



vegIMPACT

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WP Occupational Health

*Baseline survey of occupational pesticide exposure
in Kersana sub-district, Brebes, Indonesia*

Edwin van der Maden, Melliza Wulansari and Irene Koomen



vegIMPACT

Improved Vegetable Production and Marketing for small farmers to Increase the Food Security status and to promote Private Sector Development in Indonesia



vegIMPACT is a program financed by The Netherlands' Government promoting improved vegetable production and marketing for small farmers in Indonesia, contributing to the food security status and private sector development in Indonesia. The program builds on the results of previous joint Indonesian-Dutch horticultural development cooperation projects and aligns with recent developments in the horticultural private sector and retail in Indonesia. The program activities (2012 – 2016) include the Development of Product Market Combinations, Strengthening the Potato Sector, Development of permanent Vegetable Production Systems, Knowledge Transfer and Occupational Health.

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List of abbreviations and acronyms

a.i.	Active ingredient
CDI	Centre for Development Innovation, Wageningen UR
FGD	Focus Group Discussion
IPM	Integrated Pest Management
NA	Not available
PMC	Product Market Combination
PPE	Personal Protective Equipment
vegIMPACT	Vegetable production with IMPACT project
Wageningen UR	Wageningen University & Research centre
WHO	World Health Organisation

1. Introduction

1.1. Background

VegIMPACT is a program aimed at improving vegetable production and marketing for small farmers in Indonesia. The program (2013-2016) is carried out by Wageningen University and Research Centre, together with local partners such as the Indonesian Vegetable Research Institute and Fresh Dynamics Indonesia, and with national and international companies involved in the vegetable production and marketing chain. The program is carried out in West, Central and East Java, North Sumatra and Sulawesi.

One of the work packages of the vegIMPACT project is Occupational Health. This work package aims to reduce the occupational health risk regarding pesticides, with specific attention to women.

In Indonesia, pesticide use is one of the most significant occupational health exposures for agricultural workers. Pesticides are used extensively based on the idea of preventive spraying to protect the crop to ensure good yields. Farmers, labourers, and society around the vegetable production are jeopardized by the high dependence on pesticide in vegetable production and are exposed to pesticides on a daily basis. Personal protective equipment (PPE) is not or rarely used and is of such quality that sufficient protection is not guaranteed. Furthermore, there is limited awareness about the chronic negative health effects of exposure to pesticides. Major steps have to be taken regarding pesticide exposure, handling and application in order to reduce pesticide related occupational health risk in Indonesian agriculture.

1.2. Baseline survey

The baseline survey is part of a pilot study that is being carried out in five villages in the Kersana sub district, which were selected based on the criterion that a large part of the community is engaged in horticulture. In the Kersana sub district mainly shallot and hot pepper are being cultivated.

The objective of the baseline survey was to gather information about the current situation related to pesticide exposure routes of farmers and farm labourers and create a starting point from where to start interventions. This baseline survey follows up the first observations made in the pilot study area (Koomen et al., 2014) and provides a more quantitative substantiation of the current situation related to exposure of farmers and female labourers to pesticides. The baseline survey questionnaire used for the interviews can be found in Annex 1.

Beside some general characterization questions similar to the vegIMPACT overall baseline (Dijkxhoorn et al., 2014), this specific baseline survey focused mainly on exposure of farmers and farm labourers to pesticides and related occupational health topics. It does not only serve as a tool to gather initial information on current practices and situation, but at a later phase also as a reference for the level of success and impact of implemented interventions.

Additional to the baseline survey questionnaire separately focus group discussions with female labourers were held for each of the 5 villages, in order to talk and discuss with female field labourers in an informal way to get more in-depth information from them. In addition, it also served as a tool to create initial awareness. The focus group discussion guiding questionnaire can be found in Annex 2.

This baseline survey report presents an overview of the current situation among the farmers and female labourers that participate in the pilot study in the Kersana sub district, Brebes, Indonesia.

1.3 Study area

The Brebes district, Central Java has been selected as the study area for pilot activities on occupational health of those working in the horticultural sector. The Brebes district, which is divided in 17 sub-districts, is located in the north-western part of Central Java province in Indonesia. Its capital is Brebes and is located about 350 km east of Jakarta. Brebes is well-known for its shallot (*Allium cepa* var. *aggregatum*) cultivation, the next major crop is hot pepper. The production of both crops involves intensive application of pesticides, and as such poses a major risk to the occupational health of those working in these crops.

In the first phase of the WP Occupational Health the focus will be mainly on the sub-district Kersana for implementation of a pilot study. In the Kersana sub-district a total of 13 villages are located. In the majority of the villages horticulture activities take place. For the pilot study the following villages were selected: Kersana, Limbangan, Kemukten, Sutamaja and Kramat Sampang. In two of the villages (Kersana and Limbangan) vegIMPACT PMC activities are taking place.



Figure 1.1 Map of the Brebes district (Bahasa Indonesia: Kabupaten)

2. Baseline survey results

For this baseline survey a total number of 32 male farmers and 112 female labourers were interviewed over a period of 2 months (February and March 2014), in 5 villages (Kersana, Limbangan, Kemukten, Sutamaja, Kramat Sampang) in the Kersana sub district of Brebes district, Central Java, Indonesia. In Table 2.1 an overview is given of the number of interviewees per village.

Table 2.1 Number of surveyed farmers and female labourers in the baseline survey.

	Farmers (#)	Female labourers (#)
Kersana	5	23
Limbangan	6	21
Kemukten	7	22
Sutamaja	8	22
Kramat Sampang	6	24
TOTAL	32	112

2.1. Main characteristics of the participants

Table 2.2 and 2.3 present the main characteristics of the male farmers and female labourers. In general the education level of the farmers and female labourers is relatively low. About 40% of the male farmers and 50% of the female labourers had no or have not completed primary education. Another large segment of 47% of the male farmers and 46% of the female labourers received primary education only. However, despite the low education level, the literacy rate is high with 96% of male farmers and 82% of female labourers being able to read and write.

There is a clear separation between the work activities of men and women. Male activities comprise of preparing land, spraying and irrigation. Female activities are planting, weeding, harvesting and post-harvest handling. Both male and female apply fertilizer to the crop. Working days per week and working hours per day are similar for male and female, working 7 days a week and between 4 and 7 hours per day.

Table 2.2 Main characteristics of surveyed farmers and female labourers.

		Farmers (%)	Female Labourers (%)
Age	< 25	0.0	0.0
	25 – 34	6.3	27.7
	35 – 44	28.1	32.1
	45 – 54	40.6	59.8
	55 – 64	18.8	9.8
	≥ 65	6.3	0.0
	NA ¹	0.0	2.7
Education	None / < elementary	40.6	49.1
	Elementary	46.9	45.5
	Middle school	6.3	5.4
	High school	6.3	0.0
Reading / writing	Yes	96.9	82.1
	No	3.1	17.9
Work activities	Preparing land	68.8	0.0
	Planting	3.1	98.2
	Fertilizing	62.5	59.8
	Weeding	15.6	97.3
	Spraying	90.6	0.0
	Harvesting	6.3	84.8
	Postharvest	15.6	54.5
	Irrigating	21.9	2.7

¹ Some respondents did not remember when they were born

Table 2.3 Working days and hours of surveyed farmers and female labourers.

		Farmers (%)	Female Labourers (%)
Working days / week	1 - 3 days	0.0	6.3
	4 – 6 days	3.1	7.1
	7 days	96.9	86.6
Working hours / day	≤ 4 hours	12.5	3.6
	5 hours	31.3	17.0
	6 hours	28.1	67.9
	≥ 7 hours	28.1	11.6

2.2. Production characteristics of farms

Table 2.4 present the land holding size of the farms. The average farm size is about 5800 m². Farmers mostly work with standard sized plots of 1600 m². About 65% of the farmers crop on 1 to 3 of these standard sized plots (1600 to 4800 m²). About 1/3 of the land is owned by the farmers and about 2/3 is rented.

In general, a distinction can be made between two growing seasons, the dry seasons (May – October) and the wet season (November – April). However, in practice, the seasons are not as strictly defined as according to these months, as there is often some overlap between the seasons based on planting and harvesting time.

Farmers do not practice a clear distinct cropping pattern. In general, farmers grow paddy once in the wet season (Jan–Apr), followed by three times shallot both in the dry and wet season (May–Dec). Sometimes shallots are alternated with hot pepper. Other crops that are grown to a much lesser extend are maize, eggplant, sweet corn and bitter melon.

Depending on the size of the farm, a farmer will hire labour for several cultivation activities. Male labourers are hired mainly for land preparation, spraying and harvesting, while female labourers are hired mainly for planting, weeding, harvesting and post-harvest activities. Land preparation, fertilizing and spraying are activities where the farmer himself also contributes.

Table 2.4 Distribution of land holding size of surveyed farmers.

	Size (m ²)	Farmers (%)
Average land holding	5,828	
Land holding	< 1,600	3.1
	1,600	15.6
	3,200	31.3
	4,800	18.8
	6,400	6.3
	8,000	3.1
	11,200	3.1
	> 11,200	18.8
Total land holding owned by respondents	186,500	
Land owned	61,700	
Land rented	124,800	



Figure 2.1 Typical shallot field.



Figure 2.2 Farmer at his shallot field.



Figure 2.3 Shallot planting.



Figure 2.4 Post-harvest activity.

2.3. Pesticide practices

Table 2.6 presents the pesticide practices of the farmers. All farmers use the strategy of preventive spraying to protect their crop. In general they believe that spraying is necessary to protect the crop to ensure good yields. This results in a high number of sprays per week, which is even higher in the wet than the dry season, up to 3 and 7 sprays/week, respectively. As many as 15 pesticide products may be mixed in one tank. Farmers appear to lack knowledge on possible combi-tox effects of certain pesticides when mixed together, which can pose serious health risks, phytotoxicity and mixing may also affect the effectiveness of the used chemicals. They apparently think it is more efficient to spray all chemicals mixed together in one tank at one time to save time, instead of spraying them separately. However, on the other hand, from the point of exposure to pesticides the time and risk of exposure is lower when using mixtures instead of spraying products separately, of course dependent on the frequency of spraying.



Figure 2.5 Simultaneous weeding and spraying. **Figure 2.6** Examples of local PPE.

Another issue that was observed and which also became clear from the survey is the fact that labourers are in the field while pesticides are being applied to the crop (e.g. female labourers are hand weeding simultaneously while pesticides are being sprayed, Figure 2.5). All male farmers indicated that commonly labourers are in the field while pesticides are being sprayed. Furthermore, farmers indicated that the majority of the labourers are using PPE, however it should be mentioned that from observations the PPEs used are of such low quality that they provide insufficient protection. Mostly they consist out of a piece of cloth or an old t-shirt to cover mouth and nose (Figure 2.6). Furthermore, most of the protective equipment is used for other reasons than for protection against exposure to pesticides (e.g. protection against sun or dust).

When pesticides are being applied to the crop, about two third of the farmers consider the wind direction. The concept of restricted re-entry time is not standard applied and labourers enter the field directly after spraying activities took place, or are even in the field during spraying activities. Only a few farmers mention that they sometimes used a re-entry interval (few hours to one day), but that they thus do not apply this standard every time. The knapsack sprayer and other spraying equipment are cleaned in the channel near the field which causes pesticide residues to end up in the environment and water. The condition of the knapsack sprayer in general is poor and most of them need maintenance. A leaking knapsack increases exposure of sprayers to pesticides by means of skin absorption. All of the farmers use pesticides for protection of seed material (mostly fungicides) they are saving for the next crop. It was observed that shallot seedlings are stored hanging under the roof of the porch of the house and are sprayed with fungicides for conservation when stored under the roof (Figure 2.7 and 2.8).



Figure 2.7 Storing shallot seedlings.



Figure 2.8 Storing shallot seedlings.

The farmers were also asked if in the case there would be a professional spraying service available (well trained experts with proper equipment and PPE), the farmer would consider hiring this service. About 80% of the farmers replied they would like to make use of such a service, however some also mentioned that they would use the service only if it is of good quality, is beneficial to the farmers (e.g. reduction in production costs) and will result in a good yield. Other remarks of the farmers on the benefits of the professional spraying service were that it may improve the control of pests and diseases in their crop, payment of such a service could be done after harvest, the farmer can learn about good spraying practices, the process of pesticide spraying for the farmer will cost less effort and that it may prevent farmers getting sick and will improve health and protection against pesticides for others as well.

Table 2.6 *Pesticide practices of surveyed farmers.*

		Farmers (%)
Spraying strategy	Preventive	100.0
	Curative	0.0
Using mixtures	1 – 4 products	29.0
	5 – 9 products	54.8
	10 – 15 products	16.1
# spray /week dry season	1x	12.9
	2x	48.4
	3x	38.7
# spray /week wet season	1x	12.9
	2x	12.9
	3x	61.3
	5x	6.5
	7x	6.5
Labourers in field during spraying	Yes	100.0
	No	0.0
Labourers using PPE	Yes	61.3
	No	38.7
Consider wind direction when spraying	Yes	74.2
	No	25.8
Re-entry time after spraying	Direct	100.0
	> one hour	0.0
	> one day	0.0
Cleaning equipment	In channel near field	100.0
	Other	0.0
Condition knapsack sprayer	Well maintained	12.9
	Needs maintenance	87.1
Using pesticides for protection seed material	Yes	100.0
	No	0.0
Would consider hiring a professional sprayer	Yes	81.3
	No	3.1
	Do not know	15.6

2.4. Pesticide information and knowledge

Table 2.7 presents the source of information for male farmers on pesticide choice and usage. Most information and knowledge on mixing and choice of pesticide is based on own experience, or from a pesticide salesman. No farmer mentioned that advice on pesticide use is received from an independent advisor like an agricultural extension worker. Pesticide use is actively promoted by pesticide salesmen, who provide farmers with gifts (e.g. caps, hats, t-shirts) to promote their products. Many farmers can be seen wearing hats or clothing with a pesticide brand name. Several pesticide stores and suppliers can be found spread in and around the villages and pesticide advertisement can be seen everywhere. Pesticide traders are abundant compared to the number of agricultural extension workers. It is therefore not surprising that farmers receive their information from pesticide traders rather than from extension workers, from whom one would expect a more balanced advice. This is probably also why few farmers are unaware of possible alternatives to pesticides. Only about 23% of the farmers have heard of Integrated Pest Management, let alone that they know exactly what it means and how they can apply it. About 38% of the farmers indicated they are aware of which pesticides are prohibited by law and were able to give some examples. The prohibited pesticides are products with active ingredients listed in the

Government Regulation Permentan no.24/2011. These active ingredients are e.g. endosulfan, DDT, metamidophos, fentoate and many more.



Figure 2.9 Popular pesticide products in the Kersana sub-district.



Figure 2.10 Advertisements.

Table 2.7 Pesticide information and knowledge of surveyed farmers.

		Farmers (%)
Information on using mixtures	Own experiment	71.0
	Friends / parents	19.4
	Salesman / shop	6.5
	Others	3.2
Information on pesticide choice	Own experience	50.0
	Pesticide shop	21.9
	Salesman	15.6
	Others	12.5
Know about Integrated Pest Management (IPM)	Yes	22.6
	No	77.4
Know what pesticides are prohibited by law	Yes	38.7
	No	61.3
Examples given by farmers:		
“Dekasulfan”		a.i. endosulfan
“Tiodan”		a.i. endosulfan
“Tamaron”		a.i. metamidophos
“Dharmasan”		a.i. fentoate
“DDT”		

There is a clear difference between the general information men and women receive about pesticides (Table 2.8). When asked directly if pesticides are bad for human health, about 87% of the male farmers and only about 55% of the female labourers acknowledge this. As with regard to receiving any kind of information or training related to pesticides, the females barely received training, 93% of the females have never received any training on safe use of pesticides. Also with regard to reading the label of a pesticide product, the majority of the males do read the label before they use the product. Female labourers do hardly read the label of pesticide products. This is especially worrying since female labourers are often in the field while pesticides are being sprayed and are thus unaware of what they are being exposed to. As with regard to actually understanding what information is given on the label, only about 45% of the male farmers who do read the label and only a few female labourers say that they understand the label.

Table 2.8 Pesticide knowledge of surveyed farmers and female labourers.

		Farmers (%)	Female labourers (%)
Believe that pesticides affect health negatively	Yes	87.1	55.4
	No	12.9	44.6
Received (any) information on pesticides	Yes	87.1	69.6
	No	12.9	30.4
Received (any) training on safe pesticide use	Yes	45.2	6.3
	No	54.8	93.8
Reading label on pesticide product before use	Yes	60.0	9.8
	No	40.0	90.2
If yes reading label, understand the information on the label	Yes	44.5	72.7
	No	55.5	27.3

Table 2.9 shows the opinion of male farmers and female labourers on the trend in pesticide usage of the past 5 years. Although it was expected that farmers would give their opinion on the amount of pesticides used and the difference in that between now and 5 years ago, they understood the question differently and responded with their opinion on the effectiveness of pesticides. In this view, about 65% of the male farmers and 50% of the female labourers responded that the effectiveness of the pesticides is less than 5 years ago and expressed their dissatisfaction about this (see the additional remarks).

Table 2.9 Opinion on trend in pesticide usage of surveyed farmers and female labourers.

		Farmers (%)	Female labourers (%)
Opinion on trend in pesticide usage the past 5 years (effectiveness pesticide)	Lower	64.5	49.1
	Same	32.3	25.0
	Higher	22.6	19.6
	Do not know	0.0	6.3
Additional remarks	“The pesticides are less effective nowadays”		
	“The pesticide dosage is reduced”		
	“The quantity of pesticide usage increases, especially when the weather changes”		
	“Pesticide packaging had transformed from glass or can to plastic”		
	“The number of pesticide brands has increased”		
	“Over usage of pesticide, using the same product and low price means no good results”		
	“I change to new pesticide products every 2-3 year”		
	“The pesticides are not powerful enough to kill pest, so I change to new products continuously”		
	“Old pesticide can still be used with minimal dosage and still are effective. In new products, the active ingredients is reduced”		
	“The old pesticides were more effective”		
	“The dosage of pesticide is reduced by the pesticide company. Before a lot of sprayer got unwell during spraying”		
	“The older pesticides were more effective and made sprayers get unwell (dizzy, nausea, and vomit). Now, pesticide is not effective and sprayers do not get unwell”		

2.5. Pesticides used by farmers

Table 2.10 to 2.12 present information on pesticide types used by farmers. On average farmers use 10 different pesticide brands, with a maximum of 17 and a minimum of 4 different pesticides. In total 89 different brand names and 37 different active ingredients are used. Of 14 brand names it could not be ascertained what the active ingredient was. Insecticides are the most commonly used pesticides as 62% of the chemicals used by farmers are classified as insecticides. Insecticides are in general the most harmful types of pesticides to humans.

Table 2.10 Most popular brand, active ingredient and pesticide types used.

Most popular	Brand	Active ingredient	Main use	WHO class*	Frequency (# used)	% of total
Brand name	1. Buldok	beta-cyfluthrin**	Insecticide	Ib	20	6.5
	2. Antracol	propineb	Fungicide	U	17	5.6
	3. Dithane	mancozeb	Fungicide	U	16	5.2
	4. Arjuna	chlorfenapyr	Insecticide	II	13	4.2
	5. Regent	fipronil	Insecticide	II	13	4.2
Active ingredient	1. mancozeb		Fungicide	U	42	13.7
	2. abamectin		Insecticide	NA	41	13.4
	3. chlorfenapyr		Insecticide	II	30	9.8
	4. beta-cyfluthrin		Insecticide	Ib	28	9.2
	5. propineb		Fungicide	U	21	6.9
Pesticide type			1. Insecticide		192	62.7
			2. Fungicide		97	31.7

*) Class Ia: extremely hazardous Class III: slightly hazardous Class U: unlikely to be hazardous
 Class Ib: highly hazardous Class II: moderate hazardous

**) It should be mentioned here that it was observed that beta-cyfluthrin in Indonesia is still sold as a class II product instead of a class Ib product, as according to the WHO classification. In 2004 the WHO classified beta-cyfluthrin as a class II product (WHO, 2004). However in the updated 2009 version of the WHO recommended classification of pesticides (WHO, 2009), beta-cyfluthrin was changed to class Ib. Cyfluthrin and beta-cyfluthrin were evaluated by the Joint FAO/WHO Meeting on Pesticide Residues (JMPR) in 2006 and data were evaluated which showed that the acute oral toxicity of beta-cyfluthrin was in the range for classification in Class Ib (personal communication Richard Brown, WHO, November 2014). The WHO publication is only a recommendation and classification of any pesticide in a country is a matter for the registration authority in that country. It seems that Indonesia has (not yet) adopted and implemented the change in classification, because the labels of beta-cyfluthrin products still has a yellow colour code, indicating that it is a class II product (see figure 2.11).

Table 2.11

WHO classes of chemicals used.

WHO Class	Frequency (# used)	% of total
Ia	0	0.0
Ib	38	12.4
II	103	33.7
III	15	4.9
U	81	26.5
NA	69	22.5

Table 2.12

Health effect of chemicals used.

Health effect	Frequency (# used)	% of total
Acute poisoning	50	16.3
Possible carcinogenic	121	39.5
Endocrine disruptor	69	22.5
No effect	79	25.8
NA	53	17.3

The analysis of Tables 2.10 2.11 is based on 'The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification' (WHO, 2009). For Table 2.12 the 'PAN International List of Highly Hazardous Pesticides' (PAN, 2013) was used.

From the tables above it is apparent that the use of beta-cyfluthrin (9.2%) greatly contributes to the exposure of farmers and farm workers to class Ib pesticides (12.4%). Also more than 30% of pesticide used fall in category II, for which about one third is contributed by chlorfenapyr (9.8%). With regard to effect on health, nearly 40% of the pesticides used by shallot farmers are possible carcinogens and more than 20% are endocrine disrupting pesticides. More than 15% of the pesticides used can cause acute poisoning.



Figure 2.11 Two examples of beta-cyfluthrin products in Indonesia with yellow colour coding.

2.6. Pesticide exposure and personal hygiene

Table 2.13 presents the answers of male farmers and female labourers on whether or not they use Personal Protective Equipment (PPE) during mixing, spraying of pesticides or in general at moments of pesticide exposure. According to the answers several PPEs are being used, however there is discrepancy between the perception of farmers and labourers what are PPEs and the type of PPEs that do actually protect against pesticide exposure. From observations we can conclude that the PPEs used by the interviewed male farmers and female labourers are of such low quality that they provide insufficient protection. Mostly it consists out of a piece of cloth or an old t-shirt to cover their mouth and nose (Figure 2.2). Furthermore, most of the protective equipment is used for other reasons than for protection against exposure to pesticides (e.g. protection against sun and dust). The masks that are commercially available, and are sometimes recommended and distributed by the health extension, are also not of sufficient quality. In general the availability of any kind of PPEs at pesticide stores or agro input stores is low. PPE can, in general, only be purchased in R1 (= distributor) stores. For farmers it is hard to access R1 shop, for instance in Brebes an R1 store can only be found in Cirebon, in the region itself R2 and R3 shops can be found.

The acknowledgement of the necessity of PPEs is still low. If farmers and labourers have received PPEs they will use it but no replacement is purchased after the PPEs are broken.

Table 2.13 Personal Protection Equipment (PPE) used during mixing and/or spraying or when in contact with pesticides by surveyed farmers and female labourers.

	Farmers (%)	Female labourers (%)
Hat	93.8	100.0
Shirt short	3.1	7.1 *
Shirt long	96.9	97.3 *
Gloves	9.4	19.6
Pants short	90.6	88.4 *
Pants long	9.4	20.5 *
Nose / mouth cover	65.6	62.5
Mask	12.5	8.9
Eyeglasses	0.0	0.9
Boots	0.0	0.0

*) Women sometimes wear double layers of clothing

Table 2.14 presents the personal hygiene practices of male farmers and female labourers with regard to pesticide handling. Hands and feet of sprayers get wet especially during spraying activities. This is because the sprayers walk up to their wastes through the irrigation channels. In this way pesticide residues in the water can easily enter the body through the skin. In general after mixing hands are not washed. After spraying the majority of respondents do wash their hands, however mostly without soap

and they use the channel for washing their hands (which might contain pesticide residues). Eating, drinking and smoking is mainly done in the field and again washing of hands with soap prior to consuming food or drinks does not take place.

With regard to the location of washing work clothes, farmers mostly wash their clothes in the irrigation channel, which is actually the same channel in which they clean their spraying equipment. They will leave their clothes to dry in the field house and will use the same clothes the next day. Most of the female labourers wash the clothes at home. They will dry their clothes in the house and will use the same clothes the next day. When clothes are washed at home these are washed separately from other clothes. Farmers and female labourers will only change their clothes when their current clothes are worn out and need to be replaced by a pair of new clothes.

Table 2.14 *Forms of personal hygiene applied by surveyed farmers and female labourers.*

		Farmers (%)	Female labourers (%)
Hand / feet get wet during mixing	Yes	45.2	-
	No	54.8	-
Washing hands after mixing	Yes	22.6	-
	No	77.4	-
If yes washing hands after mixing, wash with soap	Yes	42.9	-
	No	57.1	-
Hand / feet get wet during spraying	Yes	90.0	-
	No	10.0	-
Washing hands after spraying	Yes	93.3	-
	No	6.7	-
If yes washing hands after spraying, wash with soap	Yes	14.3	-
	No	85.7	-
Eat / drink / smoke in or near the field	Yes	90.0	93.8
	No	10.0	6.3
Washing hands before eat / drink / smoke	Yes	90.0	92.9
	No	10.0	7.1
If yes, washing hands with soap	Yes	20.2	1.9
	No	79.8	98.1
Bathing after work	Every day	96.8	100.0
	Once per week	3.2	0.0
Location of washing clothes	At home	40.1	95.5
	In the canal	56.1	4.5
Washing work clothes separately	Yes	100.0	93.8
	No	0.0	6.3

Table 2.15 presents the location for storage of pesticides, reuse of pesticide containers and the way empty containers are disposed of. The majority stores the pesticide products in a store room in the house. However, still about 20-25% store pesticides in the kitchen area, where it can come into contact with food items. Reuse of pesticide containers is low. When they are reused, they are however never reused for food or drink purposes. One farmer used an old pesticide container as a lampshade.

As with regard to disposal of empty pesticide containers, about one third says they are collected by a waste collector who will sell it as plastics for recycling. This is not a special chemical disposal service and thus the empty pesticide containers are handled as any other plastic waste. The majority disposes the

empty containers just anywhere, e.g. on the side of the road or near the field. Burn or bury is practiced only by a minority. Only one respondent replied that he used the recently opened pesticide container recycling plant of CropLife. However, it seems that CropLife does not yet have all the proper permits for operations and the recycling plant is out of order at the moment.



Figure 2.12 Pesticide waste



Figure 2.13 CropLife recycling plant for pesticide waste materials



Table 2.15 Storage and disposal of pesticides according surveyed farmers and female labourers

		Farmers (%)	Female labourers (%)
Storage of pesticides	Store room	59.4	47.3
	Kitchen	21.9	25.9
	Locked room	12.5	8.9
	Other	6.2	4.5
	NA	0.0	13.4
Reuse empty containers	No	83.9	96.4
	Pesticide	12.9	3.6
	Food / drink	0.0	0.0
	Other	3.2	0.0
Disposal empty containers	Waste collector	34.4	39.3
	Throw everywhere	56.3	57.1
	Burn / bury	9.3	3.6

2.7. Health

Table 2.16 and 2.17 presents the answers of male farmers and female labourers on whether they ever experienced any of the signs or symptoms of adverse health after being in contact with pesticides. It is however difficult to directly relate the occurrence of these signs and symptoms to pesticide exposure, as development of certain signs and symptoms is not always the result of exposure to a pesticide. They can also be the result of other diseases, conditions or disorders. Common ailments such as the flu, heat exhaustion or heat stroke, pneumonia, asthma, respiratory and intestinal infections, and even a hangover can cause similar signs and symptoms as those of pesticide exposure.

The most frequent complaints of farmers during work are eyelid twitching, excessive sweating, cough, itchy skin, nausea and numbness. Female labourers have more or less the same complaints. Abrasion (41.1%) is mostly caused by water fleas, especially during dry season. In this cause, the damaged skin provides an entry point for pesticides to enter the body.

Table 2.16 Signs of acute pesticide poisoning of surveyed farmers and female labourers.

	Farmers (%)	Female labourers (%)
Tremor	3.1	0.0
Eyelid twitching	31.3	21.4
Excessive sweating	31.3	16.1
Red eyes	15.6	29.5
Runny nose	0.0	0.9
Cough	21.9	11.6
Difficulty Breathing	9.4	3.6
Salivation	0.0	0.0
Staggering	0.0	0.0
Diarrhoea	0.0	5.4
White rash and scaling	9.4	1.8
Red skin	12.5	8.0
Pallor	0.0	0.9
Loss of consciousness	6.3	0.0
Convulsions	0.0	0.9
Vomiting	15.6	2.7
Blisters	3.1	0.9
Abrasions	25.0	41.1

Table 2.17 Symptoms of acute pesticide poisoning by surveyed farmers and female labourers.

	Farmers (%)	Female labourers (%)
Dry throat	18.8	15.2
Tired	9.4	13.4
Chest pain	9.4	11.6
Numbness	37.5	58.9
Eye itching / burning	21.9	11.6
Blurred vision	25.0	25.0
Shortness of breath	15.6	14.3
Dizzy	34.4	21.4
Nausea	37.5	34.8
Excessive salivation	0.0	0.0
Sore throat	0.0	3.6
Burning nose	6.3	4.5
Muscle cramps	18.8	20.5
Muscle stiffness	15.6	13.4
Muscle weakness	3.1	6.3
Headache	15.6	33.9
Stomach pain	3.1	6.3
Constipation	0.0	12.5
Itchy skin	40.6	52.7

Table 2.18 presents if the male farmers and female labourers recently have had some kind of health check. More than 50% of the male farmers and female labourers have had a health check and about 25% also had a blood test (general and/or cholinesterase check from sanitarians). Three farmers and two female labourers mentioned that they were diagnosed with pesticide poisoning after a health check. Others were diagnosed with more general illnesses or problems, however of which some could be a sign or symptom of pesticide poisoning. Some of problems that were mentioned are lung problems, allergic skin problems, tiredness, high blood pressure, vomiting and dizziness.

Table 2.18 Type of health check done by surveyed farmers and female labourers.

	Farmers (%)	Female labourers (%)
No	41.9	46.8
General medical check	58.1	53.2
Blood test	25.8	22.5
Diagnose pesticide poisoning	9.7	1.8

Male farmers and female labourers were also asked if they have ever had any experience with pesticide incidents themselves or heard stories of others. More than 80% of the male farmers confirm this, where

female labourers only about 35% say they have experiences with pesticide incidents (Table 2.19). They also shared experiences which provide a good illustration of examples of acute pesticide poisoning (see additional remarks in Table 2.19).

Table 2.19 *Experience of surveyed farmers and female labourers with pesticide incidents.*

		Farmers (%)	Female labourers (%)
Experience with pesticide incidents yourself or heard from others	Yes	83.9	36.6
	No	16.1	63.4
Additional remarks		<p>"I experienced nausea after pesticide use"</p> <p>"People got nausea after pesticide use"</p> <p>"Someone got convulsions, was vomiting and died"</p> <p>"Someone lost consciousness after using pesticide"</p> <p>"I often suffer itchy skin and excessive sweating"</p> <p>"My friend had blurred vision, nausea and felt dizzy"</p> <p>"My brother suffered itchy skin because of pesticide"</p> <p>"The male workers spraying pesticide felt dizzy and had foam in their mouth"</p> <p>"The sprayer vomited"</p> <p>"I have experienced dizziness, nausea and vomiting after pesticide use"</p> <p>"My friend felt dizzy and nausea spraying pesticides"</p> <p>"While a sprayer was mixing pesticides, he had to vomit, felt dizzy and experienced excessive sweating"</p> <p>"My father felt dizzy, nausea and tired after spraying pesticides"</p> <p>"When I used an extra / high dosage of a pesticide, I lost consciousness"</p> <p>"After spraying I felt dizzy, had blurred vision and stinging eyes. Afterwards I had nausea. Now I use coconut oil to protect my body"</p> <p>"A sprayer felt dizzy and had tremor during spraying"</p> <p>"I often feel dizzy"</p> <p>"I feel headache and nausea. I use coffee to recover"</p> <p>"I was exposed to pesticide from a leaking knapsack. My neck skin was burning and I had a white rash. One time I also felt nausea and had to vomit after spraying"</p> <p>"A pesticide sprayer had to go to the hospital because he sprayed a too high dosage of a pesticide"</p> <p>"There was a sprayer who felt dizzy and lost consciousness"</p> <p>"A sprayer used high dosage of pesticide and he lost consciousness"</p> <p>"A sprayer lost consciousness and had to vomit, because he inhaled pesticide"</p> <p>"My husband was vomiting and felt tired and dizzy after using pesticide. I gave him black coffee to drink and then he recovered"</p> <p>"My husband felt dizzy, nausea, sweating and had to vomit during spraying of pesticide"</p> <p>"My husband had nausea, tremor and had to vomit because of spraying pesticide"</p> <p>"I get dizzy when I inhale pesticide"</p> <p>"A farmer was spraying pesticide in the field and suddenly he had to vomit and felt dizzy"</p> <p>"One sprayer had foam in his mouth during spraying pesticide"</p> <p>"My husband sprayed pesticide and suddenly he gets dizzy and nausea. We gave him coconut water"</p> <p>"I heard a sprayer had shortage of breath, felt dizzy, nausea and then had to vomit during spraying pesticide"</p> <p>"I frequently heard that sprayers felt dizzy and even lost consciousness after spraying pesticides"</p> <p>"A sprayer was smoking while spraying and then lost consciousness"</p> <p>"I feel dizzy and tired when I work in field at the same time as the sprayers"</p>	

Apart from females, children are also a vulnerable group considering exposure to pesticides (Table 2.20). Especially female workers bring their children to the field and about half of both male farmers and female labourers mention that children are playing near the field. About 40% of the female labourers continue to work in the field during their pregnancy and therefore might also be exposed to pesticides during their pregnancy.

Table 2.20 *Presence of children in or near the field.*

		Farmers (%)	Female labourers (%)
Bring children to the field	Yes	26.7	41.4
	No	73.3	58.9
Children play near the field	Yes	43.3	58.0
	No	56.7	42.0
Female work in the field while pregnant	Yes	76.7	59.8
	No	23.3	40.2

3. Focus group discussion results

Focus group discussions (FGD) were organised with the female labourers. The purpose of the FGDs was to validate the outcome of the formal interviews as often through group discussions additional information might be shared.

For the FGD a total number of 45 female labourers participated in 5 villages (Kersana, Limbangan, Kemukten, Sutamaja, Kramat Sampang) in the Kersana sub district of Brebes district, Central Java, Indonesia. The focus group discussion topics are related to daily activities, pesticide knowledge and exposure, hygiene practices and health aspects. For each village 10 female labourers were invited to join the discussion, however not all attended the meetings. The actual number of participants per village is shown in Table 3.1.

Table 3.1 Number of participants in the focus group discussions.

	Female labourers (#)
Kersana	7
Limbangan	11
Kemukten	8
Sutamaja	9
Kramat Sampang	10
TOTAL	45



Figure 3.1 Focus Group Discussion with female labourers (Kersana village).

3.1. Activities

The female labourers usually wake up around 03.30 - 04.00hr. They work for 5 until 7 days per week, and on average for 5.5 hours per day. There is no real difference in working hours for the dry and wet season. The exception for working hours is for harvesting shallot at locations outside their own village, especially the participants from Kramat Sampang village work elsewhere at times. When the location of harvesting is outside Kersana subdistrict, as it is for labourers from Kramat Sampang village, they will work until 18.00 hr, according to the participants. Females take care of most of the activities in the house such as washing, cooking, cleaning house, taking care of children. Some of the female labourers are involved in post-harvest activities, working in the afternoon cutting shallot leaves, if there is request from middle man or traders. Religious activities take place on Friday afternoon (13.30 - 16.00hr) and additional religious activities take place on Tuesday for Sutamaja, Wednesday for Kemukten and Kersana, and Thursday for Limbangan (Table 3.3). In Kemukten female labourers have monthly meetings with female groups. This meeting is only for 25 members. The females who help the village nurse with the health examination of toddlers, assist in this activity around once or twice per month. As an example the various activities for Kemukten village are summarized in Table 3.2.

Table 3.2 Activity calendar in Kemukten village.

Time (hr)	Activity		
	Female	Husband ^{*)}	Children ^{*)}
00:00	Sleeping	Sleeping	Sleeping
01:00			
02:00			
03:00	Waking up (3.30)	Waking up (4.30) Taking a bath Praying Breakfast	Waking up (5.30) Taking a bath Breakfast Going to school (6.30)
04:00	Cooking		
05:00	Washing Praying Taking a bath Going to field (if far from the house)		
06:00	Going to field (if near the house or if they use a bicycle)	Going to the field	
07:00	At the field (6.30)	At the field (07.00–12:00)	At school (7.30)
08:00	Breakfast, planting		Going Home (12.00 – 12.30)
09:00	weeding, picking pest		
10:00			
11:00			
12:00	Going home Arriving at home (12.30)		
13:00	Arriving at home (1pm)- if far from field Taking a bath &Washing clothes, Lunch (cooking or buying food)	Taking a bath Lunch Taking a rest	
14:00	Praying, Looking for feed for goat, taking care of children, sleeping Post harvest work starts at 14:00		Lunch Watching TV Playing Extra school activity
15:00	Greeting neighbour		Watching TV
16:00	Taking a rest, Watching TV		
17:00	Going Home Praying	Playing	
18:00	Post harvest work stops at 18:00 Continue with taking a bath. Praying Dinner and watching TV	Praying and going to mosque for religious activity until 20:00	
19:00			
20:00	Watching TV	Watching TV	
21:00			
22:00	Sleeping	Sleeping	Sleeping

^{*)} as described by the women

Table 3.3 Religious activities for women.

Village	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Sutamaja		X			X		
Limbangan				X	X		
Kersan			X		X		
Kemukten			X		X		
Kramatsampang					X		

The activities of the males are mostly heavy duty tasks like preparing the land, irrigation of the crop, cultivation of the soil and spraying of pesticides, however it also depends on their job and the size of the field. If a farmer has a field of 1600 – 6400 m², he most of the time works the land himself, except from preparing the land. Above a land size of 6400 m² the farmer will hire additional male labourers for working the land. Participants explained that religious activities for male start at 07.00 – 10.00 hr. The women mentioned that farmers rarely go to religious activity or farmer's group activity because they are lazy or uninterested. Most of the children activities are studying, playing, watching television, and praying in the mosque. Participants frequently mentioned that children or youth do not help their parents in the field.

In agriculture activities, 100% of the female labourers are involved in planting, weeding and harvesting. Only 20-50% of the female labourers irrigate the field. Spraying is only done by farmers or male labourers. 60-80% of the female labourers do harvesting and post-harvest activities. We found that female labourers who attended the FGD in Limbangan, Kemukten and Sutamaja, 18, 12 and 55%, respectively help their husband with farm activities. The others work as labourers for other farmers, especially in the Kersana and Kramat Sampang villages.

3.2. Pesticide knowledge

The female labourers shared their opinion on the reason for why pesticides are being used. They stated that pesticides are being used to increase the size of tubers and leaves, to fertilize, to eradicate pest and disease, and to get a successful harvest. Most female labourers believed that there is no alternative way for successful shallot cultivation without the use of pesticides. According to the women there is no high risk associated regards the use of pesticides. A few female labourers are able to give brand names of some of the pesticides that are being used, however they have no idea of the information on the label. In Limbangan, Sutamaja and Kramat sampang, the information about pesticides was recognized by female labourers from farm owners and pesticide stores. In Kemukten and Kersana village, female labourers did not receive any information about pesticide.

The source of information for female labourers was either from husband, friends, pesticide seller/shop, and neighbours. The females shared that reduction in pesticide use will result in decreasing the volume of harvest. In agriculture activities, they informed that there are constraints during:

1. Planting: small seed, hard soil
2. Irrigation: availability of water
3. Weeding: hard to pull the weed when the shallot reach 30-40 days
4. Harvesting: hard to harvest
5. Post-harvesting: lower back pain during processing

These constraints were perceived by female labourers as risks related to working in agriculture. However, pesticides were not mentioned as a big risk for their work. This might indicate that the information they receive on health risks related to pesticide is limited and they are unaware of the possible dangers.

3.3. Exposure to pesticides

The participants answered that pesticides are used in seed coating, weed control, spraying the field, and seed storage. In a week, the female labourers stated that they are up to 3 to 4 times per week simultaneously in the field while spraying is in progress. They wear PPE such as hat, veil, gloves from socks, long shirt, long pants and mouth and nose cover. The female labourers expressed that they felt shortness of breath using the mouth and nose cover, so they choose thin material to cover their nose and mouth. Most of them explained that empty containers were thrown in the field or collected for selling to waste collector. Farmers will receive a higher price from the collector if containers are in good condition. Sometimes there are buyers who offer the empty container refilled with salt or cooking oil.

In Kersana, female labourers mentioned that pesticide is only applied through spraying. This is different in Kemukten and Kramat sampang, where the female labourers knew that pesticide is used for seed coating before planting and seed storage. In the other villages (Sutamaja and Limbangan), they mentioned all activities and added rodenticide and herbicide usage.

Pesticides are kept in the house by males in the storeroom, but also female labourers mentioned that pesticide was kept in the kitchen (Table 2.15). During FGD sessions, the female labourers showed that they keep pesticide in the kitchen and they explained that the kitchen is big enough, so in one side is the cooking area, and in the other side is enough space to keep pesticides (Figure 3.2). Generally, in their opinion, the good way to store pesticide in the house is by a hanging locked box, or using sack. Beside pesticide, they frequently use repellent for mosquitoes in the house during watching of television and sleeping.



Figure 3.2 Pesticides and pesticide equipment stored in the kitchen area.

3.4. Hygiene practices

Several hygiene practices topics discussed were washing work clothes, washing hands before eating, and using a spoon for eating. They wash the work clothes at home separately, because the clothes not smell good and they are dirty with mud. 100% of the female labourers do not wash their hands with soap after work in all 5 villages. They said that they washed their hands in house using soap but not in the field, where they only use water from the channel. The participants said that no farm owner or anyone else provides or brings soap. As a labourer, all of them were given wage or wage plus food. The farm owners provide the dried food. The female prefer to eat using their hands rather than a spoon. Spoons are only used for vegetable soup provided by farm owners.

3.5. Health aspects

During the health session the females put stickers on a picture of the body. They put the sticker in the part of body that they felt unwell during working in the field, indicating having most problems with head, hand, finger, shoulder, waist, legs and genital area. They will only go to the health clinic if they cannot resist their pain however herbal medicine or paracetamol is most often taken to ease the pain.

Besides that, they have not checked their condition regularly in the health clinics. They wanted to know the cause of their illness.

Female labourers usually work during first semester of pregnancy. They said that they must work even they were pregnant, to earn for a living. They stopped to work somewhere between 5 and 9 months. Only just under 1/3 of female labourers did not work during pregnancy. In general, except slippery soil, women do not have any anxieties about their health with regard to working in the field during pregnancy.

In Kramat Sampang, there was one female who shared her experience of a miscarriage. It happened at the time of 7 months pregnancy, because the condition of womb seemed to be weak. Bringing babies in the field was very common to female labourers, because they need to work to bring in money for their livelihood. Sometimes, they breast feed the baby in the field house during or after work. Another female labour in Limbangan mentioned that the high temperature of breast milk will make the baby get diarrhoea.

4. Conclusions

This baseline survey provides insight in the current situation of pesticide exposure routes of farmers and farm labourers and creates a starting point from where to start interventions. The results confirm the presumption that pesticide use is one of the most significant occupational health exposures in vegetable production in the Brebes district, Central Java.

The results can be summarized in the following key findings:

- Intensive use and application of pesticides and high usage of pesticides categorized as (highly) toxic and hazardous;
- Irresponsible and uninformed handling and application of pesticides;
- Simultaneous pesticide application and hand weeding by female labourers;
- Limited use of PPE or use of low quality non-protective PPE;
- Poor pesticide equipment maintenance;
- Lack of knowledge, information and training among farmers on pesticide choice, mixing and proper handling and applying of pesticides;
- Lack of knowledge and information among farmers and especially female labourers on pesticides in general and (long term) health effects of pesticides;
- Difficulties with interpretation of the label of pesticide products;
- Poor (personal) hygiene in relation to pesticide use;
- Poor pesticide storage and waste disposal practices;
- High exposure to pesticides among female labourers, even during pregnancy.

The findings of this baseline survey will be used as input for the work package Occupational Health to address the problem of occupational pesticide exposure in Indonesian vegetable production. Based on the findings several interventions, trainings and workshops activities will be developed and implemented, aimed at mitigating pesticide exposure and responsible handling and application of pesticides, in order to reduce pesticide related occupational health risk in Indonesian vegetable production.

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Annex 1 Baseline Survey Questionnaire

	= question for farmer & female labourer
	= question for farmer only

Date	
Sub District	
Village	

A. General Personal Information

A.01	Name		
A.02	Gender	1. Male 2. Female	
A.03	Phone number		
A.04	Age		
A.05	Highest finished education level	1. None 2. Elementary 3. Middle school 4. Senior high school 5. Other:	
A.06	Reading & Writing	Yes / No	
A.07	Size of household	Adults:	Children:
A.08	Job	1. Farm owner 2. Labourer 3. Other:	
A.09	Type of work activities	1. Field preparation 2. Planting 3. Fertilizing 4. Weeding 5. Spraying 6. Harvesting 7. Post-harvest 8. Other:	
A.10	# days working p/w		
A.11	# hours working p/d		

A.12	Total size of land	
A.13	Land rented?	Yes / No
A.14	Crop rotation (fill in table below)	

Dry season 2013				
Crop	Planting date	Harvest date	Area	Comment

Wet season 2013				
Crop	Planting date	Harvest date	Area	Comment

A.15	Family members doing farm labour?	Yes / No (If yes, include in table below)	Number of family members:
A.16	Labourers hired?	Yes / No (If yes, fill in table below)	

Dry season					
Activity	Own days farmer	Male	Labour days	Female	Labour days
Field preparation					
Planting					
Fertilizing					
Weeding					
Spraying					
Harvesting					
Post-harvest					
Others:					

Wet season					
Activity	Own days farmer	Male	Labour days	Female	Labour days
Field preparation					
Planting					
Fertilizing					
Weeding					
Spraying					
Harvesting					
Post-harvest					
Others:					

A.17	Labourers in the field during spray activities?	Yes / No
A.18	Labourers using PPE?	Yes / No

B. Current pesticide practices

B.01	How do you spray to prevent pests & diseases?	1. I do not spray 2. Always a single doses of 1 product 3. Always a mixture of various products 4. Sometimes a mixture, sometimes the single product 5. Other, please specify:
B.02	How often do you / labourers spray p/w?	Dry season: Wet season:
B.03	How many hours do you / labourers spray on average?	Dry season: Wet season:

B.04	Why do you spray?	1. Preventive (Calendar) 2. Curative 3. Other, please specify:
B.05	How do you spray?	1. By hand-driven knapsack sprayer 2. Motorized knapsack sprayer 3. Other, please specify:
B.06	Do you use mixtures of pesticides?	Yes / No How many in one tank?
B.07	Where do you get information on mixing pesticides?	
B.08	Do you own or hire the spray equipment?	Own / Hire Please specify why:
B.09	Do you consider wind direction when you spray?	Yes / No
B.10	Kind pesticides that you use:	

	Brand name	Active Ingredient	Control against what pest / disease	Type (insect-/herb-/fungicide)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

B.11	Where do you buy your pesticides?	
B.12	How do you decide on what kind / brand of pesticide to use?	
B.13	Do you know what Integrated Pest Management is?	Yes / No If yes, give a short description what you see as IPM
B.14	What is your opinion on trend in pesticide use the past 5 years?	Lower / Same / Higher Please specify:
B.15	Would you consider hiring a professional pesticide sprayer instead of spraying yourself?	Yes / No Please specify:

C. Knowledge about pesticides

C.01	Do you think pesticides affect health?	Yes / No	
		In what way?	
		1. ...	
		2. ...	
C.02	Have you received information about pesticides?	Yes / No	
		From who and what kind of?	
		1. ...	
		2. ...	
C.03	Have you received any training on safe use of pesticide	Yes / No	
		From who and what kind of?	
		1. ...	
		2. ...	
C.04	Do you know if any or what kind of pesticides are prohibited by law?	Yes / No	
		Please specify:	
C.05	Do you read the label before using the pesticide?	Yes / No	
		If yes, do you understand the label?	
		Yes / No	
		Please specify why:	
		If yes, do you follow the instructions on the label?	
Yes / No			
C.06	What kind of information can you find on the label?	Please specify why:	

D. Pesticide exposure/practices

D.01	PPE during mixing	1. Hat	Yes / No	
		2. Shirt short	Yes / No	
		3. Shirt long	Yes / No	
		4. Gloves	Yes / No	
		5. Pants short	Yes / No	
		6. Pants long	Yes / No	
		7. Nose / mouth cover	Yes / No	
		8. Mask	Yes / No	
		9. Eyeglasses	Yes / No	
		10. Boots	Yes / No	
D.02	Hands / feet get wetted during mixing?	Yes / No		
D.03	Hand washing after mixing?	Yes / No	With soap?	Yes / No
D.04	PPE during spraying	1. Hat	Yes / No	
		2. Shirt short	Yes / No	
		3. Shirt long	Yes / No	
		4. Gloves	Yes / No	
		5. Pants short	Yes / No	
		6. Pants long	Yes / No	

		7. Nose / mouth cover 8. Mask 9. Eyeglasses 10. Boots	Yes / No Yes / No Yes / No Yes / No
D.05	Hands / feet get wetted during spraying?	Yes / No	
D.06	Hand washing after spraying?	Yes / No	With soap? Yes / No
D.07	Do you eat / drink / smoke in or near the field?	Yes / No	Wash hands? Yes / No With soap? Yes / No
D.08	Re-entry time	1. Direct 2. 1 hour 3. More than 1 hour 4. 1 day 5. More than 1 day 6. I don't know	
D.09	Cleaning equipment / knapsack	1. In channel near to field 2. Spray leftover out over field 3. Other:	
D.10	Is knapsack in good condition?	1. Yes 2. No, it leaks 3. Other:	
D.11	Where do you store pesticides? (needs observation)	1. Kitchen 2. Warehouse 3. Locked box 4. Farm site	How are they stored? 1. On the floor 2. High of the ground (children cannot reach them)
D.12	How do you dispose the empty containers?	1. Sell to waste collector 2. Buried 3. Destructed 4. Throw anywhere	
D.13	Reuse empty container	1. Pesticide 2. Feed container 3. Drink/Food container 4. I don't reuse it	
D.14	Seed material protection	1. Spray fungicide 2. I do nothing	Spray where? 1. Near / in front house 2. Other:

E. Personal hygiene practices

E.01	Frequency bathing after work	1. Every day 2. Every week 3. Other:
E.02	Frequency changing work clothes	1. Every day 2. Every week 3. Other:
E.03	Frequency washing work clothes	1. Every day 2. Every week 3. Other:
E.04	Washing work clothes separately?	Yes / No

F. Health

F.01	Health complaints		
	Signs	Ever experienced?	How often (per season)
	1. Tremor 2. Eyelid twitching 3. Excessive sweating 4. Red eyes 5. Runny nose 6. Cough 7. Difficulty breathing 8. Salivation 9. Staggering 10. Diarrhoea 11. White rash and scaling 12. Red skin 13. Pallor 14. Loss of consciousness 15. Convulsions 16. Vomiting 17. Blisters 18. Abrasions	Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No	
	Symptoms	Ever experienced?	How often (per season)
	1. Dry throat 2. Tired 3. Chest pain 4. Numbness 5. Eye stinging/itching/burning 6. Blurred vision 7. Shortness of breath 8. Dizzy 9. Nausea 10. Excessive salivation 11. Sore throat 12. Burning nose 13. Muscle cramps 14. Muscle stiffness 15. Muscle weakness 16. Headache 17. Stomach pain 18. Constipation 19. Itchy skin	Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No	
F.02	Health check	1. General medical check up 2. Blood test 3. Cholinesterase test	Yes / No Yes / No Yes / No
		What was the result?	
F.03	Have you ever experienced yourself or from others incidents with pesticides?	Yes / No	
		Please specify: 1. ... 2. ... 3. ...	

G. Children

G.01	Do you bring your children to the field?	Yes / No
		Where do they stay?
G.02	Do your children play in or near the field?	Yes / No
G.03	Did you work in the field while you were pregnant?	Yes / No
G.04	Children doing farm labour?	Yes / No

Annex 2 Focus Group Discussion Guiding Questionnaire

1. Activity Calendar - daily activities in farm and house
 - 1.1 What are your activities in the farm / field?
 - 1.2 What kind of crops do you work in?
 - 1.3 When do you start and finish working in the farm / field?
 - 1.4 How many hours are you working in the field?
 - 1.5 How many farms do you work at?
 - 1.6 What are your activities before and after work?
2. Knowledge about pesticides
 - 2.1 What do you know about pesticides?
 - 2.2 What do you know about pesticides and your health?
 - 2.3 What are the risks of working in fields sprayed with pesticides?
 - 2.4 Have you received any information about pesticides?
If yes, from who and what information?
3. Pesticide exposure/practices
 - 3.1 Are you aware when pesticides are applied to the crop?
If yes, how do you know?
 - 3.2 Do you know what kinds of pesticides are being sprayed?
 - 3.3 What are you doing when spraying takes place in the field you are working?
 - 3.4 What do you wear while working?
 - 3.5 When is spraying done?
 - 3.6 Does the person spraying wear PPEs?
 - 3.7 Are PPEs available for you to use?
If yes, what kind of?
 - 3.8 Does spraying happen near your working station?
 - 3.9 Do you enter the field after spraying has taken place?
 - 3.10 Where do you see the empty containers of pesticide?
 - 3.11 Where are pesticides stored? Outside/inside? What kind of storage?
4. Hygiene practices
 - 4.1 What are you doing after you work?
 - 4.2 What do you do with your clothes after work?
 - 4.3 Are your work clothes washed at the same time with other family members' clothes?
 - 4.4 Do you wash yourself or bath after work? With soap?
 - 4.5 Do you eat/drink/smoke during the work in the field?
 - 4.6 Where do you take breakfast or lunch or time break?
5. Children
 - 5.1 Do you bring your children to the field? Where do they stay?
 - 5.2 Do your children work in the field?
6. Water
 - 6.1 Where do you get water for drinking?
 - 6.2 Where do you get water for washing and bathing?
7. Health
 - 7.1 Did you work in the field while you were pregnant?
If yes, do you think this had impact on your health or health of your baby?
 - 7.2 Do you work when you raise your baby?
 - 7.3 Where do you (breast) feed your baby?

- 7.4 Have you ever felt ill while working in the fields?
If yes, explain symptoms (e.g. headache, dizzy, breathing problem, nauseous, etc.)
- 7.5 Have you sought medical care when feeling ill during or after working in the field?
- 7.6 Do you have regular health check-ups?