

**Self –monitoring of Sign and Symptoms of Pesticide
Poisoning by farmers occupationally exposed to pesticides**

**Report of a study conducted by Vikalpani Women’s Federation
co-sponsored by PANAP and Global Green grant Fund**

Vikalpani Women’s Federation

No.117

Talahena

Malabe

Sri Lanka

The Back Ground

For over a quarter century the Community Education Center has been working “Towards alternatives” with programmes geared to protect nature and to better people’s lives through enhancing knowledge. Since the first meeting between Anita Fernando chairperson of CEC and Sarojini Rengam, Director, Pesticide Action Network (Asia and Pacific) in 1994, their work expanded with a broader vision and determination to make the world a better and healthier place for everyone. The responsibility of this grave task was assigned to the Vikalpani National Women’s Federation, which branched out from CEC, in 2001.

Chemical pesticides, which took over the traditional environment –friendly pest control methods since the Green Revolution, has become a part and parcel of the farming community in the world and Sri Lanka is no exception. The pesticide and pharmaceutical industries thrived with ever increasing profits at the expense of poorer farmers, unhealthy people and polluted environment. Although the level of toxicity varies, Pesticides are poisons and harm intentionally or unintentionally, all organisms that come into contact with them. Duped by attractive advertisements and being unaware of the danger involved, farmers throughout the world continue to use more and more pesticides. There is no escape from the vicious circle, which begins the moment one purchases the first bottle of pesticide. Every year there are reports of many farmers who end their lives burdened with heavy debts by drinking pesticides, which are supposed to word off pests.

Concerned about the health of women in farming communities who directly come into contact with pesticides constantly, inside and outside their humble abodes, PANAP sponsored a survey. On women and Pesticides, which was carried out by CEC in several parts of the island, in 1995. The findings of this survey involving 506 women shocked CEC and they started conducting more awareness programmes on the hazard of pesticides. Chandra Hewagallage, who co-ordinated the women’s activities, underwent special training on all aspects of pesticides. One such workshop organized by FAO conducted by Dr. Helen Murphy, medical Epidemiologist and health advisor

in 2000, paved the way for this year –long study on self –monitoring of signs and symptoms of pesticide poisoning among farmers who spray pesticides.

Similar studies have been conducted in Thailand, Cambodia, Malaysia and Vietnam too.

Introduction

Sri Lanka is an Agricultural Country where the majority of the population does crop cultivation as their main occupation. The main constrain of crop cultivation is controlling pests & diseases, for which most farmers use chemical methods as it is Easy, Quick & Efficient. But they do not think about the risk that they face during mixing & application of pesticides.

On one hand people feel short-term acute poisoning signs & symptoms after spraying of Pesticides, but they do not take that serious unless it is a threat to their normal life style. On the other hand there is no occupational health history recording procedure in Sri Lanka and hence connection between clinical signs and effect pesticides is missed. If they feel serious they are admitted to the hospital & those cases are the only available records of health problems due to Pesticides, but these records shows only about 5 % of the acute poisoning cases, so most of the acute poisoning cases are not recorded. The farmers are continuously exposed to the Pesticides, as farming is the only option they have for a living. Although they neglect the signs & symptoms, which are not serious at the moment, accumulation of those effects could lead to chronic effects on them later.

With this background a study was done to find out all the acute Poisoning signs & symptoms, which could be noticed by the operator after the spraying of Pesticides. Farmers were advised to take care to get all the precautions in safety aspects. (Use of face mask, hat, Clothes to cover all the body, not to use leaking spray tanks, not to eat, drink or smoke while spraying etc.) However of the farmers did not seem to have follow these instructions and they have sprayed on the way that they are normally

doing. The reasons for this may be protective clothing are uncomfortable in hot climate and uneasy to use.

The results showed that 23.6% of the farmers, who were used in the study, did not have any effect to be recorded after the spraying of pesticides.

Dr. Murphy had classified thirty signs & symptoms in to three categories according to the seriousness and it is given in the Table Number 1.

Those categories are Mild (1), moderate (2) & serious (3).

Table 1: Classification of signs and Symptoms into Categories

Serial No	Sign or Symptom	Category
1	Dizziness	1
2	Seizure	3
3	Loss of consciousness	3
4	Vomiting	2
5	Sore throat	1
6	Cough	1
7	Chest pain/ burning/tightness	2
8	Nausea	2
9	Stomach cramps	2
10	Numbness	1
11	Diarrhoea	2
12	Itchy skin	1
13	Sweating	1
14	Staggering gait	2
15	Skin rash/dryness/crack/scales	1
16	Muscle cramps	2
17	Tremor	2
18	Muscle weakness	1
19	Shortness of breath	1
20	Headache	1
21	Exhaustion	1
22	Burning nose	1
23	Blurred vision	2
24	Twitching eye lids	2
25	Insomnia	1
26	Red eyes	1
27	Burning eyes	1
28	Excessive tearing	1
29	Runny nose	1
30	Excessive salivation	1

There were only two symptoms in the serious category. They were Seizure & Loss of consciousness. 20 farmers throughout the study had reported that had felt the symptoms in this category. This was reported in Monaragala Sevenagala, Kkirawa and Kanthle they had felt these symptoms after spraying **Tamaron (monocrotophos) which is a WHO class I pesticide and (Malathion, Paraquat and Carbofuran) Tamaron and Malathion banned in Sri Lanka, it is necessary to find out how they come to the market. Most of the farmers had felt only mild symptoms. (52.5%)**

Materials & Method

This study was conducted using the voluntary members in the partner organizations of the “Community Education Center” over a period of one year. 22 members were trained to conduct the study by the help of Dr. Helen Murphy facilitated by S.N.Lasantha Rathnaweera Research officer and Subhash S. Rathnaweera Agriculture officer two officers from the Department of Agriculture. This was a “training of trainers” session of Five days, which included the following subjects.

- Identification of farmers for the study
- Identification of Signs & symptoms correctly
- Method of training them for the study
- Method of recording the signs & symptoms
- Method of entering the data in special sheets provided.

After the training, volunteers went to their destinations & selected the farmers who are spraying pesticides, for the study. The selected numbers of farmers from each Site, Partner organization of CEC who did the study are given in the table 2. There was no special reason other than the destination of the Partner organizations, to select these areas, but the majority of population of these areas is farmers.

Table 2 : Number of Farmers selected for the study from each site

Site	Part organization who do the servay	Number of Farmers
Moneragala	Community Resources Protection Center	59
Wellavaya	Uva Wellassa Farmer Women's Organization	33
Thanthirimale	Vanni community Development Foundation	21
Kantale	Eastern United Women's organization	42
Sevanagala	Human Resources Youth Guild	41
Kekirawa	Rajarata Jana Prbodhani Foundation	23
Total		219

The farmers were given one-day training by the volunteers to identify the acute signs and symptoms. Most signs are common & therefore it was necessary to identify & decide whether the effects are actually due to pesticide exposure. The farmers were given a format to mark the signs & symptoms that they felt within 24 hours after each spray session. Those formats were collected & data were entered by the trainers in to the special sheets developed by the two officers of DOA, which could facilitate the data entry in to the computer for analysis. These sheets were sent to the CEC head office at Malabe. A data entry operator Inoka Udayangani Samaranayake entered data to the computer for analysis and the findings one as follows are reported here.

This sheet contained Name, address, Gender of the application, Date of application, Number of Tanks, Number of hours sprayed, Crops, Volume of the tank, name of the pesticide and the all Signs/Symptoms marked in a schematic diagram farmers had only to fill the relevant information and mark the Signs/Symptoms that they feed within 24 hours after application of pesticides.

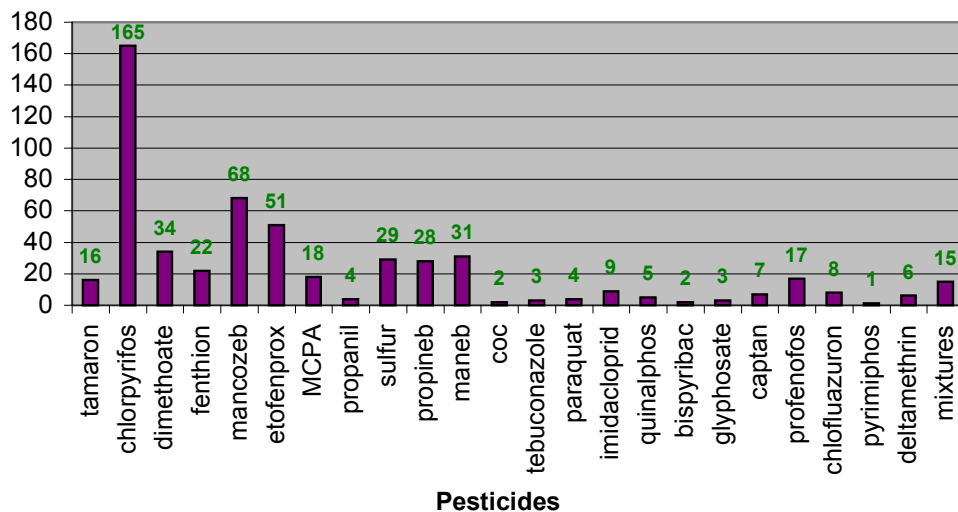
Results

1. Monaragala

The study was performed by the members of the Community Resources Protection Center in the area. They have selected 59 farmers for the study out of which 9 were female. The farmers had used 23 types of pesticides as well as pesticides mixtures in a single tank. 15 spray sessions were pesticides mixtures. Farmers had used chlorpyrifos in 165 sessions, which is the highest number in the Monaragala area in this study. Pesticides used are given in Figure Mo.1

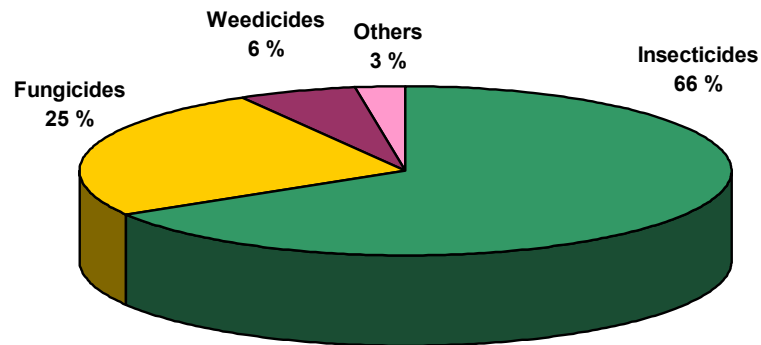
Monocrotophos (Tamaron) had been used in 16 spray sessions. This WHO class I pesticide is banned in Sri Lanka since 1995. Therefore further investigation should be carried out to find out how this pesticide has gone to the farmer

Figure Mo.1 - Pesticides used by the farmers in Monaragala area in the study



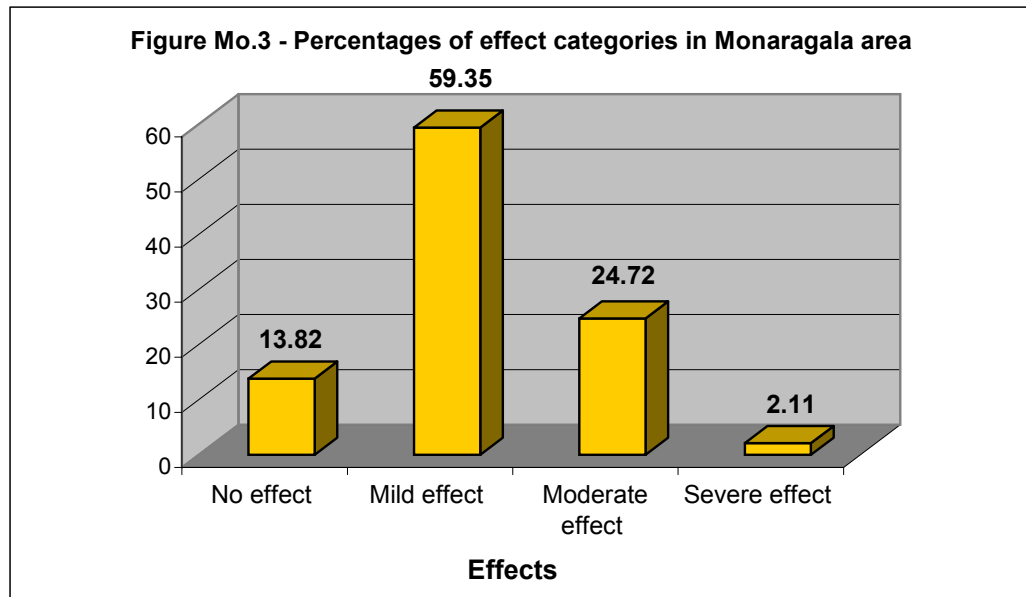
Out of 548 spray sessions 364 are Insecticides, 139 are Fungicides, 31 are Weedicides and 14 are other category. These are shown in Figure Mo.2

Figure Mo.2 - Percentages of each category of Pesticides used in Monaragala area

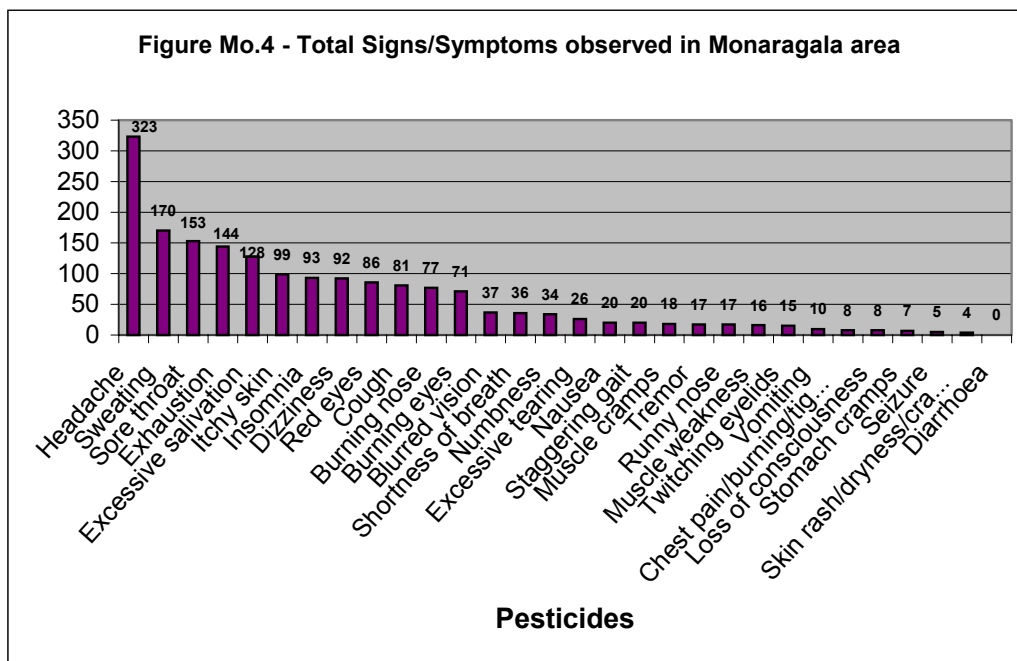


In 365 sessions they have had mild effects, in 152 sessions moderate effects, in 85 sessions no effect and 13 sessions severe effects. Figure Mo.3 illustrate these results graphically.

Figure Mo.3 - Percentages of effect categories in Monaragala area

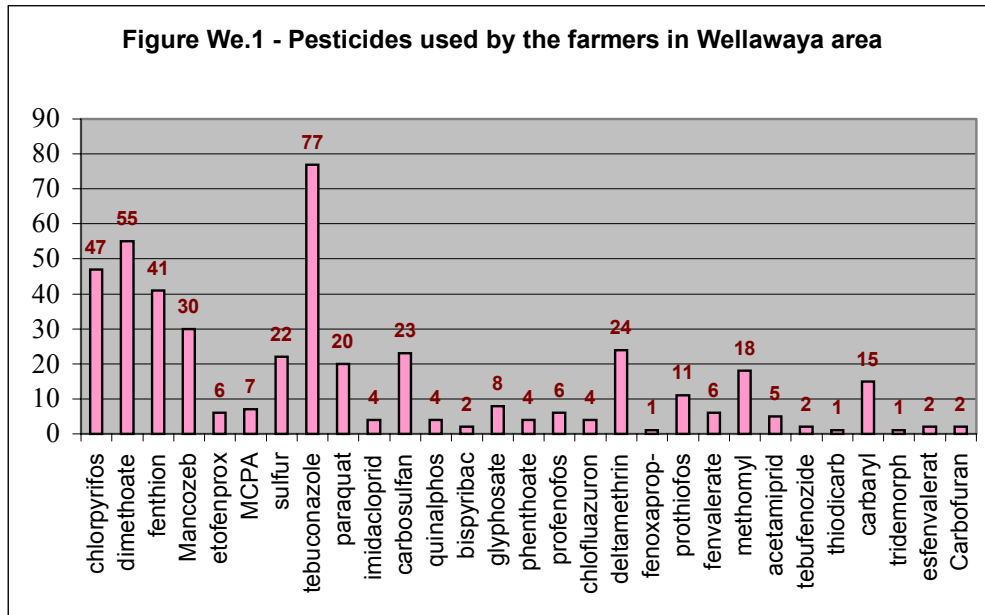


The total number of signs/symptoms observed in Monaragala area in this study is 1783. Headache has been observed in 323 times followed by sweating, sore throat and exhaustion. Total signs/symptoms observed are given in Figure Mo.4



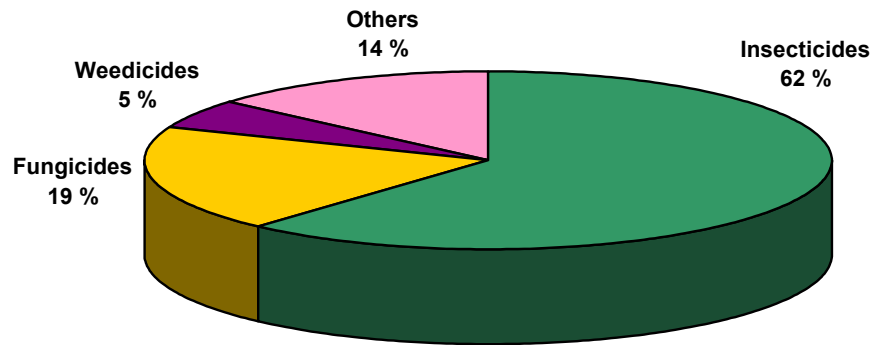
2. Wellawaya

The study was performed by the members of the Uva Wellassa Farmer Women's Organization in the area. They have selected 33 farmers for the study. The farmers had used 29 types of pesticides. Farmers had used Tebuconazole in 77 sessions, which is the highest number in the Wellawaya area in this study. Pesticides used are given in Figure We.1

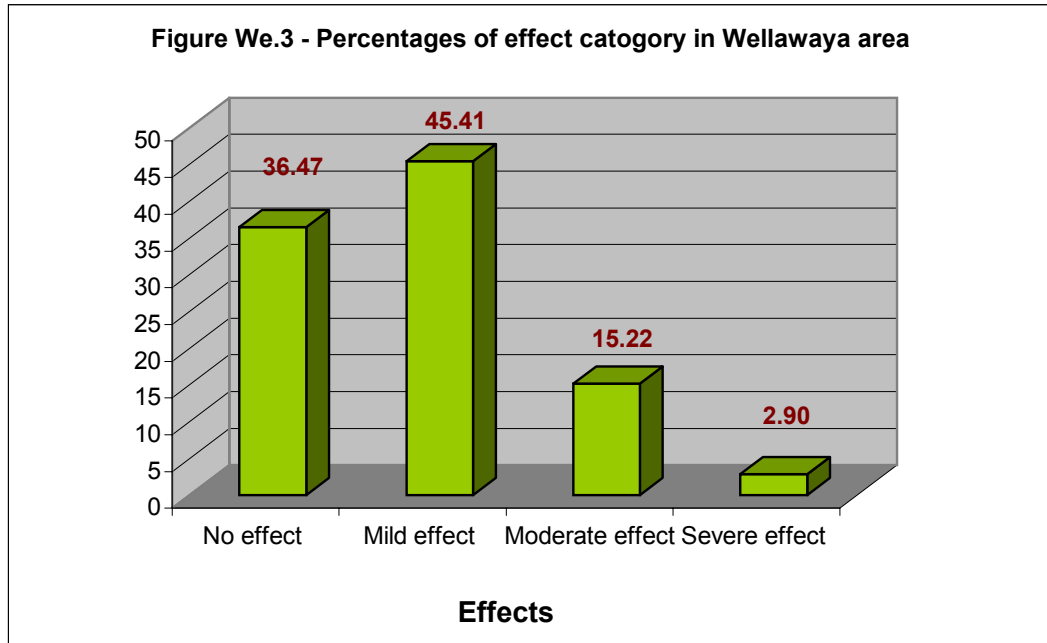


Out of 401 spray sessions 247 are insecticides, 78 are Fungicides, 21 are Weedicides, and 55 are other category. These are shown in Figure We.2

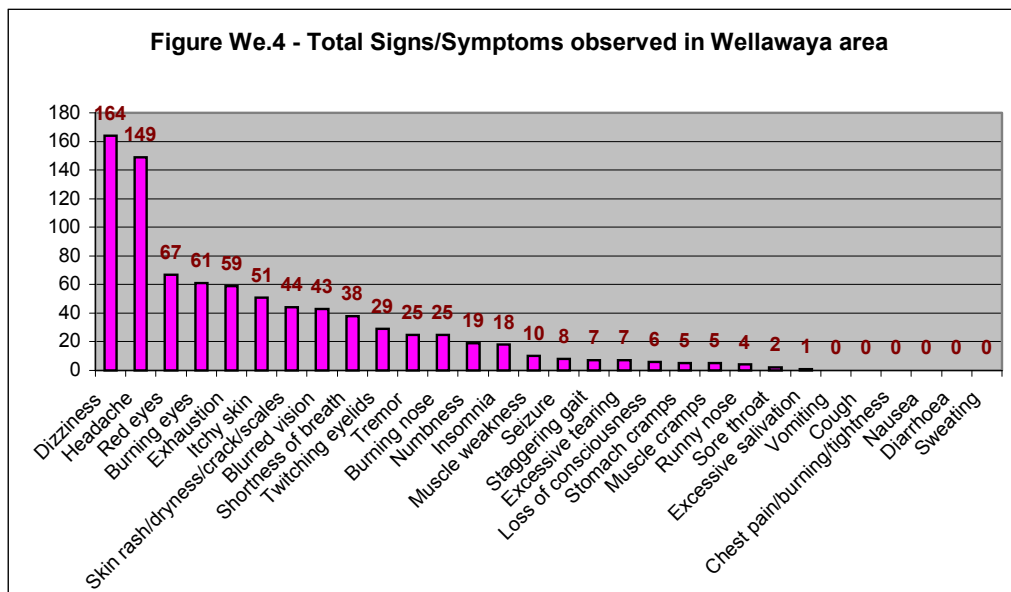
Figure We. 2-- Percentages of each category of Pesticides used in Wellawaya area



In 188 sessions they have had mild effects, in 63 sessions moderate effects, in 151 sessions no effect severe effects and 12 sessions severe effects. Figure We.3 illustrate these results graphically.

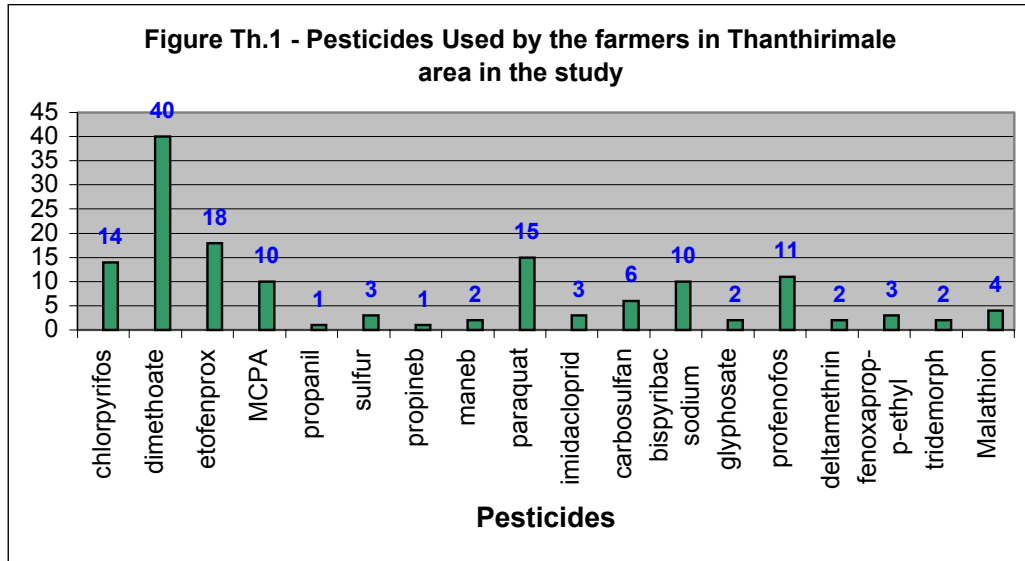


The total number of signs/symptoms observed in Wellwaya area in this study is 847. Dizziness has been observed in 164 times followed by headache, red eyes and burning eyes. Total signs/symptoms observed are given in Figure We.4



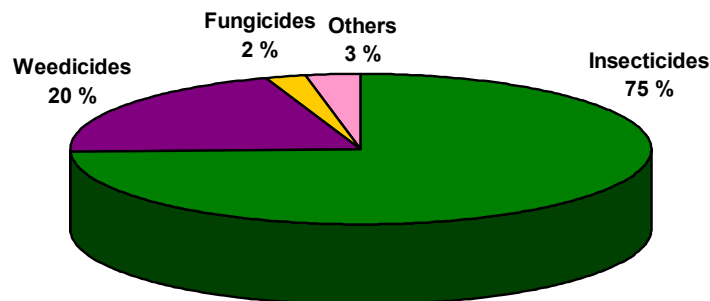
3. Thanthirimale

The study was performed by the members of the Vanni Community Development Foundation in the area. They have selected 21 farmers for the study. The farmers had used 18 types of pesticides and dimethoate in 40 sessions, which is the highest number in the Thanthirimale area in this study. Pesticides used are given in Figure Th.1

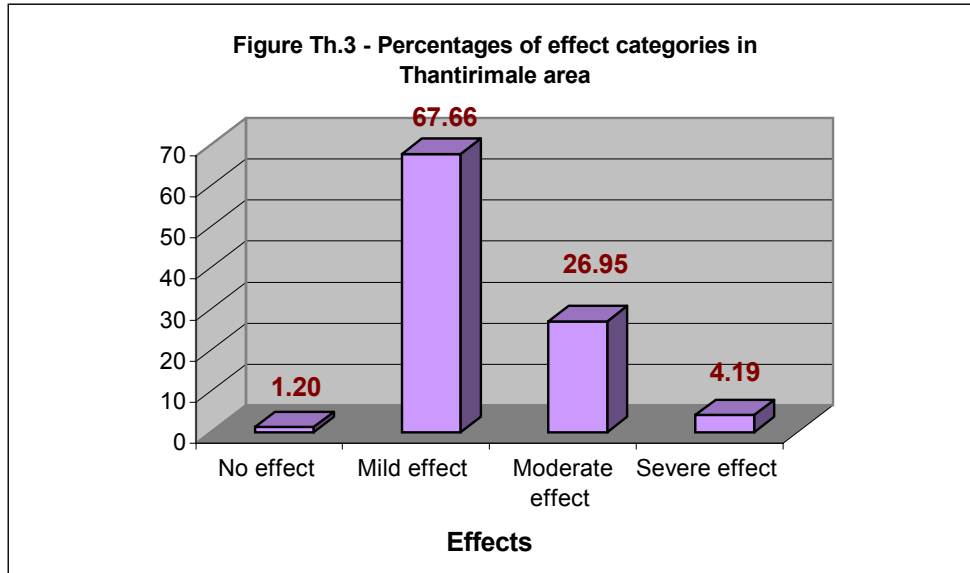


Out of 133 spray sessions 99 are insecticides, 3 are Fungicides, 27 are Weedicides, and 4 are other category. These are shown in Figure Th-2

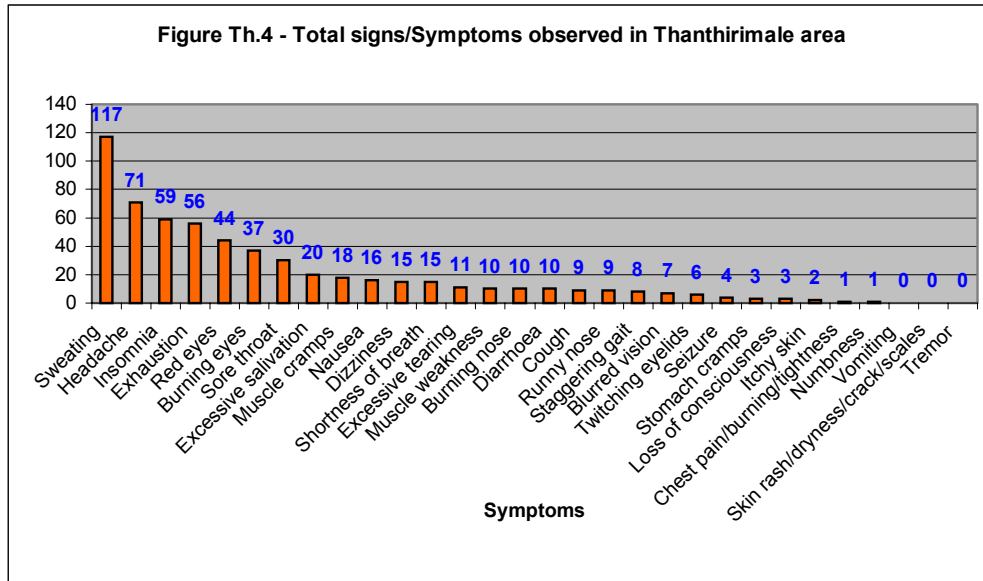
Figure Th.2 - Percentages of each category of Pesticides Used in Thanthirimale area



In 113 sessions they have had mild effects, in 45 sessions moderate effects, in 2 sessions no effect severe effect and 7 sessions severe effects. Figure Th.3 illustrate these results in a graphically.

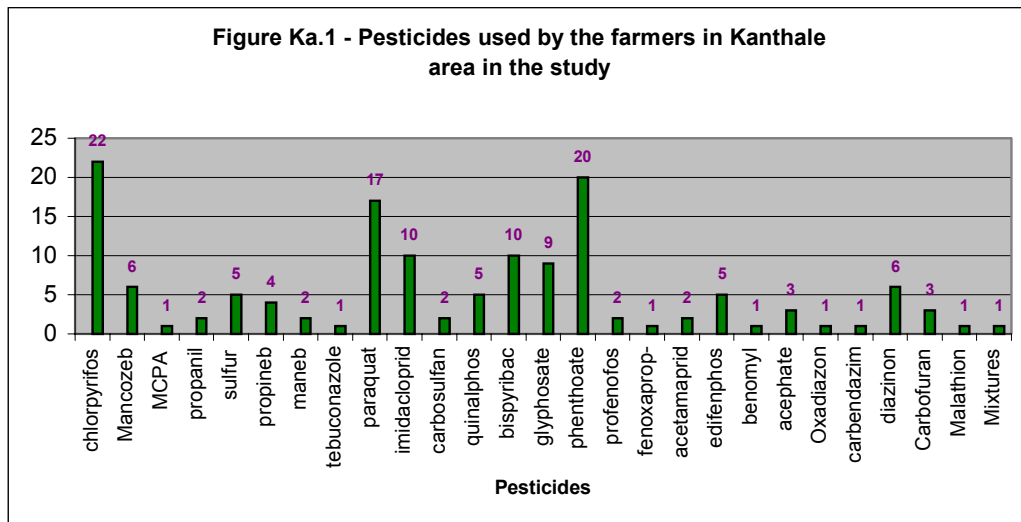


The total number of signs/symptoms observed in Thanthirimale area in this study is 558. Sweating has been observed in 117 times followed by headache, Insomnia and exhaustion. Total signs/symptoms observed are given in Figure Th.4



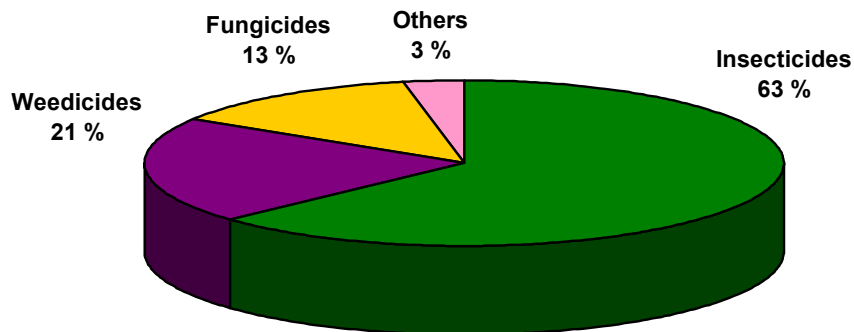
4. Kanthale

The study was performed by the members of the Eastern United Women’s organization in the area. They have selected 42 farmers for the study, out of which 5 were female. The farmers had used 26 types of pesticides and 1 pesticides mixture in a single tank. Farmers had used chlorpyrifos in 22 sessions, which is the highest number in the Kanthale area in this study. Pesticides used are given in Figure Ka.1

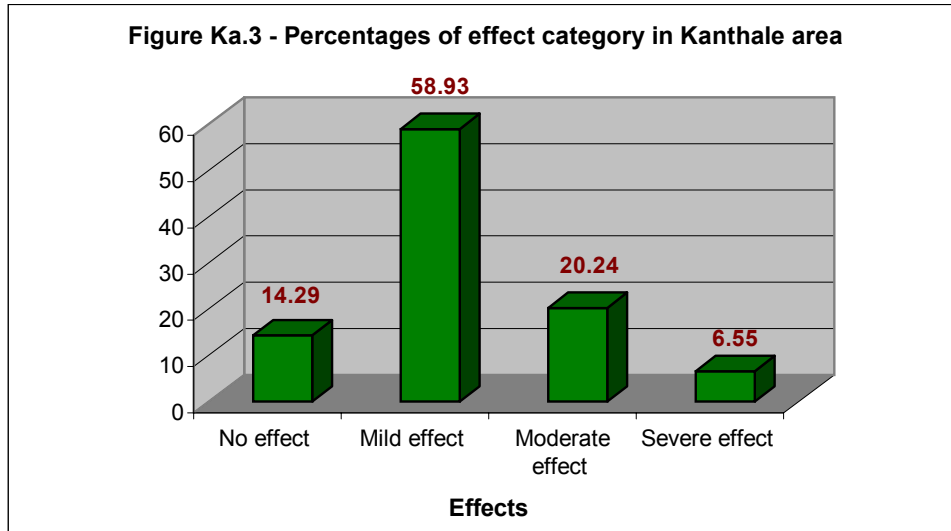


Out of 130 spray sessions 82 are insecticides, 17 are Fungicides, 27 are Weedicides, and 4 are other category. These are shown in Figure Ka.2

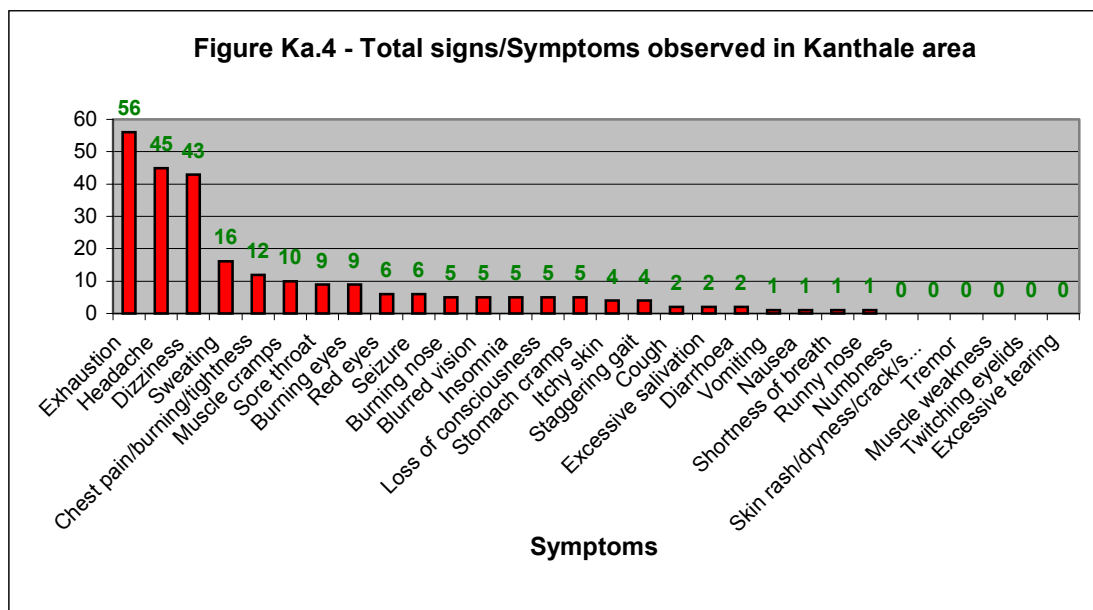
Figure Ka.2 - Percentages of each category of Pesticides used in Kanthale area



In 99 sessions they have had mild effects, in 34 sessions moderate effects, in 24 sessions no effect severe effects and 11 sessions severe effects. Figure Ka.3 illustrate these results in a graphically.



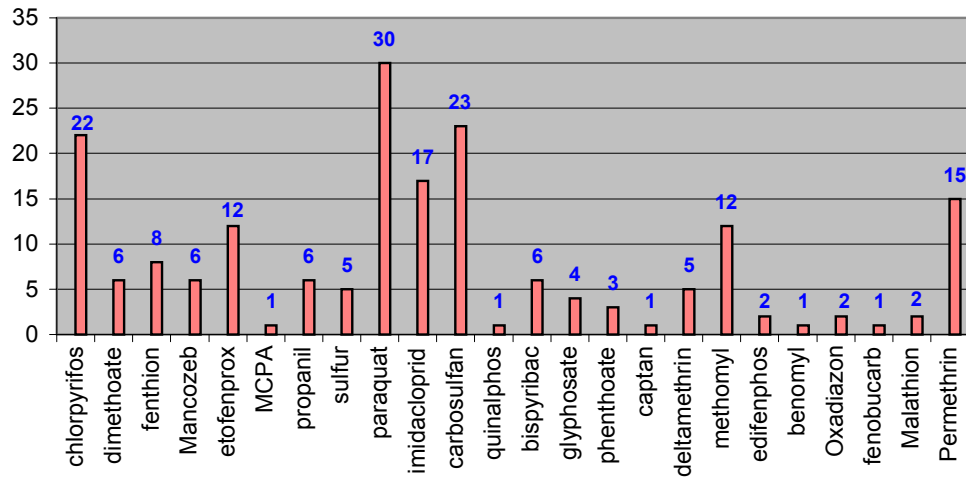
The total number of signs/symptoms observed in Kanthale area in this study is 255. Exhaustion has been observed in 56 times followed by headache, dizziness and sweating. Total signs/symptoms observed are given in Figure Ka.4



5. Sevanagala

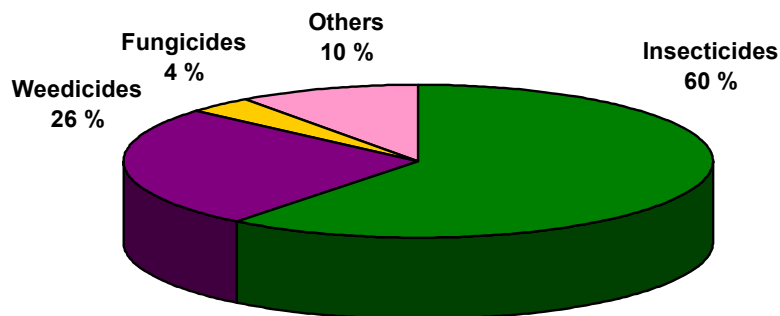
The study was performed by the members of the Human resources youth association in the area. They have selected 41 farmers for the study. Out of which 2 were female. The farmers had used 24 types of pesticides. Farmers had used Paraquat in 30 sessions, which is the highest number in the Sevanagala area in this study. Pesticides used are given in Figure Se.1

Figure Se.1 - Pesticides used by the farmers in Sevanagala area in the study



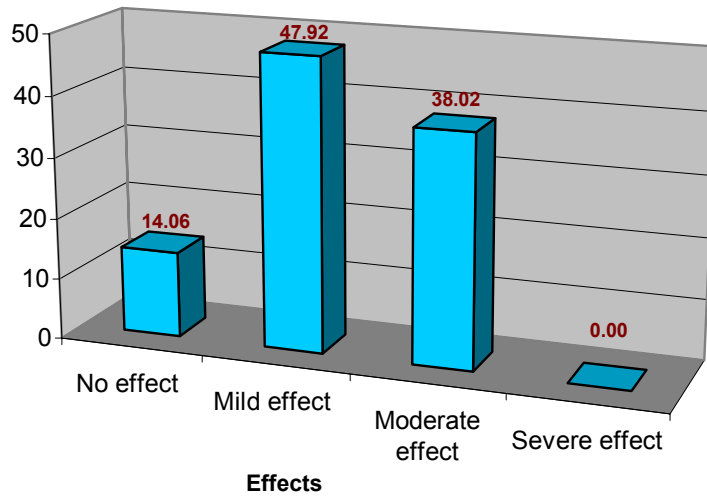
Out of 192 spray sessions 116 are insecticides, 7 are Fungicides, 50 are Weedicides, and 19 are other category. These are shown in Figure Se.2

Figure Se.2 - Percentages of each category of Pesticides used in Sevanagala area



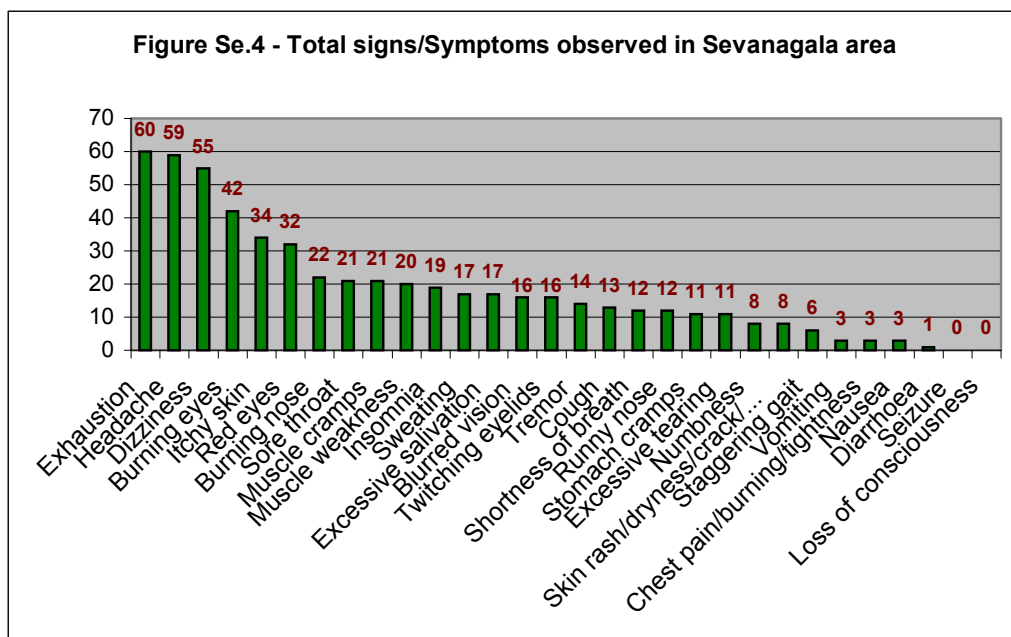
In 92 sessions they have had mild effects, in 73 sessions moderate effects, in 27 sessions no effect and severe effects has not been reported. Figure Se.3 illustrate these results in a graphical way.

Figure Se.3 - Percentages of effect category in Sevanagala area



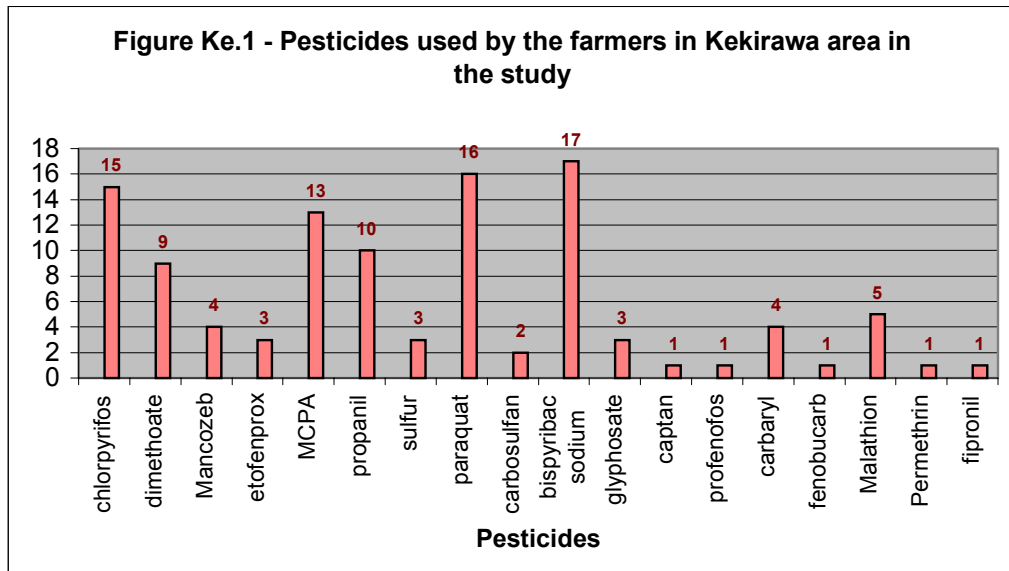
The total number of signs/symptoms observed in Sevanagala area in this study is 556. Exhaustion has been observed in 60 times followed by headache, dizziness and Burning eyes. Total signs/symptoms observed are given in Figure Se.4

Figure Se.4 - Total signs/Symptoms observed in Sevanagala area



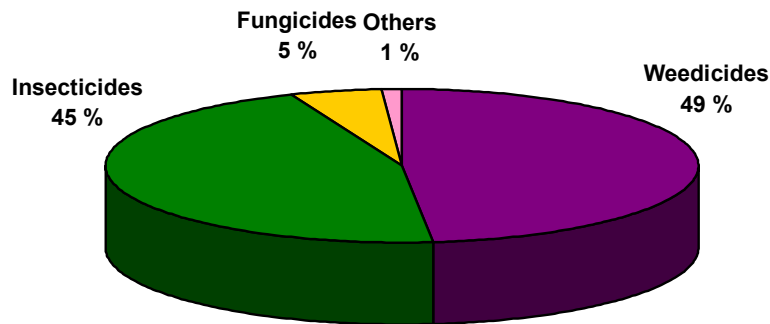
6. Kekirawa

The study was performed by the members of the Rajarata Jana Prbodhani Foundation in the area. They have selected 23 farmers for the study. The farmers had used 18 types of pesticides. Farmers had used bispyribac sodium in 17 sessions, which is the highest number in the Kekirawa area in this study. Pesticides used are given in Figure Ke.1

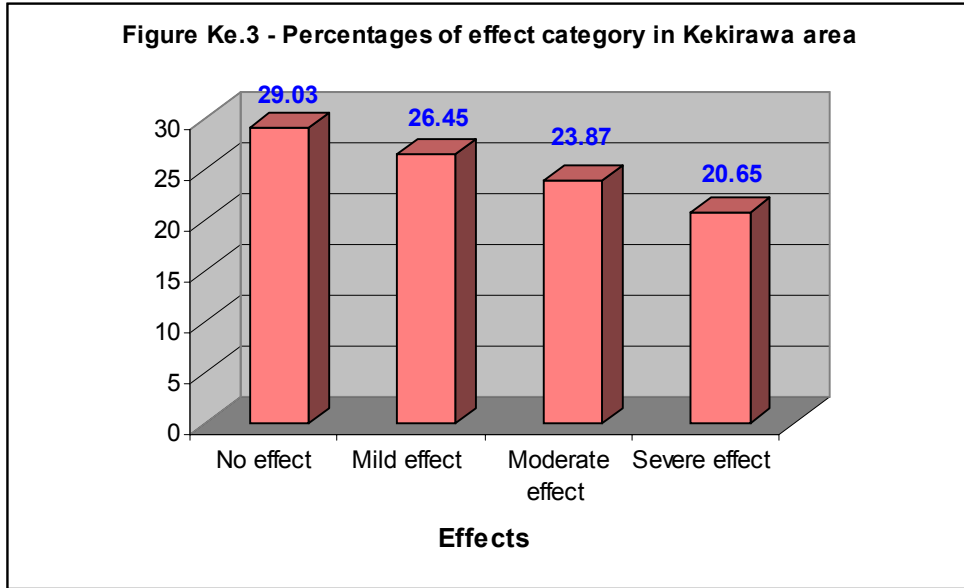


Out of 97 spray sessions 44 are insecticides, 5 are Fungicides, 47 are Weedicides, and 1 are other category. These are shown in Figure Ke.2

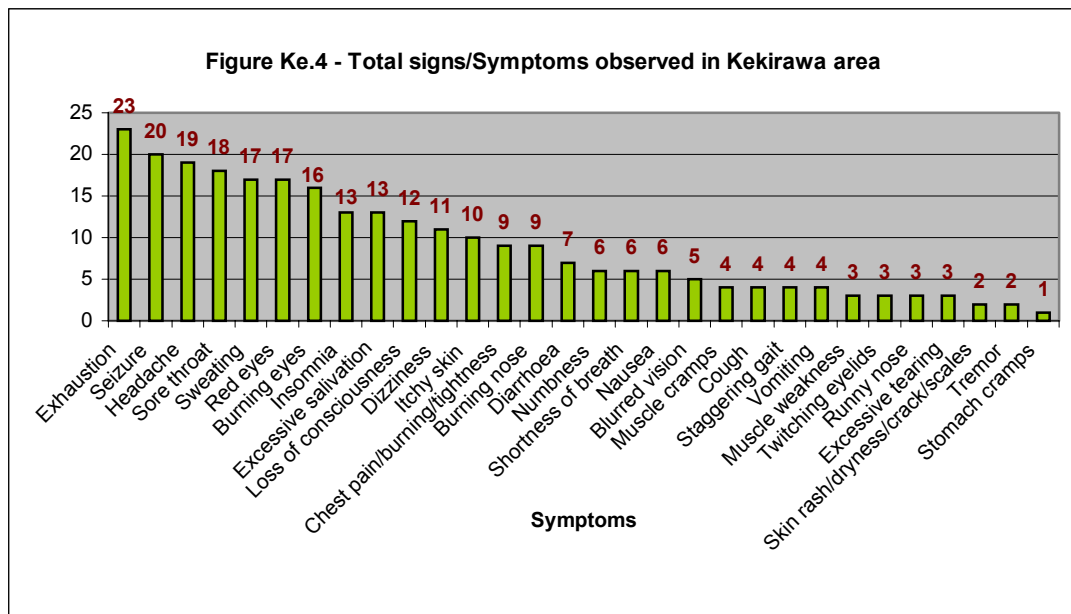
Figure Ke.2 - Percentages of each category of Pesticides used in Kekirawa area



In 41 sessions they have had mild effects, in 37 sessions moderate effects, in 45 sessions no effect and 32 sessions severe effects. Figure Ke.3 illustrate these results in a graphically.



The total number of signs/symptoms observed in Kekirawa area in this study is 270. Exhaustion has been observed in 23 times followed by headache, sore throat and sweating. Total signs/symptoms observed are given in Figure Ke.4



7. Overall Results

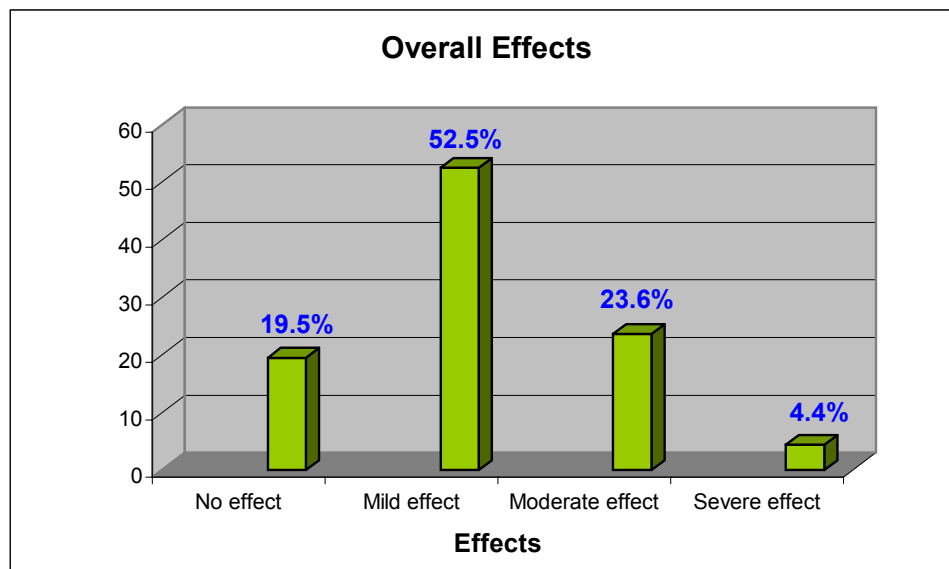
Table Number 3 shows the number of spray sessions in each category in each site. Percentages are given in parentheses. Maximum number of effects was found in mild category that is 52.5%. Next highest is no effect category that is 23.6%. Moderate effect category shows 19.5% and severe effects have been recorded in only 4.4% sessions out of 1711 sessions through out the whole study. According to these results majority of farmers have experienced mild effects after spraying of pesticides.

Figure 1 shows these results in a graphical diagram.

Table 3: Number of Spray sessions in each category

Site	No effect	Mild effect	Moderate effect	Severe effect	Total
Moneragala	85 (13.8)	365 (59.3)	152 (24.7)	13(2.1)	615
Wellavaya	151 (36.5)	188 (45.4)	63 (15.2)	12(2.9)	414
Thanthirimale	2 (1.2)	113 (67.7)	45 (26.9)	7 (4.2)	167
Kantale	24 (14.3)	99 (58.9)	34 (20.2)	11 (6.5)	168
Sevanagala	27 (14.1)	92 (47.9)	73 (38.0)	0 (0)	192
Kekirawa	45 (29.0)	41 (26.5)	37 (23.9)	32 (20.6)	155
Total	334 (19.5)	898 (52.5)	404 (23.6)	75 (4.4)	1711

Figure 1 : Percentages of effect categories in overall study



The pesticides used by the farmers & their category (Insecticides –I, Fungicides –F, Weedicides –W, Other-O) are given in table 4. Number of Pesticides used by the farmers in this study is 47. Out of these 25 are insecticides, 8 are Fungicides, 7 are Weedicides and 7 are other category.

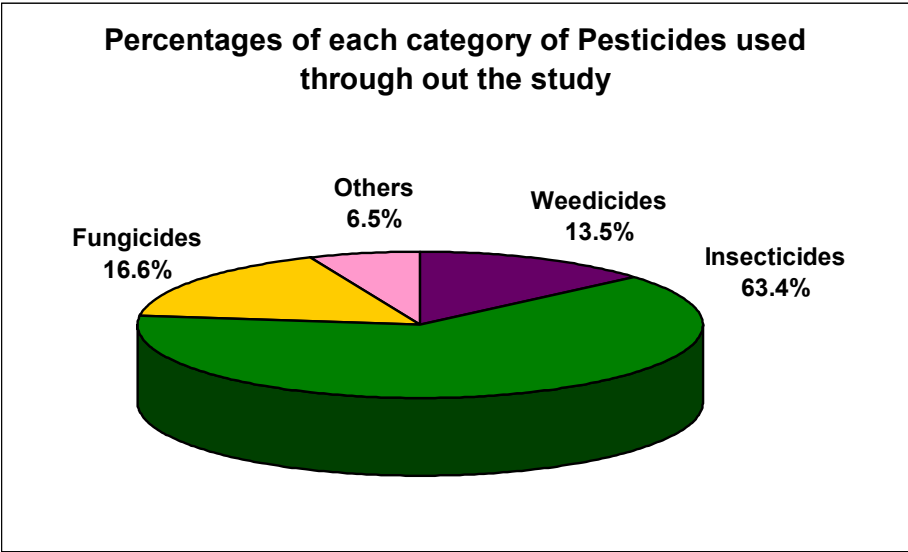
Table 4 : Pesticides sprayed by the farmers and their categories

Pesticide	Category
chlorpyrifos	I
dimethoate	I
fenthion	I
Mancozeb	F
etofenprox	I
MCPA	W
propanil	W
sulfur	I
propineb	F
maneb	F
coc	F
tebuconazole	F
paraquat	W
imidacloprid	I
carbosulfan	I
quinalphos	I
bispyribac sodium	W
glyphosate	W
phenthoate	I
captan	F
profenofos	I
chlofluzuron	O
pyrimiphos methyl	I
deltamethrin	O
fenoxaprop-p-ethyl	W

Pesticide	Category
prothiofos	I
fenvalerate	O
methomyl	O
acetamaprid	I
tebufenozide	O
thiodicarb	I
carbaryl	I
tridemorph	O
edifenphos	O
benomyl	I
acephate	I
oxadiazon	W
fenobucarb	I
carbendazim	F
diazinon	I
carbofuran	F
malathion	I
permethrin	I
fipronil	I
esfenvalerate	I
monocrotophos	I
Mixtures	I

Figure 2 shows break down of pesticides used in the whole study. Out of 1711 spray sessions 952 were Insecticides, 249 were Fungicides, 204 were Weedicides and 98 were other pesticides. These results indicate that insecticides were used in the highest number of spray sessions seconded by fungicides in this study.

Figure 2:



The above overall results were obtained from the collective data of six sites

Conclusions

Following conclusions could be obtained from the result of this study

- ★ The majority of the farmers (52.5%) spraying pesticides feel mild acute poisoning Signs/Symptoms within 24 hours after pesticide application.
- ★ Considerate amount of farmers (19.5%) do not feel any active poisoning Signs/Symptoms after application of pesticides.
- ★ Very small amount of farmers (4.4%) felt 1 active poisoning Signs /Symptoms.

Recommendation

Action must be taken to remove from market all banned pesticides in Sri Lanka.