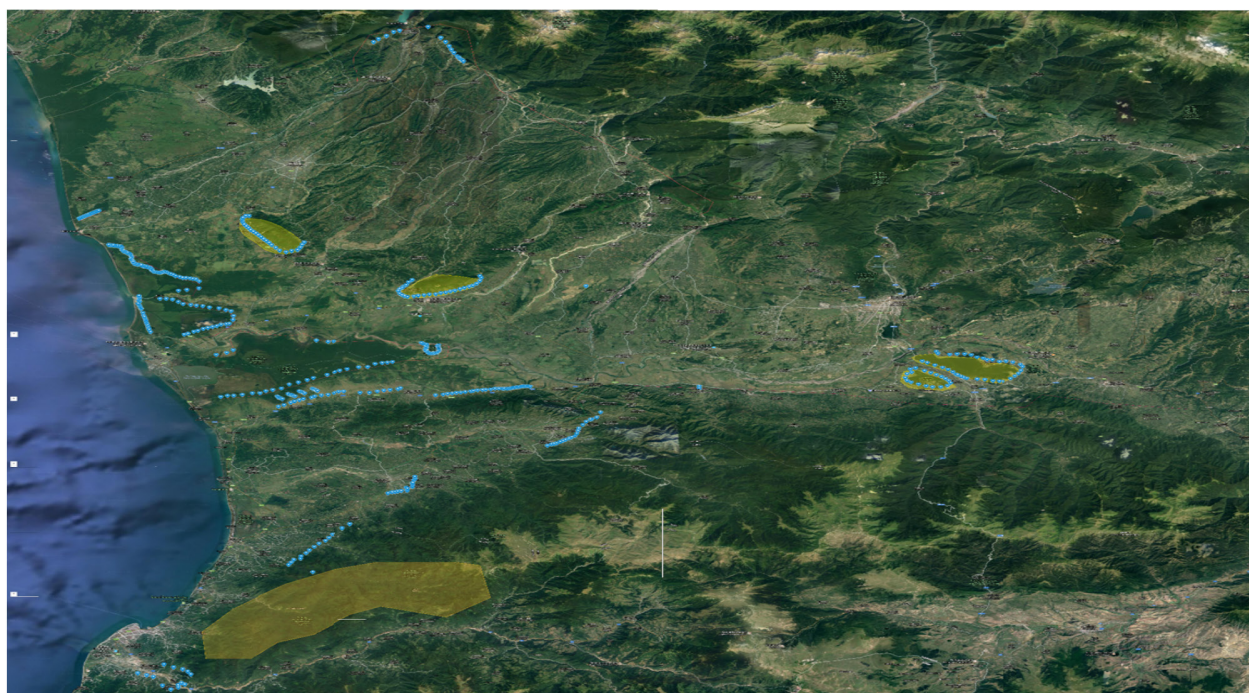
“ATTRACT AND KILL” TRAPS

As regards “attract and kill” traps, in the beginning of the measures, according to the Agency, in total 50 000 traps were placed to fight pests, and from 1 September 2018 another 50 000 pheromone was allocated to the regions to protect the population against pests moving for hibernation towards residential houses. Installation of these pheromones was done by the managers of self-governance bodies, as instructed by the Agency, on inner roadsides of villages in total approximately 17 000 km distance, on nonflowering plants.

It is recommended to install “attract and kill” traps with 50 m radius intervals (აშშ-ის ექსპერტები, 2018) (US experts, 2018), because action of pheromone spreads over 50 m. Coordinates of installed traps are not entered electronically and makes it impossible to assess the adherence to this standard. Only the traps installed on the parameters of woodland and protected territories are marked on the map – in total 464.



Image N2.3.2 “Attract and kill” traps map in the West Georgia (traps are marked with blue)



THEREFORE:

- › Despite the annual increase of the size of measures taken by the Agency against BMSB, and improved results generated in comparison to the previous year, there is a need for improvement of mechanisms applied for achieving integrated control.

It is important to note that the quantity of mechanical appliances used in fighting BMSB is low. The advantage of use of pheromone, i.e. mechanical appliances, unlike thermal fogging, is that it attracts BMSB only to a specific place where pests are sprayed. This method allows to avoid spraying of entire land plot/territory causing less damage to the environment. Moreover, chemical substance used during mechanical appliance has residual action and enables pest control in a longer term period.

Out of calls incoming through the hot line, the audit team analysed 945 calls and identified 153 incidences (16%) where the population points out that their villages have not been sprayed, or were sprayed but not their sections. Therefore, there is a **risk of migration of pest from untreated areas**. As clarified by the Agency: “All incoming information was adequately responded. Agency’s phytosanitary inspectors paid on-site visits and examined the situation, often reporting that the complaint or information was not relevant”.

Experts’ studies (ქართული და ამერიკელი ექსპერტები, 2017) (Georgian and American experts, 2017) and hot line calls (population is requesting treatment of neighboring abandoned orchards because pests are moving over to their orchards despite spraying) prove that there is a migration of pests from untreated territories to sprayed areas and reduces the effectiveness of measures implemented.

CONCLUSION

- › Despite the annual increase of the size of measures taken by the Agency against BMSB, and improved results generated in comparison to the previous year, measures implemented against BMSB failed to cover certain part of the pest prevalence area.

The following gaps have been identified in terms of integrated management:

- › In 2017 only hazelnut lands with less than 5 ha area were treated on which the municipalities have not performed validity and accuracy monitoring of the measures implemented. According to the Agency's survey, out of 230 000 households, about 25% have not used the given pesticide at all, treatment of hazelnuts lands with more than 5 ha area was not foreseen and there is no evidence whether the farmers themselves have implemented anti-pest measures or not. Also, only the part (43%) of maize areas was treated.
- › In 2018, mainly hazelnut and maize lands were sprayed and homestead lands were treated only nearby roadsides, within up to 150 radius. Mainly thermal fogging technology was used which is respiratory exposure to pests and has no residual action effect.

Based on the above-mentioned circumstances, there is a high risk of migration of pest from untreated areas of hazelnut, maize and other cultures as well as homestead lands to treated territories, increasing the risk of ineffectiveness of the implemented measures.

For full coverage of areas and reduced pest migration risk, assuring BMSB population control, it is also important to enhance use of mechanical appliances. If installed effectively, these mechanisms will attract the pests from inaccessible places and better control the area of prevalence.

RECOMMENDATION

- › To enhance control on pest population and minimize the migration risk, the Ministry of Environmental Protection and Agriculture together with the National Food Agency should develop, plan and put in practice the controls and their monitoring system enabling as much as possible coverage of prevalence sites through combined and complex methods of fight against pests.

2.4 GAPS IN THE AREA OF PUBLIC AWARENESS RAISING

In fight against pests, community involvement and raising of their awareness on measures to be taken, environmental protection and safety measures is very important. Public awareness raising is important not only as part of fight against BMSB, but also, in general on anti-pest and plant protection.

Since the government is not conducting large-scale measures on homestead lands of the community, and the major parts of orchards in Georgia are enclosed within these very yards, the role of public in fighting the BMSB is increasing.



Due to BMSB's biology, it overwinters in buildings, mainly roofs and cracks where use of chemicals is toxic and harmful. Killing of overwintering phase is the precondition to stop next year's growth of the number of pests. Consequently, public involvement is particularly important that can be achieved through effective information campaign.

Productive mechanism for effective information campaign is direct communication with the public on plant protection and anti-pest methods, **importance of public involvement, understanding of their role** and the benefits therefrom. For instance, **identification of target groups** by priorities and development of long-term plan of trainings.

Both in 2017 and 2018, one of the top areas of the Anti-BMSB measures Program was information campaign and financial funds were allocated, too.

Table N2.4.1 Budget planned for information campaign

Year	Planned funds (GEL)	Actual performance (GEL)
2017	96,990	96,990
2018	1,888,934	800,049

As laid down under the Governmental Decree (საქართველოს მთავრობა, 2018) (Government of Georgia, 2018), the main source of implementation of information campaign is media, social networks, printed material and direct interaction with public; 2018 action plan provides for training of local population to directly provide them information on the pest's biology, behaviour and methods against it, as well as the measures to be implemented by the Government. However, it is not specified in detail.

About 230 000 households are the beneficiaries of anti-BMSB measures. Hot line has been set up as part of the program with total 2479 incoming calls. From 945 recordings supplied by the Agency, in 270 instances (29%) does not have information about the anti-pest methods, instructions for use of pesticides, and measures to be taken by the Agency. It is also important to note that **in 590 instances of incoming calls (62%) public is requesting the government to take action and treat their orchards, which means that they don't have understanding of their role in fight against pests.**

THEREFORE:

- › *Despite supply of various means of information to the public, their awareness level is low. Part of the public does not have understanding of the importance of their involvement and has insufficient information on anti-pest pesticides and their use, because of ineffective mechanisms in place.*

The mechanisms planned to raise public awareness (booklets, webpage, social network) is less effective because there is a risk that the public does not read the handed-out booklets and they might not have access to internet resources.

CONCLUSION

Despite the information campaign implemented by the Government, the **level of public awareness of its role on anti-pest issues is not sufficient** and this requires enhancement of measures and improved involvement of the public. For improved level of public awareness on plant protection and health safety, more productive and effective could be direct supply of information to them and delivery of trainings on methods against not only on BMSB but also on importance of public involvement in fight against pests and on the methods of fight.

RECOMMENDATION

- › To raise the level of public awareness, the National Food Agency should plan and deliver large-scale campaign through which the public will be directly informed on the methods of fighting pests and will understand the importance of their involvement. This will ensure increased participation of the community in the anti-pest actions.

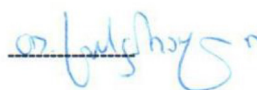
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Name, Surname

Tatia Tsiskarauli

Auditor

Signature



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