Report on Women and Pesticide Survey

Case Study in Sang Distric Kandal Province

By Survey Team of Pesticide Reduction Net work-Cambodia

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Table Content

List of Acronyms

ADB	Asia Development Bank
ATSA	Agriculture Technology Services Association
CamFAD	Cambodian Farmers' Association Federation for Agricultural Development
CEDAC	Centre d Étude et de Développement Agricole Cambodgien/ Cambodian Center For Study and Development in Agriculture
EJF	Environment Justice Foundation
FAO	Food and Agriculture Organization of the United Nations
IPM	Integrated Pest Management
MAFF	Ministry of Agriculture, Forestry and Fisheries
MOP	Ministry of Planning
NGO	Non-Government Organization
PAN AP	Pesticide Action Network Asia & the Pacific
PANNA	Pesticide Action Network North America
PPE	Personal Protective Equipment
PRN-C	Pesticide Reduction Network-Cambodia
RUA	Rural University of Agriculture
USDA	United States Department of Agriculture
WHO	The World Health Organization

EXECUTIVE SUMMARY

With supporting funds from PAN AP and NGO Forum on Cambodia, a survey on women and pesticide in Saang district, Kandal province was conducted in June and July 2010.The designed questionnaire was the main tool for collecting information from the field. As the result, 51 woman samples were randomly selected from 3 communes of Saang district, Kandal province where a commercial vegetable production is. The overall findings can be summarized as below:

- 94% of respondents accessed to school from primary (68%) to secondary levels (24%). However, only 74% of them are literate, while 6% of respondents did not go to school.

- The household size of the interviewees is 5.68 persons (range 2-11) on average and the average household income from agriculture activities is 4,305,435riels (equivalent to USD1,025) which range from 1,000,000riels to 10,000,000riels per year. The agriculture is the main income of the respondents.

- Farmers spend 1,308,372 riel per year per household on pesticides on average which range from 700,000 riel to 5,400,000 riel. The total pesticide expense of farmer household is depending on the farm size and the cycles of vegetable production. Farmers can grow vegetable from 4 to 6 cycles per year or whole year according to the land topography.

- 47.06% of respondents have sprayed pesticide to protect their own vegetable crops, while 45% have never sprayed pesticides on their own because they have their brothers, husbands and/or father to do this work. The remainder (6%) used to spray pesticides when they were single. However, they had exposed to pesticides in vegetable farming, on average 9 years ranging from 1 year to 20 years.

- 28% of respondents provide their service for weeding at vegetable farm. They work at the field around 8 hours per day and earn 10,000 riel per day. They can find this job every month from 10 to 20 days per month.

- 46.15% spray pesticide every week, 42% spray every month and 11.54% spray every day. Normally, they spray pesticide every three days. However, they will use pesticide every day or every week, depending on whether it is a seasonal or insect outbreak. Around 12% of the woman sprayers are main responsible for pesticide application since they are widow or single. While other women pesticide sprayers just help and share their husband, father or brother.

- The most common activities happened at works or home and other exposing factors are re-entry for working in fields where pesticides are being used or have been used (100%), purchasing and bring pesticide (63%), washing clothes that have been used for spraying and mixing pesticide (59%), mixing and pesticide spraying in the field (47%), and washing equipment (27.5%). And 45% of respondents have used mosquito pesticide application at home as spray and mosquito coil.

- The most common form of exposure is the application of pesticides by hand spraying method. More than this, 80% of woman pesticide applicators use backpack sprayer and 12% use spraying machine while only 8% women use hand-pump sprayer.

- The common way of pesticides exposure is caused mainly by pesticide application of neighbors (61%), laundry of clothes that have been worn to work with pesticides (47.06%), bathing in ponds or water sources near the spraying area (29.4%), foods as vegetable that were sprayed with pesticides (27.5%) and use of pesticide by government for public health purposes (12%).

- Pesticide applicators use only some items of the personal protective equipments (PPE) while spraying such as casual long-sleeved shirts (84%), long pant (76%), facemask (48%), gloves 32% and boots 20%. Furthermore, some 52% of them use cotton scarf (Krama) for protection. There is a low percentage (8%) of sprayers use rain coat. However, all of them did not indicate use the overalls, eyeglasses, or respirator. 96% said they did not know the PPE or it is not

available and 4% said it is expensive and while 24% of them think that it is uncomfortable for use.

- 84% of sprayers had experienced the spillages either while spraying (52%), while mixing (28%) and while treating seed (4%). The spillage was occurred on some parts of the body such as on back (48%), hand (48%), leg (33%) and face (10%) of the respondents.

- 70% of respondents had involved in buying pesticide. 69% of them always buy pesticides from retailer shops in their village and 19% buy pesticide from the central district market. The remainders (12%) always buy pesticides for use from the village retailer shop and district market.

- They choose pesticide for application according to the suggestion from pesticide sellers (77%), own experience (50%) and via label (4%). However, it would be considered that most of pesticide retailers have never accessed to the training on pesticide, according to retailers said.

- 81% of respondents access to the information on how to use pesticide by sellers. But only 23% received information on pesticide and its hazard. Very low percentage (8%) of respondents got advice to use PPE from the seller.

- The most common places for storing pesticides are at home (54%), field (46%) and shed (11%) or hang on the tree (8%) with no careful lock. But 49% said that they put pesticide out of reach of children, and 68%keep pesticide separately from other items.

- While mixing pesticide for use, 35% of respondents had decanted all pesticides in one empty soft-drink bottle (Sprite or coca cola). 8% of the respondents reused pesticide container for making a kerosene lamp and 1respondent reused for keeping food.

- The most common form of pesticide container disposal is to throw away them in the open field (70%) and follow by burying in the ground (43%) and burning (32%). Other ways of disposal including the throwing of empty pesticide containers into the pond, canal (Prek) or river, particularly when water is rising up. Small among of pesticide containers were sell to collectors (16% of respondents indicated).

- 43% of respondents have never washed equipment, while 57% used to wash the equipment at farm, house or canal. Inside the vegetable farm, farmer dig pond, well or put a jar on the farm to keep water for watering and mixing pesticide. 65% of respondents have washing facilities (for hands and body) after applying or working with pesticides.

- They did not know the common name of pesticide they use. Normally, they called the name of pesticide according to the picture on the label of pesticide containers. As the result of the recording, at least 73 pesticide products have been used in the area. The most commonly use are dicrotophos, abamectin, emamectin benzoate, indoxacard, cypermethrin, methomyl, permethrin, chlorpyrifos, imidacloprid, nereistoxin and glyphosate. The most commonly used pesticides belong to extremely or highly hazard pesticide category as classified by the World Health Organization, such as dicrotophos (Ib) and methomyl (Ib). Commonly dangerous way is pesticide cocktail; all of pesticide applicators mix pesticide together, on average 4 types ranging from 2 to 8 types of pesticides.

- The most symptoms they had experienced from pesticide were dizziness (66%), headache (52%), fatigue/tiredness (44%), blurred vision (26%) and excessive sweating (22%). However, 21.57% of respondents indicated they do not think to have any symptom of pesticide poisoning.

- 20% of all respondents used to have miscarriages from 1 to 3 times and/or have problems during pregnancies. According to data analyses on married women have involved in spraying or exposing to pesticide reported that 25% of them used to have miscarriages and 25% used to have problems during pregnancies, but only 18% of married women have involved in spraying or exposing to pesticide used to have both miscarriages and problems during pregnancies. The most common responses during pregnancy were abdominal pains and vomiting or unconsciousness.

- When they think that someone has been poisoned, most responded that they would call local doctor (60%) or go to hospital (54%) and 6% of them call their family members. And other (10%) try to save the victim using local method/practice for non-serous poison case, such as eating sweat or sugar or drinking coffee, lemon-tea etc.
- On average, they have access to doctor who is at distance 3 kms from their house. However, it is difficult for people living on the Eastside of Basac River because the referral hospital center is located on the Westside.
- Only 16% visited the doctor recently to check conditions related to pesticide exposure. It is reported that members of their household cure their poisonings by injecting serum 1-2 sacs every month or a few months which they believe can destroy the dangers of some poison in the pesticide.
- In general, they had proposed to have their health check every 3 months on average, while some said once a month and others said once a year.
- 79% of the respondents indicated that they use pesticides with labels written in Vietnamese and Thai. 16% did not bother about the label because they depend on the pesticide retailer told them. 57% of them did not receive safety data sheet.
- Around 19% of the respondents saw labels on pesticide containers in the Khmer language. 76% use pesticides labeling with Vietnamese or/and Thai language. Majority of them (92%) said that they cannot understand but they can only understand from the pictures of insect pest on the label only.
- 16% of respondents received training on pesticide use. However, the trainings were conducted with short instruction given by a Pesticide Company during their advertisement. 61% knew or were aware of the hazards of the pesticides they use through the label (6%) and the safety data sheet (6%). Despite the availability of the information source as stated above, the evidence of pesticide poisoning occurring in their community (neighbor (5%), their husband (6%) and their owns' poisoning cases (26%)).
- Only a few farmers know of other ways to control pests without using pesticide. They had access to trainings given or done by NGOs and/or Agriculture office. However, they did not prepare and use botanical pesticides because they indicated that it was not strong and effective as chemical pesticides.

The result of the survey was highlighted the deleterious effects of pesticide misuse/abuse on woman health, causing the people and environment in the studied area in an alarming state.

I. Introduction

1.1. Survey background

Due to the collaboration between Pesticide Action Network Asia and the Pacific (PAN AP) based in Penang, Malaysia and the NGO Forum on Cambodia based in Phnom Penh, which co-funded the Pesticide Reduction Network-Cambodia for conducting a survey on women and pesticide in Cambodia with the following objectives. The aim of the survey is to determine the current situation of pesticide practice in vegetable production in the community. The specific objectives of the survey are:

- To gather information on the impact of pesticide exposure on woman health;
- To understand the conditions of pesticide use and the situations in which women work with pesticides;
- To identify the highly hazardous pesticides that are being used; and
- To use the result for working with local partners to highlight the pesticide-related problems and to establish new links and to strengthen the existing relationships with partner organizations.

The finding this survey will be used for advocacy purpose to informed to government and development partners of Cambodia about the current situation of women and pesticide in Cambodia and help farmers in communities, especially, women farmers from pesticide risks.

To reach these objectives, a survey team was formed by PRN-C member during the bi-monthly meeting in May 2010. Members of the survey team are Mrs. Men Vannavy, Ung Soeun (NGO Forum on Cambodia), Mr. Saroeun Minea (CRWRC), Mrs. Mam Sitha (National IPM), Mrs. Chhay Kry (ATSA), Mrs. Tit Samphors (SFODA), Miss Ke Sophea (BSc. in agronomy, graduated from the RUA), Mr. Khorn Sdok and Mr. Keam Makarady (CEDAC). The survey team conducted the following activities.

1.2 Survey Methodology

Review of the secondary data

Based on the knowledge and experiences, the survey team discussed with relevant key informants and reviewed documents related to the objectives of the survey. The information was collected from reports, working paper and newspapers. Additionally, the information was also collected from the study area at provincial and district levels with the focus on general situation of the area. It helped them gather information on the respondents' background, pesticide exposure and situation of pesticide use.

Rapid Survey and test of the questionnaire

The rapid survey and test of the questionnaire were conducted by the survey team in June 2010 in Saang, Koh Thom and Kien Svay districts of Kandal province, where farmers grow various types of vegetables for supplying mostly to Phnom Penh. Due to limitation in time and season, the survey team chose only Saang district for conducting the in-depth survey and interview because most farmers were still producing vegetables during the survey period. Before starting the field interview, the survey team discussed the main and sub questions in the questionnaire to make sure that all interviewers understood all the questions so that good quality data can be ensured. For the interview, the survey team used the questionnaire which was designed for individual interviewee. Therefore, each interviewer separately went to the community to interview the farmers. Soon after finishing the test of questionnaires, the survey team made reflection on the information and data collected from the interview and revised some questions which are overlapping and get rid of the unnecessary points.

In-depth interviews

The main purpose of the in-depth interview was, to further understand real situation of female farmers living in the selected study area, especially those who are involved in the commercial vegetable production and the use pesticides.

The in-depth interview was carried out on 51 women involve in vegetable production living in Prek Koy, Svay Brateal and Treuy Sla communes of Saang district, Kandal province. The survey team of Pesticide

Reduction Network in Cambodia (PRN-C), conducted the in-depth interview (face to face) with women in June and July 2010 using the revised questionnaires (see annex 2).

Data processing and analysis

Data was processed and analyzed with the usage of excel program. The information and data of the respondents such as: Personal information, Exposure to Pesticide, condition of pesticide use, type of pesticide, Label and data sheet, handling and buying pesticide, Storage and Disposal, Signs and Symptoms of Pesticide Poisoning, Healthcare facilities were processed and analyzed.

II. Description of the results of the study

2.1. Global health problems by pesticides

The World Health Organization and others estimated of acute poisoning of agricultural workers range from 1.5 million through 25 million in developing countries alone, and to 50-200 million worldwide; and 99% of acute poisoning deaths are believed to occur in developing countries (PAN AP, 2007). As a report of the Environmental Justices Foundation (EJF), global estimate are lacking and it is likely that millions of pesticide poisoning cases still occur each year (EJF, 2003).

Pesticide can have both acute and chronic health impacts, depending on the extent of exposure. Acute poisoning is caused by exposure to a high dose of the chemical, on one occasion during a short time period. Some acute health effected including headaches, dizziness, tremor, nausea, abdominal cramps, sweating, blurred vision, tiredness, vomiting, diarrhea, difficulty breathing or respiratory depression or slow heartbeat. Very high dose may result in unconsciousness, convulsion and death.

Chronic health effects that manifest over a long period of time following many small exposures include: impaired memory and concentration, disorientation, severe depression, irritability, confusion, headache, speech difficulties, delayed reaction time, nightmares, sleepwalking, drowsiness, and insomnia. Pesticides can interact with bio-chemical functions in the body, resulting in: endocrine disruption, in which hormone production and action are disrupted, for example affecting reproduction or development, immune-dysfunction whereby pesticides interrupt nervous system function, carcinogenesis resulting in cancers, mutagenesis in which genetic damage is inflicted on body cells, and terato- genesis in which genetic damage to unborn fetuses results in birth defects and other disorders (EJF, 2003).

According to the report by EJF revealed that exposure to pesticides has also associated with increased diseases such as respiratory, neurological disorders, sensory threshold, skin, Parkinson's disease, stroke and cancers. The cancers of the brain, breast, liver, stomach, bladder, kidney, skin, prostate, recta, pancreas, lung, ovary, testicle, and leukemia have associated with pesticides (EJF, 2003).

Furthermore, Dr. Meriel Watts showed 98 pesticides (including insecticides, herbicides and fungicides) one common adjuvant and two contamination of pesticide formulation, as having the potential to cause breast cancer. There are 10 million new cases of invasive cancer worldwide each year and approximately 10% are breast cancer. An estimated 1.15 million women got breast cancer and 411,000 died from it in 2002. And 4.4 millions women have breast cancer diagnostic within the last 5 years. Men can also develop breast cancer but it account less than 1% of all breast cancers (PAN AP, 2007). The reasons of women are more vulnerable to the effects of pesticide then men as well as women's higher proportion of body fat providing a greater reservoir for fat-loving pesticides; women may also absorb pesticides through their skin more easily than men—dermal absorption of the organochlorine lindane has been found to be three times greater for women than for men; and women has higher level of hormonally sensitive tissues make them more vulnerable to the effects of pesticides, especially those that are endocrine disruptors, capable of effecting profound changes on hormonally sensitive tissues—such as breast tumors.
The situation is even more alarming in pregnant women as pesticides can pass through the placenta and affect the fetus, and also can contaminate breast milk. Breast milk, considered the best food for babies as it offers superior nutrition, protection against infection, enhancement of the immune system, a contraceptive effect while lactating, economic benefits, and emotional support is now proving to be a concern as there is evidence of presence of pesticide residue in women breast milk. They also found in female blood, urine, adipose tissue,

amniotic fluid, ovarian follicular fluid, placental tissue, umbilical cord blood, and infant meconium (PAN AP, 2007)

2.2. Overview on Agriculture and pesticide use in Cambodia

The population of Cambodia is about 14 million and approximately 80 percent of the population resides in rural areas. The potential arable land area of the country has been estimated at roughly 3.6 million hectares by respected international authorities, though officials in the Cambodian government (National Institute of Statistics) have argued that up to 6.0-6.5 million hectares could potentially be converted to agricultural use. Cambodian agricultural development officials have also indicated they believe rice area itself could be expanded to approximately 3.5 million hectares, an increase of roughly 1.2 million hectares or 52% (USDA, 2010). However, average land holding by household is only 1.2 hectare per household (five persons), and more than 80% of families with have less than 2.00 ha of land. Small farmers, especially rice farmers, are dominant. (CEDAC, 2009).

Agriculture is the mainstay of Cambodia's economy, contributing 41.5% in 1999 and 33.5% in 2009 and Gross Value Added for agriculture is increasing from 5.078 billion Riel in 1999 to 7.994 billion Riel in 2009 and absorbing 70% of the total labor force (MAFF, 2010). The agriculture sector plays an important role as a backbone to the economy and rural poverty reduction strategy because of its immediate effect on the living conditions of the rural poor. Most of population in rural areas is employed in agricultural activities and over 65% are women who in addition to their household work are actively involved in most on-farm activities from planting to harvesting, and in artisanal fisheries, management of livestock and marketing of agricultural products.
Since 1993, following the adoption of a free-market economy, importation restrictions on chemical pesticides were relaxed and private traders began to import chemical pesticides, the net result being that chemical pesticides were found more freely available in the market place and hence more widely available to rural farmers. Pesticide usage not only requires spending much money, but also has serious impacts on human health and long term sustainability of the soil.

Farmers in Cambodia not only use chemical pesticides and fertilizers with their rice production, but also use them with vegetable production. Due to the increased concern of impact on human health and environment, 116 pesticides were banned and 40 pesticides were restricted for importing and using by the government since 2003 (MAFF, 2003). But the bans are only administrative warnings and carry no legal penalties or on law on pesticide. It was observed that the pesticide trade and use seems to be on the rise from 517 products in 2005 and 757 products in 2009 (CEDAC, 2010).

Vegetable production is the second most important agricultural activity and is mainly located in the lowland areas of Cambodia, especially around the Mekong River. Currently, agrochemical utilization is increasing in agricultural practice in Cambodia, particularly in vegetable farming. It was estimated that the total usage of pesticides in Cambodia is about 3,200,000 liters with a total expenditure of USD 20,000,000 dollars every year (CEDAC, 2004). Pesticide usage not only increases the production costs of farming, but also affects long term human health, the environment and damage soil fertility. According to Sodavy P *et al* (2000), research the impact of pesticides on 210 vegetable farmers from close to Phnom Penh, Kandal and Siem Reap found 88% of them poisoned from pesticide use.

2.3. Overview of the studied area

2.3.1 Population in Saang district, Kandal province

With reference to the General Population Census of Cambodia 2008, population in Saang was 195,445 persons including 100,969 female. The total number of household was 40,190, giving an average household size of 4.9 persons (MOP, 2009). Most of population is active in agriculture and fish work, small trader, garment worker and government officers.

Saang is one of eleven districts of Kandal province, located at the south of Phnom Penh and most part of the district is low land. Basac river flows through the North to South of the district which divides two parts of the district into the East and the West parts. The river provides delicious fish and water way for people living

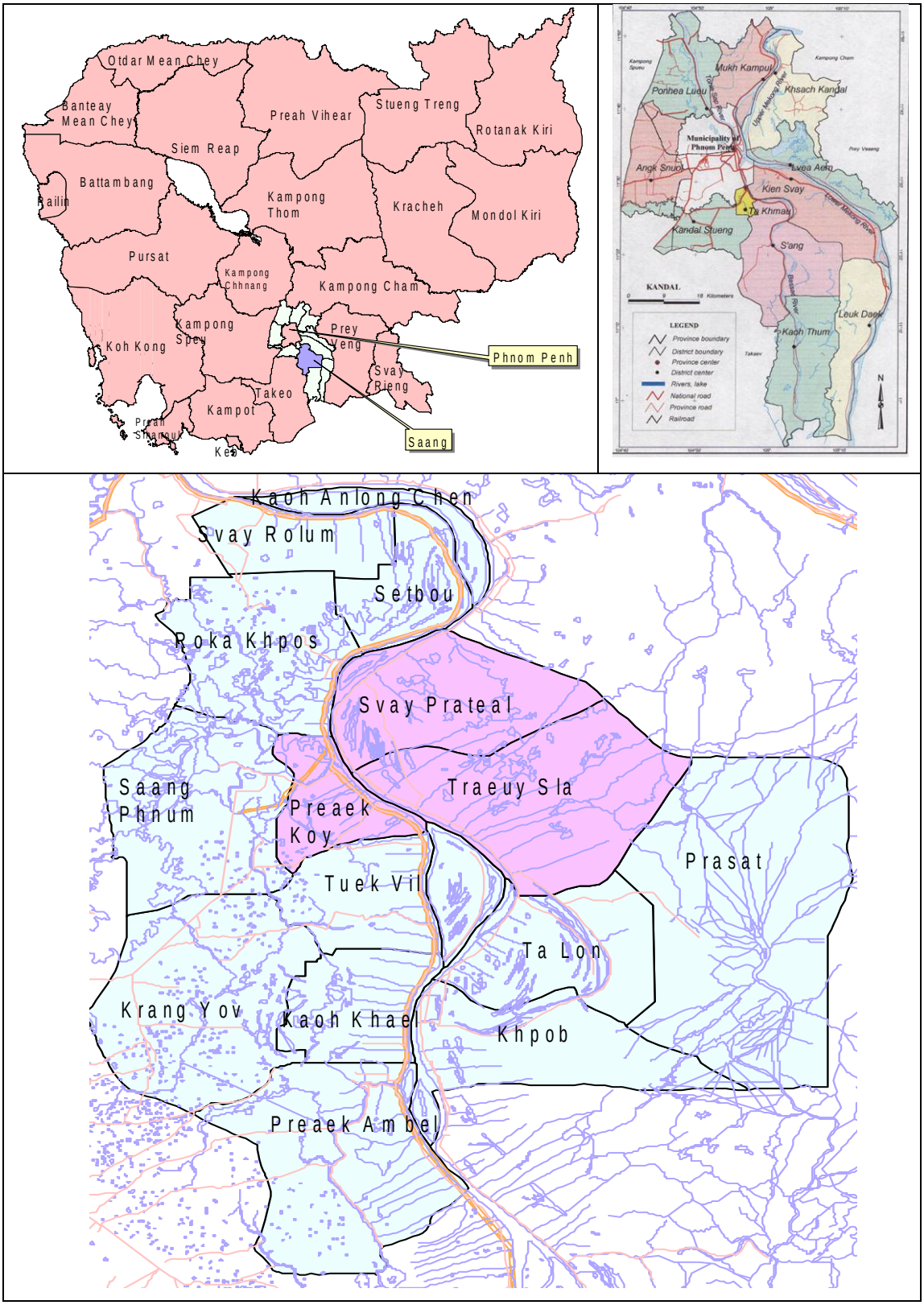
in the area. Furthermore, it offers the alluvial soil filling the lower land for growing crops for many centuries. The district is subdivided into 16 communes and 119 villages as shown in table 1.

Table 1: Names of communes and villages in Saang district

No.	Commune	Village
1	Khpob	Ruessei Srok, Khpob Leu, khpob Kraom, Roka Leu, Roka Kraom, Kaoh Thmei, Boeng Khpob, Damrei Chhlang, Prey Totueng, Tnaot Nhi
2	Koh Anlong Chen	Kbal Kaoh, Kandal Kaoh, Svay Pum Trang, Chong Kaoh
3	Koh Khael	Svay Chuor, Tep Archun, Preaek Kaev, Kaoh Khael, Preaek Pang, Daeum Pring
4	Koh Khsach Tonlea	Kbal Kaoh Khang Kaeut, Kbal Kaoh Khang Lech, Kandal Kaoh, Chong Kaoh Kaeut, Chong Kaoh Lech
5	Krang Yov	Kampong pou, Tuol Krang, Samraong, Andoung, Roka, Vihear, Ping Pong, Ampil, Ta Kol, Thum, Kor, Kandal, Ta Pech, Chek, Angk
6	Prasat	Lekh Muoy, Lekh Pir, Lekh Bei, Lekh Buon, Lekh Pram
7	Prek Ambel	Traeuy Troeng, Preaek Ta Lai, Sampan Leu, Sampan Kraom, Anlong Ta Sek Leu, Anlong Ta Sek Kraom, Koun Chreae, Preaek Kralanh, Peam Prachum
8	Prek Koy	Knong Preaek, Preaek Run, Preaek Snang, Preaek Snay, Svay Ta Ni, Preaek Chruk, Tuol Sophi
9	Roka Khpos	Kaoh Kor, Preaek Thei, Preaek Samraong, Preaek Ksev, Tuol Krasang
10	Saang Phnum	Preaek Slaeng, Tuol Sala, Preaek Khmaer, Kampong Trea, Kouk Andaet, Damrei Chhlang, Peam Sala, Veal, Ta Nu
11	Setbou	Preaek Pring, Setbou, Kampong Pring, Preaek Traeng
12	Svay Prateal	Preaek Ta Ten, Ruessei Chrouy, Preaek Ta Choar, Preaek Ta Sau, Chong Kaoh Kor, Paraen Kraom, Paraen Leu, Ou Rumchek, Pou Ta Pang
13	Svay Rolum	Lekh Muoy, Lekh Pir, Lekh Bei, Lekh Buon, Lekh Pram
14	Ta Lon	Preaek Ta Prak, Ta Lon, Chong Kaoh Touch, Kandal Kaoh Touch, Kbal Kaoh Touch, Tuol Spueu, Preaek Slaeng, Preaek Ta Aek, Veal Traeng
15	Traeuy Sla	Pou Leu, Pou Kandal, Pou Kraom, Preaek Ta Aek, Preaek, Preaek Pan, Preae Balat Chhoeng, Thkol, Tuol Kdei
16	Tuek Vil	Preaek Thmei, Preaek Ta Pem, Preaek Ta Ra, Preae Ong Pang, Voat Kandal, Phlov Bambaek, Preaek Pou, Preaek Reang

Source: CamFAD, 2009

Figure 1: Map of the studied area (Saang district, Kandal province)



2.3.2. Agriculture Production in Saang district

The area of the Saang district is 51,496 ha included 27,926 ha of arable land, 6,031 ha of forest land, 5,515 ha of homestead and other land around 12,024 ha. The topography of the district is mostly the floodplains to the Basac River. (Saang district hall, 2009)

Referring to the agriculture statistics of Saang in 2009, it shows that in the dry season (the total cultivated land) farmers grew rice about 10,000 ha and yield of 4.50 tonnes per ha. Other crops such as corn, peanut, mung bean, cow pea, sweet potato, sugarcane and vegetable was about 5,219 ha including 1,100 ha of corn, 934 ha of peanut, 791 ha of mung bean, 775 ha of cowpea, 200 ha of sweet potato, 340 ha of sugarcane and 1,079 ha of vegetable land. In the wet season, farmers grew rice on about 5,830 ha and other crops such as corn, chili, sugarcane and vegetable around 3,255 ha, including 1,775 ha of corn, 30 ha of chili, 696 ha of sugarcane and 784 ha of vegetable. For instance, the vegetable production in Saang district represented about 10,410 tons of vegetable for supplying Phnom Penh markets. Unfortunately, nearly 100% of farmers are using chemical fertilizers and pesticides for their crop productions (Saang, 2009).

2.3.3 Review of the status of women in the community

At the end of the 1990 decade, Saang just like other areas around Phnom Penh started absorbing laborers to work at the garment factories, particularly their urban areas, have been attracting a large number of younger women who take up jobs in garment factories (MOP, 2009).

There are at least 3 communes in the Saang district have garment factories as well as Svay Rolum, Setbou and Roka Khpos that are next to Takhmao town and Phnom Penh city. In general observations, many young women have found their new employment opportunities in those garment factories. With the benefit they earned from paid employment and changes of their way of living (in the rural and urban area), working condition, labor standard and union, it has caused a prompt discussion on employment, development and trade issues. Garment workers actually represent a small percentage of the labor force. Yet garment workers face high expectations for regular remittances to rural areas with a substantial contribution to rural livelihoods. The security of these jobs also depends on international agreements and global markets. According to the Asian Development Bank, garment women workers represent 20% of the total female population and 85 to 90% (nearly all) of garment factory workers are women. The majority of the garment workers are young single women between the aged 18 and 24 years old migrants from remote villages (ADB, 2003). It means that garment factories provide the most jobs for young women after agriculture.

However more than 65% of Cambodian women are farmers (ADB, 2007) and percentage of male employment in agriculture below 50% (MOP, 2009). The agriculture sector has the advantages of some reasonably good arable land, low cost labor and all ages' acceptability (young, middle and old ages). According to the survey analysis shown that the maximum age of respondents is 67 years old. It is indicated that minimum age of interviewee is 20 years old. It shows that most women who involve in agriculture sector are old age. The result of the survey indicated that 80% of the respondents are 30 to 67 years old. Some of them used to work at the garment factories and returned home after they married and had children. They found other jobs in their village and have to look after their family. But 24% of interviewers are single and are involving in the farming activities in the village. It should be noted that one respondent said that her husband died by pesticide poisoning.

2.4. Respondents Information

2.4.1. Education Level of Respondents

Based on the interview, it was noted that 94% of respondents accessed to school from primary (68%) to secondary levels (24%) but for most of older generation, they did not attend school. However, only 74% are literate people. Figure 2 shows that only 6% of respondents did not attend school but 26% is denote the percentage of illiteracy because most of them did not read and write after they finished their school.

Table 2: Summary of socio-demographic characteristics

Characteristic	Number of respondents	Percentage
Age group		
20-29	10	20
30-39	21	42
40-49	9	16
50-59	8	16
60-69	3	6
Level of Education		
No school	3	6
Primary	34	68
Secondary	12	24
High school	1	2
Literacy	37	74
Illiteracy	14	26
Marital status		
Spouse	34	68
Single	12	24
Widow	5	10
Household size	**Average 5.68 persons(range 2-11)**	
Household income	**Average 4,305,435 riel ranged from 1-10 million riel**	

2.4.2. Human capital and income from agriculture activities

The total number of people per household ranged from 2 to 11 persons, giving an average household size of 5.68 persons is higher than the General Population Census of Cambodia 2008.

According to the interview, the average total labor forces of household in the study area is around 4 persons per household and ranges from 2 to 9 persons. Most of them are involved in agriculture. On the other hand, some of their husbands have other work out of their agricultural work such as motor taxi, construction work, carpentering, fishing and motorbike repairing which could help to contribute to their family income. The finding indicates that the average children are 2 persons per household ranging from 1 to 6 children per household.

According to the analysis, the average household income of the respondents is 4,305,435 Riel (equivalent to USD1,025) which ranges from 1,000,000 riel to 10,000,000 riel per year with an average household size of 6 persons.

2.5 Pesticide Use and Exposure

2.5.1 Employment

According to the result of the rapid survey indicated that pesticide application is the main responsibility of the male farmers. Furthermore, after a long period of experience with pesticide poisoning, many vegetable farmers are hiring labor in the community to spray pesticide. It was found that at least 8% of the respondents have husbands provide labor service for pesticide application on vegetable farm and fruit farm in the area. They can earn 3,000 riel for spraying pesticide on vegetable farm 1 backpack of pesticide and 5,000 riel /backpack for spray at mango or sapodilla farms.

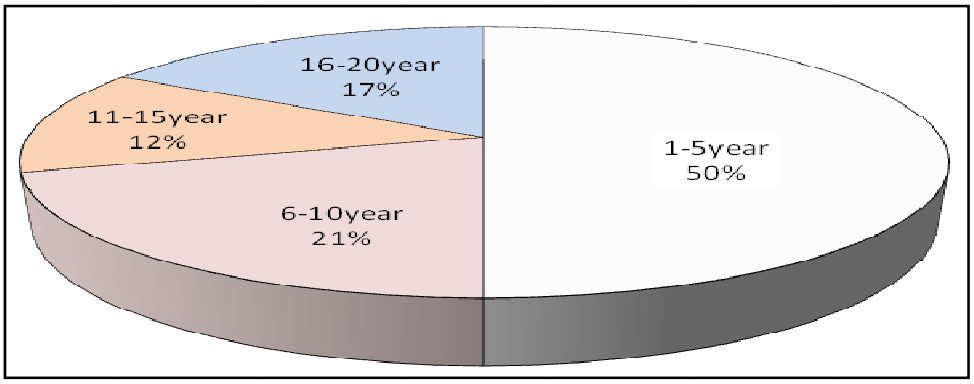
As a result of the interview, all the respondents can be divided into two groups. The first group comprises of the owners of vegetable farm (72%); and the second group are of women who are workers (28% of respondents), employed at vegetable farm of neighboring villagers. These farm women workers are employed at the vegetable farm for weeding or uprooting weeds.

All respondents said that they know that all vegetable farms in their community uses pesticide. They admitted that their vegetable will not productive if they do not apply pesticide. According to the interview, it indicated that they spend more money on pesticide for 1,308,372 riel per year per household which ranges from 700,000 riel to 5,400,000 riel on average for protecting their vegetable. The total pesticide expense per household is dependent on the farm size and the cycles of vegetable production. As mentioned in the beginning, farmers can grow vegetable from about 4 to 6 production cycles per year according to the land topography. For growing vegetable for a whole year on their land, farmers have filled their flooded land area with the alluvial soil, which is taken out from the Prek (man-made canal) by truck and it is managed by the commune council committees.

According to the result of the interview with 51 female farmers, 47.06% of respondents indicated that they have sprayed pesticide to protect their own vegetable crops. The other, 45% of respondents informed that they have never sprayed pesticide because their brothers, husband and/or father are always responsible for this dangerous work. The remainder around 6% said that they used to spray pesticide when they were single. However, all of them said that they can be exposed to pesticide since they are actively working in the vegetable farm; they always enter into the vegetable farm that is being sprayed pesticides for weeding and harvesting. It means that all respondents are exposed to pesticide through their works.

The all respondents were asked to identify the length of time which they have used pesticide or are exposed to pesticide; on average they are exposed to pesticide in vegetable farming for 9 years, ranging from 1 to 20 years. Figure 2 summarizes the length of time that women farmers have used pesticide or get exposed to pesticide according to five year brackets.

Figure 2: Length of time respondents have used or exposed to pesticide



When asked how they were exposed to pesticides, the most common route indicated was smelling pesticide when they re-entered the farm. The common activity indicated was the entry into the farm to do the weeding. They were also exposed by the pesticides which were just sprayed by neighbors. Specifically, 28% of respondents had provided their services for weeding at vegetable farm; they are also exposed to pesticides. They work at the field around 8 hours per day starting from around 6 am to 4 pm and have a break for lunch from 11 am to 1 pm. Generally, they are given 10,000 riel per person for weeding in vegetable farm for the whole day. Since vegetable production at the area is available for a whole year, most of them can find this work every month with 10 to 20 working days per month. Weed is a main constraint of vegetable farmers in the studied area. They always hire poor women in their community or from outside for weeding or uprooting weeds from their farm because they cannot spray herbicide when vegetable is growing, even though they always spray herbicide after or before planting.

Furthermore, the neighbors who spray are also strong exposure to other farmers because they are working close to each other with the distance between 8 meters to 15 meters in an open atmosphere. They said that pesticide is blown by wind and exposes them as they can smell while they are working on the nearby field.

Picture 1a: Farmers uprooted grass at vegetable farm of neighboring villagers in Prek Koy commune. The field close to this farm has just been sprayed with pesticide on yesterday.

Picture 1b: They were thinning and weeding at their own vegetable farm in Svay Proteal commune that just sprayed with insecticides on yesterday.

When asked about the pesticide use, 46.15% of sprayers said that they spray pesticide every week, 42% spray every month and 11.54% spray every day. However, on average, they spray pesticide every three days on their vegetable farm. But depending on whether it is a seasonal or insect outbreak, they use pesticide every day or every week. It is noted that only around 12% of the female sprayers are mainly responsible for pesticide application because they are widow or single. Other women sprayers just help their husband, father or brothers when they are busy or sick.

The respondents were asked to comment on their pesticide-related activities at work or home and also other exposure factors. The most common activity indicated were re-entry for working in the fields where pesticides are being used or have been used (100%). Other ways of exposure to pesticides are such as purchasing and bring pesticide (63%), washing clothes that have been used for spraying and mixing pesticide (59%), mixing and spraying pesticide in the field (47%), and washing spraying equipment (27.5%). They also reported that they normally wash spray equipment after they sprayed herbicide only. People in the studied area also use household pesticides indoors to kill mosquitoes inside their houses. As a result of the interview, 45% of respondents said they have used mosquito pesticide application such as spray and mosquito coil at home.

When asked about the ways that they are exposed to pesticides, the most common form of exposure by pesticide being applied by ground method (100%) which they use backpack sprayers and backpack sprayer machine. According to the interview, 80% of women pesticide applicators use backpack sprayer and 12% indicated that they spray pesticide with backpack spraying machine while 8% use hand-pump sprayer.

Table 3: Activities which expose to pesticide

Activities/works expose to pesticide	Percentage (N=51)	Times of expose per month *		
		Average	Min	Max
mixing/loading	47.06	13	2	30
household application	45.10	18.0	1	30
working in fields where pesticides are being used or have been used	100.00	17.0	1	30
re-entry to treated fields	47.06	14.7	2	30
washing clothes that have been used when spraying or mixing pesticides	58.82	11.4	1	30
washing equipment that has been used when spraying or mixing pesticides	47.06	4.6	2	15
purchasing or transporting	62.74	4.8	1	20

Other ways, respondents were exposed to pesticides include, neighbors' use of pesticide (61%), washing spouse clothes which have been used while spraying pesticides (47.06%), bathing in water is close to the sprayed areas (29.4%), food (as fresh vegetable) that was sprayed with pesticide (27.5%) and use of pesticide by government for public health purpose (12%).

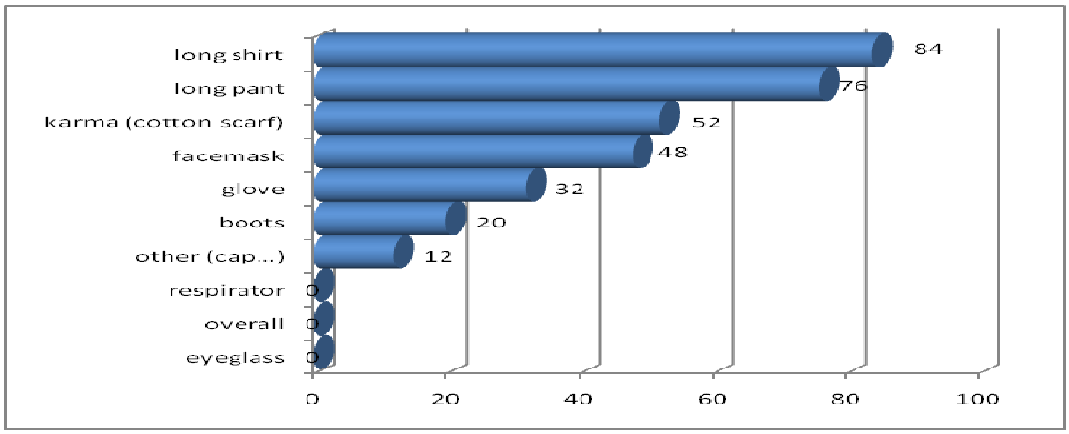
Table 4: Ways which respondents are more exposed to pesticides

Ways that exposing to pesticides	% of respondents (n=51)
Washing or touching husbands clothes which have been used for spraying pesticides	47.06
water contamination (e.g. drinking or bathing in water that is close to sprayed areas)	29.41
food: eating food that is sprayed with pesticides	52.94
eating food after spraying pesticides without washing hands first	27.45
neighbors use of pesticides	60.78
governments spraying for public health purposes	11.76

2.5.2 Personal protective equipment practices

All of the pesticide applicators indicated that they did not wear protective clothes when they mix and spray pesticide. However, some people admitted to have worn some items of personal protective equipment (PPE) while spraying such as normal long sleeved shirts (84%), long pants (76%), facemask (48%), gloves 32% and boots 20%. Furthermore, 52% of applicators use cotton scarf (Krama) for protection. A very small numbers, only 5% of sprayers indicated that they used rain coats when spraying pesticide. However, all of them did not indicate the use of overalls, eyeglass and respirator. The reasons given for not using were unavailability (94%), expensive (4%) and uncomfortable (24%) while some of them did not respond because they did not know the products. As far as Dr. Murphy Helen mentioned in the fact-sheet of the Toxic trail that even if available and used such it would be difficult to use in 30-40 degree Celsius tropical heat (FAO and TVE, 2001).

Figure 3: Percentage of respondents use PPE



2.5.3. Spillages

According to the interview, 84% of applicators reported having experienced the spillages either while spraying (52%), while mixing (28%) or and while treating on seeds (4%). When we asked about the parts of body that were spilled by pesticide, , it is found out that the most common responses were back (48%), hand (48%), leg (33%) and face (10%).

Table 5: Spillage experiences of pesticide sprayers

Spillage	while spraying	while mixing	other
Percentage	52	28	4

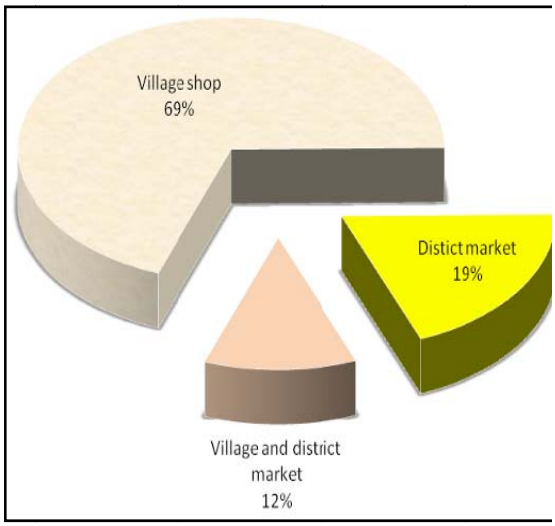
2.5.4. Purchasing pesticide

According to the interview with farm owners, it shows that 70% said that they are involved in buying pesticide. Pesticide shops are available in their community. They can buy pesticide from markets in their

village or other villages in the commune and district nearby (Psar Prek Touch). In general, women were requested by their husband to buy pesticides from the retail shop or market. But, most households the husbands decided whether pesticides should be used.

Figure 3: Places of respondent to buy pesticide

The result also indicated that majority of the respondents (69%) always buy pesticides at retail shop in their village only, and 19% buy pesticide at the central district market. The remainders (12%) always buy pesticides from retail shop in the village and sometimes they go to the district market to buy. More than this, only 3% of them buy pesticides from the agents of Pesticide Company who to their community to advertise pesticides.



When we asked about the ways that they choose pesticide to use, the most common ways were via suggestion from pesticide sellers (77%), own experience (50%) and via label (4%). According to the rapid interview, farmers cannot advice or share information about how to use pesticides effectively with other people. It means that they depend on their own experience/ observation and pesticide retailers. However, it can be considered that most of pesticide retailers have not had any access to training on pesticide. Some of them are also farmers; they started to as pesticide users and then became pesticide sellers.

Picture 2: Pesticide retail shops in commune and village

Furthermore, 81% of respondents said that they always have access to information on how to use pesticide by sellers, while only 23% of them they have got information on pesticide and its hazard. A very small number of respondents (8%) reported that they got advice from the seller about PPE use. None of the respondent indicated indicated that they received information on precautions of working with pesticide from sellers.

2.5.5. Storage practice

Based on observation and the interview, it can be shown that the most common places for storing pesticides were within their homes, fields, gardens and sheds or hung on the tree. As the table below shows, 54% of farmers stored pesticide within their home; various locations in the home are used, including the kitchen, hung under the house or hung on the wall, under/near the sleeping bed or bathroom, while 46% of them said

that they stored the pesticides at the field and 11% stored at the shed close to the house. Other places where farmer store pesticide are by hanging on the tree (8%).

Table 6: Places for storing pesticide

Storage At	Field	Shed	Home	Other Place	Out Reach of Children	Separated From Other Items
Percentage	46	11	54	8	49	68

The survey team did not find actual storage in box or cage. However, 49% indicated that they put pesticide out of reach of children, and 68% said that they stored pesticide in a place separated from other items. In term of mixing pesticide for use, 35% of respondents decant all pesticides in a soft-drink bottle. The most common use is plastic bottle (2 liters) of soft drink (Sprite or Coca cola). When asked about the reusing of pesticide container, a small number (8%) of respondents indicated that they reused it for making kerosene lamp and only one respondent reused it for keeping food (peanut) after cleaning and soaking them in the water for about one month.

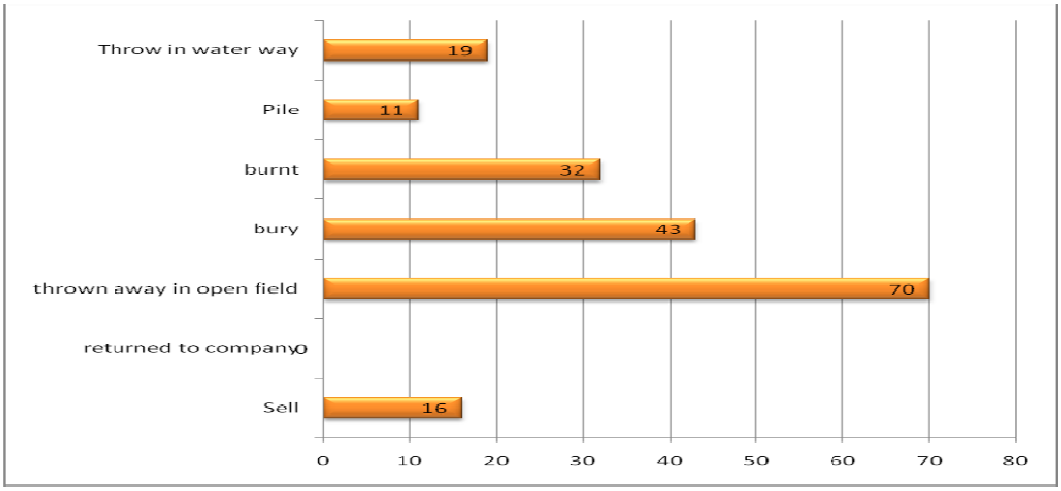
2.5.6. Disposal of pesticide containers

Accidental contamination of the environment by pesticides use on farmland was a main concern in the area. Throwing away containers in an open field was the most common form of disposal (70% of respondents reported) and follow by burying (43%) and burning (32%). Other people also mentioned that they have threw the empty pesticide containers into watercourses such as canal (Prek) or river, particularly when the water level is rising; the water current then carries the containers to the river and/or lake. Small empty pesticide metal containers are sold to collectors and only 16% of the respondents indicated they did. No pesticide company have collected their old containers for appropriate disposal or recycling or reusing.

Picture 3: Pesticide containers packs had abandoned and piled up in the field are important source of environment contamination

Picture 4: Pesticide containers throw away in the vegetable farm

Figure 4: Percentage of respondents have been disposed the pesticide containers



2.5.7. Washing Equipment

When asked about the place where the equipment used for the pestcide are washed, 43% of household interviewed said that they have never washed equipment, while 57% indicated that they wash the equipment at the farms, houses or canal. Inside the vegetable farm, farmers make ponds, wells or keep a jar, to keep water for watering and mixing pesticide. It should note that in the studied area has water-bodies as well as river, lake and canals nearby fields are used for multiple purposes bathing and drinking and washing equipment. Thus, washing equipment and run-off chemical from the filds is concerned of causing pollution of the water. The storage of water like this is also helpful for emergency such as the spillage of pesticide on body and hand, they can use this water for washing.

Picture 5 : Storing jar in the vegetable farm for mixing pesticide and washing

According to the interview, 65% of the respondents indicated that they have washing facilities such as a well, pond or canal or jar which is set up in the farm or near the farm where they spray pesticides for washing their hands and body.

2.5.8 Pesticide identity

Respondents were asked to identify pesticide they use or are exposed to through their activities. All of the women workers are not indicated pesticide because they do not know the identity of pesticides that farm's owner used to spray. According to the result of a survey 2009 done by the capacity building for the control of agricultural inputs and standards project (Supported by JICA) showed that only 13% of pesticides were registered and 3% of them had been labeled in Khmer language. Other 87% of pesticides did not register at MAFF, 5% is on the banned pesticide list of Cambodia and 6% is on the banned list of World Health Organization, (Speech's H.E. Chan Sarun, MAFF Minister; July 14th 2010, addressed at the opening of consulting workshop on Draft Law on Pesticide and Agricultural Inputs). It is likely that most of pesticides are illegal or uncontrollable.

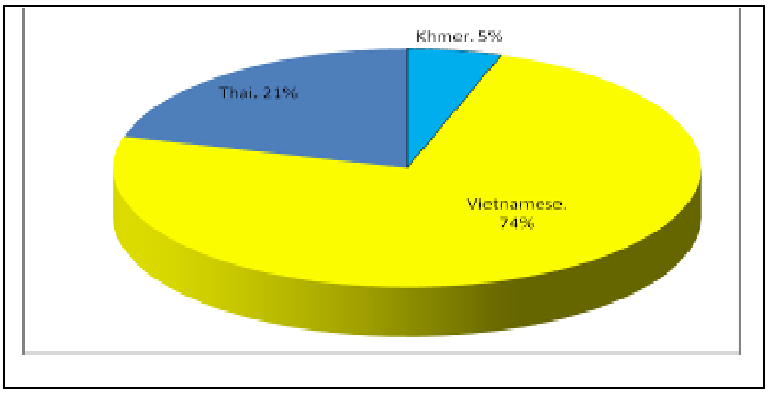
When asked to identify pesticides they use or are exposed to through their activities, all of them had difficulty responding because they did not know the common name of pesticides. Normally, they will identify the pesticide by the picture on the label of pesticides. However, they brought the packs of pesticide which they used to show our team. As the result of recording, it is indicated that at least 77 pesticide products have been used in the area (annex 1). The most commonly and recently used pesticides are dicrotophos; emamectin,benzoate; abamectin; indoxacard; cypermethrin; methomyl; permethrin; chlorpyrifos; imidacloprid; nereistoxin and glyphosate.

Picture 6: Farmers don't know the common name of pesticide they use. He mixed 8 pesticide types for spray.

The some commonly used pesticides are those in the extremely or highly hazardous pesticide category as classified by the World Health Organization, such as mevinphos (Ia); methyl parathion (Ia); dicrotophos (Ib) and methomyl (Ib). According to the database and website are updated and enhanced by Pesticide Action Network North America (PANNA) and list of pesticide having potential to cause breast cancer (PAN AP, 2007) indicated that majority of pesticides use in the studied area had been listed for the pesticides involving in breast cancer and carcinogenicity such as 2,4-D; atrazine; cyfluthrin; carbaryl; chlorpyrifos; chlorothalonil; cypermethrin; deltamethrin; dicrotophos; fenvalerate; fipronil; mancozeb; metaldehyde; methyl parathion; permethrin; tebuconazole, hexaconazole.

The majority of pesticides sold and used in the area are labeled in foreign languages. According to the sub-decree 69 in 1998, it is states that the pesticide containers with non-Khmer language labels that are imported and sold in Cambodia are illegal. As a result of the survey, there are only 4 pesticides with container labels written in Khmer (5%). Most of pesticide container labels are written in foreign languages such as Vietnamese (74%) and Thai 21% as shown in Figure 5.

Figure 5: Language of pesticide container labels found in studied area



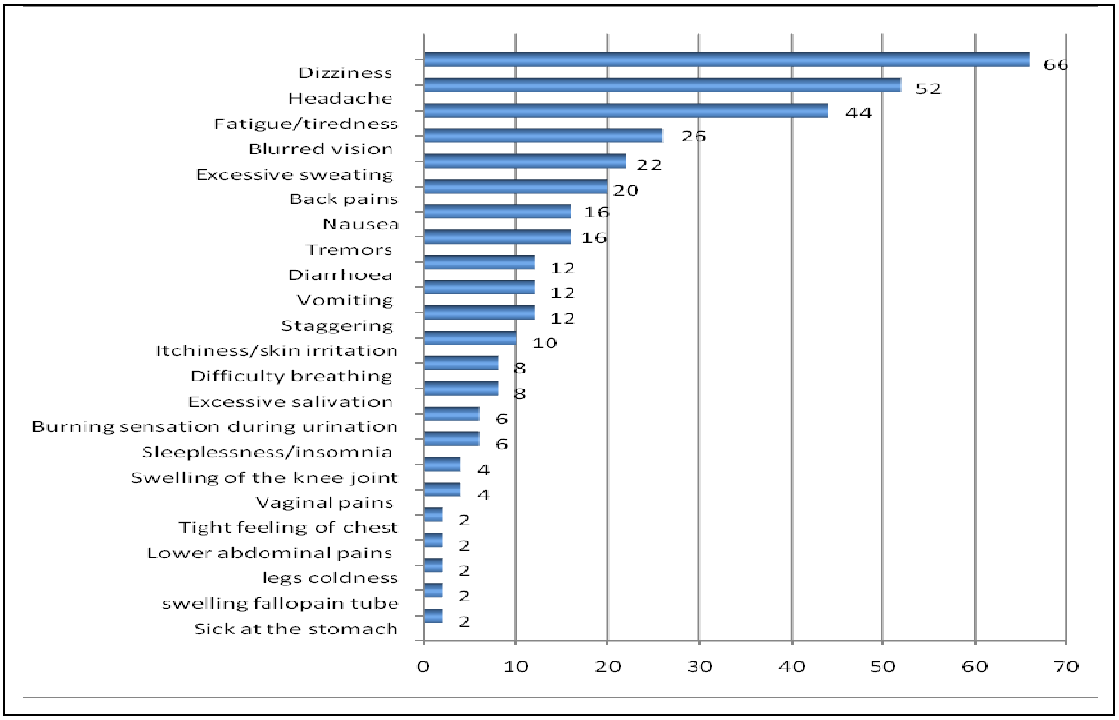
Farmers in the study area have mixed different pesticides together to produce "pesticide cocktail" which is found to be a very common practice. They mix pesticides 2 to 8 different kinds of pesticides together and on average 4 kinds are mixed together for more effective pesticide cocktail for killing pests, particularly when some pests have became resistant to certain types of pesticide compound.

2.6. Health Impacts of Pesticide

2.6.1 Signs and Symptoms

According to result of the interview, 21.57% of respondents indicated that they have not had suffered any symptom of pesticide poisoning when asked wether they had ever experienced symptoms when using pesticide or were exposed to them. But 78.43% of respondents reported that they had experienced at some point, some signs or symptoms. Most of the responses were dizziness (66%), headache (52%), fatigue/tiredness (44%), blurred vision (26%) and excessive sweating (22%). The full list of the symptomps is showed in figure 6.

Figure 6: Percentage of Symtomps reported in studied area, Saang district



2.6.2 Pregnancy Problems

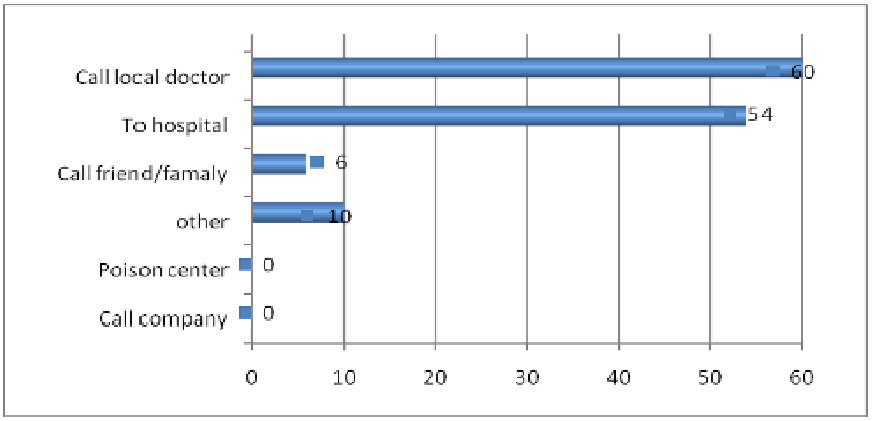
Miscarriage is the most concern problem in the area since some (16%) of the respondents reported that they used to have miscarriages from 1 to 3 times. According to data analysis, around 25% of married women involve in spraying or exposing to pesticide reported that they used to have miscarriages. When we asked them if they used to have problems during pregnancies, 25% of married women reported to have this kind of problem. The most common responses were abdominal pains and vomiting or unconsciousness.

But 18% of married women used to have both the miscarriage and pregnancy problem. Babies' deaths were also reported from this area which wondering with pesticide impacts, according to 2 respondents indicated.

2.7. Healthcare facilities

When asked what they would do if they thought someone was poisoned by pesticide, the most response was they would call a local doctor (60%), followed by taking the person to the hospital (54%). 6% said that they would call their family member. And 10% reported that they would try to aid the victim by using local traditional method/practice for non- serious poisoning cases. The method they would is eating sweet or sugar or drink coffee, lemon-tea etc. However, they have access and prefer to local doctor when they are experiencing pesticide poisoning. In serious poisoning cases, they will bring victim to the Saang District Referral Hospital where they believe that this hospital has good facilities as well as electricity, oxygen and medicines. On average, their access to a doctor is 3 km. However, it is difficult for people living at the Eastside of Basac River because the hospital is located on the other shore of the river (the Westside).

Figure 7: Respondents would do if they thought someone was poisoned



When asked whether they have visited the doctor recently for conditions related to exposure to pesticide, only 16% said that they did. It is reported that members (husband or father) of their household cure for their poisoning by injecting serum 1-2 sacks every month or every few months which they believe can destroy the dangers of some poisons in the pesticide.

In regards to their experiences with pesticide poisoning, most of the respondents said that they would go for regular health check-ups if paid by the employer or provide free of charge because health care is very expensive and they cannot afford it. They had suggested that they should have regular check-ups, on average every 3 months; some said that check-ups should be done every month, while others said it should be every year.

2.8. Access to pesticide information

2.8.1 Labeling and safety data sheet

All respondents were asked about their access to hazard information including label and safety data sheet. According to the survey results, 79% of respondents indicated that they use pesticides with labels. 16% of respondents indicated that they do not care much about the labels because they depend on the pesticide

retailers. For the safety data sheet, 57% indicated that they did not have access to it while 38% of the respondents received it. The remainder (5%) did not provide response because they are not involved in pesticide spraying.

When asked about whether the local language was used on the labels on pesticide containers, around 19% responded that they used some pesticide with labels in the Khmer language. 76% of the respondents had used pesticides with labels in Vietnamese or/and the Thai language. Only a few farmers (8% of the respondents) indicated that they can understand the label. Majority of the respondents said that they cannot understand the labels, so they only read/look at the picture of insect/pests on the label. While the majority of respondents said that they cannot understand but they can understand from the pictures of insect pests on the label of pesticide containers.

Table 7: Access to pesticide information from label and safety data sheet

Response	Label	Safety Data Sheet	Khmer Language	Label understanding
Yes	78.38	37.84	18.92	8.11
No	16.22	56.76	75.68	62.16
Not Answer	5.41	5.41	5.41	29.73

2.8.2. Training access to information on pesticide use

In term of receiving pesticide information, only 16% of respondents informed that they had received training on pesticide use. However, upon further discussion with them, it was found that the trainings were actually short instructions given by the Pesticide Company during their advertisement/marketing. They provided some leaflets, posters and booklets on pesticide use.

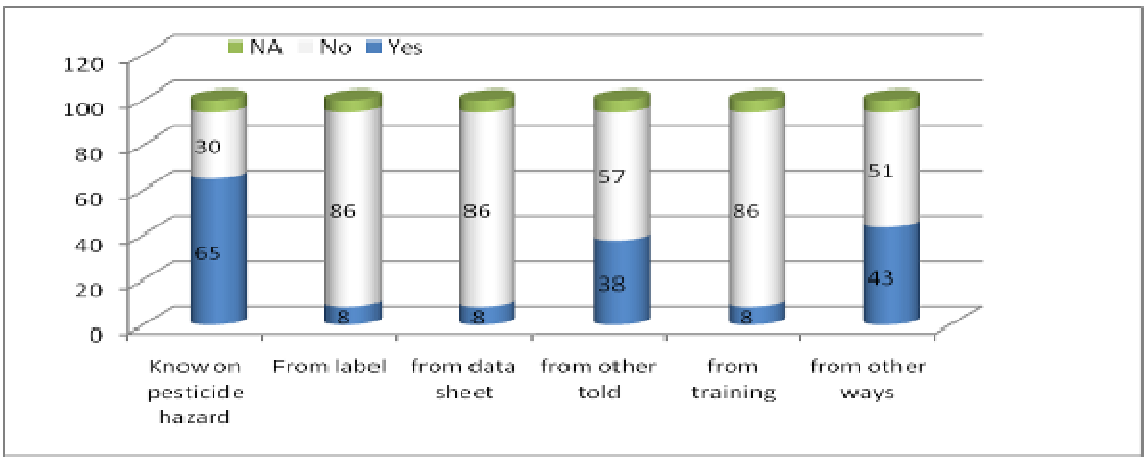
It should be noted that more than 5 years ago, they accessed to training on how to use pesticide and safe use on vegetable cropping, provided by a French NGO, called AGRISUD who had a project in this area with collaboration with Kandal PDA (Provincial Department of Agriculture).

As a result of the rapid survey, it showed that most of the farmers generally know hazards of the pesticide they use. However, when asked female farmers (respondents) were asked if they knew or aware of hazards of the pesticides they are using, more than half of respondents (61%) said that they did know by the label (6%), safety data sheet (6%), told by other people (37%), through training (6%) and their community experiences (37%). The neighbor villagers and pesticide retailers are the main persons who inform them about hazard of pesticides in their community. Furthermore, the above source of information, the evidence of pesticide poisoning had occurred in their community such as neighbor (5%), their husband (6%), and their own poisoning cases (26%) were also reported.

Table 8: Ways of Respondent knew on pesticide hazard

Response	Know on Pesticide Hazard	From Label	From Data Sheet	From Other Told	From Training	From Other Ways
Yes	64.86	8.11	8.11	37.84	8.11	43.24
No	29.73	86.49	86.49	56.76	86.49	51.35
Not Answer	5.41	5.41	5.41	5.41	5.41	5.41

Figure 8: Ways of Respondent knew on pesticide hazard



2.8.3. Knowledge of alternatives

Only a few farmers (8% of respondents) know of other ways to control pests using botanical pesticide, using compost, mulching. They had access to training by NGOs and agriculture officers of PDA. However, they did not prepare and use botanical pesticide because they said that those methods were not effective as the chemical pesticide. However, mulching practice is a common application.

III. Conclusion and Recommendation

3.1 Conclusion

The result of the survey highlighted deleterious effects of pesticide misuse on women health, in addition to causing the people and the environment in the study area to be in a parlous state. Majority of female farmers have some signs and symptoms of pesticide poisoning such as dizziness, headache, fatigue/-tiredness, blurred vision and excessive sweating.

Miscarriages were also a concern for women in the area as1/4 of married women suffered the miscarriage and another 1/4 had problems during pregnancy.

There is only a limited understanding on pesticide issues among female famers. They appear to be using pesticides as an immediate cure for pest problems with little regard given to their future health and environment. They wear some items of personal protective equipment (PPE) while spraying; mixing various types of pesticide together without knowing the name of those pesticides and they normally throw away pesticide containers in the open field or water ways.

Most of the women farmers have been exposed to pesticide in commercial vegetable farming because they are involved in spraying pesticides and weeding. There are also women who were exposed to pesticide by other activities such as purchasing pesticide, washing clothes that have been used for spraying and mixing, washing equipment and mosquito pesticide applicators, neighbours" spraying, washing their spouse's clothes, bathing in water that is close to sprayed areas, and some food that was sprayed with pesticide.

The enforcement of existing legal regulation on pesticides has not effectively materialized. Many pesticides are imported illegally and labelled in foreign languages such as Vietnamese and Thai. Pesticide shop retailers operate close to restaurants or food shops without licenses.

Access to a medical doctor or health practitioner to cure pesticide poisoning is limited. It is reported that members of some households cure their poisonings by injecting serum every month or few months, which they believe can destroy the dangers of some poison in the pesticide.

Access to information on pesticide is limited and only a small proportion of farmers have received training on the use of the pesticides from professionals such as agriculture officer or pesticide companies.

3.2 Recommendations

- Work together with local partners and community to highlight the problems concerning pesticides. Support local government and NGOs by strengthening the role of civil society on pestcide monitoting and control.
- Increase the awareness of pesticide problems for both female and male farmers through the mass media including television, radio, newspapers, magazines, posters and leaflets.
- Provide more intensive training program should be conducted so as to increase skill and knowledge of farmers, especially female farmers on alternative, cropping technique without using or reducing pesticide such as IPM (Integrate Pest Management), and ecological agriculture and healthier prevention practices among vulnerable women farmers.
- Farmers should be stopped using illegal pesticide, banned pesticides, restricted pesticides and should be chose using only legal pesticide, which registered at MAFF and labeled in Khmer language.
- Enhancing capacity of health staff, authorities and networks to promote a pesticide use health related effects responsive based local health care and management training for recognize pesticide and symptoms and the ability to save victim of the risks associated with pesticide misuse.
- The Cambodian government should improve the enforcement of legislation and pass the draft law on pesticide to the National Assembly for approval thus strengthening the ability of agencies to regulate and control the pesticide use and trade; and enforcing pesticide companies to label pesticide container in Khmer language.

REFERENCES

- ADB, 2003: Technical Assistance to the Kingdom of Cambodia for preventing poverty and empowering female garment workers affected by the changing international trade environment.

- ADB, 2007: Cambodia: One step Forward for women in agriculture. SEAGEN Waves Volume 1, Issue 1. British Crop Protection Council (1997): The Pesticide Manual, Eleventh Edition;

- CamFAD, 2009: Kandal. *camfad.org /newwebsite/index.php/en/component/content/ article/51*

- CEDAC, 2004: Pesticide Use and Consequence in Cambodia;

- CEDAC, 2009: Overview of CEDAC agriculture and Rural Development

- CEDAC, 2010: The Cambodia Monitoring Report on the Pesticide issue in 2009

- EJF, 2003: What's your poison? Health Threats Posed by Pesticides in Developing Countries. Environment Justice Foundation, London, UK;

- FAO and TVE, 2001: Toxic Trail. Pesticides and Poisoning. Helen Murphy, Community Health Consultant. ww.toxictrail.org/Documents/Fact-PesticidesandPoisoning-forWEB2.pdf

- MAFF, 2003: Circulation No. 598 on List of pesticides in Kingdom of Cambodia

- MAFF, 2010: Presentation on Agricultural Productivity and Diversification. The 3rd Cambodia Development Cooperation Forum; H.E Chan Tong Yves, Secretary of State, Ministry of Agriculture, Forestry and Fisheries,

- MOP, 2009: General Population Census of Cambodia 2008.

- PANNA, http://www.pesticideinfo.org . The database and website are updated and enhanced by Pesticide Action Network North America.

- PAN AP, 1999: Warning! Pesticides are a Danger to your Health.

- PAN AP, 2007: Pesticides &Breast Cancer. A Wake Up Call by PhD. by Dr. Meriel Watts .

- Saang, 2009: Report on agricultural production in 2009 Agriculture office of Saang district.

- Sodavy,P., Sitha, M., Nugent, R. and Murphy,H. (2000): Situation analysis: Farmers awareness and perception of the effects of pesticides on their health. FAO Community IPM Programme Field document. April 2000.

- USDA, 2010: CAMBODIA: Future Growth Rate of Rice Production.

Annex 1: List of pesticide had been used on vegetable farm in the study area

No	Common Name	Trade Name	Label[1]	List of pesticide in Cambodia [2]	WHO acute hazard [3]	Pesticide company
1	2,4-D	Anco 720DD	VN	P	II	An Giang
2	abamectin	Abamectin	Thai	P	III	Astim enterprise, T.K Agro Co,.Ltd,
3	abamectin	Abatin 5.4EC	VN	P	III	Map Pacific
4	abamectin	DoAbin 3.8EC	VN	P	III	TNHH - TM Đồng Xan
5	abamectin	PropaK	Thai	P	III	Kang Chak KakseKam Cambodia Co,Ltd
6	abamectin	Sock-D	Thai	P	III	
7	abamectin	Tungatin 3.6 EC	VN	P	III	CP SX-TM-DV Ngoc Túng
8	acetamiprid	Mopride 20WP	VN	NL	NL	HP
9	alpha cypermethrin	Motox 5EC	VN	P	II	Nong Phat
10	atrazine	Mizin 80WP	VN	P	III	Saigon Pesticide Company
11	bacillus thuringiensis	Dipel 6,4 DF	VN	P	III	ABBOT/VALENT
12	bacillus thuringiensis	Biobit 32B FC	VN	P	III	Forward International Ltd
13	bacillus thuringiensis	VBT usa	VN	P	III	Jiangsu Wuxiruyze agrochemical, Co Ltd
14	beta-cyfluthrin	Folitec 0.25EC	Thai	P	II	Bayer
15	buprofezin + acetamiprid	Atylo 650WP	VN	P	III	MAI Thai Nong
16	carbaryl	S-F 85	Thai	P	II	Sharp phamolater co,
17	carbendazim	Vicarben 50HP,	VN	P	III	VIPESCO
18	carbofuran	Vifuran 3G	VN	R	Ib	VIPESCO
19	chlorantraniliprole +thiamethoxam	Virtako 40WG	VN	NL	Nl	Syngenta
20	chlorfluazuron	Atabron 5EC	VN	NL	III	H.A.I
21	chlorothalonil	Lynil	Thai	P	III	SK
22	chlorpyrifos	Bosacokos 40	Thai	P	II	
23	chlorpyrifos	Mapy 48EC	VN	P	II	Map Pacific
24	chlorpyrifos	Phodiem 400	Thai	P	II	Master Agrotech
25	chlorpyrifos ethyl+ cypermethrin	Nato 55SC	Khmer	P	II	Agrotech
26	chlorpyrifos ethyl+ cypermethrin	Pertrang 55.5EC	VN	P	II	TNHH - TM Thôn Trang
27	cypermethrin	Cypermethrin 10EC	Thai	P	II	Master Agrotech
28	cypermethrin	Pycythrin 5 EC	VN	P	II	Forward International Ltd
29	cypermethrin	TungRin 10EC	VN	P	II	Aquarius Overseas Private Limited
30	cypermethrin	Visher 25 ND	VN	P	II	VIPESCO
31	cypermethrin	Vit-Sunchiro 10	Thai	P	II	Silver Door
32	cypermethrin	Tenzo 10	Thai	P	II	SK
33	deltamethrin	Videci 2.5 ND	VN	P	II	VIPESCO
34	diafenthiuron	Pegasus 500SC	VN	P	III	Syngenta
35	dicrotophos	Kra Choa 330	Thai	R	Ib	Politekam Agrotech co.Ltd
36	dimehypo (nereistoxin)	Apashuang 95WP	VN	P	II	TNHH -TM. Thái Nông
37	dimehypo (nereistoxin)	Neretox 95WP	VN	P	II	PSC.1
38	dimehypo (nereistoxin)	TungSong 95WP	VN	P	II	CP SX-TM-DV Ngoc Túng
39	dimethoate + fenobucarb	Vibam 5H	VN	P	II	Vipesco
40	dimethoate+ cypermethrin	Nitox 30EC	VN	P	II	NICOTEX
41	dinotefuran	Oshin 20 WP	Khmer	NL	NL	Agrotech
42	emamectin, benzoate+matrine	Redconfi	VN	NL	NL	AM Tam
43	emamectin,benzoate	Do Emectin 4.0 EC	VN	NL	NL	
44	emamectin,benzoate	TikEmectin	VN	NL	NL	CP XNK Tho Khang
45	emamectin,benzoate	Ematin 1.9EC	VN	NL	NL	ALFA
46	emamectin,benzoate	Mekomectin 3.8EC	VN	NL	NL	Jiangsu Fengdeng Pesticide Co., Ltd
47	emamectin,benzoate	Map Winner 5WG	VN	NL	NL	Map Pacific
48	fenvalerate	Vifenva 20ND	VN	P	II	VIPESCO
49	fipronil	Regent	VN	P	II	Bayer
50	fluazifop-P-buthyl	Onecide 15EC	VN	P	III	H.A.I

No	Common Name	Trade Name	Label	In list of MAFF	WHO categories	Pesticide company
51	flubendiamide	Takumi 20WG	VN	NL	NL	Ngat Ban
52	gibberellic acid	ProGibb 10SP	VN	P	U	Valent Biosciense corporation
53	glyphosate	Dream 480SC	Khmer	P	III	HAI Agrochem Yonh Sdok
54	glyphosate	Grassana 480 SL	Khmer	P	III	NoKorthom Agriculture Development
55	glyphosate	Ly Rin 480DD	VN	P	III	Ngoc Yen Trading and Production Co. Ltd
56	hexaconazole	Anvil 5SC	VN	P	III	Syngenta
57	hexaconazole	Dovil 5SC	VN	P	III	Thanh HUNG
58	imidacloprid	Map Jodo	VN	P	II	Map Pacific
59	indoxacard	Ammate 150SC	VN	NL	II	Dupont
60	iprodione	Viroval 50BTN	VN	P	III	VIPESCO
61	lufenuron	Match 50EC	VN	P	II	Syngenta
62	mancozeb+ metalaxyl	Ridomil 68WP	VN	NL	III	Syngenta
63	mancozeb+ metalaxyl	Mexyl MZ 72 WP	VN	NL	III	Saigon Pesticide Company
64	metaldehyde	Bolis 6 B	VN	NL	II	ADC
65	metaldehyde	Saipatre	Thai	NL	II	Golden Door
66	methomyl	Methomyl	Thai	B	Ia	Dupont
67	methyl parathion	Door Super 3-5-9	Thai	B	Ia	Golden Door
68	Mevinphos	Phodrin	Thai	B	Ia	Shell
69	permethrin	Map-permethrin 50EC	VN	P	II	Map pacific
70	permethrin	Tungperin 10EC	VN	P	II	CP SX-TM-DV Ngoc Tung
71	phenthoate	Vifel 50ND	VN	P	II	VIPESCO
72	phenthoate+ etofenprox	Vicidi-M 50ND	VN	P	II+III	VIPESCO
73	phenthoate+ fenobucarb	Hopsan 75ND	VN	P	II	H.A.I
74	tebuconazole	Fortil 25SC	VN	P	III	An Nong
75	thiophanate-methyl	Topsin-M 70 WP	VN	P	III	VITHACO
76	validamycin	Validacin 5DD	VN	P	III	An Giang
77	validamycin	Validan * 5DD	VN	P	III	An Giang

Note:

[1]. Label VN: Vietnamese,

[2]. NL: Not list, B: Banned, P: permitted

[3]. WHO acute hazard: Ia: Extremely Hazardous ;

Ib: Highly Hazardous ;

II: Moderately Hazardous

III: Slightly Hazardous,

U: Unlikely to be Hazardous