

# AFRICA

## STOCKPILES PROGRAMME

### AN ASSESSMENT OF THE PESTICIDE USE, PRACTICE AND HAZARDS IN THE ETHIOPIAN RIFT VALLEY

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# INTRODUCTION

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- ✦ Even if pesticides are created to kill
- ✦ Even if they affect human health and pollute the environments
- ✦ We are obliged to use them
  - ◆ loss due to pests in some years was estimated to reach between 30 and 40% annually.

## INTRODUCTION...

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- ✦ Although chemical pesticide use in Ethiopia was historically low,
- recent developments in increased **food production** and expansion in **floriculture industry** have resulted in higher consumption of chemical pesticides.



# OBJECTIVES

## ✦ General Objective

- To assess the pesticide use, practice and hazards to the small holder farmers in the Ethiopian Rift Valley.

## ✦ Specific Objectives

- To assess the **pesticide utilization practices** of the farmers in Ziway and Arsi Negele
- To assess the pesticide related **knowledge** and **perception** of farmers in Ziway and Arsi Negele
- To Assess the pesticide use and related **public health** and **environmental effects**

# METHODOLOGY

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## ✦ Training of high school Environment club students

- A total of 70 students (40 from Ziway and 30 from Arsi Negele) were registered to participate in the training and carry out the local surveys.
- Their club leader **teachers** (two from each high school) were also included to make the training more effective.



## Survey

### ✦ Study Setting

- A **cross-sectional study** was conducted in 23 villages of the two Weredas of the Great Rift Valley of Ethiopia namely, Ziway and Arsi Negle from September to December 2007.

### ✦ Climate

- The two Weredas are characterized by a **semi-arid to sub-humid climate**

### ✦ Vegetation

- ✦ The vegetation in the rift valley is mainly characterized by **Acacia open woodland**

# Survey...

## ✦ Lakes

- The two Weredas are characterized by four lakes namely Lake Ziway, Lake Langano, Lake Abjata and Lake Shalla.

## ✦ Birds and other wildlife

- Over four hundred species of birds have been registered in the area
- The bird species include Ostrich, Imperial Eagle, Lesser Kestrel and wattled Crane.
- Other wildlife includes Greater Kudu, Grant's gazelle, Warthog, Klipspringer and Jackal.



## Study Population

### \* Sample Size

- The Source population included farmers in Ziway and Arsi Negele.
- The number of farmers to be included in the study (participants) was determined using **single population proportion formula**.
- $n = \frac{(Z_{\alpha/2})^2 p (1-p)}{d^2}$

### \* Where,

$(Z_{\alpha/2}) =$  Reliability coefficient = 1.96

n = Sample size

p = 50% this is because similar studies were difficult to find

d = assumed marginal error (5%)

10% non-response rate was added

Therefore the final **sample size was 422 farmers** of which 211 were from Ziway and the rest 211 were from Arsi Negele.



# Sampling Procedures

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- ✦ After selecting the two woredas (Ziway and Arsi Negele), it was decided conveniently to take 50% of the samples from each.
- ✦ **Random sampling technique** was, therefore, used to select 10 farmer villages from Ziway and 13 farmer villages from Arsi Negele.
- ✦ Households were also selected randomly and the intended data from 422 households was collected from the 23 farmer villages of Ziway and Arsi Negele.



# Data collection

## ✦ Data Collection tools

- A semi-structured questionnaire was developed by referring different literatures and modifying according to the objectives of this study
- The questionnaire was first developed in English.
- For the data collection, it was translated in to Oromifa (a local Language) and back to English for data entry.
- ✦ Fifty youth were selected from the 70 trained students and the four teachers were taken as supervisors of the data collection
- ✦ The selected data collectors and supervisors were trained for two days on the concepts and contents of the questionnaire, ethical considerations, instruction of the questionnaire, data collection procedure and coding.

## Ethical consideration and Data collection procedure

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- ✦ The selected villages were contacted with a **formal letter** written from ISD and asked for permission to continue the data collection.
- ✦ The study participants were also asked for **verbal consent**.
- ✦ Data was collected after their full consent and their **confidentiality** was kept by not mentioning their names in any communications.

# Data Processing

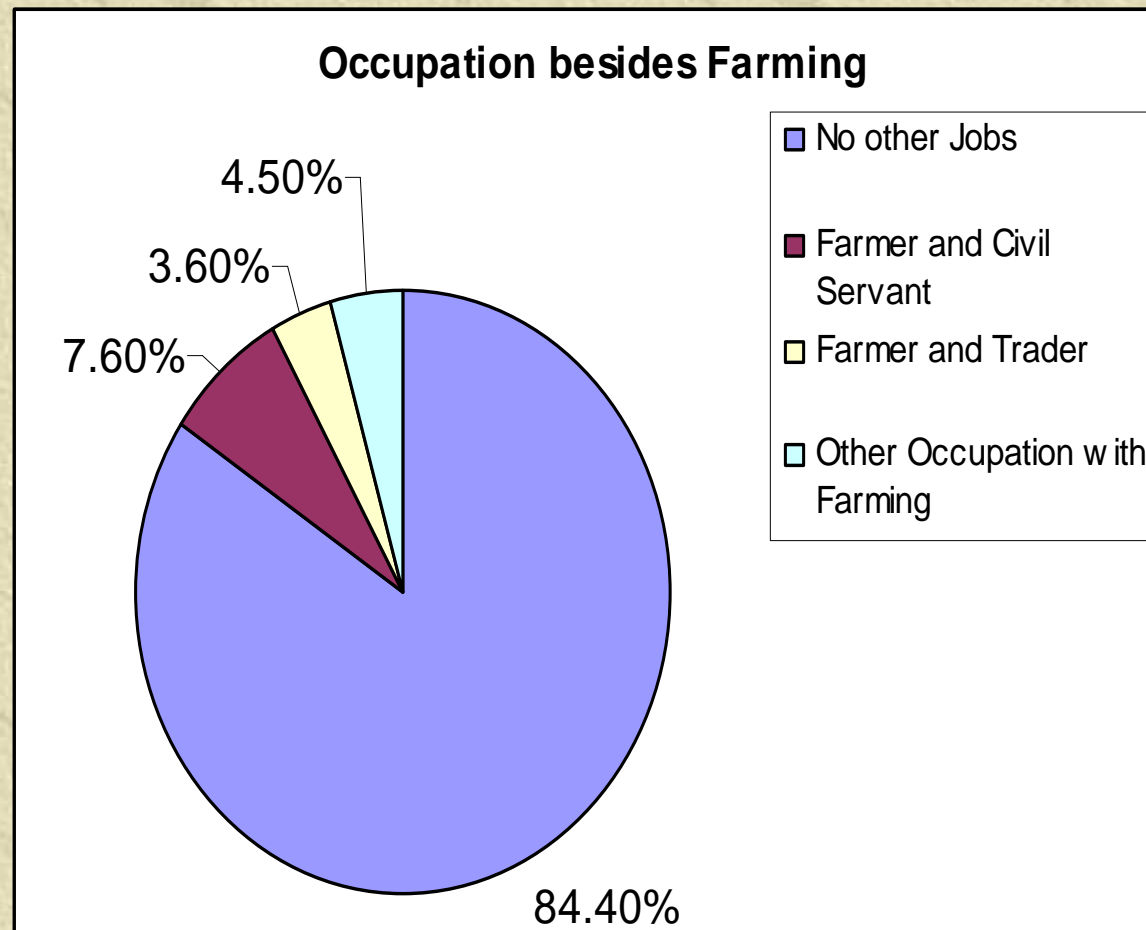
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- ✦ Data were entered in to **EPI info** software version 6 and data analysis was conducted with **SPSS** software version 11 for windows.
  - ✦ **Frequency distribution** and **percentages** were used to describe the findings according to each specific objective.

## RESULT & Discussion

**Table 1. Socio-demographic characteristics of farmers in Ziway and Arsi Negele, 2007**

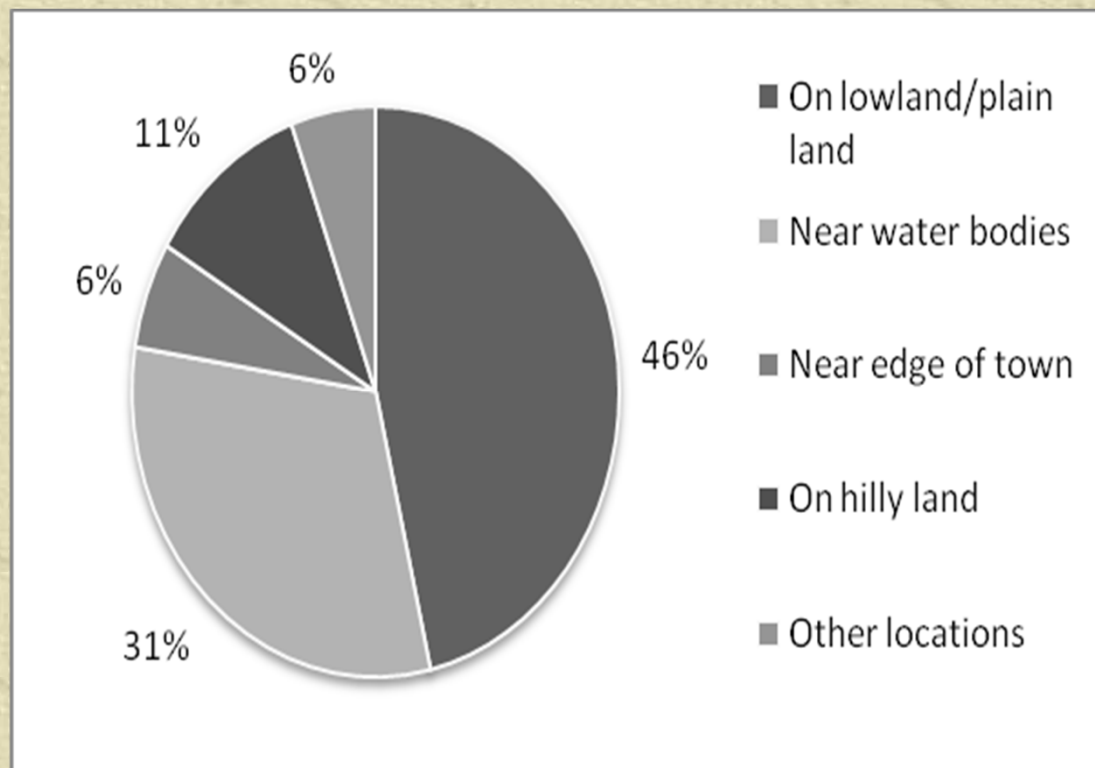
No.	Variables	Frequency	Percent
1	Sex		
	Male	347	82.2
	Female	75	17.8
2	Head of the family	392	92.9
3	Can read and write	234	55.5
4	Highest level of Education		
	Elementary	116	27.4
	Grade 7-9	98	23.3
	Higher education	14	3.3

# Other occupation of farmers

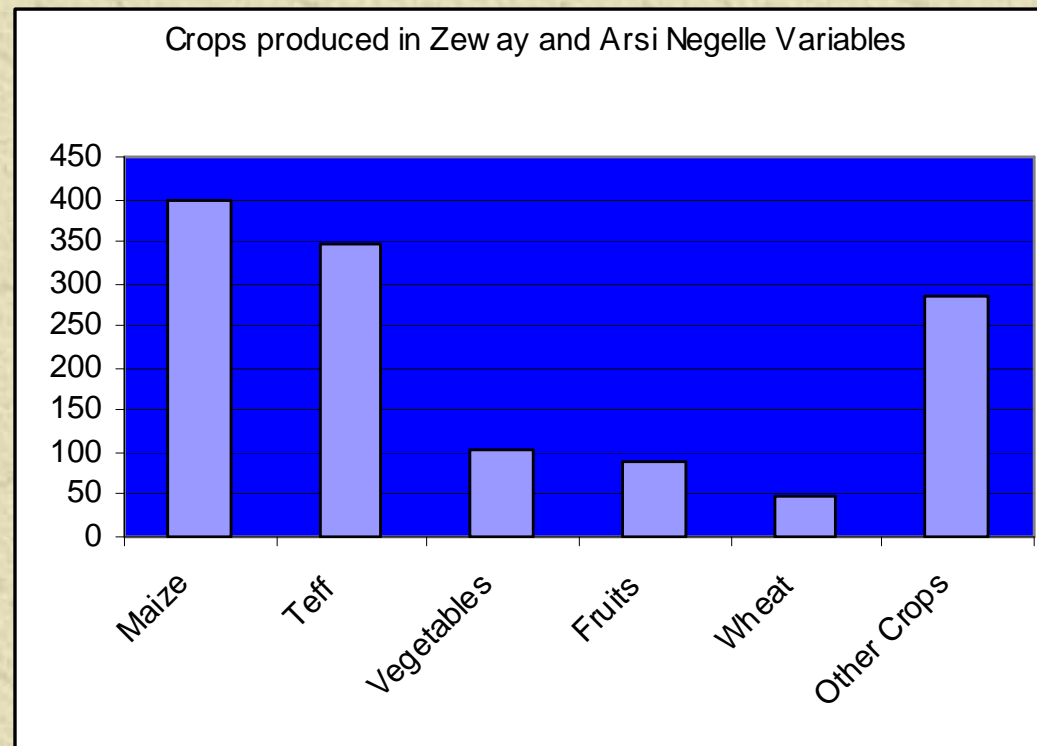
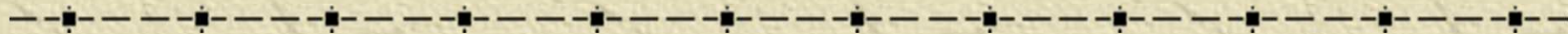




## Location of farm land



# Crops produced



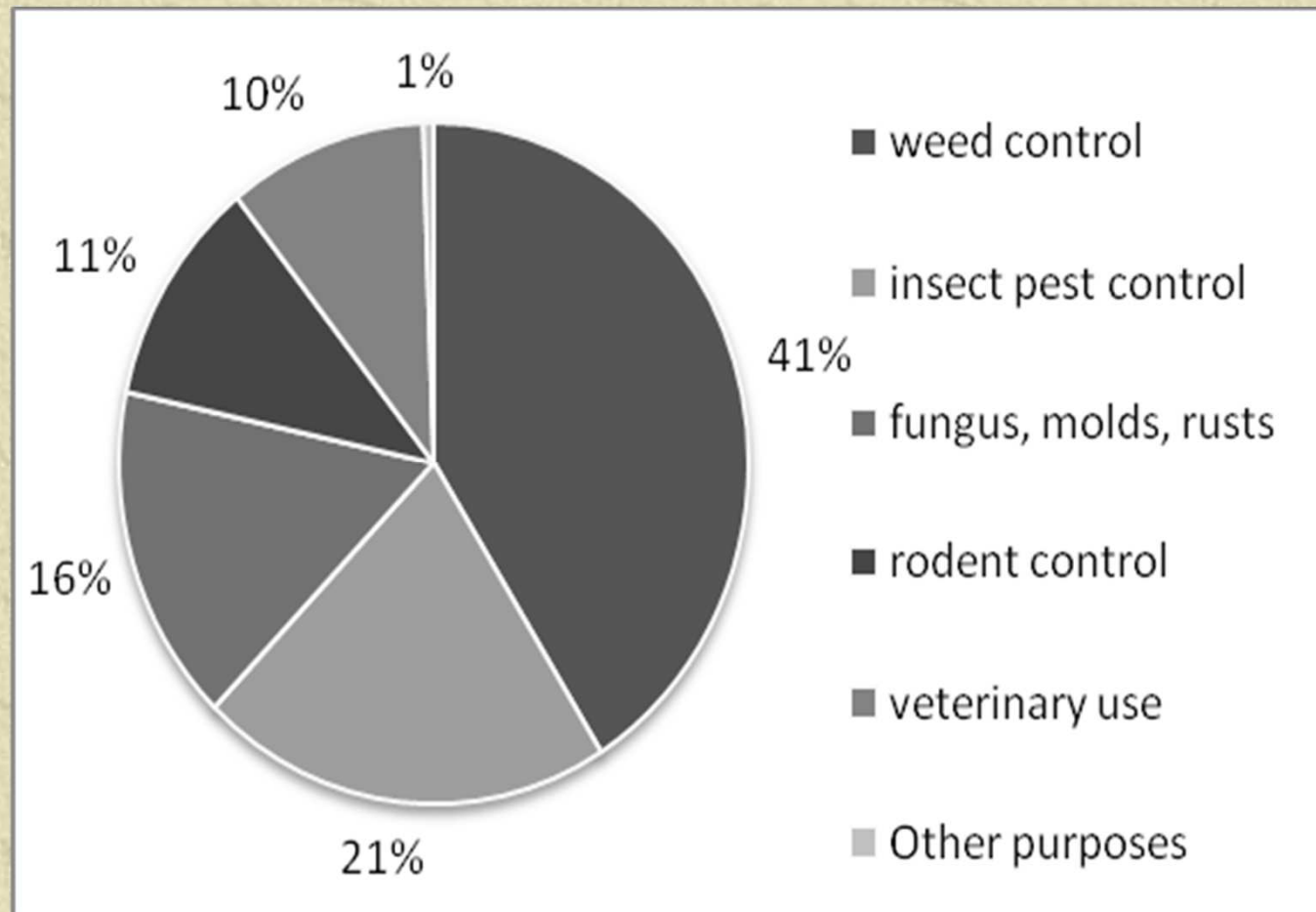


## Pesticide utilization

Table 2. Table showing Pesticides used by farmers in Ziway and Arsi Negele, 2007

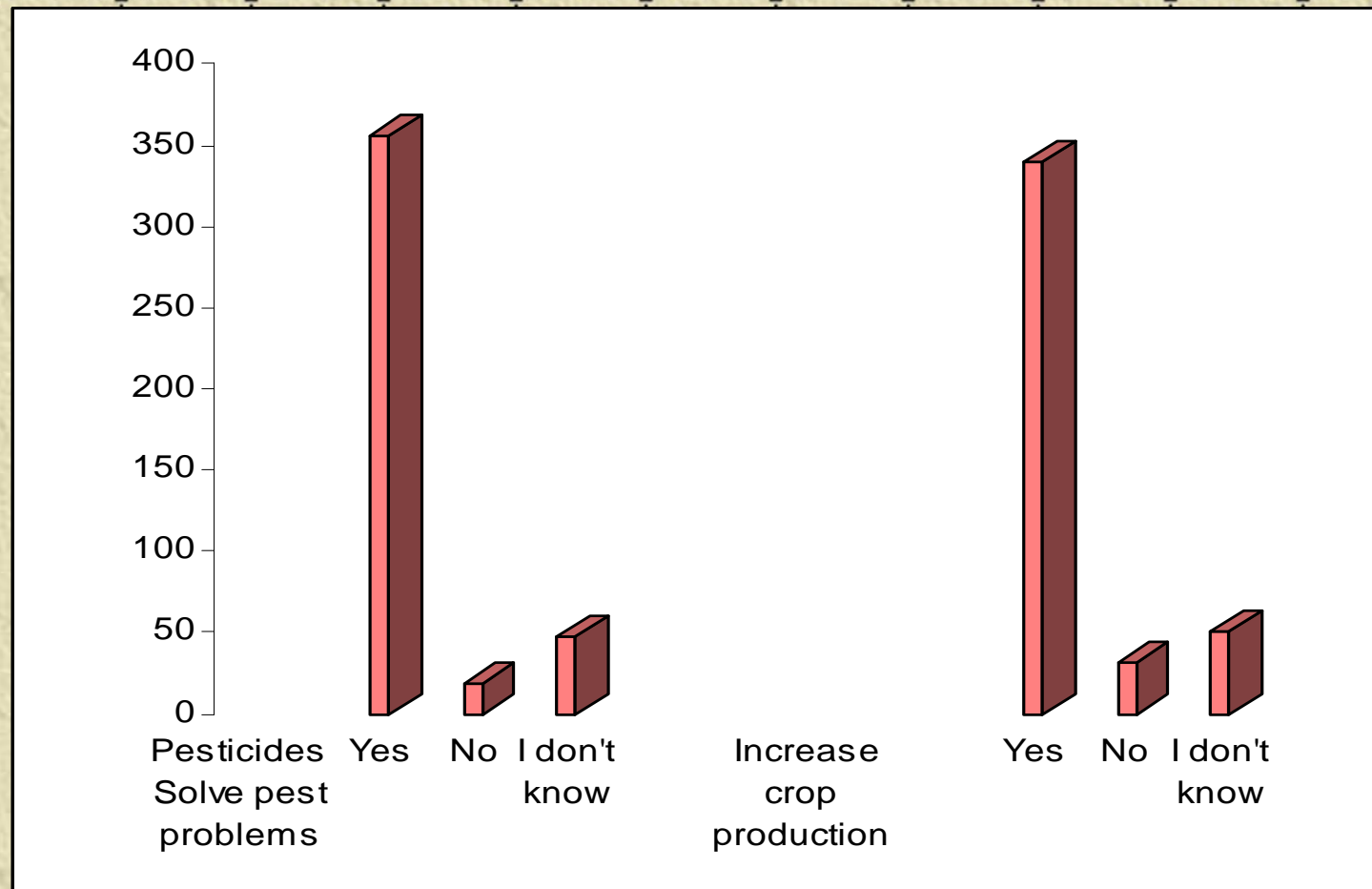
No.	Pesticide used by farmers	Frequency	Percent
1.	2,4-D	193	45.7
<b>2.</b>	<b>DDT</b>	<b>121</b>	<b>28.7</b>
3.	Malathion	41	9.7
4.	Selecron	8	1.8
5.	Thionex	7	1.7
6.	Mancozeb	5	1.2
7.	Ridomil	3	0.7

# Pesticide practices of farmers





## Perceived benefits of pesticides



**Table 3. Table indicating pesticide sprayers, in Ziway and Arsi Negele, 2007**

N o	Variables	Frequency	Percent
1	<b>Pesticide sprayer</b>		
	Father	189	44.8
	Mother	8	1.9
	Son	57	13.5
	Daughter	3	0.7
	Hired Labor	160	37.9
	Other	5	1.2

# Using protective devices

✦ None



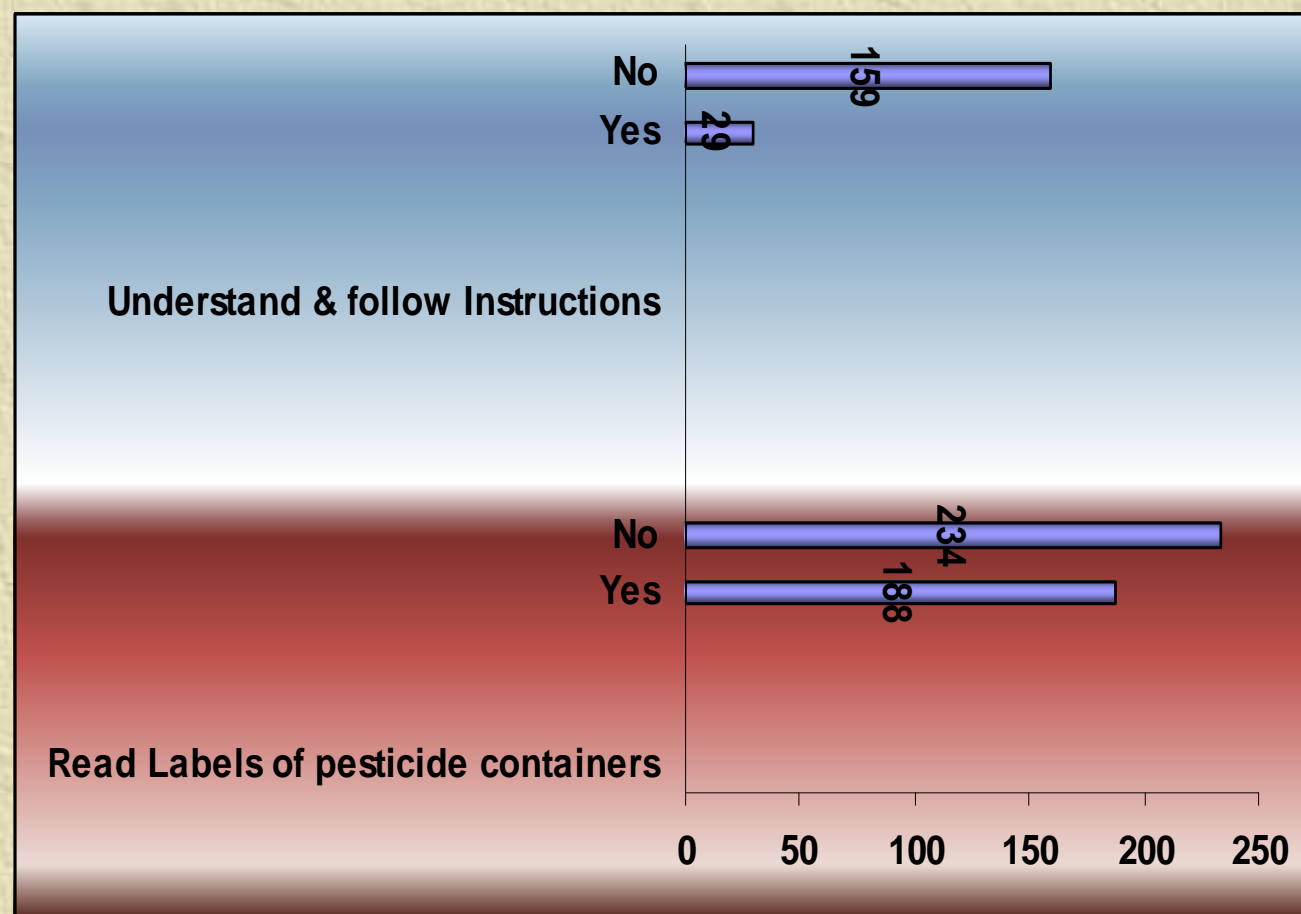
# Training

✦ Nearly no proper training for farmers

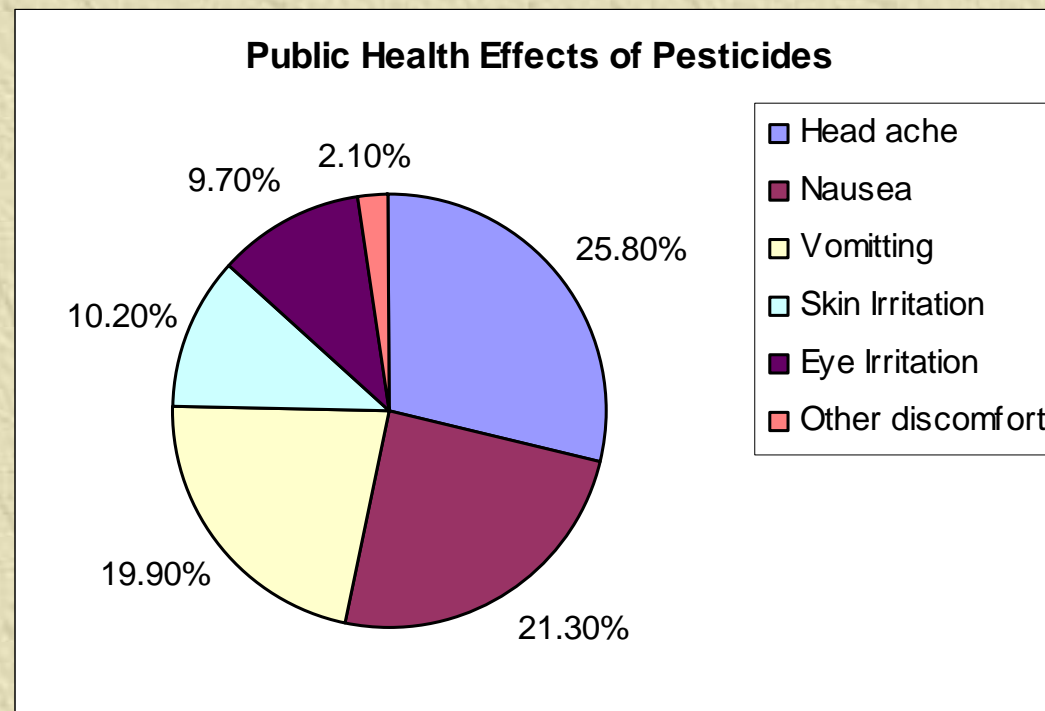




## Reading labels on pesticide containers, understanding and following instructions

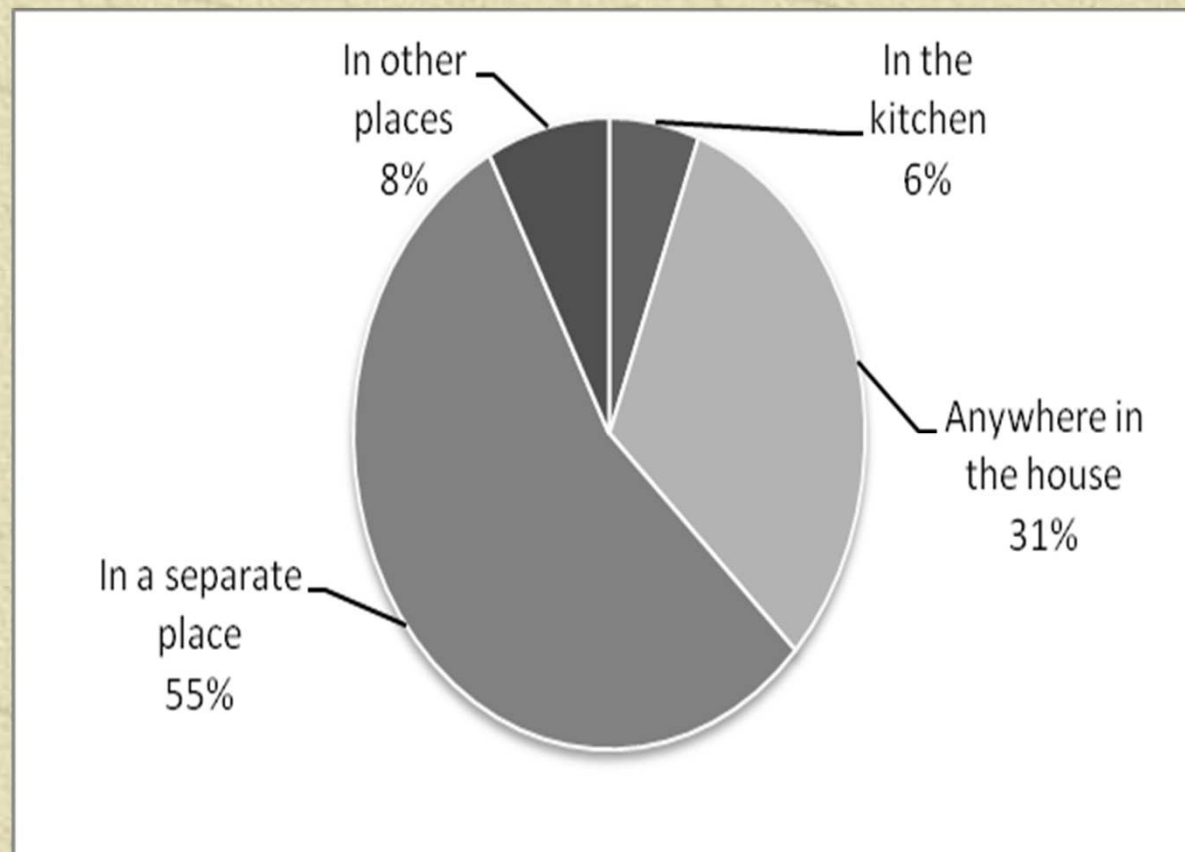


## Public health effects of pesticides

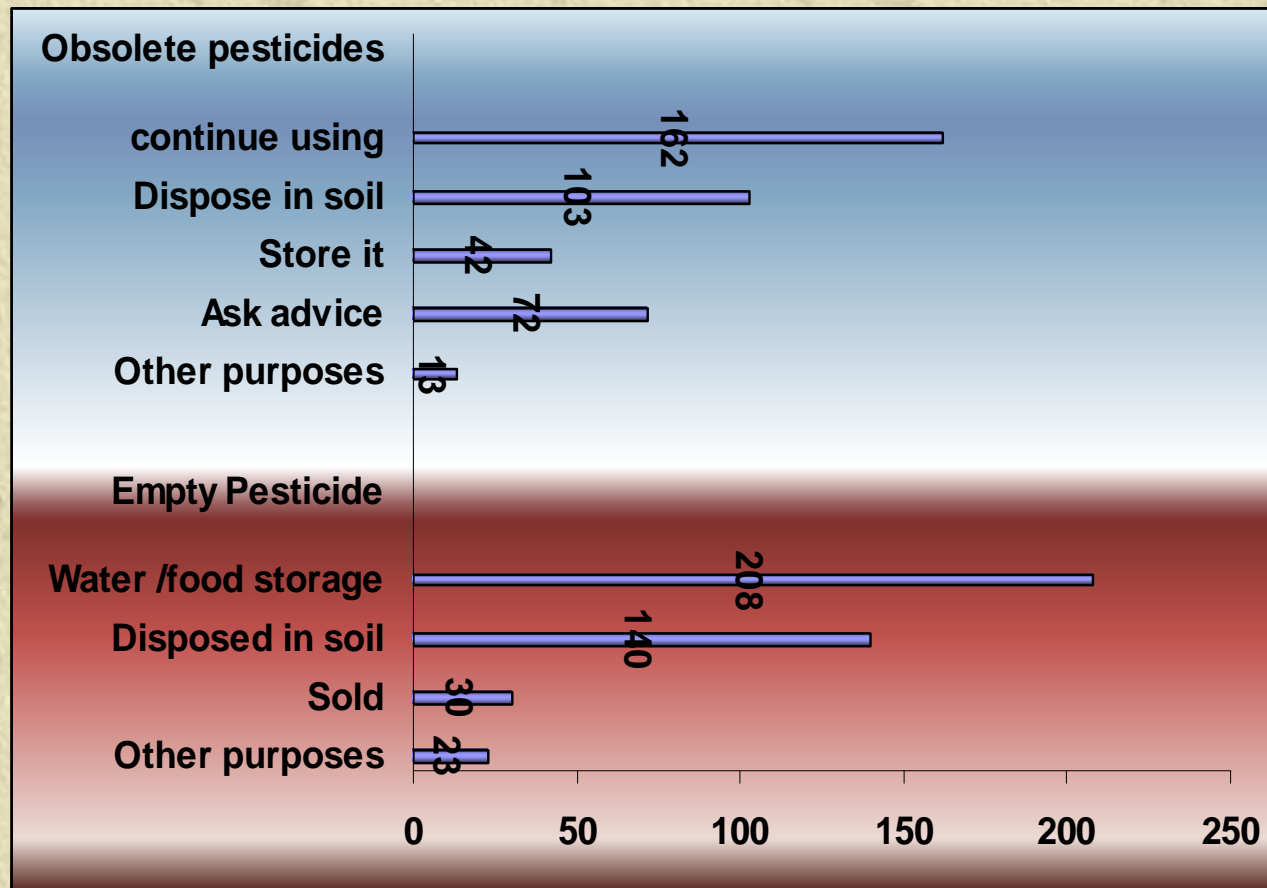




# How pesticides are stored



## Empty pesticide container and obsolete pesticide management



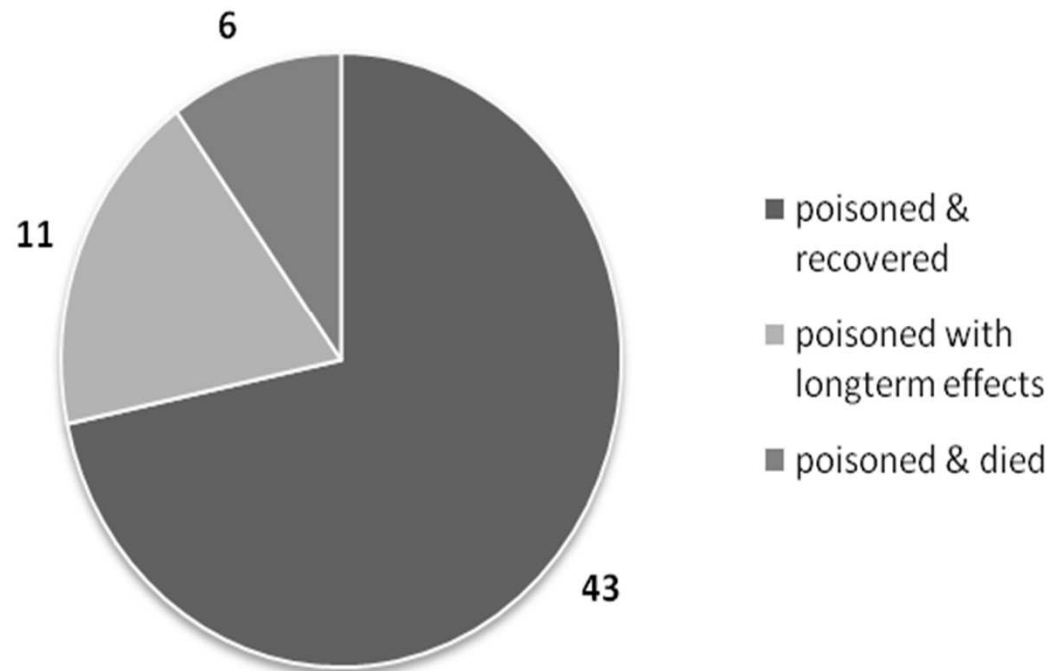


## Farmers Perception

No	Variables	Frequency	Percent
1.	Farmers perception about pesticides		
	Always good	148	35.1
	Some times good	102	24.2
	Always harmful	2	0.5
	Sometimes harmful	146	34.6
	Useless/not effective	3	0.7
	Don't know	20	4.7
	Other	1	0.2
3	Perception of farmers on possibility of protecting pesticide hazards		
	Yes, pesticide hazards can be protected	197	46.7
	No, we can not protect pesticide hazards	47	11.1
	Don't Know if it is possible to protect pesticide hazards	178	42.2

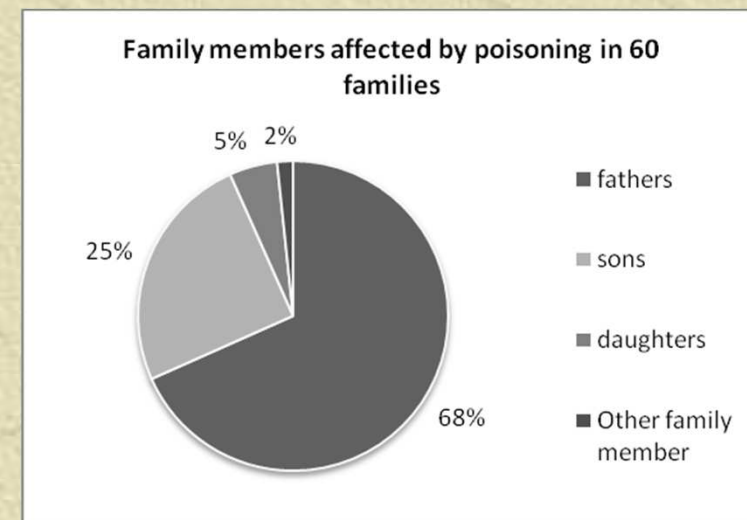
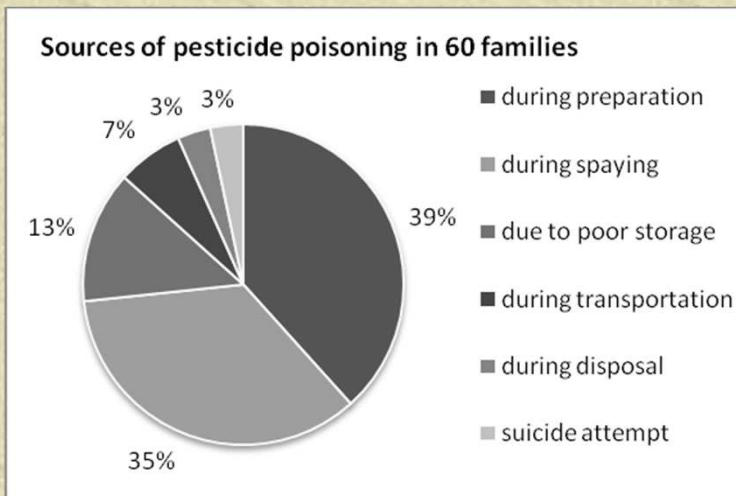
## Family pesticide poisoning incident

Impact of pesticide poisoning in 60 families





## Causes of pesticide incidents and affected family members



## Application of different pesticides

No.	Variables	Frequency	Percent
<b>1.</b>	<b>Dust application</b>		
	With hands	72	17.1
	Using powder sack	75	17.8
	From a can or plastic tub	63	14.9
	Using mechanical device	83	19.7
	Mixed	12	2.8
<b>2.</b>	<b>Granule application</b>		
	With hands	52	12.3
	From a container (can/tub)	96	22.7
	Using mechanical device	112	26.5
	Mixed	2	0.7



## Application...

<b>3.</b>	<b>Liquid application</b>		
	From a bottle	46	10.9
	From a spinning disk applicator	8	1.9
	From a backpack sprayer	312	73.9
	From a vehicle mounted sprayer	20	4.7
	From a bucket	16	3.8
	Other	2	0.5

# Place of Mixing

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<b>4.</b>	<b>Place of mixing pesticides</b>		
	<b>Near community water sources</b>	<b>30</b>	<b>7.1</b>
	<b>Near a lake</b>	<b>42</b>	<b>10.0</b>
	<b>Near a river</b>	<b>26</b>	<b>6.2</b>
	<b>At home</b>	<b>34</b>	<b>8.1</b>
	<b>In the field</b>	<b>278</b>	<b>65.9</b>
	<b>Other</b>	<b>2</b>	<b>0.5</b>



**Table 6. A table showing the changes in pest population in Ziway and Arsi Negele, 2007**

No.	Variables	Frequency	Percent
<b>1.</b>	<b>Weeds in the last two years</b>		
	Increase	87	20.6
	Decrease	285	67.5
	No Change	25	5.9
	Don't know	25	5.9
<b>2.</b>	<b>Insect pests in the last two years</b>		
	Increase	40	9.5
	Decrease	257	60.9
	No Change	35	8.3
	Don't know	90	21.3

## Table 6. Cntd...

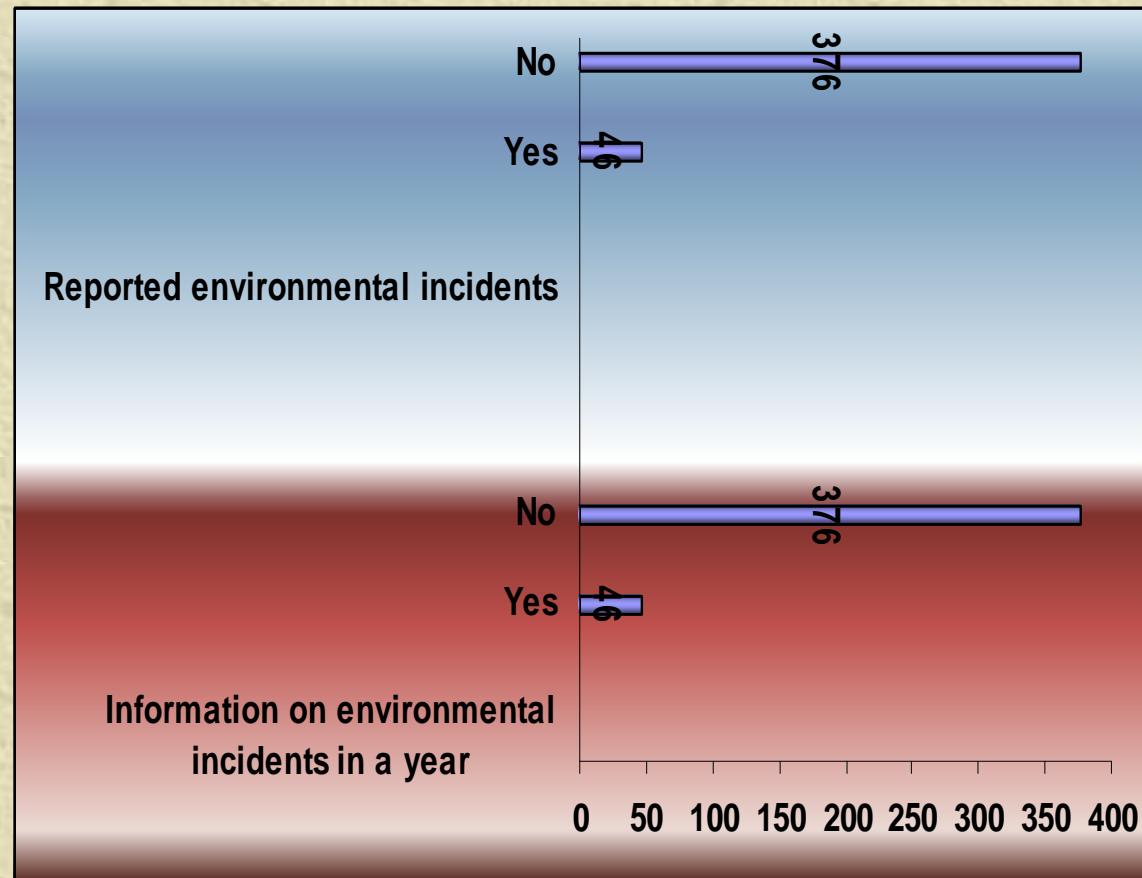
<b>3.</b>	<b>Mosquitoes in the last two years</b>		
	Increase	55	13.0
	<b>Decrease</b>	<b>218</b>	<b>51.7</b>
	No Change	41	9.7
	Don't know	108	25.6
<b>4.</b>	<b>Spiders in the last two years</b>		
	Increase	27	6.4
	<b>Decrease</b>	<b>170</b>	<b>40.3</b>
	No Change	37	8.8
	Don't know	188	44.5



## Table 6. Cntd...

<b>5.</b>	<b>Bees in the last two years</b>		
	Increase	40	9.5
	<b>Decrease</b>	<b>242</b>	<b>57.3</b>
	No Change	19	4.5
	Don't know	121	28.7
<b>6.</b>	<b>Other pollinators in the last two years</b>		
	Increase	32	7.6
	<b>Decrease</b>	<b>159</b>	<b>37.7</b>
	No Change	24	5.7
	Don't know	207	49.1

## Environmental incidents and reporting



## *A case study material*

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- ✦ One of the teachers said that he was mixing maize with pesticides for protecting weevils. He was doing the mixing without protective equipment. He said he was unconscious for some time (he doesn't know how long) and he recovered because of the help of his family. He didn't realize that it could be pesticide poisoning until he got this training.
  - ✦ One of the trainee students also said that he knew a farmer who used Malathion to treat ecto-parasites of his cattle and lost 9 of them at once
  - ✦ The student data collectors were also confronted by farmers when they were explaining about the hazards of using DDT for agriculture.
  - ✦ It was also mentioned that some elderly people in remote areas of Alaba (southern Ethiopia) used to drink cups of DDT for malaria prevention.

## Strength and Limitation of the study

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### ✦ Strength

- The involvement of school environment club members

### ✦ Limitations

- it was difficult to get similar studies in the area to be used for comparison.
- It would have been better if it were also supported by a laboratory based analysis



## CONCLUSION

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- ✦ The environmental and public health impacts being caused by improper utilization of pesticides is very serious
  - ✦ The underlying cause for this could be the dispersed (uncoordinated) efforts being done by governmental and non-governmental organization at the grass roots level.

## Recommendation

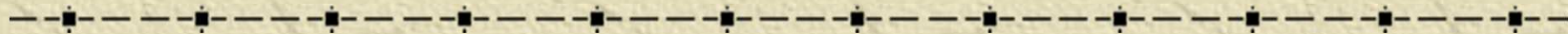
✦ Based on the study findings the following are recommended.

- There should be a clear **mechanism of working** and **chain of communication** between the Ministry of Health, Ministry of Agriculture and Environmental Protection Authority from the grass roots to the Federal level.



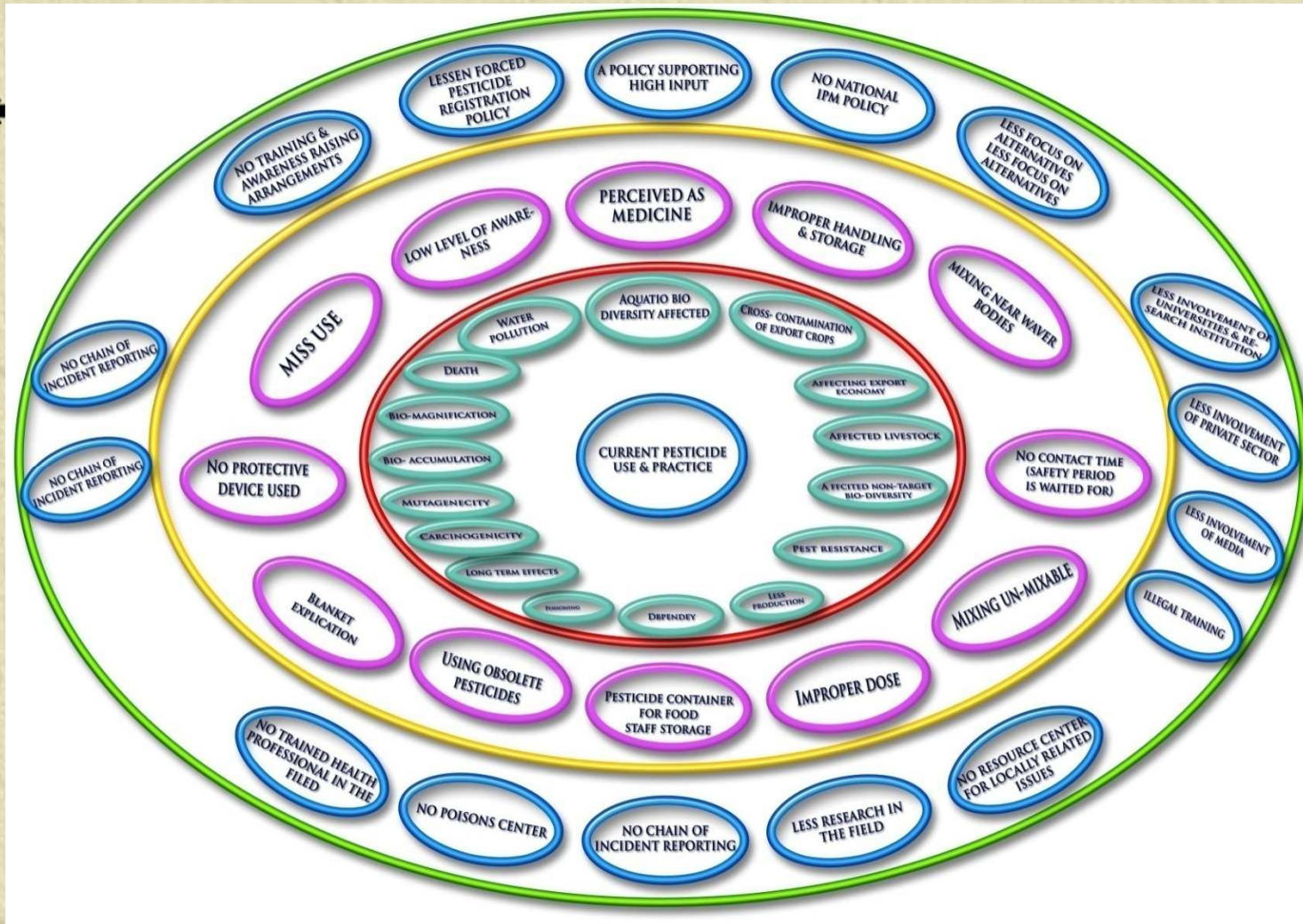


## Recommendation...



- A **laboratory based study** (residual analysis) is recommended so that the extent of pesticide damage on public health and the environment could be confirmed and a better mitigation mechanism can be developed.
- There should be an **integrated effort** from governmental and non-governmental organizations that focuses on the awareness raising of farmers on proper pesticide management and related issues-PSA as example.

## Current Pesticide Use and Practice



# AFRICA

## STOCKPILES PROGRAMME

### Envisioned system-wide pesticide Stewardship

