Supporting evidence-based pesticide regulation and risk reduction in Georgia, with a focus on vulnerable groups

FAO Project reference LoA/GF/UK/2015/AGPMR-P0318

Pictured:
Khatuna Akhalaia of Eco-Life discusses pesticide use with a farming family in Kvemo Kartli

Final narrative report

PAN-UK in partnership with Eco-Life

and the

Secretariat of the Rotterdam Convention

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CONTACT:

Pesticide Action Network UK
Brighthelm Centre
North Road Brighton BN1 1YD
Switchboard: Tel +44 1273 964230

www.pan-uk.org
www.facebook.com/PesticideActionNetworkUK
twitter.com/pan_uk
Company No. 2036915 Charity No: 327215

Introduction

This document summarises the key findings of a study of pesticide use in Kvemo Kartli, Georgia in 2016. It is intended as a discussion document and to help inform decisions regarding risk reduction and pesticide management in Georgia.

Glossary

For the purposes of the current report we have defined terms as follows:

Farmer – an adult (male or female) who is working their own family's land and whose income primarily derives from the sale of the farm produce

Farm worker – someone who is paid to do agricultural work on land that does not belong to them and for which they receive payment

Handle pesticides – someone who 'handles pesticides' does any of the following tasks; dipping livestock with pesticides; transporting/storing/disposing pesticide containers; mixing/diluting pesticides; maintaining spray equipment; applying pesticides

Summary

The current work is designed to contribute to better protection of public health by supporting the identification and reduction of risks posed by hazardous pesticides in Georgia. It is a response to a request for technical assistance from the Ministry of Agriculture in Georgia and builds on the results of a pilot study which was conducted by PAN-UK, Agroservice and the Rotterdam Convention in Georgia during 2014-15[1] with the support of FAO and the European Union.

The initial study revealed an alarming situation with regard to risky practices and potential levels of exposure to highly hazardous pesticides. The current study builds on this work to identify the people, products and exposure scenarios that are more frequently associated with pesticide poisoning in Georgia.

Poisoning

In the latest survey, 20% respondents who handle pesticides said they experienced signs and symptoms of pesticide poisoning over the previous twelve months. Some were experiencing such symptoms more than five times per year. Signs and symptoms included, for example, skin and eye irritation, nausea, vomiting, blurred vision, weakness, headaches and unusual heart rhythm.

Safety procedures

It was difficult to find anyone in Kvemo Kartli who followed standard safety procedures:

- Only 3% respondents had any training on safe handling of pesticides in the last decade.
- The pesticide label is a key source of information on pesticide safety, dosage and use. However, 34% farmers and 52% farm workers said they had difficulty reading or understanding the label. Reasons included the label being missing or damaged and the label being in a foreign language.

[1]FAO/EC project titled 'Improving capacities to eliminate and prevent recurrence of obsolete pesticides as a model for tackling unused hazardous chemicals in the former Soviet Union' (GCP/RER/040/EC).

- We only found two people who said they wore a protective coverall when handling pesticides. 99.8% said they wore ordinary clothes for this task.
- Only half the respondents had access to a tap where they could wash off spills when handling pesticides.
- 21% farmers and 34% farm workers said they sometime eat, drink or smoke while handling pesticides.
- 17% women and 7% men who handle pesticides said they sometimes apply pesticides with a broom or brush, rather than suitable equipment.

Vulnerability

Physiological factors increase the vulnerability of children and women, particularly breastfeeding and expectant mothers. Unfortunately, a large proportion of women in the study said that they took no extra precautions to avoid pesticide exposure during pregnancy. Given the general poor standard of safety, this is concerning. Female farm workers seem to be at particular risk, with more than half of mothers in this group aged 18-40 saying they take no extra precautions during pregnancy. The difference in response between Azerbaijani-speaking farmers (working on their own farms) and Azerbaijani-speaking farm workers is striking. This raises questions about working conditions for agricultural workers in particular.

Behavioural and social factors can influence exposure to pesticides. For example, more men said they handle pesticides than women. The gender difference is much more marked among Azerbaijani speakers than Georgian speakers, as illustrated in Figure 2. On the other hand, 55% women hand-wash pesticide-contaminated clothing compared to 20% men.

Social factors also include language. Just 5% of the Azerbaijani speakers told us that they speak Georgian, and only 1% also read Georgian. This could affect their ability to access safety information

Risks to environment

Poor safety practices not only endanger the end user's health but also the wider community and the environment. 56% respondents said that there was an open water source in or next to an area that is sprayed with pesticides. In this case, it is likely that pesticide run-off can contaminate the water – increasing the risks to users.

Financial risks

Hazardous pesticides can not only exact a high price in terms of human health and the environment, but in economic terms too[2]. A survey of Kvemo Kartli in 2012, conducted by the Swiss Agency for Development and Cooperation, found that 52% respondents assessed their economic situation as 'bad' ('income/ harvested products are only enough for nutrition') while a further 19% said they do not meet their own income or nutritional needs from harvested products. In this context, even small

[2] UNEP (2013) Costs of inaction on the sound management of chemicals. http://www.unep.org/hazardoussubstances/Portals/9/Mainstreaming/CostOfInaction/Report_Cost_of_Inaction_Feb2013.pdf

economic losses can have a significant impact on rural livelihoods. The following findings represent economic losses to farmers:

- By using the wrong product, dosage or frequency, farmers are wasting resources, encouraging pest resistance and failing to achieve the desired level of pest control.
- Using pesticides that are banned in other countries damages export markets
- Farmers are spending an average of 95GEL per season (€36.10) on the single pesticide they use most (1% farmers spend over 1000GEL, or €380, per year on a single pesticide)
- 3% farmers reported losing days' work in the last 12 months due to the effects of pesticides on their health (1-14 days' work lost)
- 37 incidents of livestock poisoning were reported, including cattle, sheep, chickens, bees, dogs. These represent significant economic losses.

Background

Target area

The focus of the current study is the southern region of Kvemo Kartli. The region has a population of 518,120 and an average household size of 3.9. This area is one of relatively intense agricultural production and pesticide use and a high number of women seasonal workers. 42.5% of the population works on their own farm[3].

The main crops include grains (corn, barley and wheat) and vegetable growing (potatoes, tomatoes, onions, beet, cucumber). Fruit orchards are common on smallholdings and a small number of large commercial farmers grow orchard fruits.

Kvemo Kartli is an ethnically diverse region, mainly populated by Georgians (56.3%), Azeri (36.8%) and Armenians (5.6%).

[3] http://csogeorgia.org/uploads/publications/80/1-eng.pdf

Map showing Kvemo Kartli

Source: Google Maps Kvemo Kartli, shaded in red.

Pesticide poisoning

Acute poisoning by pesticides can be fatal. A range of other serious, permanent effects from acute poisoning by pesticides include malignancy, teratogenicity (foetal abnormality) and organ damage. At lower doses symptoms may be less severe in the short term but chronic exposure is associated with serious impacts such as cancer, nervous system damage, reproductive disorders, developmental problems and disruption of the immune system.

Users of pesticides often have a poor understanding of the impact they have on their own health or the health of others. This undermines efforts to promote safer practices. Pesticide regulators and decision-makers also lack essential information on the scale and causes of the problem that would help them to make more robust regulatory decisions. The work described herein aims to better understand the issues in this country and to share the findings with regulators, affected communities and other stakeholders.

Vulnerable groups

Some groups are more vulnerable to pesticide poisoning such as women, particularly expectant mothers and those who are breastfeeding, and children. These groups form a relatively large proportion of agricultural workers worldwide. It is estimated that over two-thirds (70%) of all working children are found in agriculture (ILO IPEC, 2000). Since many children below the age of employment live on farms, the risk of accidents and pesticide exposure is relatively high.

Migrant, seasonal and casual workers are also prevalent in agriculture. They may be particularly vulnerable to pesticide poisoning due to language and literacy barriers, as well as lacking the means or confidence to question hazardous work practices due to precarious conditions of employment.

The current study was designed to capture new information on the exposure of women, children and ethnic groups to hazardous pesticides. Respondents were asked which languages they speak or read; Georgian, Azerbaijani or Russian as an indicator of potential issues regarding reading and understanding safety information in Georgian, and also as a signifier of other cultural differences that may be linked to pesticide exposure and risk.

Consultations

The purpose of the project is to support farming communities and decision-makers to make better informed decisions regarding the management of pesticides and risk reduction. To this end, a group of key decision-makers, drawn from several ministries and institutions, has been invited to engage with the project throughout its implementation. Participants were drawn from the Ministry of Agriculture, the Ministry of Environmental Protection and Natural Resources, the National Food Agency, the Institute of Toxicology, the National Centre for Disease Control, and Information Control Centres in Kvemo Kartli.

The following meetings have taken place:

- Inception meeting hosted by Ecolife in Tbilisi in February 2016
- Meeting with Information Consultation centre in Bolnisi District, April 2016
- Meeting between Khatuna Akhalaia, Ecolife, and the Head of Marneuli Municipality
- High level meeting hosted by Ecolife, PAN-UK and Secretariat of the Rotterdam Convention 29th March 2016
- Interim meetings with Irma Tskvitinidze, DNA, of the National Food Agency in order to keep her informed of activities and findings
- Final meeting for sharing results and planning next steps, October 2016

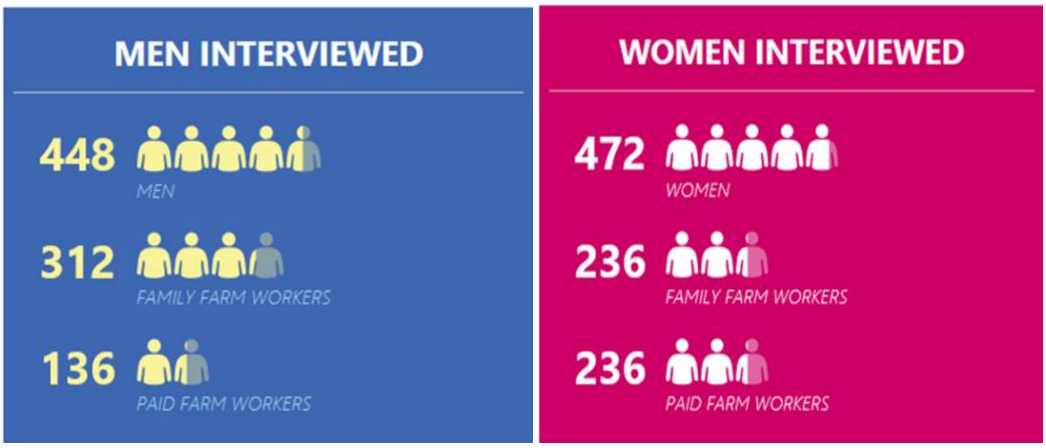
Reports of all meetings are available on request. The report from the final meeting is found in Annex 5.

Methodology

Georgia lacks a reporting mechanism for pesticide poisoning incidents. The pilot study revealed that few people seek medical or other assistance when a mild or moderately severe incident occurs. In order to better understand the scale and nature of pesticide poisoning in Georgia, it is necessary to meet with rural people and explore the circumstances, frequency and severity of incidents of pesticide poisoning. To this end, PAN-UK has developed new survey tools based on the ones that were developed and tested during the previous pilot phase. The new survey was tested with field workers (enumerators) before being tested and modified in the field with farmers and farm workers and then rolled out to 920 farmers and farm workers.

Respondents were selected to give a reasonable representation of men, women, farmers, farm workers and people for whom Georgian is not their first language so that adequate comparisons could be made between the different groups in terms of risk of pesticide exposure and poisoning.

Table 1 Number of respondents from different groups



The survey team of eight were recruited from a variety of backgrounds. As far as possible, we took on suitably qualified people from the target communities themselves, including a medical doctor working in an Azeri village (female), two farmers (female), a researcher in agricultural entomology and several agricultural students. The team were provided with guidance materials and a four-day training course as well as regular follow up from Ecolife (face-to-face and by telephone) and feedback sessions on data quality from PAN-UK (by Skype).

The survey was developed in Excel format. All the data was rigorously checked and corrected before analysis. The system is sufficiently flexible to allow for a large variety of relationships to be explored. It is possible, for example, to disaggregate the data by gender, age, farm size and a large variety of other factors. A summary of results is presented below.

Results

Characterising the participating farms – size, crops

Farm sizes were small in the target area. 69% participating farmers were on farms of under a hectare and only 1% were farming more than 15ha.

Table 2. Farm size of participating farmers

0<1 ha	1<5 ha	5-15ha	>15 ha
379	131	30	7
69%	24%	5%	1%

Perhaps surprisingly, more than half of farms of under 1ha employ one or more workers. More predictably, the proportion of farms employing workers increased as farm size increased (Figure 1).

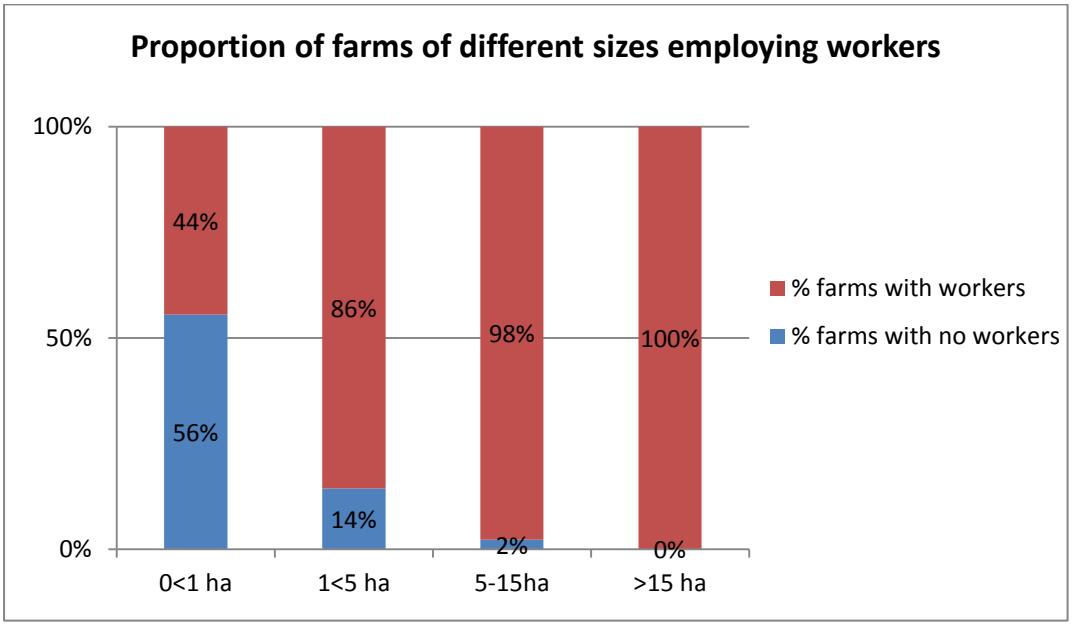


Figure 1. The proportion of farms of different sizes employing workers

Common crops included potatoes, tomatoes and cucumber (Figure 2). Many of the farmers were also livestock owners.

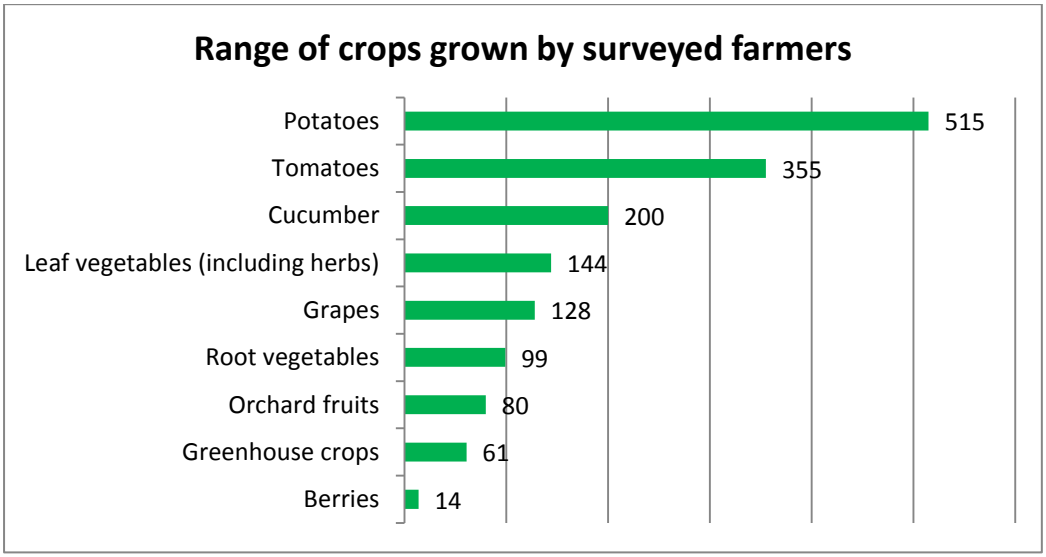


Figure 2. Range of crops grown by surveyed farmers

Languages Spoken

The two main languages spoken among the target population were Georgian and Azerbaijani. The Azeri population are mostly settled in the area and long term residents. **Just 5% of the Azerbaijani speakers told us that they also speak Georgian, and only 1% also read Georgian.**

To disaggregate the interviewed people in Georgian speakers and Azerbaijani speakers we took in account the written and read language: respondents stating that they could speak, write and read Georgian were considered Georgian speakers, even if they also speak Azerbaijani but do not read or write it. Conversely, respondents declaring that they could speak, read and write Azerbaijani and

also speak Georgian, but are not literate in Georgian, were reported as Azerbaijani speakers. People sometimes only speak, but not read or write, only one language which has been reported as first language. Russian is sometimes spoken by both Georgian and Azerbaijani people as a second language.

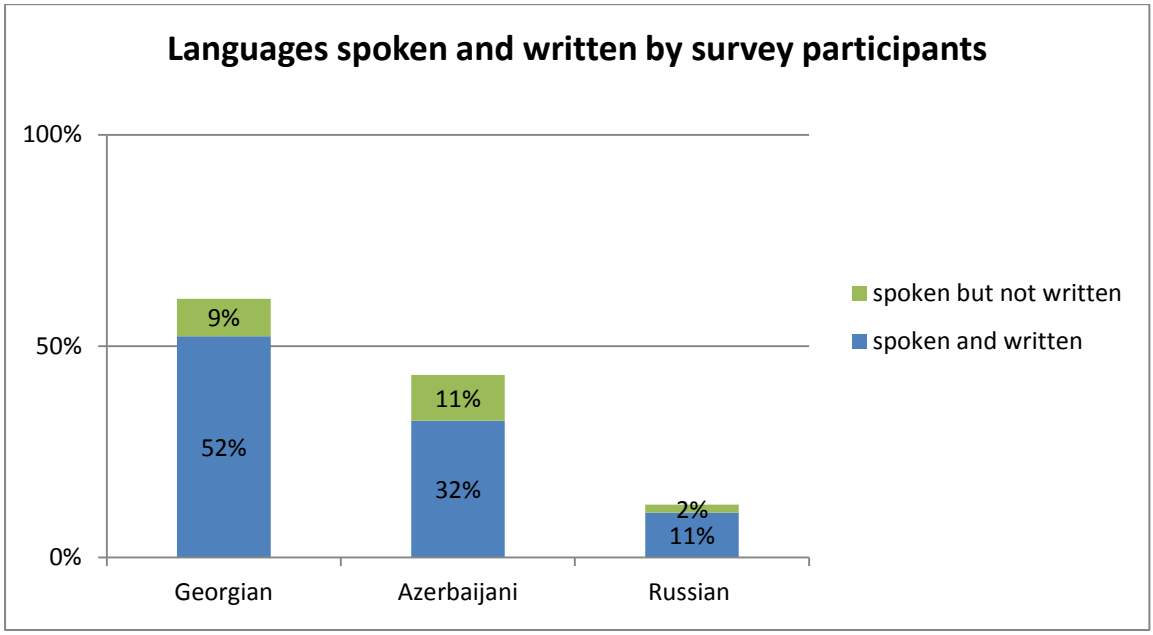


Figure 3. Languages written and spoken by survey participants

Age and Gender

Participants were asked their age and main occupation (farmer, farm worker or other). 'Farmer' refers to someone who works on their own family farm. 'Farm worker' or 'paid farm worker' refers to someone who works on someone else's land for payment.

14 (4%) participating farm workers were under 18 years (11 boys, 3 girls). Only two participants in the survey were under 18 years and working on their family farms, both were girls.

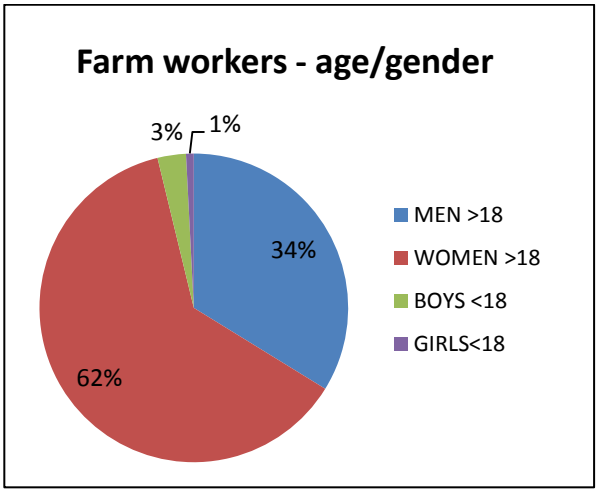


Figure 4. Age and gender distribution of participating farmers

Figure 5. Age and gender distribution of participating farm workers

Pesticide exposure on the farm

The survey asked participants about the kind of tasks they undertake on the farm. Clearly, tasks that bring people into direct contact with pesticides increase the risk of exposure. Some less direct exposure routes include handling and picking produce that has been applied with pesticides, weeding (particularly if herbicides are also in use) and handling seed or grain which has been treated with pesticides.

Looking at the graphs below, one can see that, among farmers, there is a relatively even distribution between men and women of planting, weeding, harvesting and handling/packing produce. The pattern is somewhat different among paid workers; a greater proportion of women taken on the planting, weeding, harvesting and handling/packing produce than men.

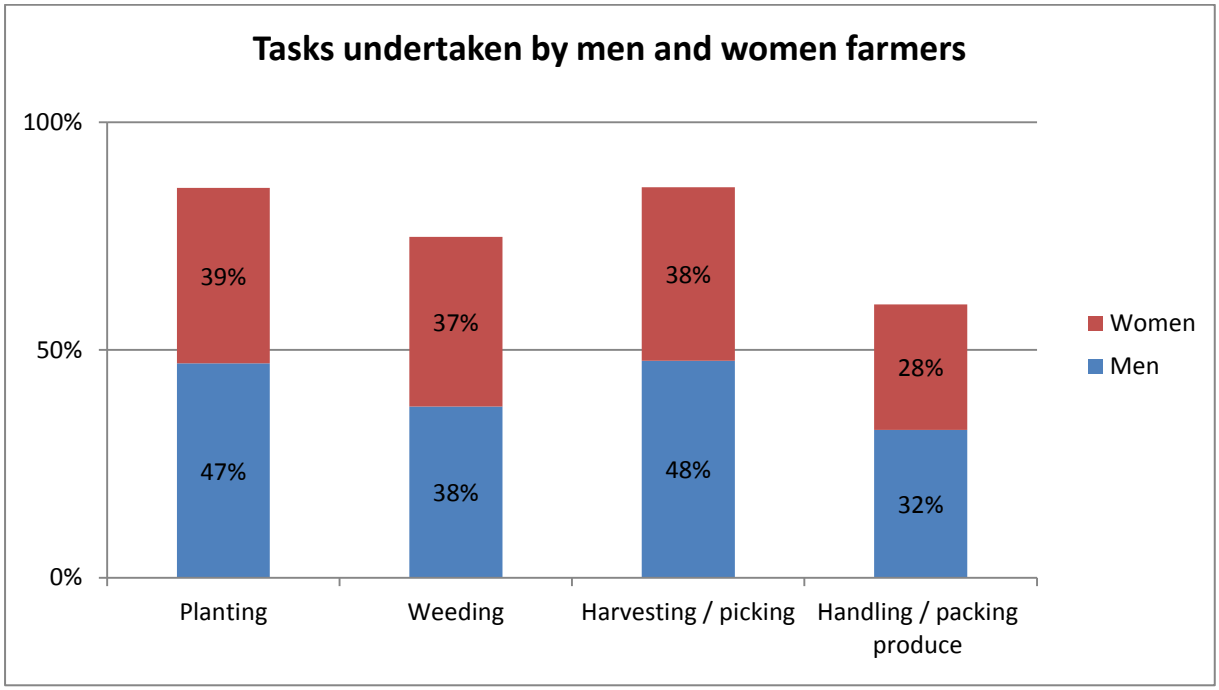


Figure 6. Tasks undertaken by men and women farmers

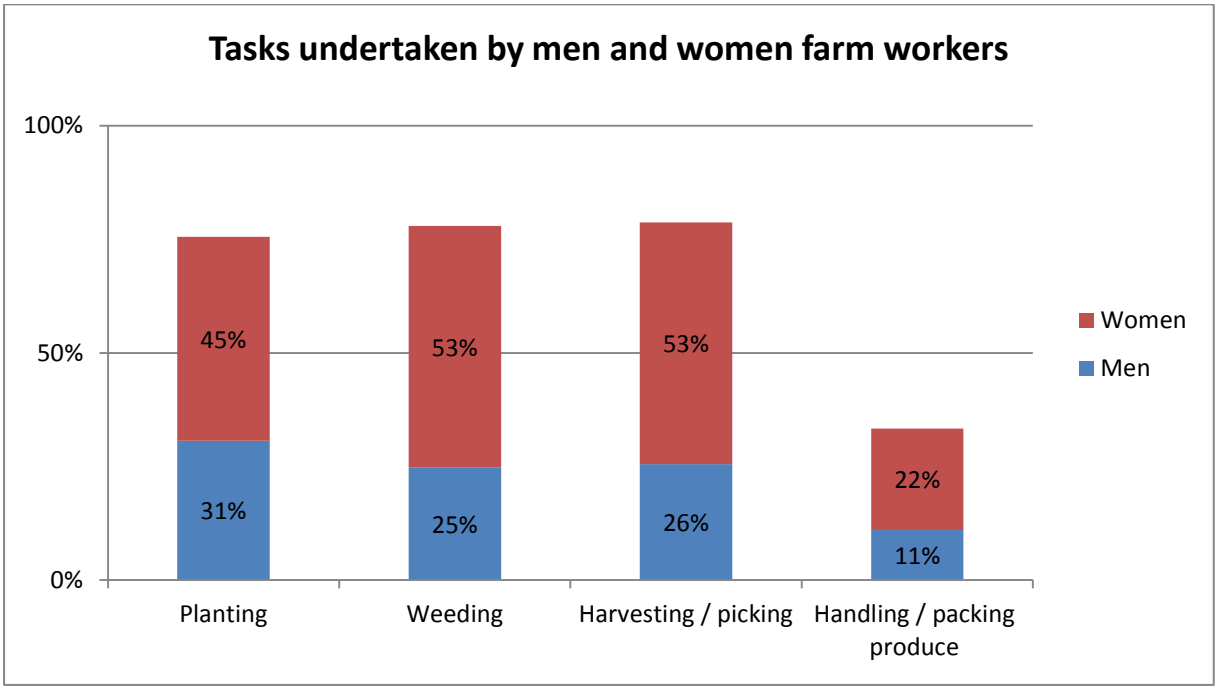


Figure 7. Tasks undertaken by men and women paid farm workers

Handling pesticides

All survey participants were asked about the different tasks they conduct on the farm. The respondents that agreed that they undertake one or more of the following tasks are deemed as 'handling' pesticides directly:

- Dipping livestock with pesticides
- Transporting/storing/disposing pesticide containers
- Mixing/diluting pesticides
- Maintaining spray equipment
- Applying pesticides

The data were analysed to determine the proportion of respondents that undertake these tasks, and to identify any differences between men/women or people speaking and reading Georgian and Azerbaijani.

Table 3. Number of participants handling pesticides

	HANDLE PESTICIDES			DON'T HANDLE PESTICIDES
	GEORGIAN FIRST LANGUAGE	AZERBAIJANI FIRST LANGUAGE	TOTAL HANDLING PESTICIDES	TOTAL **NOT** HANDLING PESTICIDES
MEN FARMERS	230	64	294	17
%	97%	85%	94%	5%
WOMEN FARMERS	129	21	150	84
%	80%	28%	64%	36%
MEN FARM WORKER	69	40	109	26
%	85%	73%	80%	19%
WOMEN FARM WORKER	10	28	38	197
%	5%	54%	16%	84%

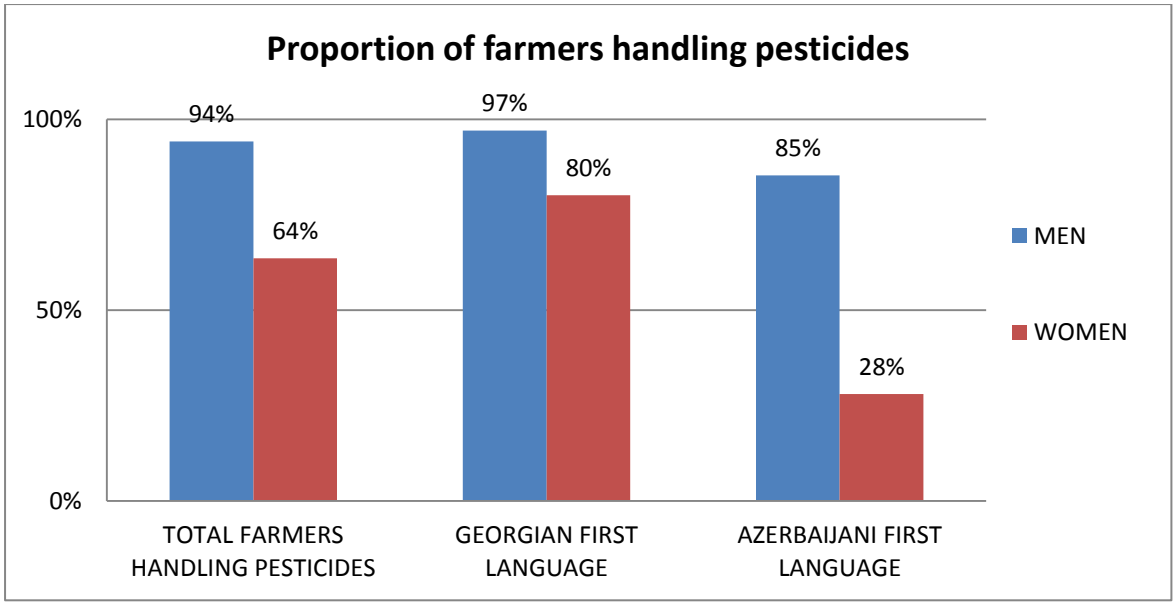


Figure 8. The proportion of men and women farmers handling pesticides

Table 3 and Figure 8 indicate that the majority of farmers handle pesticides. Overall there is a somewhat larger proportion of men handling pesticides than women. Among communities where Georgian is the first language, the difference is smaller with 97% men handling pesticides compared to 80% women. Among Azerbaijani speakers, however, the gender difference is much greater. Just 28% women farmers who speak Azerbaijani as a first language handle pesticides, compared to 85% men.

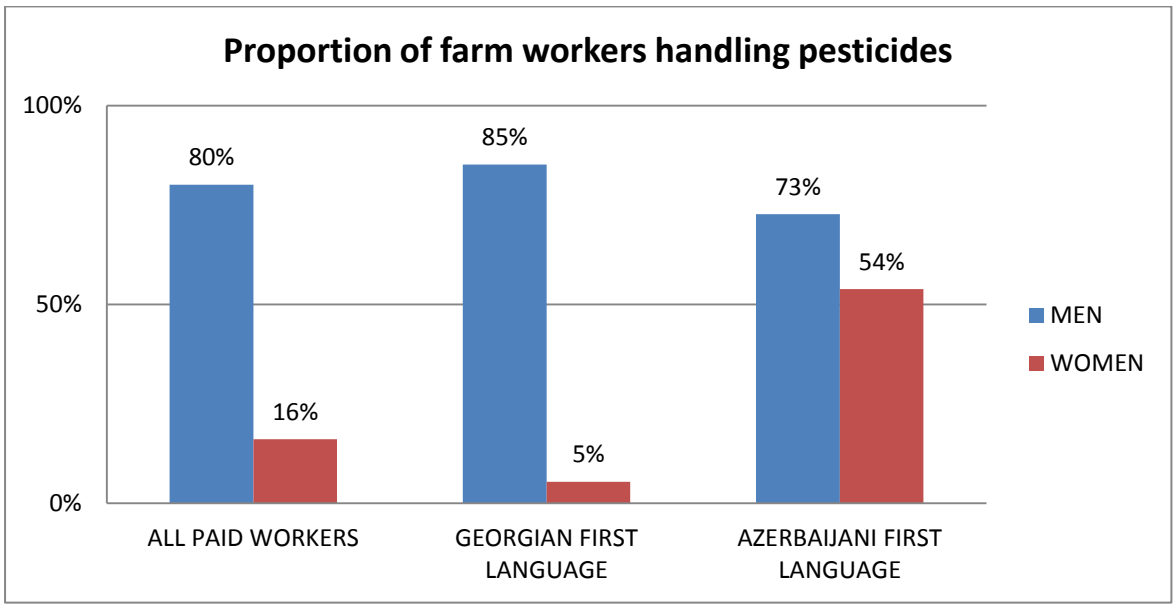


Figure 9. The proportion of men and women farm workers handling pesticides

Interestingly, the pattern of pesticide handling among farm workers is quite different to that of farmers (Figure 9). Only 5% of women farm workers who speak Georgian handle pesticides (compared to 80% women farmers who speak Georgian), while 85% of the men handle pesticides at work. The pattern for the group that speak Azerbaijani is also different between farmers and farm workers. In this case, a much larger proportion of women handle pesticides – 54% women farm workers, compared to 28% women farmers.

Observance of basic safety procedures

Reading the Label

The label is a key document in understanding the risks from any pesticide product and appropriate safety precautions. Labels must comply with national regulations. The current study looked at problems farmers and farm workers have in accessing and understanding the pesticide label.

In the pilot study it was found that repacking of pesticides into unsuitable bags and drinks bottles was a common practice. This leads to unnecessary spills and exposure incidents for retailers and end users as well as preventing the end user from seeing the correct label. In the current study we explored this issue a bit further and also considered language barriers to understanding pesticide labels.

The current study showed that a significant minority of farmers are purchasing pesticides in inappropriate containers that lack the original label. The proportion of farmers buying pesticides in the original container was similar in this study (71%) to the previous pilot study (66%).

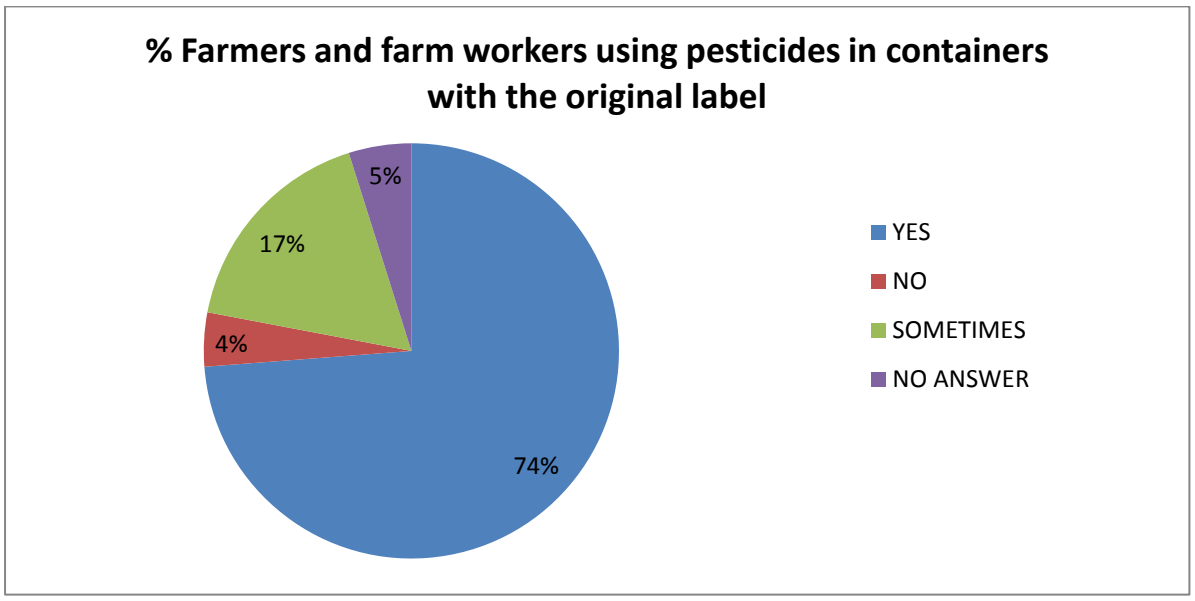


Figure 10. % Farmers and farm workers using pesticides in containers with the original label

When asked whether they use pesticides in containers with the original label, 21% respondents said 'no' or 'sometimes'. Even if the label is present, many end users cannot understand it. Only 52% of all participants could read Georgian. Of the Azerbaijani speakers only 1% could read Georgian. Farm workers, in particular, said that they had difficulty reading the label due to the language.

Where the information is missing from the package or label, the packaging is clearly not compliant with regulations.

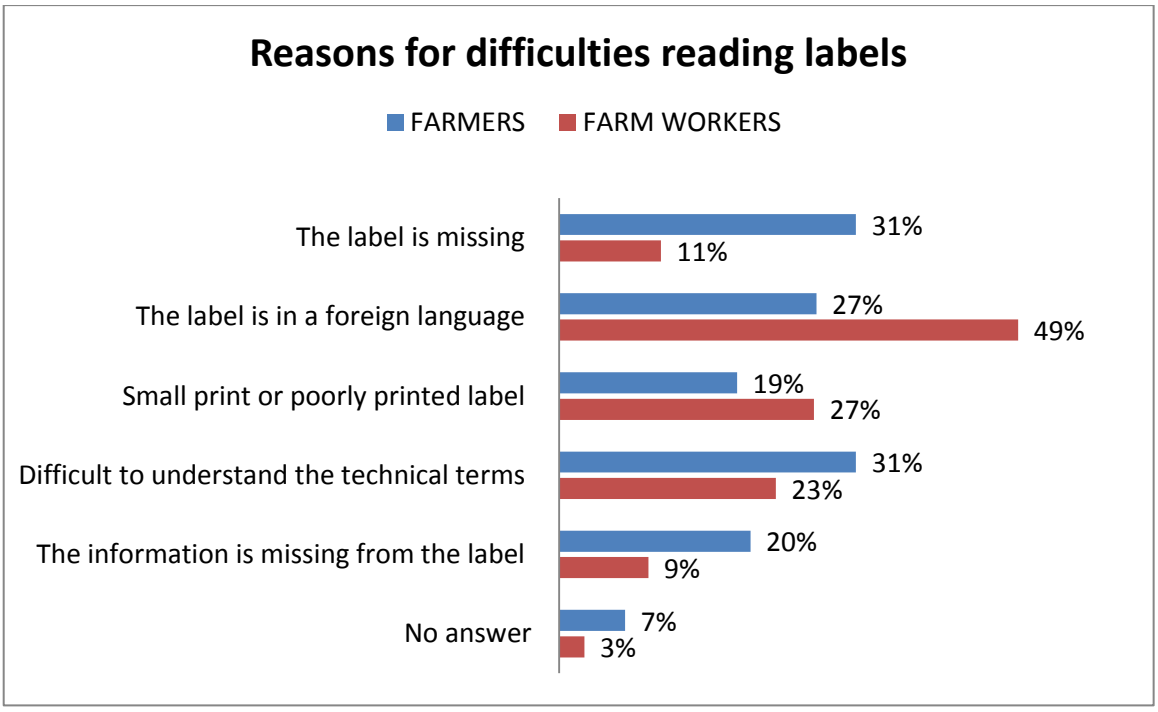


Figure 11. Reasons end users have difficulty reading or understanding pesticides labels

Other worrying examples of hazardous packaging include glass vials. The team came across several incidents of dimethoate (B58) being sold in small glass vials, for example.

Pictured:

Glass bottles of B58 - dimethoate on sale in Bolnisi District.

Protective Equipment

Very few respondents reported having had any training in the last decade on the use of protective equipment when handling pesticides. This may be an important factor in the extremely low use of PPE. Few suppliers in Georgia offer PPE, so that even people wishing to purchase it will have difficulty finding effective PPE. Some people use dust masks and builders' gloves in the mistaken belief that these items will offer sufficient protection.

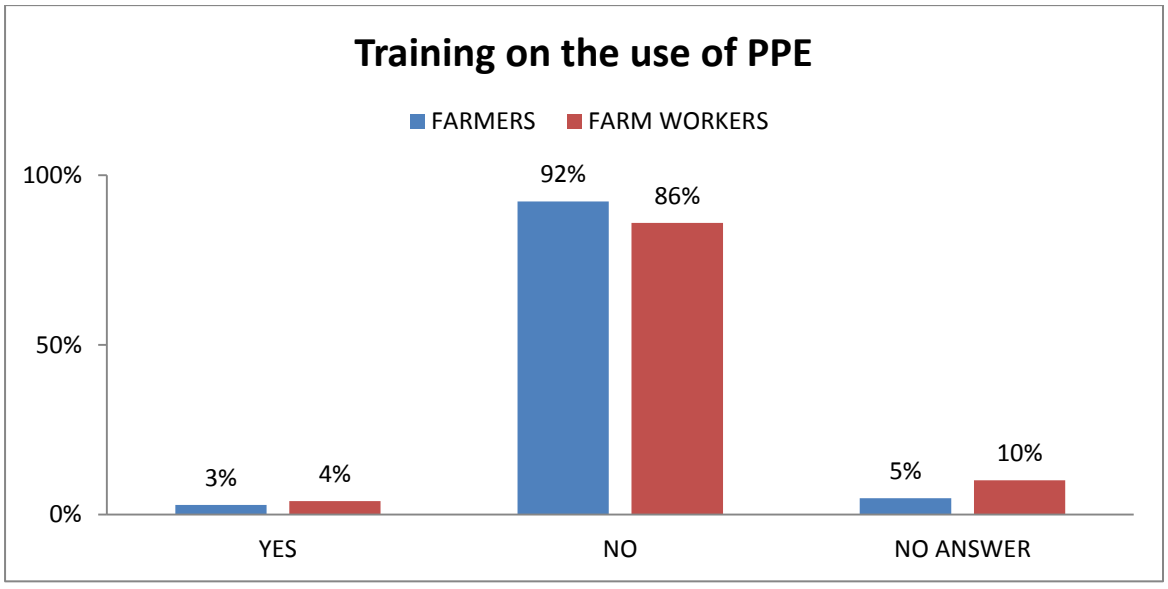


Figure 12. % respondents trained on the use of Personal Protective Equipment for handling pesticides

The results of the current survey confirm the findings of the pilot study that the vast majority of people handling pesticides wear ordinary clothes when doing so (columns A,B and C of Figure 13). Figure 13 shows that farmers tend to keep a set of long clothes to wear when handling pesticides. The fact that farmers are more likely to wear long clothes may suggest some awareness of the

danger of skin absorption of pesticides. Farm workers also tend to wear ordinary, non-protective clothes, but fewer of them keep a set of long clothes for this task.

Even the people wearing some protection, are often not as well protected as they think. Investigation of masks and respirators worn by farmers and farm workers reveals that they are usually simple dust masks, and do not offer suitable protection from pesticide inhalation.

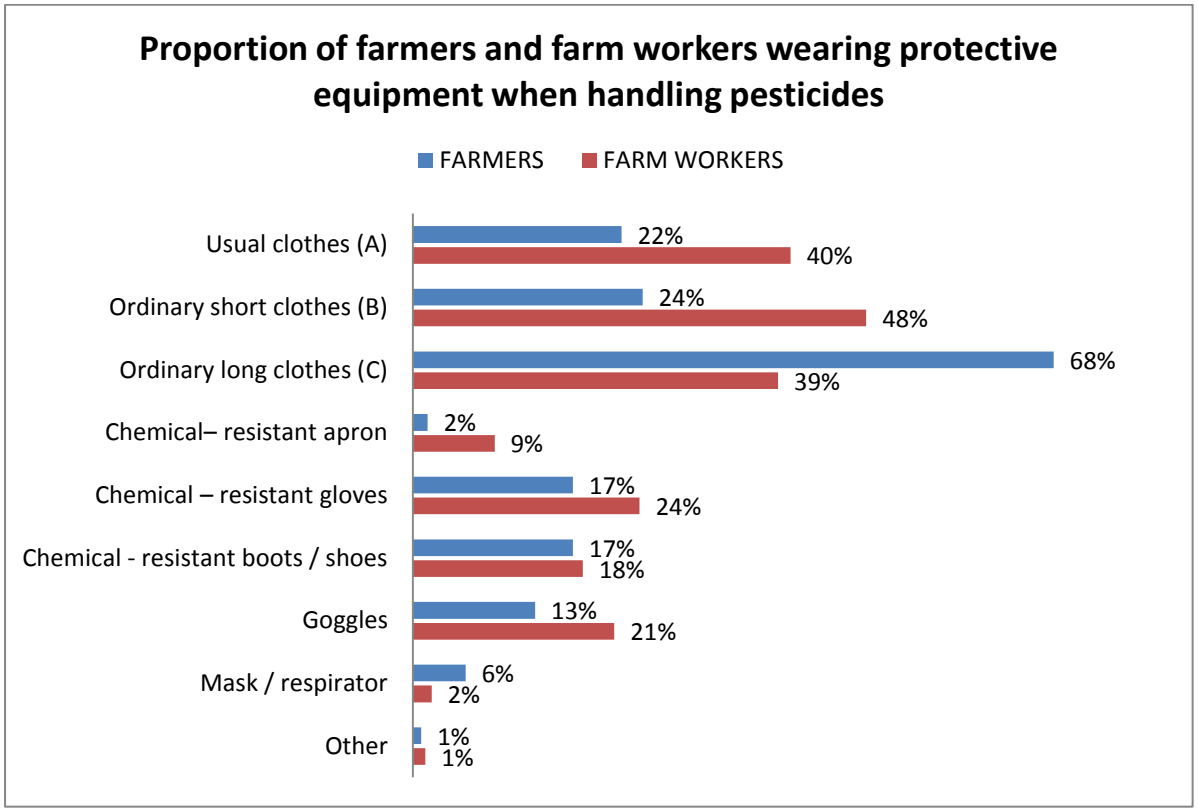


Figure 13. Proportion of farmers and farm workers wearing protective equipment when handling pesticides

A – ordinary clothes that are worn for everyday purposes
B – ordinary clothes with short sleeves/trousers that are kept only for work with pesticides
C – ordinary clothes with long sleeves/trousers that are kept only for work with pesticides

Further investigation in the current study showed interesting differences between farmers and farm workers as well as men and women.

Figure 14. Clothes and protective equipment worn by men and women when handling pesticides

A – ordinary clothes that are worn for everyday purposes
B – ordinary clothes with short sleeves/trousers that are kept only for work with pesticides
C – ordinary clothes with long sleeves/trousers that are kept only for work with pesticides

Figure 14 shows some interesting differences in behavior of men and women farmers and farm workers in terms of what they wear when handling pesticides. 73% women farmers, for example, reported wearing additional items in an effort to protect themselves from pesticide exposure, 'other' in Figure 14. These items included using cloth, veils or scarves across the mouth and nose; wearing (non protective) boots and gloves and sunglasses to protect eyes from splashes. These women seem to be making more efforts to protect themselves, albeit with improvised equipment, than men or farm workers – none of whom reported taking these measures.

Method of Pesticide Application

Figures 15 and 16 below show the methods the respondents use to apply pesticides. The most common methods used by men and women are backpack sprayers and tractor mounted booms. Poorly maintained and leaking backpacks are a potential source of high levels of dermal exposure.

Male farm workers were the largest group using tractors to apply pesticides, perhaps reflecting the fact that larger farms are the most likely to employ workers and to invest in tractor equipment. Fewer women use tractor mounted sprayers, but at 21-27% it is still a sizeable minority.

Women farm workers tend to use more ULV sprayers, perhaps because they require less physical strength than some other methods.

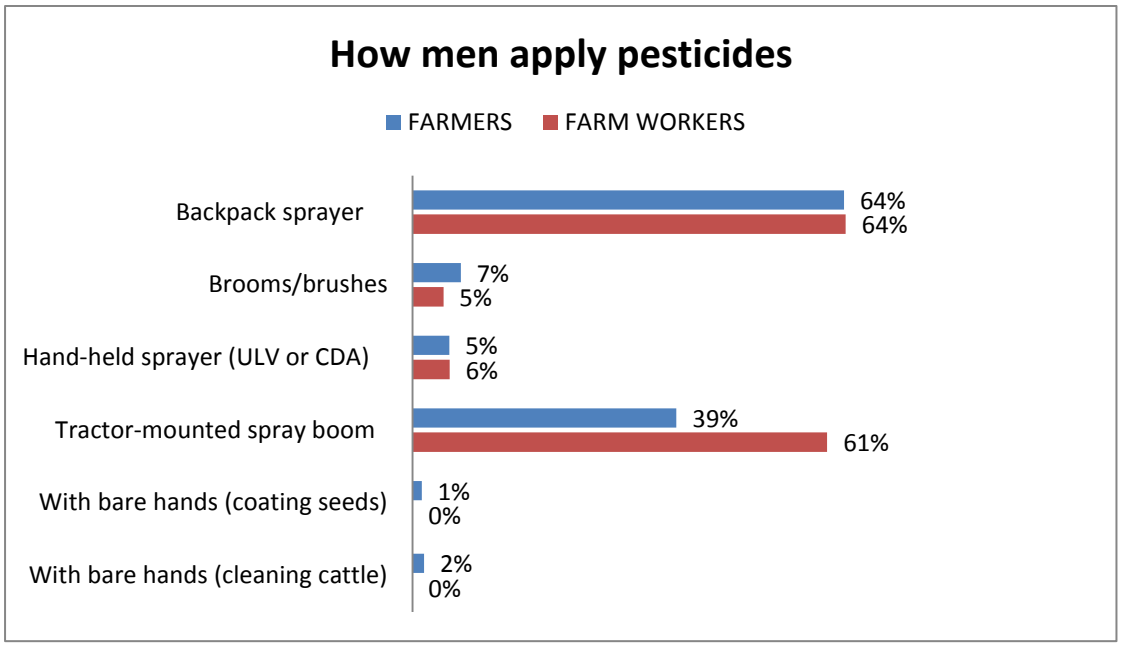


Figure 15. How men (farmers and farm workers) apply pesticides

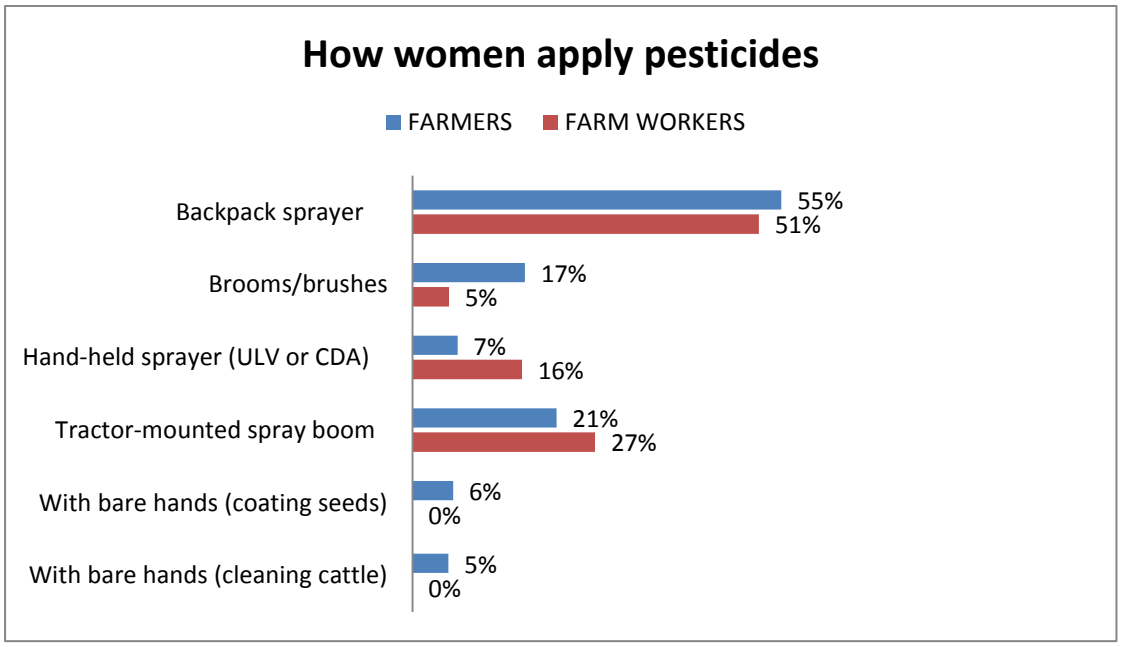


Figure 16. How women (farmers and paid workers) apply pesticides

Pictured : A woman using a brush to apply pesticides

7% male farmers and 5% male and female farm workers use brooms or brushes to apply pesticides. This figure rises to 17% among women farmers. This may reflect a tendency to use this method on kitchen gardens, usually looked after by women. This is not a suitable method for pesticide application. There is no way to calibrate the dosage and the likelihood of contaminating clothing and skin is high. Obviously, applying pesticides by bare hands is not a suitable method either (reported by 6% women farmers and 1% male farmers, but not by farm workers).

Washing

Pesticides can enter the body through the skin, orally and by inhalation. It is very important to remove one's self from the area where pesticides are being used and to wash hands thoroughly before eating, smoking or going to the toilet. But this can be rather impractical if washing facilities are lacking. The skin in the genital area is particularly permeable to pesticides, so washing pesticide contamination from hands BEFORE using the toilet is very important.

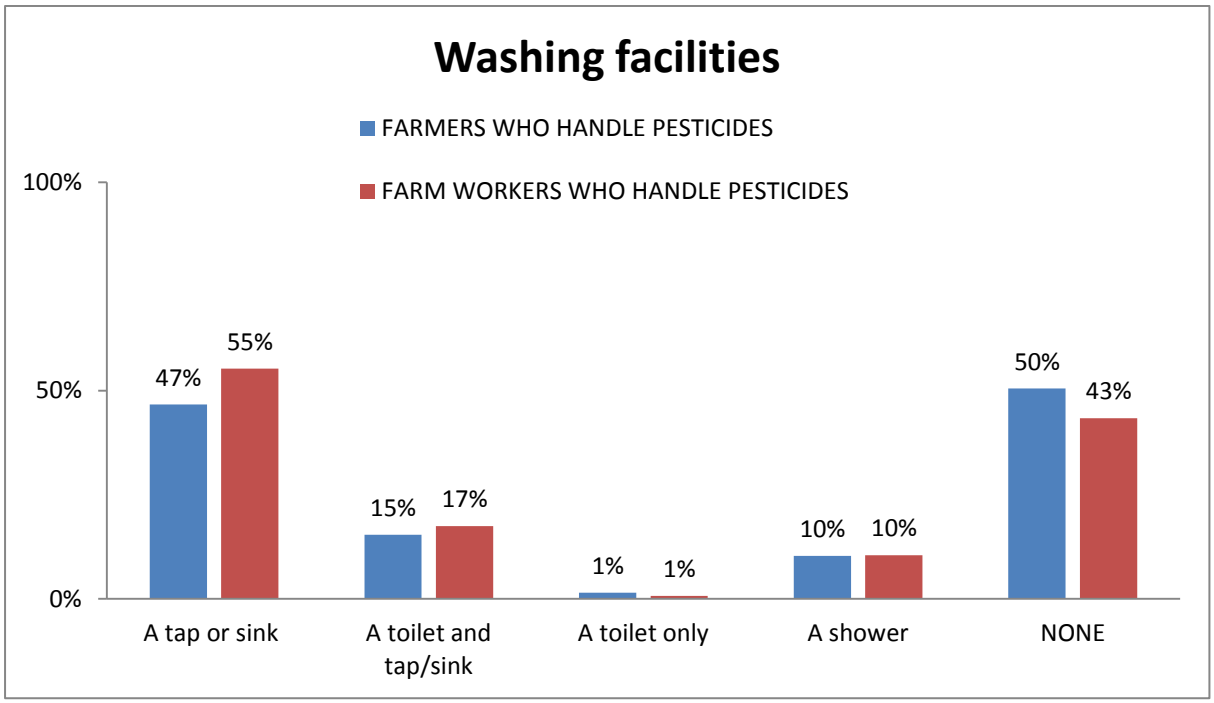


Figure 17. Showing washing facilities available to farmers and farm workers when handling pesticides

Figure 17 shows that only around 50% farmers and farm workers have access to a tap when they are working with pesticides.

Eating, Drinking or Smoking While Handling Pesticides

Eating, drinking and smoking while handling pesticides greatly increase the chance of accidental exposure to the pesticide, even more so if hands are not thoroughly washed first. The survey indicates that this is relatively common practice and that it is more common among farm workers than farmers.

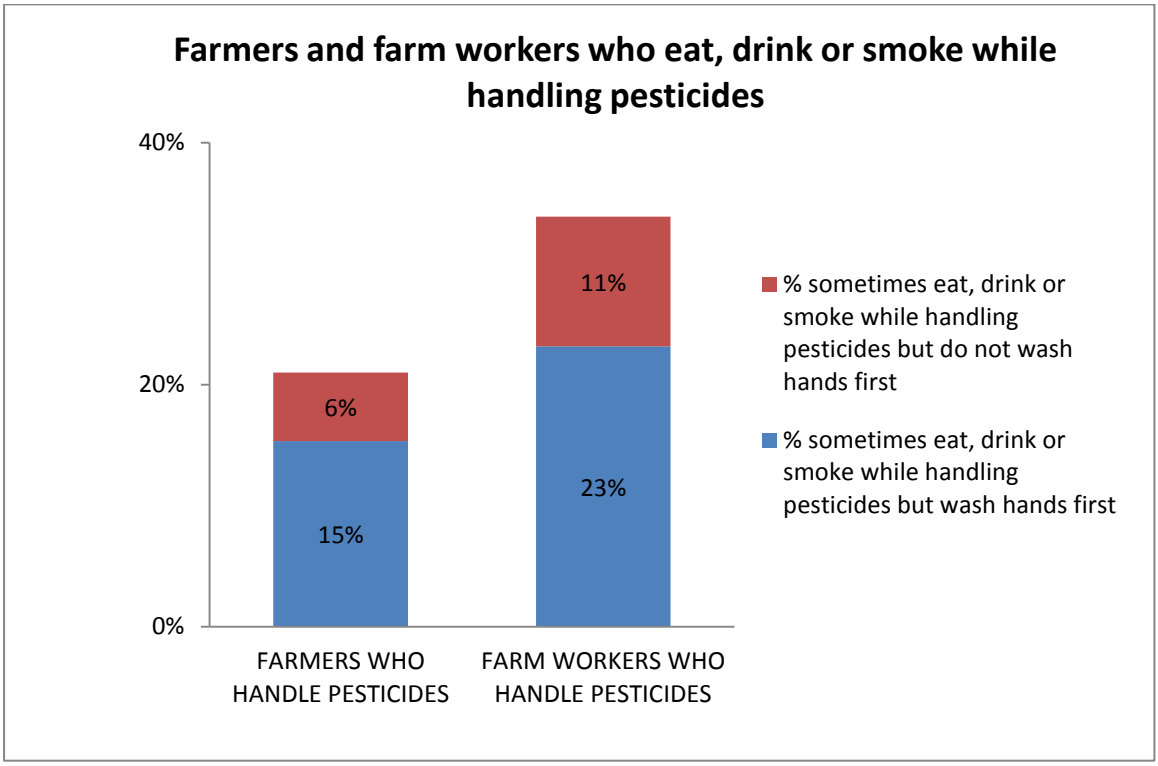


Figure 18. % Farmers and farm workers who eat, drink or smoke while handling pesticides

Exposing family members to risk

Pesticides can affect all members of the household, even individuals that do not work with pesticides. Pesticides can be brought into the home by spray drift and on contaminated clothing, for example.

It is difficult to say how far a home should be from sprayed areas, but there is plenty of evidence[4,5,6,7] that families living close to areas that are regularly sprayed with hazardous pesticides can suffer impacts on their health. The distance a pesticide can travel from the target area varies greatly depending on the weather, droplet size and other factors.

Buffer zones are areas of unsprayed land that are designed to offer some protection to sensitive areas adjoining them. Other measures can also be taken to reduce spray drift. The width of the buffer zone varies, depending on the application method, the product and the sensitivity of the adjoining area - but they give an idea of common standards. Buffer zones of 5m next to water courses, for example, are fairly usual when a product poses a particular risk to aquatic flora and/or fauna. 15m buffers are commonly used around organic crops, to try to avoid contamination from

[4] A review of nonoccupational pathways for pesticide exposure in women living in agricultural areas.https://www.ncbi.nlm.nih.gov/pubmed/25636067
[5] Acute Nonoccupational Pesticide-Related Illness and Injury - United States, 2007-2011 https://www.ncbi.nlm.nih.gov/pubmed/27736825
[6] Acute health effects associated with nonoccupational pesticide exposure in rural El Salvador. https://www.ncbi.nlm.nih.gov/pubmed/10092408
[7] Living near agricultural pesticide applications and the risk of adverse reproductive outcomes: a review of the literature. https://www.ncbi.nlm.nih.gov/pubmed/21281330

conventional crops in adjoining land. Parts of California have put ¼ mile buffer zones around schools.[8]

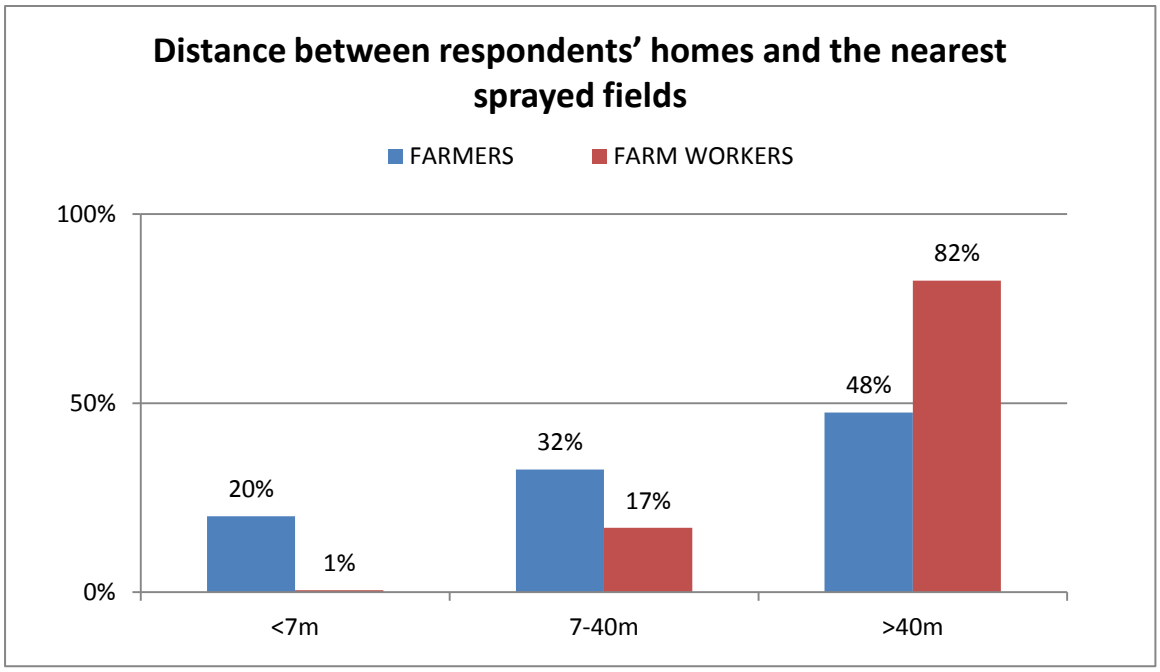


Figure 19. Showing the distance between respondents' homes and the nearest sprayed fields

The responses reveal that a high proportion of farmers and some farm workers live within a very short distances of sprayed fields. Their households are likely to be exposed to pesticide spray drift and contamination.

Another way that pesticides enter the home is on contaminated clothing. Washing contaminated clothes by hand is another exposure route.

The results indicate that washing pesticide contaminated clothes by hand is a common practice undertaken largely, but not exclusively, by women. It is more common among farm workers than farmers among both Georgian and Azerbaijani speaking communities.

[8] http://www.cdpr.ca.gov/docs/pressrls/2016/160929.htm

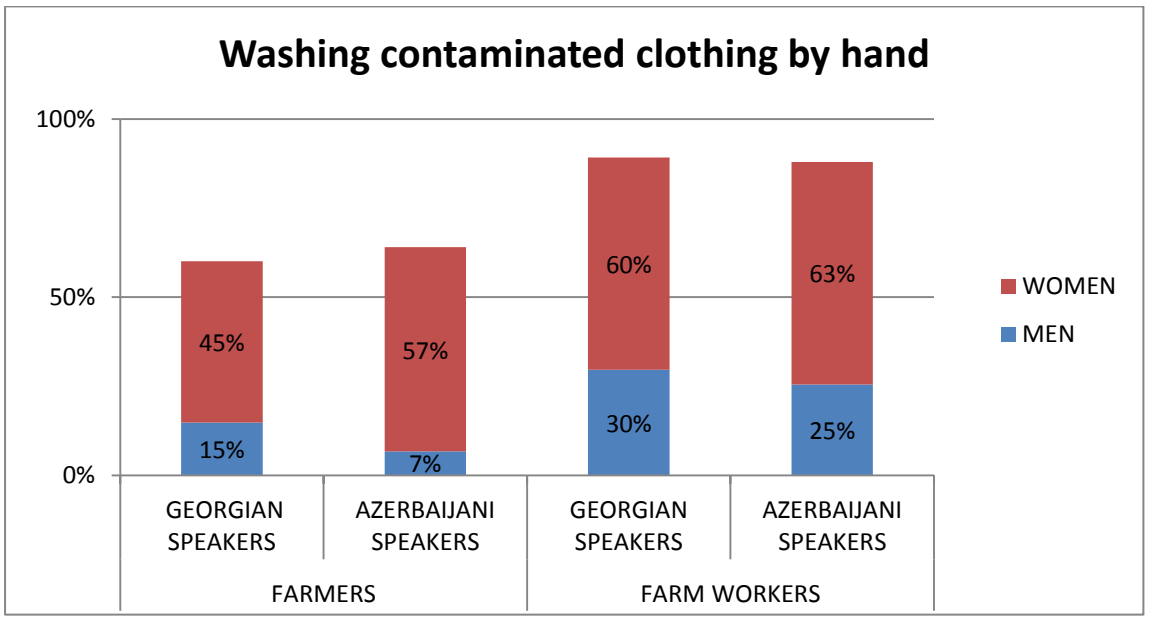


Figure 20. % Men and women farmers and farm workers washing contaminated clothing by hand

Pesticides can pose a serious risk to the health of expectant mothers and their babies. We asked women aged 18-40 years with children whether, during their pregnancy, they took special precautions to avoid pesticides (not only during handling pesticides but also handling contaminated crops, clothes or in sprayed fields/orchards). The same women were asked whether their child(ren) accompanied them when they work in the fields.

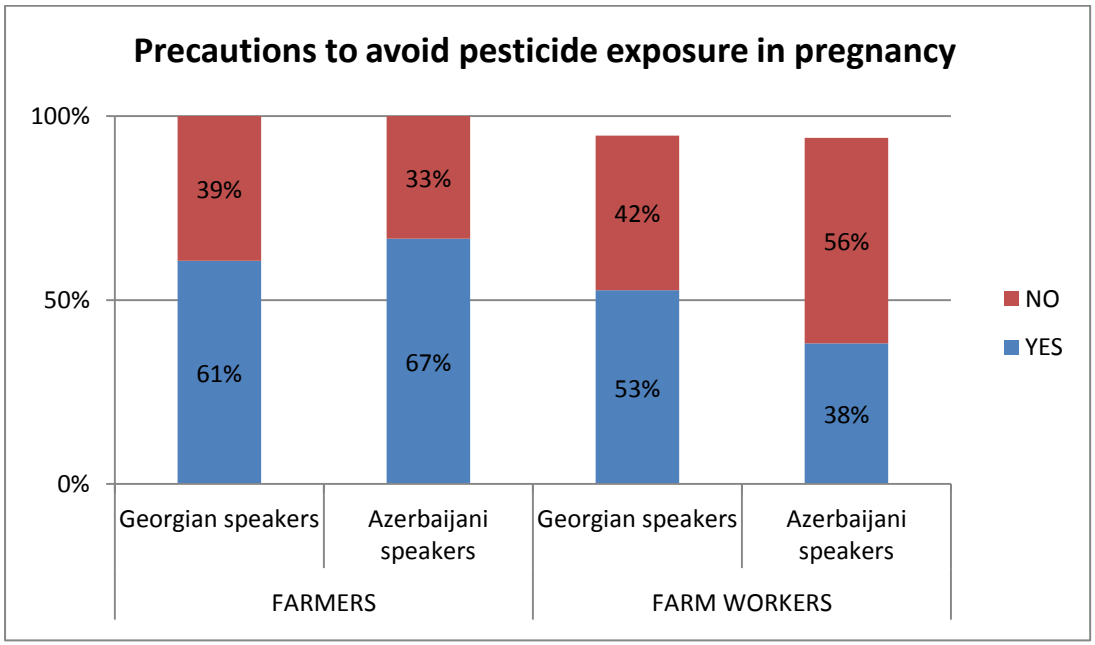
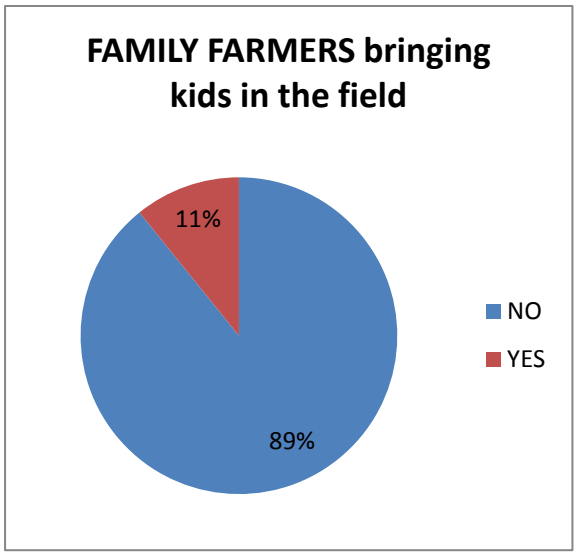
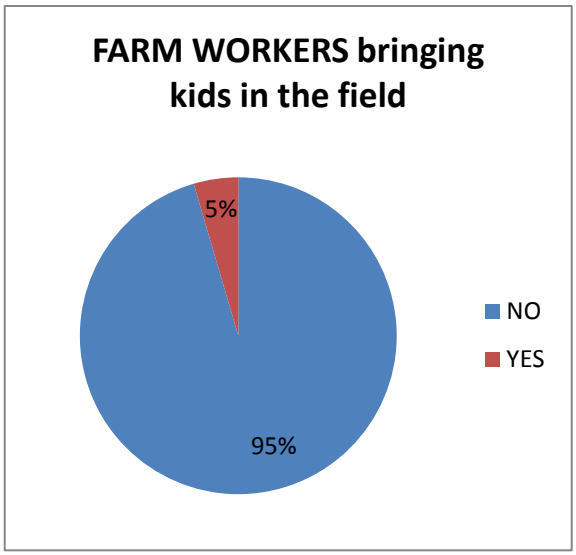


Figure 21. Showing % women age 18-40 years who took precautions to avoid pesticide exposure in pregnancy

A large proportion of women in the study said that they took no extra precautions to avoid pesticide exposure during pregnancy. Given the general poor standard of safety, this is concerning. Farm workers seem to be at particular risk, with more than half of respondents taking no extra precautions during pregnancy. The difference in response between Azerbaijani-speaking farmers and

Azerbaijani-speaking farm workers is particularly striking, raising questions about working conditions for these agricultural workers in particular.





Figures 22 and 23. % women aged 18-40 years who take children into fields when they work

8% mothers take their children into the fields with them while they work, raising questions about children's exposure to pesticides. This is more common among women working on their own farms, but also occurs among paid workers.

Potential exposure of the community and environment to hazardous pesticides

Pesticides do not only affect the people that apply them. They can, of course, affect the wider community and the environment. One potential source of pesticide pollution is water. Open water, such as rivers and streams, are subject to contamination by spray drift and pesticide run-off from fields. Participants were asked about water sources on the farm. 56% replied that they had water sources in or adjacent to sprayed fields. The responses showed that such water is used for human and livestock drinking, washing, bathing and fishing; all uses that could put people at increased risk of exposure. A high proportion of farmers, in particular, seem to be drinking potentially contaminated water, and giving it to livestock.

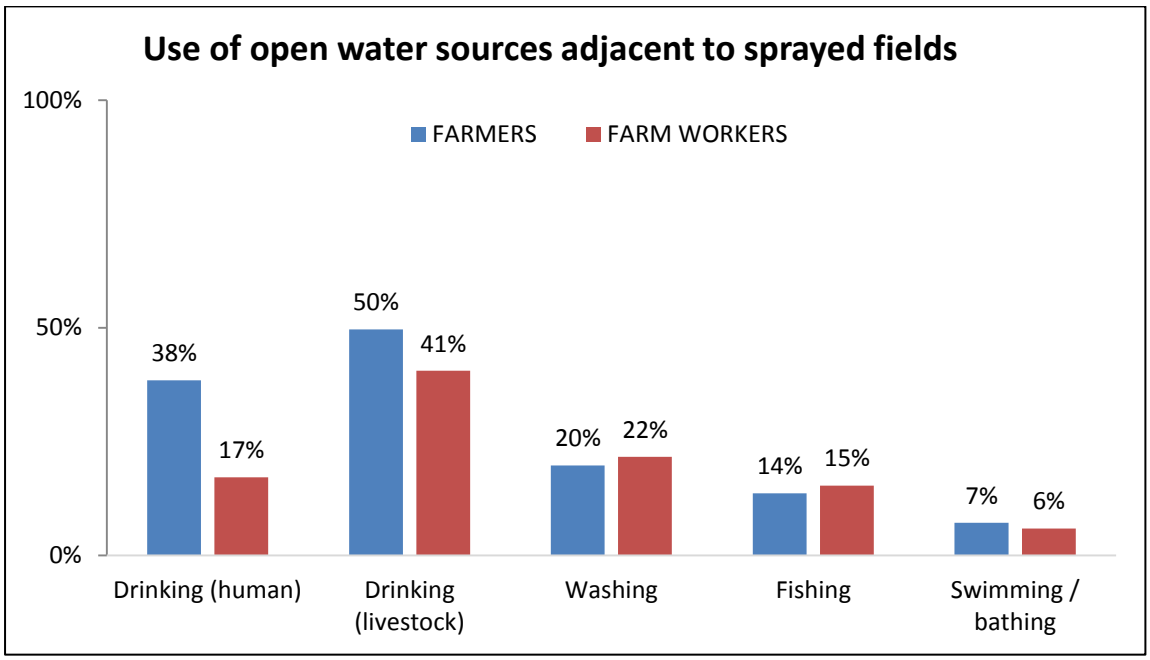


Figure 24. Use of water sources in or adjacent to open fields.

Another important source of pesticide pollution is discarded pesticide containers. Participants were asked how they disposed of used containers. Good practice involves triple rinsing the containers (making sure the rinsate is disposed of safely), puncturing the container to prevent re-use and disposal or recycling in a suitable facility. Unfortunately, Georgia has no effective disposal option for the safe collection and disposal of pesticides containers at present.

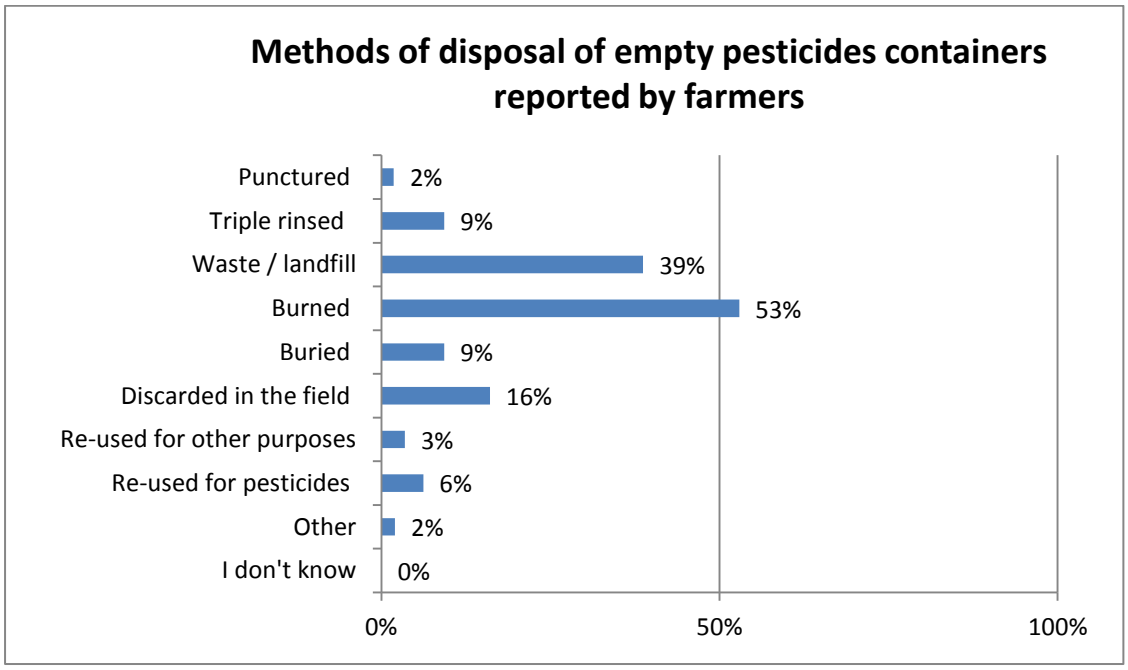


Figure 25. Methods of disposal of empty pesticides containers reported by farmers

The results show that under 10% pesticide users are puncturing or triple rinsing empty pesticide containers before disposing of them. End users are discarding hazardous waste in various ways where they will continue to contaminate soil, water and air. Burning plastic containers releases

toxins from plastics into the atmosphere as well as the pesticides. **Five respondents said that they threw old containers into the river, where it can contaminate drinking water and affect aquatic organisms. Also very worrying, 4 respondents said that they used empty containers for drinking water.**

Pesticide exposure and poisoning incidents

Annexes 1 and 2 provide lists of the pesticides used by farmers and farm workers, along with descriptions of the purpose for which each product is used. Annex 3 provides a comparison of commonly used pesticides with the Highly Hazardous Pesticide list developed by PAN.

20% of people who handle pesticides in the survey said they suffered from signs and symptoms of acute pesticide poisoning. Just 12% of this group said they sought medical attention (despite severe symptoms in many cases) and only 3% said the incidents were reported to an authority. This seems to be a very widespread problem that is largely invisible to the authorities.

We asked respondents what they were doing at the time they were exposed to pesticides. The most frequent circumstance was during mixing or applying the pesticide.

- Farm workers also reported skin irritation during harvesting and weeding.
- One severe incident (where the farmer's skin was burned by the pesticide) related to a leaking backpack sprayer.
- Several cattle farmers reported incidents relating to using pesticides to control ectoparasites.

There are variations in terms of the number, frequency and severity of such incidents between different groups.

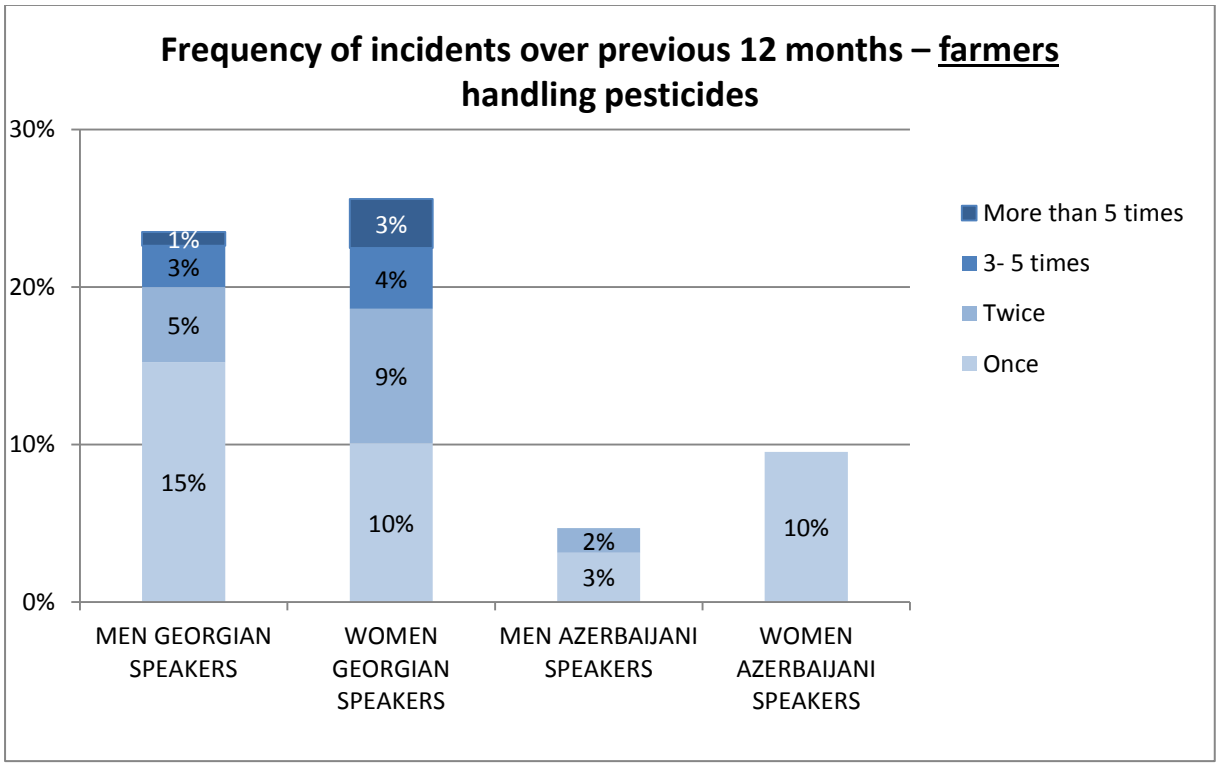


Figure 26. Frequency of incidents over previous 12 months – farmers handling pesticides

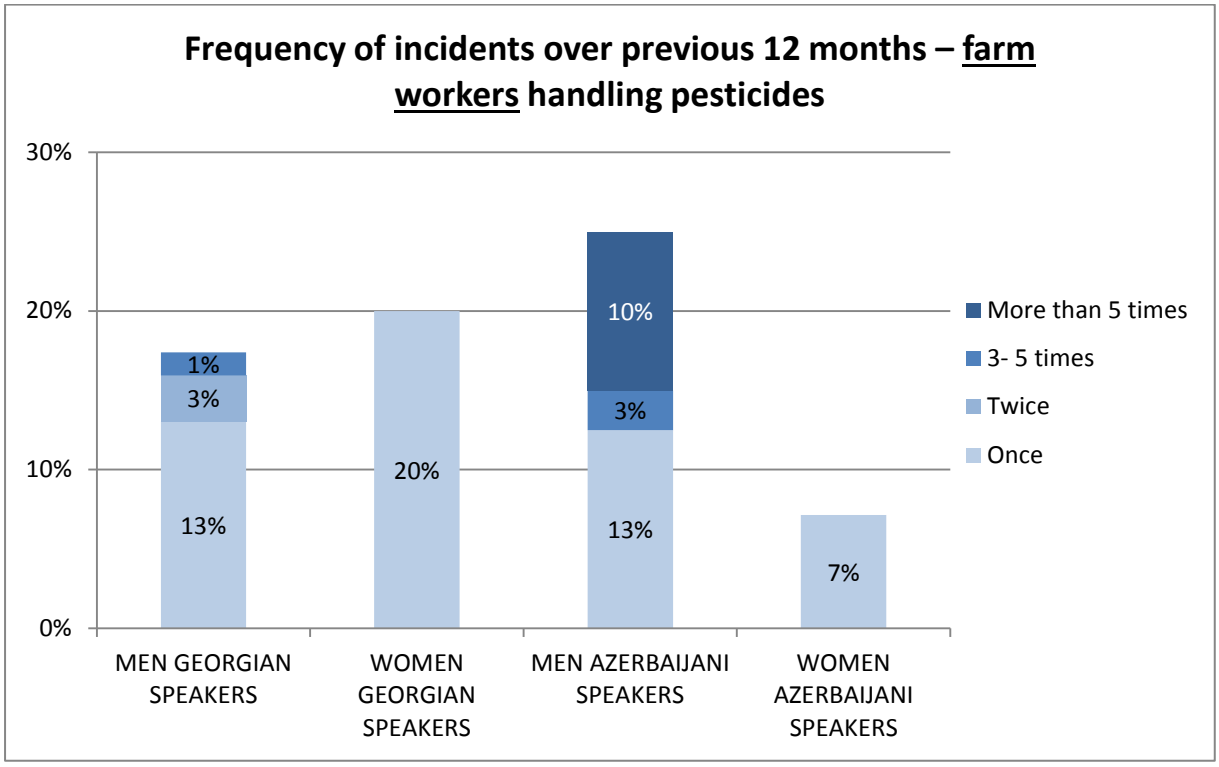


Figure 27. Frequency of incidents over previous 12 months – farm workers handling pesticides

There are some interesting differences in the frequency of incidents reported by different groups. More of the farmers who speak Georgian, for example, report signs and symptoms of pesticide poisoning and they suffer such incidents relatively frequently compared to the Azerbaijani-speaking farmers. Further research would be required to determine the reason for this difference.

Among the farm workers, gender differences are more significant. Male farm workers are reporting more frequent incidents than women, with a relatively large proportion (10%) of Azerbaijani speaking men suffering more than five incidents over the last 12 months. Women farm workers report one incident over the previous 12 months; a relatively high proportion of Georgian speaking women farm workers (20%) experienced such an incident.

A simple calculation was made to score incidents in terms of their severity. This was based on symptoms (e.g. convulsions or loss of consciousness would score higher for severity than headache or skin rash) and duration. The severity of the incidents reported in this survey was high, as illustrated in figures 28 and 29.

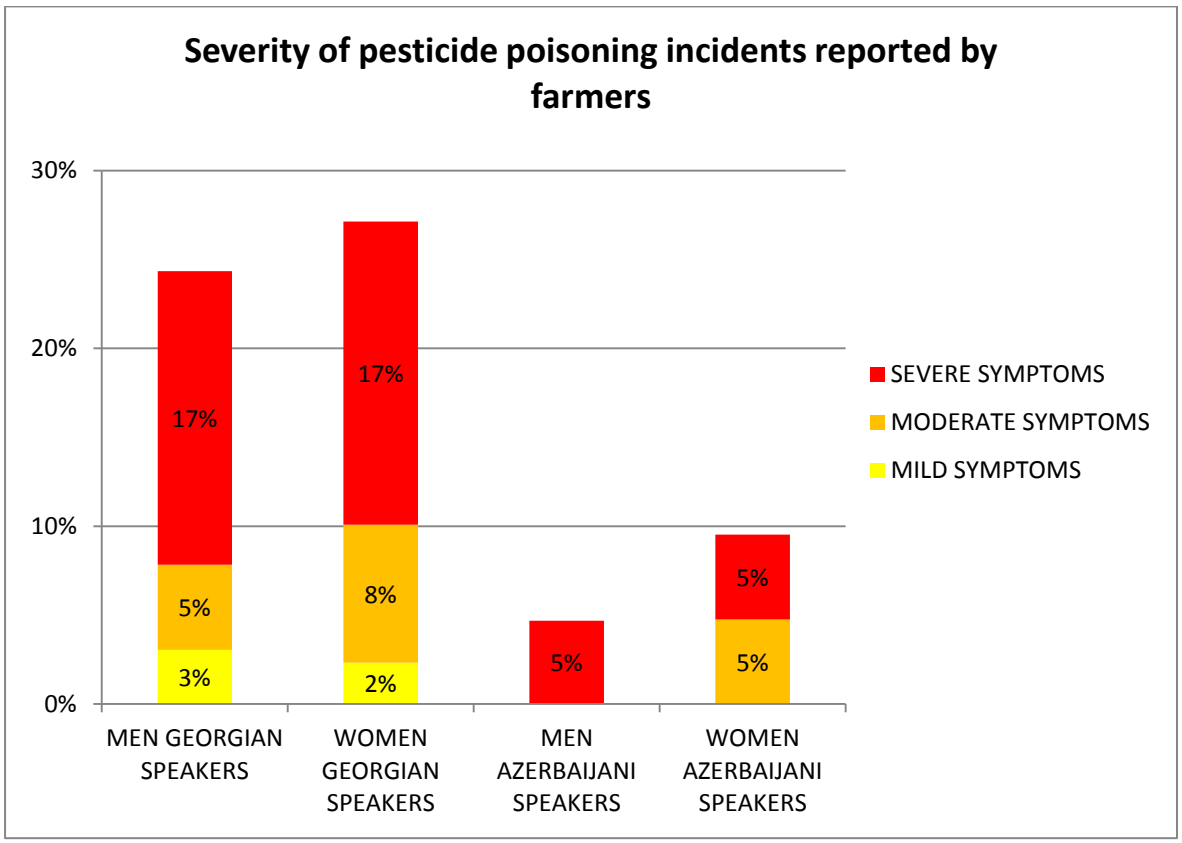


Figure 28. Severity of pesticide poisoning incidents reported by farmers

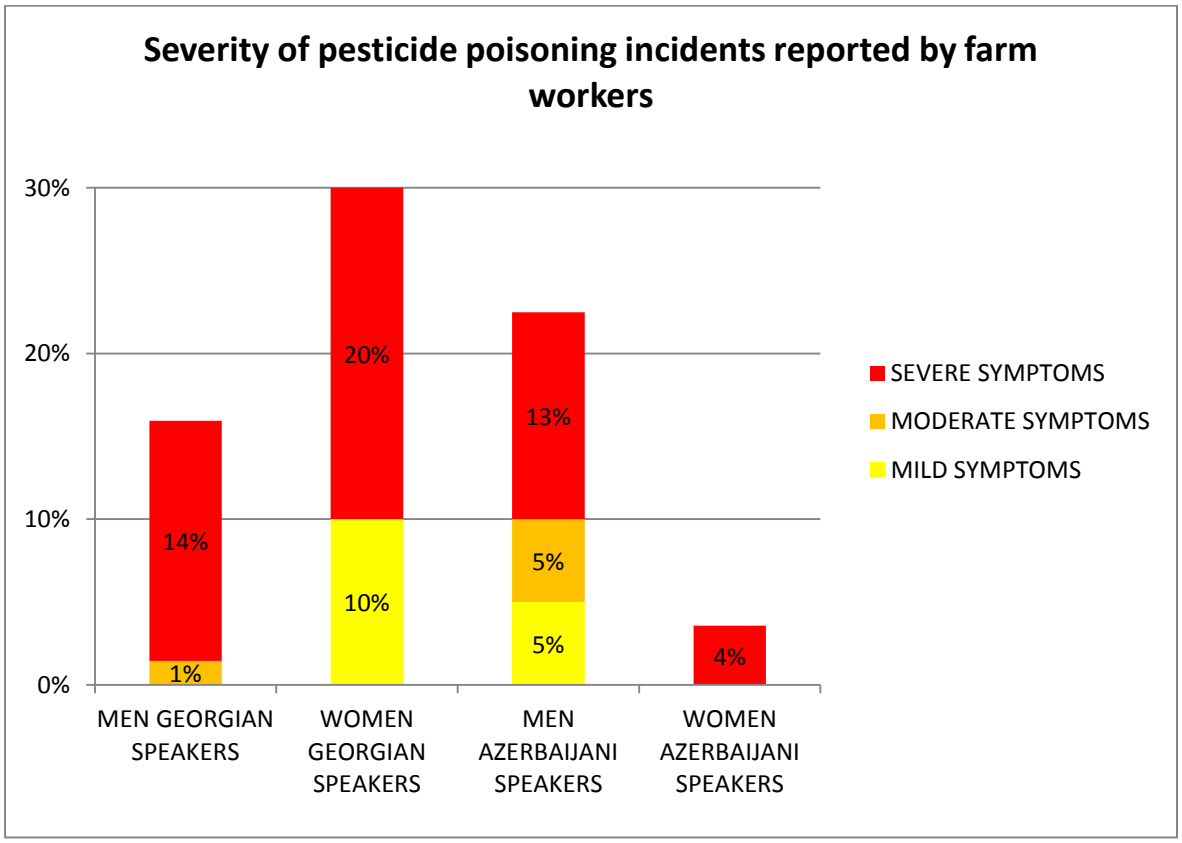


Figure 29. Severity of pesticide poisoning incidents reported by farm workers

The circumstances of such incidents primarily related to exposure during mixing or applying the pesticide. Farm workers also reported skin irritation during harvesting and weeding. One severe incident (where the farmer's skin was burned by the pesticide) related to a leaking backpack sprayer.

Several cattle farmers reported incidents relating to using pesticides on ectoparasites.

Six farmers and 11 farm workers (all female) reported bystander exposure to pesticides resulting in signs and symptoms of pesticide poisoning. These incidents related to standing nearby when spraying was under way.

Participants in the survey were asked which pesticide they had been using when they experienced unusual signs and symptoms. The most cited pesticides were Lambda cyhalothrin, Glyphosate, Metribuzin and Dimethoate.

Note that Carbosulfan is not approved in the EUand glyphosate is under review. carbosulfan (together with carbofuran) has been approved by the Chemical Review Committee to be submitted to the Conference of Parties for consideration for inclusion in Annex III of the Rotterdam Convention

Table 4. Showing number of incidents associated with particular pesticides

Pesticide linked to incident	MILD	MODERATE	SEVERE	Total number of incidents
Lambda cyhalothrin	1		14	15
Glyphosate	2	4	6	12
Metribuzin	1	3	1	5
Dimethoate			4	4
Cupperchloroxide	1	2		3
2,4 D		2		2
Acetamiprid			2	2
Nicosulfuron			2	2
Thiamethoxam			1	1
Carbosulfan		1		1
Chlorpiriphos		1		1
Diniconazole			1	1
Imidacloprid			1	1
Propineb			1	1
Tebuconazole			1	1
provalicarb + Propineb	1			1

In terms of pests, *Leptinotarsa decemlineata* (also known as Colorado beetle) was the most frequently mentioned in relation to pesticide use – perhaps not surprising in this area of potato growing. Pesticides are used in relation to a range of other pests as well as mildews and weeds.

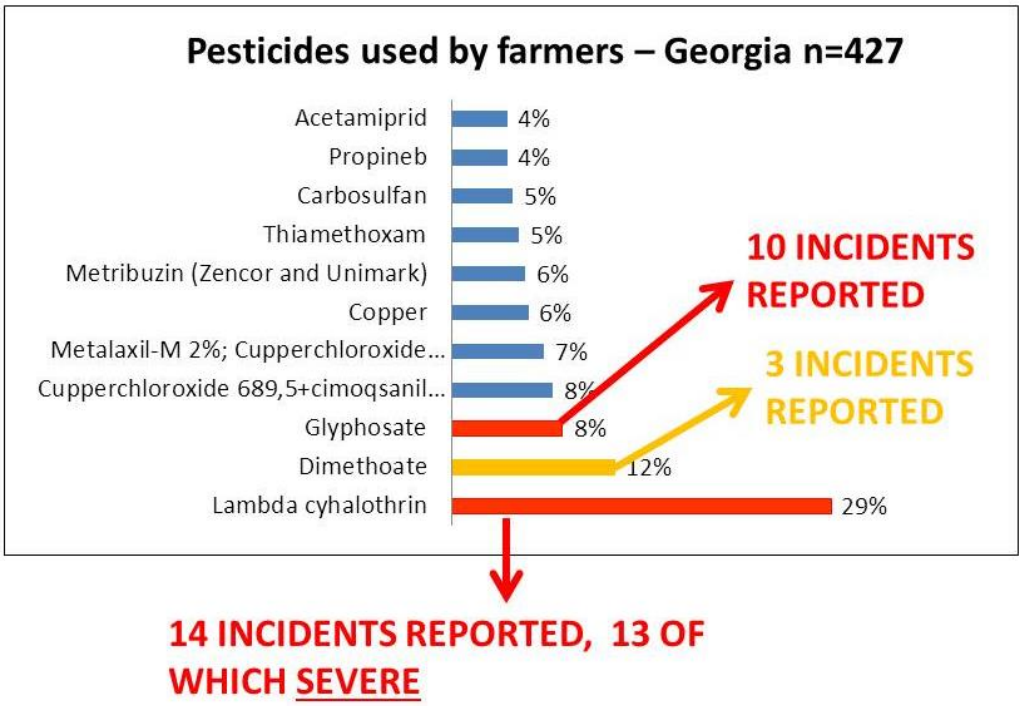


Figure 30. % farmers report using pesticide products

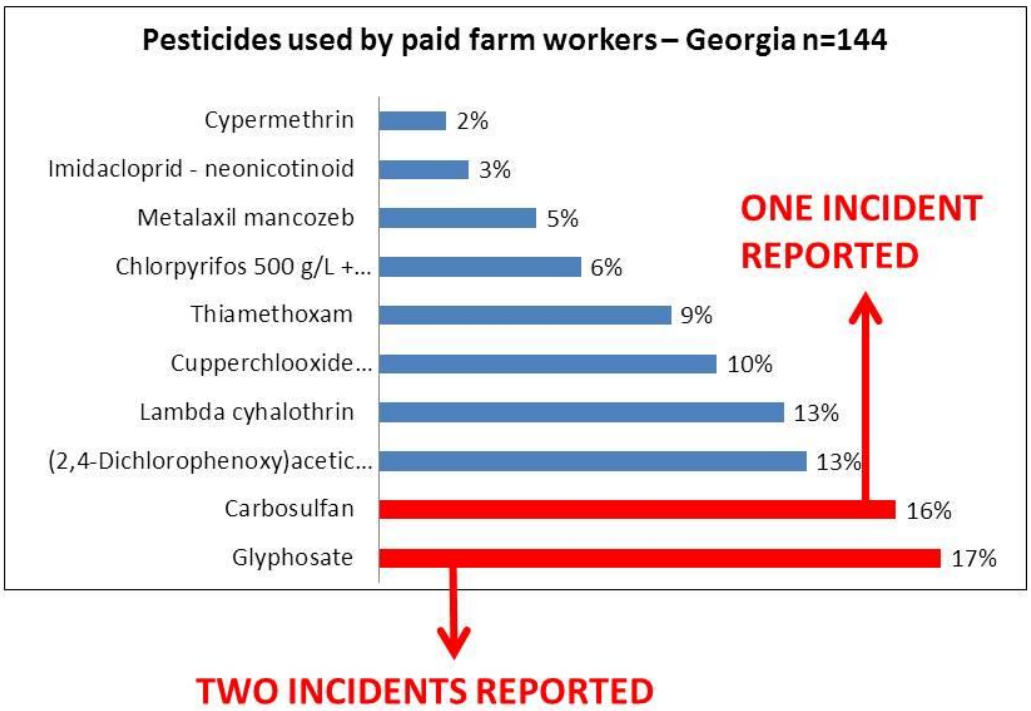


Figure 31. % farm workers report using pesticide products

Fewer incidents were reported in relation to particular products by farm workers than farmers. One reason for this was that farm workers were often not sure which pesticide product they were using, while farmers tended to be more aware of which products were in use at the time of the incident.

Awareness raising activity

PAN-UK and Ecolife have both undertaken active efforts to share the findings of the project with decision-makers and stakeholders. PAN has collected interviews and video material which will continue to be used at various levels to promote risk reduction. Some of the materials are being prepared for the next COP in 2017, for example, as well as to add to online resources on the Rotterdam Convention website, subject to the usual approval process.

The most recent meeting was held between the project team (including Ecolife and enumerators) with Gocha Tsereteli from MoA - Scientific researches center Bio farming department; Maia Tsverava - PhD Professor from Technical University faculty of Chemistry; Geronti Sivsivadze - Head of Regional Office of information consultation center; Tea Abramishvili - State laboratory of MoA; Meri Perishvili - form Certification unit of ISO. The team had very positive discussions about the key findings of the study and next steps for risk reduction in Georgia.

Ecolife meeting decision-makers to discuss risk reduction

Display showcasing the study in Georgia and communications materials for pesticide risk reduction.

Discussion

Health impacts

The evidence presented here indicates that smallholder farmers and farm workers are routinely using pesticides without even basic knowledge or observance of safety practices. Acute poisoning incidents are relatively common and may indicate a larger problem in relation to chronic health

effects. Pesticide operatives are also putting bystanders at risk and contaminating water sources that are used for human and livestock drinking water**.** The use of highly hazardous pesticides in this context is threatening the health of the pesticide users themselves as well as the broader community and the environment.

Annex 3 shows pesticides in common use in Georgia against a set of health and environmental hazard criteria. You can see that Lambda Cyhalothrin, Carbosulfan and copper hydroxide are flagged for acute health concerns. Glyphosate and Mancozeb are identified in relation to potential carcinogenicity. Several products are of concern regarding environmental risk; seven of them are highly toxic to bees, for example.

The study has identified the products that are in most common use in the survey area and which ones are most associated with self-reported incidents of acute poisoning. The products that caused most concern include lambda cyhalothrin, dimethoate, glyphosate and carbosulfan. Carbosulfan is not approved in the EU and will be submitted to the next Conference of Parties for a decision on inclusion into Annex III of the Rotterdam Convention . Additional information on cyhalothrin, dimethoate and glyphosate are provided in Annex 4.

Economic impacts

The weak management of pesticide risks is not justifiable in terms of impacts on health and environment, and does not make good economic sense either. A variety of negative economic impacts were identified in the study:

Negative health impacts

- 3% farmers reported losing days' work in the last 12 months due to the effects of pesticides on their health (1-14 days' work lost)

Inefficient and inappropriate pesticide use

- Farmers are spending an average of 95GEL per season (€36.10) on the single pesticide they use most (1% farmers spend over 1000GEL, or € 380, per year on a single pesticide). A general lack of understanding of the most effective use of these products means that it is unlikely they are having the desired impact. E.g. some farmers are using crop pesticides against ectoparasites on cattle
- 34% farmers and 52%% farm said they had difficulty reading or understanding the pesticide label. They have a poor understanding of the recommended products, dosages or frequency of application and insufficient information to help them to manage resistance

Potential risks to export markets

- Carbosulfan was found to be in common use in the study. It is not approved in the EU, for example.

Loss of livestock and pollination services

- 37 incidents of livestock poisoning were reported, including cattle, sheep, chickens, turkeys, geese, bees, dogs. These can represent significant economic losses to affected households.

Contamination of water sources is an environmental and health issue but it can have negative economic impacts, too :

- 56% respondents said that there was an open water source in or next to an area that is sprayed with pesticides
- Several respondents reported throwing empty containers into the nearest river
- 29% use such water sources for drinking water (human) and 46% for livestock. 7% bathe in

such water.

Vulnerable groups

Gender

Everyone is not equally vulnerable to the impacts of pesticides. Gender differences in toxicity have been reported for many substances. Women of reproductive age are of particular concern because of potential impacts on their health and the health of their children.

Among farmers in the study, more men undertake tasks directly handling pesticides while there is a fairly even division of labour on other tasks. However, women reported more signs and symptoms of pesticide poisoning than men.

Washing pesticide-contaminated clothes by hand is a common practice undertaken largely, but not exclusively, by women. It is a potential source of pesticide exposure and it is more common among farm workers than farmers.

Expectant mothers

Toxic pesticides are known to cross the placental barrier to the foetus and they are also found in breastmilk[9]. Some childhood cancers like leukaemia have been linked to the exposure of parents to pesticides. Reproductive effects on offspring quality have been reported for both sexes and can have multigenerational effects[10].

A large proportion of women in the study said that they took no extra precautions to avoid pesticide exposure during pregnancy. Given the general poor standard of safety, this is concerning. Farm workers seem to be at particular risk, with more than half of respondents taking no extra precautions during pregnancy. The difference in response between Azerbaijani-speaking farmers and Azerbaijani-speaking farm workers is particularly striking, raising questions about working conditions for these agricultural workers in particular.

Children

Pesticide poisoning disproportionately affects infants and children[11],[12]. They absorb a higher concentration of pesticides than adults and they can face exposure during critical windows in their development, when they are at increased risk of damage to the developing immune, nervous and reproductive systems.

For understandable reasons, some mothers take their children into the fields with them while they work. However, one must be concerned about children's exposure to pesticides. The practice is more common among women working on their own farms, but also occurs among paid workers.

20% farmers said they live within 7m of sprayed fields. In such circumstances it is likely that the whole household is exposed to relatively high levels of pesticide contamination.

[9] Watts, M. (2013) Poisoning our future: children and pesticides. Pesticide Action Network Asia and the Pacific. http://www.pananz.net/publications-2/books/

[10] Butter, M.E. (2006) Are Women More Vulnerable to Environmental Pollution? **J. Hum. Ecol., 20(3): 221-226**

[11] UNEP Chemicals (2004) Childhood Pesticide Poisoning Information for Advocacy and Action http://www.who.int/ceh/publications/pestpoisoning.pdf

[12] http://www.panna.org/resources/kids-frontline

Agricultural workers

Agricultural workers often have poor security of employment and little protection in law. They may also lack the relevant language to understand pesticide labels and safety instructions, or to negotiate better protection.

Comparisons were made between farmers and farm workers in the study as well as disaggregating data by gender and first language spoken. Just 5% of the Azerbaijani speakers told us that they speak Georgian, and only 1% also read Georgian. This could affect their ability to access safety information from labels or elsewhere.

Among paid agricultural workers, a greater proportion of women taken on the planting, weeding, harvesting and handling/packing produce while fewer taken on tasks directly handling pesticides. Male farm workers report more frequent incidents of pesticide poisoning than women, with a relatively large proportion (10%) of Azeri speaking men suffering more than five incidents over the last 12 months.

Response of national authorities

The results of the study were shared with key stakeholders from the Ministries of Health, Agriculture and Environmental Protection and Natural Resources at a meeting in October 2016.The following points summarise key issues that were raised. The agenda and attendance list are provided in Annex 5.

- **Awareness raising and information for pesticide users and bystanders** – Few pesticide users or their communities are aware of the hazards associated with pesticide use and as a result, few users take steps to protect themselves from pesticide exposure. Similarly family members are often exposed to pesticides via other routes – for example through contact with contaminated clothing. The workshop participants recommended that more effort should be made to raise awareness about pesticide hazards and to encourage users and their families to take steps to reduce their exposure. All the possible means should be used: TV, radio, newspaper, social media, leaflets and meetings
- **Personal Protective Equipment (PPE):** Just 0.2% of users wear appropriate PPE, partly because they are not aware of the hazards, but also because PPE is not available and is expensive. Other factors such as poor work conditions, unemployment and difficulty of communicating with non-Georgian communities: people work when they find a job and don't care about or can't afford PPE. Measures should be considered to mandate the use of PPE (especially for employees) and to make low cost equipment available.
- **Technical training for pesticide users and farmers in general:** As well as being unaware about the hazards or pesticides, very few farmers and workers have had any technical training in pesticide use. As a result, they use pesticides excessively and inappropriately. This has implications for profitability of production, and risks problems of pest resurgence. Emphasis should be placed on improving the training for users and providing access to independent information sources – currently the main source of information is pesticide retailers whose business depends on volumes of pesticides sold rather than effective pest control and use.
- **Set up a system to collect data about pesticide poisoning:** The survey revealed that large numbers of users reported symptoms of pesticide poisoning after use. However, the Ministry of

health does not systematically capture data on poisoning incidents. The workshop participants identified a need for more reliable data on pesticide poisoning and urged the development of a national system to collect this information.

- **Training for medical staff**: Few health workers have been trained to recognise the symptoms of pesticide poisoning and, as a result, do not automatically consider pesticides as a cause of illness. This can result in misdiagnosis and the prescription of inappropriate – or even harmful - treatment options. It also contributes to the under-reporting of pesticide poisoning. The workshop participants welcomed one of the recommendations from the previous study (Protecting farmers and vulnerable groups from pesticide poisoning) that rural health workers be provided with additional training to recognize pesticide poisoning and that awareness raising materials aimed at medical professionals be developed and distributed to rural health centres. Ideally, these materials should include treatment options.
- **Identification of less toxic alternatives and non-chemical approaches:** Workshop participants pointed out that it's better to use safer alternatives, rather than make bad use of pesticides and rely on PPE for protection. The survey usefully identified the ten pesticides most frequently associated with poisoning along with the crops and pests they are used to control. Identification of less toxic pesticides and non-chemical options for controlling these pests would help to reduce poisoning incidents.
- **Farmer Field Schools (FFS)[13]:** Related to the above point, an FFS programme to train farmers in integrated pest management (IPM) to reduce their reliance on pesticides, and adopt effective non-chemical pest control approaches would be welcomed in the country. The idea of a pilot programme in Kvemo Kartli was supported as a good answer to the expressed needs.
- **Pesticide regulation:** Areas for improving pesticide regulation and management were discussed. Options supported included: better labelling of pesticides, tackling counterfeit pesticides, stricter licensing requirements for retailers and more action on container management.
- **Kvemo Kartli region:** The regional head recognised that there is a problem with pesticides in the region. The area is an important agricultural centre that produces 85% of all the potatoes, 68% of all the onions, 30 to 35% of all the tomatoes in Georgia. He was interested to learn more about alternative methods and keen to tackle the problem with training and awareness raising programmes.

Recommendations

The following recommendations were agreed by representatives of the Ministries of Health, Agriculture and Environmental Protection and Natural Resources in October 2016:

- A pilot Farmer Field School programme should be established – with the assistance of the FAO/Rotterdam Convention – in the Kvemo Kartli region to train farmers in IPM techniques on key crops.
- The Rotterdam Convention and FAO should help to identify less toxic and non-chemical alternatives to the pesticides which the study associated with poisoning incidents.

[13] FFS is an approach to adult education that provides opportunities for learning by doing. It teaches basic agricultural and management skills that build on farmers' skills on their own **farms**.

- Awareness-raising is important to influence end users of pesticides to reduce risks.
- There is a lack of information on incidents of pesticide poisoning – A national system should be established to collect data on pesticide poisoning
- Action is needed to strengthen responses of medical services – more training and information should be provided to health professionals to assist them in diagnosing cases of pesticide poisoning
- The FAO and Rotterdam Convention should provide support to Georgia to strengthen pesticide regulation – particularly in the areas of labelling, tackling counterfeit pesticides, licensing requirements for retailers and container management

Annex 1. Pesticides used by surveyed farmers

COMMERCIAL NAME	ACTIVE INGREDIENT	USED AGAINST	CROP
Carate/Karate/Zeon/zeoni	Lambda cyhalothrin	*Leptinotarsa decemlineata*, *Gryllotalpa* spp. (mole crickets), livestock insects	Potato, tomato, fruits,livestock
B 58	Dimethoate	Aphids, worm, snail, mites, *Leptinotarsa decemlineata, Gryllotalpa* spp.	bean, potato, tomato, flowers, fruits, maize, cucumber, peppers
Curzat R/Kurzat/Kurzati	Cupperchloroxide 689,5+cimoqsanil 42g/kg	*Phytophthora* spp., *Leptinotarsa decemlineata*, Powdery Mildew, weeds	Potato, tomato, cucumber, onion, grapes
Ridomil gold	Metalaxil-M 2%; Cupperchloroxide 14,19%	*Phytophthora* spp., *Leptinotarsa decemlineata*, Powdery Mildew, aphids, *Gryllotalpa* spp., *Yponomeuta* spp. (moth), weeds	Potato, tomato, cucumber, onion, grapes
Shok	Glyphosate	weeds	Potato, tomato, maize, cucumber
Cuper/cupper/cuperoxide	Copper	Powdery Mildew	grapes
Zencor/Zenkor/Zenko and Unimark	Metribuzin (Zencor)	Weeds	Wheat, Potato, Fruit, Maize
Actara	Thiamethoxam	Aphids, insects, worms	Potato, tomato, maize
Marshal - Marshall	Carbosulfan	*Leptinotarsa decemlineata*	potato, onion, carrot, fruits
Antracol/Amtrakol/Antrakoli	Propineb	Sun burn, Powdery Mildew, *Alternaria* spp. (fungi), *Phytophthora* spp.	Potato, tomato, cucumber, fruits
Mosetam	Acetamiprid	*Leptinotarsa decemlineata*, *Phytophthora* spp, weeds	Potato, tomato
Lentamol/Lentemul/2,4 D	2,4 D (Lentemul)	Weeds	Maize, Tomato, Hazelnut
Imidor/Imidor Max/Imedor	Imidacloprid	*Leptinotarsa decemlineata*, Powdery Mildew, aphids, mites, *Plasmopara viticola* (grapevine downy mildew)	Taragon, tomato, potato, grapes, pepper, cucumber

Annex 2. Pesticides used by surveyed farm workers

COMMERCIAL NAME	ACTIVE INGREDIENT	USED AGAINST	CROP
Marshal	Carbosulfan	*Leptinotarsa decemlineata*	Potato
Shok	Glyphosate	Weeds	Potato, Onion, Wheat
Karate/Carate/Zeon	Lambda cyhalothrin	*Leptinotarsa decemlineata*, Aphids	Potato, tomato
Curzat/Kurzat	Copperchloroxide 689,5+cimoqsanil 42g/kg	*Phytophthora* spp., fungi	Potato Tomato
Actara	Thiamethoxam	*Leptinotarsa decemlineata*, Aphids, thrips	Potato, Onion, Tomato, fruit
2,4 D - Unimark	(2,4-Dichlorophenoxy)acetic acid	Weeds, *Leptinotarsa decemlineata*	Wheat, Maize, Pistachio, Potato Tomato
Nikosh Nurel D	Chlorpyrifos 500 g/L + Cypermethrin 50 g/L EC	maize butterflies	Maize
Ridomil Gold	Metalaxil mancozeb	*Leptinotarsa decemlineata*	Potato
Imedokloprid/imedocloprid	Imidacloprid - neonicotinoid	Aphids and mites	Tomato
Arivo	Cypermethrin	*Leptinotarsa decemlineata*	Potato

Annex 3. Pesticides in common use in Georgia compared to PAN HHP list

			INTERNATIONAL CONVENTIONS			ACUTE TOXICITY			CHRONIC TOXICITY								ENVIRONMENTAL TOXICITY			
Pesticide	Type of pesticide	**EU status - October 2016**	Montr Prot	PIC	POP	WHO Ia	WHO Ib	H330	EPA carc	IARC carc	EU GHS carc (1A, 1B)	IARC prob carc	EPA prob likel carc	EU GHS muta (1A, 1B)	EU GHS repro (1A ,1B)	EU EDC (1) or C2 & R2 GHS	very bio acc	very pers water, soil or sediment	very toxic to aq. organism	highly toxic bees
2,4-DB	HB	A														✓				
Acetamiprid	IN	A																		
Carbosulfan	IN; NE	NA						✓												✓
Chlorpyrifos	IN; AC	A																		✓
Copper (II) hydroxide	FU	A						✓										✓	✓	
Cypermethrin	IN; AC	A																		✓
Dimethoate	IN; AC	A																		✓
Glyphosate	HB	A										✓								
Imidacloprid	IN	A																		✓
Lambda-cyhalothrin	IN	A						✓								✓				✓
Mancozeb	FU	A											✓			✓				
Metalaxyl	FU	A																		
Metribuzin	HB	A														✓				
Propineb	FU	A																		
Thiamethoxam	IN	A																		✓
			No data in PAN HHPs list																	

What defines a Highly Hazardous Pesticide for PAN?

In October 2007 the FAO/WHO Joint Meeting on Pesticide Management (JMPM) discussed the so-called thought starter paper "Addressing Highly Toxic Pesticides (HTPs)" with a note from the Secretariat explaining: "Through this thought-starter FAO wishes to start its work on highly hazardous pesticides." Based on this thought starter the JMPM outlined criteria to identify highly hazardous pesticides (HHPs). In addition, the JMPM "recommended that FAO and WHO, as a first step, should prepare a list of HHPs based on the criteria identified, and update it periodically in cooperation with UNEP. It further requested that such a list should be made widely known to all stakeholders involved in pesticide regulation and management."

Also in 2007 the JMPM developed the following criteria for highly hazardous pesticides:

- Pesticide formulations that meet the criteria of classes Ia or Ib of the WHO Recommended Classification of Pesticides by Hazard; or
- Pesticide active ingredients and their formulations that meet the criteria of carcinogenicity Categories 1A and 1B of the Globally Harmonized System on Classification and Labelling of Chemicals (GHS); or
- Pesticide active ingredients and their formulations that meet the criteria of mutagenicity Categories 1A and 1B of the Globally Harmonized System on Classification and Labelling of Chemicals (GHS); or
- Pesticide active ingredients and their formulations that meet the criteria of reproductive toxicity Categories 1A and 1B of the Globally Harmonized System on Classification and Labelling of Chemicals (GHS); or
- Pesticide active ingredients listed by the Stockholm Convention in its Annexes A and B, and those meeting all the criteria in paragraph 1 of Annex D of the Convention; or
- Pesticide active ingredients and formulations listed by the Rotterdam Convention in its Annex III; or
- Pesticides listed under the Montreal Protocol; or
- Pesticide active ingredients and formulations that have shown a high incidence of severe or irreversible adverse effects on human health or the environment.

PAN International strongly welcomed the decisions made by the FAO Council, the COAG and the JMPM. PAN was of the opinion, however, that the list of HHP criteria agreed by the JMPM had some important shortcomings: in particular, it is important to note that pesticides with endocrine disrupting properties, eco-toxicological properties, or inhalation toxicity have not been taken into account by the JMPM.

Because of these shortcomings, PAN International in 2009 decided to independently develop a definition of HHPs with a more comprehensive set of hazard criteria, used by recognised authorities, such as the EU and the US Environmental Protection Agency (EPA), and to develop a list of HHP pesticide active ingredients based on these selected criteria. For further information follow this link: http://www.pan-germany.org/gbr/project_work/highly_hazardous_pesticides.html

The 2016 version will be released end 2016.

Annex 4. Briefing notes on Lambda Cyhalothrin, Dimethoate and Glyphosate

Lambda cyhalothrin – formulated as 'Carate /Karate /Zeon/zeoni'

Lambda cyhalothrin hazard classification is WHO II – moderately hazardous. However, it is highly toxic via some routes, including inhalation, in some formulations – such as Karate. 14 incidents were reported in the current study. Common signs and symptoms included headache, nausea, eye and skin irritation. In the US it is a Restricted Use Pesticide and so may be purchased and used only by certified applicator. It is highly toxic to fish, aquatic invertebrates and bees.

Dimethoate – formulated as ' B58 or Bi58'

This product was sold in hazardous glass vials in the study area. It is moderately toxic (World Health Organisation class II) by ingestion, inhalation and dermal absorption. Three incidents were reported in the current study, mainly headaches and eye and skin irritation. The literature states that more severe incidents affect the central nervous system, producing lack of coordination and eventual paralysis of body extremities and respiratory muscles. There is a suspected link to birth defects. In 2011 the Australian authorities suspended the use of dimethoate on a range of horticultural crops due to concerns about food safety. Dimethoate is also highly toxic to bees, moderately toxic to birds, moderate to high toxicity to aquatic organisms.

An incident of occupational exposure to dimethoate was reported by Georgia to Rotterdam Convention under Article 6 in 2015.

Glyphosate – formulated as 'Shok , Clin, Klin, Rumbo' or 'Uragan'

The main symptoms reported in the current study were headache and skin irritation. 8 respondents reported signs and symptoms in relation to glyphosate. Although Glyphosate has a low toxicity rating (WHO Table 5), surfactants added to formulated glyphosate products may cause more impacts on health. The IARC monograph on glyphosate, published in 2015, concludes that glyphosate as probably carcinogenic to humans (Group 2A). Following the classification by IARC as a probable human carcinogen, there has been an upsurge in regulatory and voluntary action against glyphosate, which is banned and restricted in several countries. Glyphosate also has direct eco-toxicological effects on microorganisms, plankton, algae and amphibia at low concentrations.

Annex 5. National Stakeholder Meeting – list of participants and agenda

Dates:	12-13th October 2016
Location:	Holiday Inn Hotel, Tbilisi, Georgia
Outputs:	Report with specific suggestions/recommendations based on the evidence gathered in the study and next steps identified.
Organised by:	PAN-UK/Rotterdam Convention, FAO and Eco-Life
Purpose:	To meet Government representatives to share the key findings of a survey of 1,000 farmers and farm workers in Kvemo Kartli region and discuss the implications for pesticide management in the country.

Agenda

Wednesday 12th October 2016

Time	Title	Speaker and organisation
09.45	**Registration**	Guests arrive
10.00	**Welcome address**	
10.10	**Introductions**	Khatuna Akhalaia Maiko Aleqsidze Eco-Life
10.20	**The importance of good data in decision making at national and international level**	Elisabetta Tagliati-Rotterdam Convention Secretariat, FAO
10.40	**Supporting evidence-based pesticide regulation and risk reduction in Georgia, with a focus on vulnerable groups** A brief outline of the current work, explaining the purpose and methodology	Dr Keith Tyrell, PAN-UK
11.00	Coffee break	
11.20	**The people and the area that were surveyed** Presenting data on crops, farm size, gender and ethnic make-up of the target population. Also presenting issues that emerged regarding adaptations of the methodology to local cultural or other circumstances.	Maiko Aleqsidze Eco-Life

11.40	**Risky practices identified**	Khatuna Akhalaia Eco-Life
12.05	**Who is at greatest risk – Vulnerable groups** Are risks the same regardless of age, gender, employment status or ethnicity?	Dr Rina Guadagnini, PAN-UK
12.30	**Round table discussion and open questions**	
13.00	BUFFET LUNCH	
14.15	**Which crops, pests and products are particularly problematic?**	Dr Rina Guadagnini, PAN-UK
14.30	**Are there safer alternatives?**	Dr Keith Tyrell, PAN-UK
14.55	**Key Findings and decision makers-Working together towards a same objective** A brief recap of key issues raised and suggesting possible areas requiring action.	Elisabetta Tagliati Rotterdam Convention Secretariat, FAO
15.10	**Open discussion** Which issues should be acted on at a national or regional level?	Facilitation by Dr Keith Tyrell, PAN-UK Note taking by Dr Rina Guadagnini, PAN-UK and Khatuna Akhalaia Eco-Life
15.40	Coffee break during discussion session	
16.30	**Recap of key points issues to be taken forward tomorrow in action planning**.	Elisabetta Tagliati, Rotterdam Convention Secretariat, FAO
16.45	Close	

Thursday 13th October 2016

Time	Title	Speaker and organisation
09.45	**Registration**	Guests arrive
10.00	**Welcome and recap**	Rotterdam Convention Secretariat, FAO
10.15	**Agreeing key areas for action** Prioritise issues for discussion. These could include, for	Facilitation by Dr Keith Tyrell, PAN-UK

	example: • Achieving behavioural change and risk reduction at farm level • Targeting high risk groups • Priority crop/pest complexes for future work on IPM/FFS and safer alternatives • Priority pesticides for review by regulatory authorities • Legislation and regulations • Health and safety at work in relation to seasonal agricultural workers • Strengthening enforcement of pesticide legislation **Note**: other issues may emerge from the discussion on 12th	
10.45	**Group discussions** Articulating actions required (and by whom) for priority issues identified above	Facilitation by Khatuna Akhalaia and Maiko Aleqsidze Eco-Life
11.00	Coffee break during discussion	
11.45	**Plenary** Each group reports agreed actions on their topic of interest and a plenary discussion reviews the actions and agrees a final set of actions/recommendations from the meeting.	Facilitation by Dr Keith Tyrell, PAN-UK Note taking by Dr Rina Guadagnini, PAN-UK and Khatuna Akhalaia Eco-Life
12.45	Wrap up	Elisabetta Tagliati, Rotterdam Convention Secretariat, FAO
13.00	BUFFET LUNCH	
14.00	Closes	

Participants:

#	Name - სახელი და გვარი	ორგანიზაცია / Organization
1	ია მირაზანაშვილი Ia Mirazanashvili	FAO Local Representation
2	ნიკოლოზ მესხი Nikoloz Meskhi	Ministry of Agriculture National Food Agency – head of department of photo sanitary control
3	ირმა ცქვიტინიძე Irma Tskvitinidze	Ministry of Agriculture National Food Agency – DNA Roterdam Convention
4	დავით სარჯველაძე David Sarjveladze	Ministry of Agriculture National Food Agency main specialist of Pesticide management division
5	ინგა ღვინერია Inga Gvineria	Ministry of Health Institute of Toxicology – toxicologist

6	მერაბ იოსავა Merab Iosava	Ministry of Health National Diseases control centre
7	ალვერდ ჩანქსელიანი Alverd Chanqseliani	Ministry of Environmental Protection and Natural resources Head of Waste and Chemical substances management Service
10	გერონტი სივსივაძე Geronti Sivsivadze	Head of Qvemo Qartli of regional information consultation centre of Ministry of Agriculture
11	ირმა კოპაძე Irma Kopadze	Tetritskaro information consultation centre of Ministry of Agriculture
12	ია ჯაშიაშვილი Ia Jishiashvili	Tetritskaro information consultation centre of Ministry of Agriculture
13	თეიმურაზ ბაკურაძე Teimuraz Bakuradze	Bolnisi information consultation centre of Ministry of Agriculture
14	გიორგი რაზმაძე Giorgi Razmadze	Dmanisi information consultation centre of Ministry of Agriculture
15	მთვარისა ქობულია Mtvarisa Qobulia	Gardabani information consultation centre of Ministry of Agriculture
16	დიმიტრი მიშელაძე Dimitri Misheladze	Tsalka information consultation centre of Ministry of Agriculture
17	თამარ დვალი Tamar Dvali	Marneuli information consultation centre of Ministry of Agriculture
18	ელიზაბეტ ტაგლიატი Elisabetta Tagliati	FAO
19	კეით ტირელი Keith Tyrell	PAN UK
20	რინა გვადანინი Rina Guadagnini	PAN UK
21	მაია ალქსიძე Maia Aleqsidze	Eco-Life
22	ხათუნა ახალაია Khatuna Akhalaia	Eco-Life
23	ნინო ჟორჟიკაშვილი Nino Zhorzhikashvili	Eco-Life