AWARENESS AND PRACTICE OF USING PESTICIDES IN VEGETABLES BY THE FARMERS OF BHIMDATTA MUNICIPALITY

By:

Deependra Dhami

Exam Roll No: 28710231

T.U Registration No: 9-2-263-310-2010

AThesis

Submitted to Health and Population Education Departmentin

Partial Fulfillment for the Requirements of Master Degree in Health Education

CENTRAL DEPARTMENT OF EDUCATION

UNIVERSITY CAMPUS

TRIBHUVAN UNIVERSITY

KIRTIPUR, KATHMANDU

December, 2018

त्रिभुवन विश्वविद्यालय
शिक्षाशास्त्र संकाय
स्वास्थ्य तथा जनसङ्ख्या शिक्षा विभाग

TRIBHUVAN UNIVERSITY
FACULTY OF EDUCATION
Health & Population Education Department

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल
फोन नं. ४३३१३३७
UNIVERSITY CAMPUS
Kirtipur, Kathmandu
Tel: 4331337

पत्र संख्या/Ref.

मिति/Date: .....

RECOMMENDATION LETTER

ThisthesisworkentitledAwareness and Practice of Using Pesticides in Vegetables by the Farmers of Bhimdatta Municipalityby**Deependra Dhami** hasbeenprepared undermyguidanceandsupervisioninpartialfulfillmentfortherequirementof Master's Degree in Health Education. Therefore, I recommend this thesis for the final evaluation and viva voce.

Date: 16 Dec., 2018

Dr. Bhagwan Aryal
(Supervisor)
Department of Health and Population Education
University Campus
Kirtipur, Kathmandu

त्रिभुवन विश्वविद्यालय
शिक्षाशास्त्र संकाय
स्वास्थ्य तथा जनसङ्ख्या शिक्षा विभाग

TRIBHUVAN UNIVERSITY
FACULTY OF EDUCATION
Health & Population Education Department

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल
फोन नं. ४३३१३३७
UNIVERSITY CAMPUS
Kirtipur, Kathmandu
Tel: 4331337

पत्र संख्या/Ref.

मिति/Date: .....

APPROVAL SHEET

Thisthesisworkentitled**Awareness and Practice of Using Pesticides in Vegetables by the Farmers of Bhimdatta Municipality**by **Deependra Dhami**in partial fulfillment for the requirements of Master's Degree in Health Education has been accepted and approved.

Thesis Evaluation Committee	**Signature**
Prof. Krishna Prasad Acharya, Head Healthand Population Education Department, Tribhuvan University, Kirtipur	..... (Chairperson)
Dr. Bhagwan Aryal, Lecturer Health and Population Education Department Tribhuvan University, Kirtipur	..... (Supervisor)
Mr. Om Bahadur Rayamajhi, Reader Sanothimi Campus, Bhaktapur	…….. (External)

Viva Date: 25 Dec., 2018

DECLARATION

I hereby declare that to the best my knowledge this thesis is my original work, and it hasnot beensubmitted for the candidature of researchdegree to anyuniversity, college or educational institution. The subject matter presented in this thesis report is the result of my own work.

Date: 16 Dec., 2018 _____

Deependra Dhami

ACKNOWLEDGEMENTS

Iwouldliketoexpressspecialappreciationandthankstomythesissupervisor Bhagawan Aryal,whohasbeenatremendousmentorforme.Iwouldliketo thank him for encouraging my research and for allowing me to grow as a researcher. His advice on both research as well as on my career have been priceless.

I would like to express my great appreciation tothe head of the Department Prof. Krishna Prasad Acharya for his valuable suggestion during this research work.

IwouldespeciallyliketothankalltherespondentsofBhimdatta Municipality, Ward No. 18of ……. district who were provided authentic information regarding pesticide use when I collected data for my thesis.

WordscannotexpresshowgratefulIamtomymotherandfatherforallofthe sacrifices that they have made on my behalf. Their prayer for me was what sustained me thus far. I would also like to thank all of my friends who supported me in writing and incented me to strive towards my goal.

Last but not the least, I would like to thank my colleagues for their valuable support and comments and kind co-operation during the study.

Deependra Dhami

ABSTRACT

Thepresentstudyentitled**Awareness and Practice of Using Pesticides in Vegetables by the Farmers of Bhimdatta Municipality**was based upon the 114 farmers astheparticipantsofBhimdatta Municipality-18 of …..district.Theobjectivesof this were to find out awareness level about pesticides application on vegetable, to find out the process and procedure s of conducting awareness, raising programme among the farmers by local authority and to identify the situation of the pesticide use practice in vegetable.Thestudyfollowed descriptive as well as analytical research design. Interview schedule and observation check list were used as tool of the study. The required data and information were collected by taking an interview with the participants by the use of interview schedule by the researcher herself. Researcher was himself made observation checklist for the approval of respondents' interview. The studywasentirelybasedonprimarysourceofdata.Thedatawereanalyzedand interpreted manually, whichhas been presented in the form of tables and figures with respective frequency and percentages.

Level of awareness about pesticide user was found very poor as they used to sell and eat vegetables after one to 4 days period of pesticide application, 57.01 percent respondents were not applied personal protective equipment (PPE), 12.28 respondents were prepared pesticide solution. Nepal is a developing country where people are learning by doing. 83.33 percent respondents were aware regarding the pesticide use in vegetables by district agricultural office as it was conducted programme. So as to make people aware and 16.66 percent respondents were aware other source such as radio, T.V. and fellow farmer. 40 respondents were having IPM knowledge but only 20 respondents were applied it practically, the main reason behind of not using IPM technique was lack of knowledge by 61.40 percent, 17.54 percent were not used it is because pesticides were cheap than that technique. The situation of pesticides was in miserable condition because, pesticides has been using massively in agro-farming. Over use or non-use of it has several acute and chronic adverse health consequences.

Although, Government of Nepal has implemented IPM programme in order to minimize the use of chemicals and pesticides throughout the country, however, farmers misuse or over use pesticides is an agricultural sector. It is because, government does not provide any help and subsidies, if it provides there is lengthy

and boring way to reach to it. On the another hand programmes regarding pesticides ill and hazards on human health. Limited information to them regarding pesticides exposure without precautions to human body and legal provision of any kind of suffering of such types of vegetables they sell within interval time of pesticide application.

TABLE OF CONTENTS

		Page No.
DECLARATION		i
RECOMMENDATION LETTER		i
APPROVAL SHEET		ii
ACKNOWLEDGEMENTS		iii
ABSTRACT		v
TABLE OF CONTENTS		vii
LIST OF TABLES		x
LIST OF FIGURES		xi
CHAPTER - I:	**INTRODUCTION**	**1**
1.1	Background of the study	1
1.2	Statement of the problem	2
1.3	Objective of the study	3
1.4	Significance of the study	3
1.5	Delimitations of the study	4
1.6	Definition of the terms used	4
CHAPTER-II:	**REVIEW OF THE RELATED LITERATURE**	**5**
2.1	Theoretical literature	5
2.2	Empirical literature review	7
2.3	Implication of review for the study	9
2.4	Conceptual framework of the study	10
CHAPTER-III:	**RESEARCH METHODOLOGY**	**12**
3.1	Research design	12
3.2	Population of the study	12
3.3	Sampling procedure and sample size	12
3.4	Data collection tools	12
3.5	Finalization of the tools	13
3.6	Data collection procedure	13
3.7	Data analysis and interpreting techniques	13
3.8	Ethnical considerations	13

CHAPTER - IV: ANALYSIS AND INTERPRETATION OF DATA 15

4.1 Demographic profile of the respondents 15

4.1.1 Gender distribution of the respondents 15

4.1.2 Ethnical distribution of the respondents 16

4.1.3 Education level of the respondents 17

4.1.4 Religious, status of the respondents 18

4.2 General information of the respondents on pesticide 19

4.2.1 Land availability with vegetable growers 19

4.2.2 Monthly income of vegetable growers 20

4.2.3 T.V. Radio facility and use for this to acquire knowledge on agriculture theme 21

4.3 Awareness of pesticide users 22

4.3.1 Educational status and pesticide use 23

4.3.2 The place of pesticide purchase 24

4.3.3 Method adopted for personal hygiene right after the use of pesticide 25

4.3.4 Pesticide affect to human health 27

4.3.5 Get information from the materials 29

4.3.6 Time interval between pesticide use and sale of vegetable 30

4.4 Practice of pesticide uses 31

4.4.1 Vegetable farmers' participation in agriculture occupation 31

4.4.2 Working hour in a day on vegetable farming area 32

4.4.3 Programs have been conducted by the organization/agency in the village 33

4.4.4 IPM knowledge and practice 35

4.4.5 Reason for not use IPM technique 36

4.4.6 Waste disposal technique or method 37

4.4.7 Use of personal protective equipment's and safety measures 39

4.4.8 Use of personal protective equipment (PPE) when before using of pesticide in the field 41

4.4.9 Method of pesticide determination while before preparing usable 42
4.5 Summary of findings 44
4.5.1 Summary 44
4.5.2 Findings 45
CHAPTER - V: CONCLUSION AND RECOMMENDATIONS 48
5.1 Conclusion 48
5.2 Recommendations 49
5.2.1 General recommendations 49
5.2.2 Recommendations for national policy 50
5.2.3 Recommendations for further research 50
REFERENCES 51
APPENDIX- I : QUESTIONNAIRE SCHEDULE 53
APPENDIX - II : CHECKLIST FOR INFORMATION 58

LIST OF TABLES

Table No.	Title	Page No.
4.1:	Gender distribution of the respondents	16
4.2:	Ethnical distribution of the respondents	16
4.3:	Education level of the respondents	17
4.4:	Religions status of the respondents	18
4.5:	Land availability with vegetable growers	19
4.6:	T.V. Radio facility and use for agriculture information	21
4.7:	Educationwise awareness about the pesticide users	23
4.8:	Pesticide shopping place	24
4.9:	Personal hygiene	27
4.10:	Genderwise distribution of the pesticide affect o human health	28
4.11:	Time interval between pesticide use and sale of vegetable	30
4.12:	Farmers participation in agriculture occupation	32
4.13:	Working hour in a day on vegetable farming area	33
4.14:	Programs of organization / agency in the village	34
4.15:	IPM training and practice	35
4.16:	Educationwise method of using pesticide disposal materials	37
4.17:	Waste disposal technique	38
4.18:	Use of personal protective equipment	41
4.19:	Use of PPEs	42
4.20:	Pesticide determination while before preparing usable	42
4.21:	Pesticide determination	43

LIST OF FIGURES

Figure No.	Title	Page No.
4.1:	Monthly income of vegetable growers	20
4.2:	Method adopted for personal hygiene right after the use of pesticide	26
4.3:	Get information from the materials	29
4.4:	Reason for not use IPM technique	36
4.5:	Use of personal protective equipment (PPE)	40

CHAPTER-I

INTRODUCTION

1.1 Background of the study

Pesticide use in Nepal started in the early 1950s especially with the use of DDT for malaria eradication (Manandhar, 2005). This was subsequently followed by use of other organochlorines (BHC, dieldrin and chlorodane), organophosphates (Ethyl parathion, methyl parathion, malathion, and oxydemeton, methyl, carhamates and synthetic pyrethroids. In Nepal, insecticide use increased rapidly over the last 10 years from 29.8 mt. in 1998 to 102.8 t in 2003 (PRMS, 2006). Since the 1960s, Nepal's government had given major emphasis to impact and supply chemical pesticides to increase agriculture reduction and as a result, pesticide started to be used in discriminately and widely throughout the country. Total amount of pesticide used annually in Nepal is 128.697 mt. (active ingredient) that includes 46.553 mt. in insecticides, 74.968 mt of fungicides, 5.701 mt herbicides, 1.808 of pesticides, 0.057 mt of bio-pesticides, and 0.238 mt of acaroids for agriculture as well as 2.556 mt of pesticides for the public health sector (PPD, 2008). The national mean pesticide consumption of Nepal was 142 g/ha in recent pest, which seems low compared to pesticide consumption of other Asian countries; however, use of pesticide is not uniform in Nepal. Most pesticides are used in rice (40-50%), pulses (14-20%), cotton (13-15%) and vegetables and fruits (10-15%) (Manadhar, 2005). Moreover, pesticides are used by vegetable farmers in the periphery of urban and sub-urban areas where they have access to vegetable market (NARC, 2005).

A number of 306 commercial products grouped under 71 common name of pesticides have been registered in Nepal: insecticides (40); fungicides (18); herbicides (5); redenticides (3); acardicide (1) and other (4) (NARC, 2005). Illegal trade and use of pesticide has been an issue for journalists and highlighted by media now and then. Till lindane, heptachlor, taxaphene, mirex, phosphanidon, organomerculy compounds, monocrotophos and methyl parathion (PPD, 2008). At present, commonly found pesticides in markets are organophosphates, synthetic poyrethroids and one organochlorine i.e. Thiodan (Manandhar, 2005).

Nepal government has passed plant protection Act 1972; plant protection rules 1975; environmental protection act 1996; environmental protection rules in order to mange the discriminate use of pesticides (Palikhe, 1998). However, there is no comprehensive record indicating the volumes of pesticides used.

Due to lack of training of training and education programs for save use from industries or government, Nepalese farmers are not much aware about the risks and rarely follow proper safety methods when using pesticides. Pesticides are applied at higher doses then needed (Manandhar, 2005), causing waste of pesticides and reduced farmers' profits. Generally, farmers make decision for applying pesticidesonce they notices pests in the field, irrespectively of damage level. Pesticide use is not static due to many factors such as available of alternatives, market prices, effectiveness and pesticide availability in market (Manandhar, 2005). Earlier studies have not explored sufficiently the recent use pattern of pesticides and its market system in totality. Available,information does not provide information about the real status of pesticide use in Nepal. Regular monitoring on different issues of pesticide could be helpful to update the changing situation of pesticide use. Besides, Nepal is a member of World Trade Organization that requires authentic data for the export of agricultural products.

The study focused on farmers' understanding of pesticides labels, farmer's awareness about the risks arising from pesticide use, and in how for appropriate safety measure are taken up by farmers.

1.2 Statement of the problem

The term 'pesticides' has wide scope in the field of agriculture. Rapidly growing population always demands high agricultural production. So that as a action of high production farmers choose pesticide to their crop and vegetables.

In terms of crops, pesticide use in most intensive in high value crops such as vegetables, mustard and cotton. Consultants predict that pesticides will be more widely used as commercial forming operations such as plantation crops and vegetable production area. Bhimdatta municipality ward no. 18 suply 15 percent of total requirement of vegetables of Kanchanpur district. Reports suggest that use of pesticides in vegetable in Nepal is higher than other food products (Koirala et al.,

2009). Very few previous research reports are available for pesticide use in vegetables for Bhimdatta municipality. Therefore, this study aims will to know the current situation of pesticide use in vegetable and to investigate awareness and practice among vegetable growers of Bhimdatta municipality, Kanchanpur.

However, there are very few studies that dealt on awareness and practices of pesticides applicators in Nepal. Based on this statement, this research geared up in order to find the answer of the following questions.

i) What experiences are felt by vegetable growers, while they use pesticides ?
ii) What is the impact of pesticides use on their health ?
iii) What types of pesticides are used in agriculture ?
iv) Does IPM technique work properly in the field of vegetables ?

1.3 Objective of the study

The main objective of this study was to explore the awareness and practice of using pesticides in vegetables by the farmers. The specific objectives of the study were as follows:

i) To identify the awareness level of vegetable growers in pesticides use.
ii) To find out the process and procedures of conducting awareness raising program among the farmers by local authority.
iii) To identify the situation of the pesticide use practice in vegetable.

1.4 Significance of the study

The significance of the study are as follows

i) The findings of this study would be helpful to raise awareness among farmers about harmful effect of pesticide in the health.
ii) It would be helpful to find out the existing situation of pesticide use.
iii) The result of the study would be helpful to aware the people about negative impact of pesticides.

iv) It would be provide information to those interested in the field of pesticides.

v) It would be provided an important guidance to future researches to carry out similar type of research.

1.5 Delimitations of the study

The delimitations of the study are as follows:

1.5.1 This study was delimited only to the responses of respondents of the Bhimdatta municipality, Ward No. 18.

1.5.2 This study was delimited to only 114 respondents of the study area.

1.5.3 This research study was included only awareness and practice of vegetable farmers.

1.5.4 The result was obtained from this study would not be generalized to whole agricultural sector.

1.6 Definition of the terms used

Pest: An insets of living organism that destroys plants, vegetables and facts etc.

Pesticide : A chemical used for killing, especially insects.

Farmer: Is a person engaged in agriculture.

Vegetable: Is an edible plant or its, part intended for cooking or eating now.

Labeling: A small piece of paper, fabric or plastic that is attached to something in order to show caution, doses, producer and other urgent information.

CHAPTER-II

REVIEW OF THE RELATED LITERATURE

This chapter deals with the important findings from different literatures. Review of literature enables to explore the research problems on different variables it may also guide to new researcher to gain the techniques of data collection and interpretation. The review literature process can be helpful to plan and conduct the present study systematically and more scientifically. On the process of reviewing the related literature the research would not find enough materials and completely research work based on Nepal especially in the field of pesticide use in agriculture. A few studies have been completed in the field of pesticide use in agriculture in the pest, which are reviewed in the following ways.

2.1Theoretical literature

Most of the farmers were not aware of the health hazards caused by the inappropriate handling of pesticides. The use of cotton apparel as protective clothing was common among them. Studies show that wet cotton clothing and cotton cloth masks in fact increase the person's personal absorption rate of pesticides (Kishi, et al. 1995).

The WHO has estimated that 1 to 5 million farm workers are estimated to suffer pesticide poisoning each year and at least 20,000 die from the exposure many of them in developing world. Four million tons of pesticides are applied in the world ever at an estimated cost of $3 billion (WHO, 2004).

Using of pesticide in Nepal had started in Nepal started in the early 1950s especially with the use of DOT for malaria eradication (Manandhar, D.N. 2005). In the pest, Nepal's government had emphasized to import and supply chemical pesticides to increase agricultural production. As a result, pesticides started to be used indiscriminately and widely since 1960s in Nepal. Plant protection Act 1972; plant protection rules 1975; pesticide Act in1991; pesticide rules 1993; environmental protection act 1996; environmental protection rules in order to manage the discriminate use of pesticides (Pallikhe, 1998).

The application of fungicides, especially Moncozeb, was observed to be widely applied having both short and long-term health effects to people exposed to it's unsafe levels. The use of harmful insecticides is likely to increase as new crop are being introduced in the cropping system.

Despite considerable knowledge of individuals about environment risks of pesticde use, farm workers did not appear to adopt adequate safety pre-equations resulting in the greater risk of exposure to chemicals. Exposure to organophosphates significantly reduced Assessing Erythrocyte Acetylcholinesterase activity acrossseasons, but its uses were not sufficient to claim clinical symptoms whereas the use of pyrethroid insecticides and fungicides was sufficient to claim acute symptoms of poisoning (Atreya, K. et al. 2013).

A study was alternative development and research centre, 2005 to assess gender differences on pesticide use knowledge attitude and practices, more than 50% women had never been to school and only 28% individuals were found trained in IPM. Almost all males and females aid not smoke, drink and eat during pesticides application and also believed that pesticides are harmful to human health, livestock, plant diversity and their environment. However, there were gender differences on household decision on pesticide to be used ($P < 0.001$), care of wind direction during spraying ($P < 0.092$), prior knowledge on safely measures ($P = 0.016$) reading and understanding of pesticides labels ($P < 0.001$), awareness of the labels ($0 < 0.001$) and protective covers. Almost all respondents were aware of negative impacts of pesticide use on human health and environment irrespective of gender; however, female were at higher risk due to lower level of pesticide use safety and awareness (Atreya, 2007).

A study on vegetable grower's awareness about health safety measures and pesticide use in Pakistan revealed knowledge on routes of entry of pesticide in human body through eyes, mouth and inhalation was at very good level. Similarly, knowledge about glasses, cap and trouser suit as PPE and clothing were at very good level, where knowledge of respirator, gloves, mask and shoes as PPE were at poor level (Ali, Akhater, Ahmand, 2007).

The above theoretical literature shows that, the maximum apply of pesticide in vegetable in Nepal. It is public problem in Nepal. But the laws are still unbehavioural

in the case of pesticide practice. So the pesticide use practice in vegetable is the most burning problem in Nepal.

2.2 Empirical literature review

In Nepal, the number of farmers using chemical pesticides has been increasing. The proportion of vegetable growers using pesticides increasing. The proportion of vegetable growers using pesticides increasing from 7.1% in 1991/92 to 16.1% in 2001/2002. In the case of cereal crop growers the rate of increase is small. In the last three census of 981182, 1991/92 and 2002/02, the percent of pesticide users among maize growers were 0.9, 2.8 and 4.2% respectively. In the 1980s, one percent of the wheat growers applied pesticide in their farming operations. While less than one percent of the rice, maize, potato and sugarcane growers used pesticide during the same period. Among the development regions the use of chemical pesticide was higher (31.9% of the total use) in the Central Department Region and the lowest (6.4%) in the far Western Development Region in 2002/03 (CBS, 2006).

Mahantesh and Singh, Alka (2009), comment that pesticide have substantially contributed for controlling pests and increasing crop yield. But over the years, there is growing concern about indiscriminate use of pesticide in agriculture. This paper attempts to understand the farmers knowledge and perception of pests and pesticide use practice and intensity of pesticide use in vegetable cultivation. The result shows that on an average 41 percent of the farmers were aware of pesticide hazards in vegetable cultivation. Most of farmers (88%) perceived that frequency of insects and disease infestation has increased over the past 10 years. It was also observed that farmers have not followed adequate safety measures regarding pesticide application. The high pesticide use cost was observed in vegetable especially in tomato and brinjal and most of the pesticide belonged to high and moderate risk chemical. Increasing farmers awareness of pesticide hazards to the environment and promotion of alternative pest management strategies such as use of bio-pesticide and IPM is essential for reducing adverse effect on environment.

A study carried out on "Knowledge attitude, practice, and toxicity symptoms associated with pesticide use among from workers in the Goza strip" revealedthat level of knowledge on the health impact of pesticides was 97.9% knowledge on the

route of entry in the body found to be 33% for inhalation 88%. For skin and 87% for ingestion. Regarding the storage and disposal practice of position 78.8% stored on the farm site and 64% threw on garbage site or along the street and 45% buried or bunt it. Minority of the farm workers reported the use of mask being 21%. Burning sensation of eyes/face was the most prevalent self-reported toxicity symptoms experienced being 64% followed by Dizziness (60%) (MM, TA and JNM, 2002, pp. 387-394).

A recent study Dhading district on knowledge, practices and use of pesticides among commercial vegetable growers showed that 50% of the vegetable growers were literate, 40% farmers worked hard for 5-9 hrs a day, 86% used pesticides in their vegetables, half of them used pesticides of category ii and 16% used of category i. Majority of them (93%) had not received training on pesticide use. Regarding the knowledge 80% had knowledge of adverse effect on human health. 43.% responded the use should be decreased in future. Regarding the practices of pesticide use one third read the label in the pesticide and only one fifty used the pesticide as in the label. Mixing the pesticide with bare hands, re-entering the field after spray was more than 50%. Nearly 40% experienced the health hazards of the use while most of them (66%) didn't use PPE. Similarly, disposal practice of the pesticide was also inadequate (Shrestha, Koirala and Tamrakar, 2010).

Khatri (2015) conducted a study on knowledge and use of pesticides and it's effect on the health of farmers at Devinagar VDC. In Palpa district, the objectives of the study are to explore the knowledge and use of the pesticide among the farmers, to assess the safety practice adopted by farmers while using pesticide and to examine the effect of pesticide on the health of farmers. The study was based on quantitative descriptive type of research design. Study was consisted of 150 respondents from the study area and to collect the data interview schedule was applied. The major findings of the study were, out of 150 respondents, 99.02% respondents said that the reason of using pesticide is to kill pests, 44.71% respondents said that the reason of using pesticide is to increase productivity 16.26% respondents said that the reason of using pesticide is to prevent vegetable. From pest, likewise, 93.33% respondent would wash their hand, foot after using pesticide, 22% respondents were found to be sometime worn gloves, 49.30% would never, whereas 28.67% didn't know the way of using gloves. Same as 3.33% respondents were found to be always worn glass, 13.33%. Would worn

sometime, 50% never worn, whereas 33.33% didn't know about the way of using it. To solve the problem Khatri said the awareness program or seminar on the right use of pesticide or on the use of natural method should be conducted time and again. Instead of pesticides, natural method should be adopted to kill pests or to get them run away such as urine of cow, mixture of ash and water can be sprayed on the crops.

Thapaliya (2014) conducted a research on the title. Hazardous aspect of pesticide use in agriculture. The main objective of the study was to study the use pattern of pesticide and to study the negative impacts of the pesticide use. The study was carried out on the basis of descriptive research design and respondents were selected with random sampling design where out of 1276 farmers, only 50 respondents were selected. The major finding of the study were, out of the total respondents, 30% of the farmers found to be using pesticides. For 9 or more years while only 12% found for 25 or more years and 18% of the respondents were for 20 or more years and 20% were found using for 10 or more years. Likely 30% farmers storied unused pesticides locked cabinet inside house, 52-50% unlocked cabinet inside the house, 10% storied in locked store room, 5% outside the house and 2.50% storied another place than above described. Similarly, 34.21% of household members of farmers are suffering from eye problems, 26.01% from asthma, 18.48% from disease 15.78% from skin disease, 15.78% from bronchitis, 2.63% from heart disease and 2.69% from cancer.

The above mentioned theoretical literature and empirical literature show that, the maximum numbers of pesticides are applying in vegetable in Nepal. It is emerging challenge for human health. Therefore, the pesticide use practice in vegetable is the most burning problem of Nepal as it generates multiple problems in human health.

2.3 Implication of review for the study

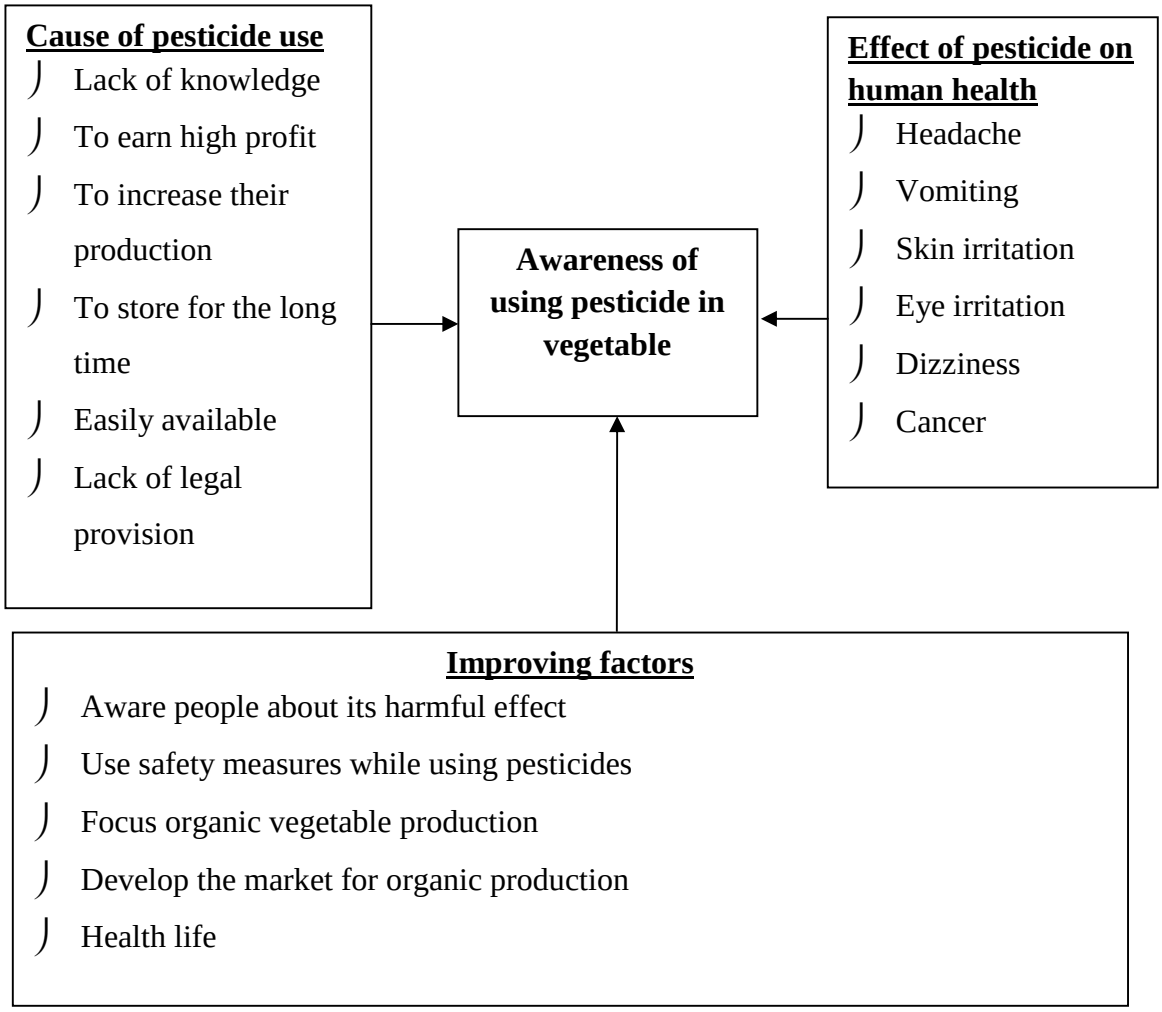
The review of the related literature is one of the guideline to prepare the proposal the review which gives us knowledge about the related subject, some implication of literature review are given below in this study.

- Review of literatures helped to write background of the study.
- It helped to make objectives of research.
- It helped to choose research design.

- It helped to select the sample size.
- It helped to prepare data collection tools.

2.4 Conceptual framework of the study

The conceptual framework sets out the concepts that underline the preparation and presentation of the study. It is the practical tools which assist the reports when developing and revising study.



Farmers were knowingly and unknowingly using the pesticide in vegetables farming. Some of the farmers, they were using it because they don't know the harmful effect of pesticides and others reason were to earn high profit, to increase their production to store vegetables. For long time, easily available of pesticide or lack of strict rules and regulation about it. Due to this hazardous use people were suffering directly and indirectly. By using this pesticide people are suffering from different type of health

problems. Such as: Headache, vomiting, skin irritation, eye irritation, dizziness cancer etc. It is major concern and to solve this problems we must aware people about harmful effect of pesticide, we should flow the withdraw period of pesticide use. We should increase farmers to produce the organic vegetables and also aware farmers to use the organic vegetable and government should make strong rules to control the use of maximum pesticide and banded pesticide. If we flowed above rules and regulation then we should have healthy life.

CHAPTER-III

RESEARCH METHODOLOGY

3.1Research design

This research paper is based on descriptive as well as analytical research design. The study was mainly focused on awareness and practice of using pesticide in vegetables by the farmers of Bhimdatta municipality. The study was included quantitative data which was collected through household survey of vegetable growers.

3.2Population of the study

The population of the study was the vegetable farmers of Bhimdatta municipality. There were 160 vegetable farmers in the ward 18 of the Bhimdatta municipality. Hence all 160 vegetable growing farmers were the population of this study.

3.3Sampling procedure and sample size

Due to the nature of the study a non-probability sampling method was adopted. In the beginning Bhimdatta municipality was decided to be the area of the study. The sample respondents were taken from those farmers who were used pesticide in vegetable. Selections of farmers were done on a convenience sampling method as those farmers who were easily accessible. Out of population 160, 114 farmers werechosen as the sample for the study. The sample size was decided on the basis of Raosoft online sample size calculator keeping population as 160, among them 5 percent error and sample size of this study were 114 farmers involving on agricultural farming.

This study area was selected on the basis of purposive sampling technique. And for respondents selection, convenience. Sampling technique were used because of the nature of research topic.

3.4Data collection tools

There are various ways of data collection, among them the researcher was used interview schedule and observation checklist. Structured questionnaire were used in interview whereas observation checklist was also used whether respondents are telling

truth or not. Therefore, interview schedule as well as observation checklist was deployed as a data collection tools.

3.5Finalization of the tools

A trial test was conducted among fifteen non-sample farmers of Bhimdatta Municipality ward no. 17 which is very similar characteristics of ward no. 18 and who grow vegetables. On the basis of trial test result, interview schedule was corrected and modified with necessary feedback and comments of the thesis supervisor.

3.6 Data collection procedure

First of all, a recommendation letter was taken from HPPE Department of University Campus for data collection. The researcherwas visited the officials at Bhimdatta municipality office for its approval for data collection purpose. After taking the permission from the municipality office the research was visited vegetable growing farmers and was asked the permission of interview regarding their farming system especially their use and knowledge of pesticides they were using in their vegetables for more production. After clarifying the purpose of the study, interview was taken with them. Later, the researcher was also observed the field, pesticides and the practice of using the pesticides whether they are doing or not accordingly they express their habitual in interview

3.7 Data analysis and interpreting techniques

After collecting the data and information, it was classified, categorized and sub-categorized according to the nature of data. The data were analyzed through tables, bar diagrams, pie charts and they further processed analyzed and interpreted in a logical way.

3.8 Ethnical considerations

Any research requires a specific work ethic to follow to make the research as valid as possible. The researcher was followed rule, regulations and ethics of research as following:

- While preparing interview schedules for this topic questions that make the respondents unaffordable was avoided as far as possible.
- During data collection, the willing of the respondentswas kept in consideration.
- Before asking questions the objectives of the research was also explained.
- The privacy of the responses was also maintained.
- Respondents fight to leave the interview at any time will be respondent.
- Provision of leaving interview if they feel any uncomfortable situation was also maintained.

Thus these work ethics will be followed strictly as it makes the process of data collection not only professional but ethical too.

CHAPTER - IV

ANALYSIS AND INTERPRETATION OF DATA

In this section,information regarding current status of pesticide use among the vegetable growers in Bhimdatta Municipalityis presented. This chapter deals with the analysis and interpretation of data, which were collect from the interview schedule andchecklist.Vegetable growers arguments and facts were collected through the use of standardized interview schedule. The collected information and data were analyzed and interpreted through descriptive as well as analytical method. The chapter is analyzed and interpreted on the basis of percentage, tables and figures that are used to make the presentation clear and meaningful under the following sub-headings.

4.1 Demographic profile of the respondents
4.2 General information
4.3 Awareness of pesticide users
4.4 Practice of the pesticide users

4.1 Demographic profile of the respondents

This section deals with the demographic profile of the respondents. Demographic profile indicates sexual, ethnical, educational age-wise and religious characters, status of the respondents who were direct participated in this research.All the respondents were from Bhimdatta Municipality, Ward No. 18, Kanchanpur district.

4.1.1 Gender distribution of the respondents

Gender distribution is an important factors for agriculture. Nepal is one of the male dominated countries and female who are residing within Bhimdatta municipality ward no. 18 are also suffering from patriarchal norms and values. Although, females are engaged in farming occupation from the beginning to end of the day, but unfortunately they are not taken into consideration always discrimination on their labour. In Nepalese context, female are in majority in national scenario. The following table shows the male/female ratio of the study area.

Table 4.1: Gender distribution of the respondents

S.N.	Description	Number	Percentage
1	Female	49	42.98
2	Male	65	57.01
Total		114	100.00

The table 4.1 shows 42.98 percent respondents were male and 57.01 percent were female in selected study area. According to nation population census 2011, the total population of Bhimdatta municipality ward no. 18 was 17014. Among them 8877 were male and 8137 were female. According to the CBS report, the nationwide percent of male and female is 48.50 percent and 51.50 percent respectively.

While compring and contrasting the sitution of male and female ratio of the study area with national data, male percentage in this area seems quite low, where as female percent are quite higher than national Indicator.

4.1.2 Ethnical distribution of the respondents

Ethnical plurality distribution is the major feature of plural society like Nepal. Likewise, there is the diversity of ethnical distribution in this study area as well. The ethnical composition of this study area is the ethnical distribution of this study including different cast ethnic groups like Brahmin, Chhetri, Tharu, Dalit and Muslim is presented in the followingtable:

Table 4.2: Ethnical distribution of the respondents

S.N.	Description	Number	Percentage
1	Brahmin / Chhetri	55	48.24
2	Tharu	21	18.42
3	Dalit	9	7.89
4	Muslim	29	25.43
Total		114	100.00

According to the table 4.2, majroity of the respondents i.e. 48.24 percent of respondents were Brahmin/Chhetri, 25.49 percent were Muslim, 18.42 percent were Tharu and 7.89 percent respondents were dalit. National census report 2011 also shows, the majorityin national level,which is also applicable in this study area too, but Muslim population secures here secondposition followed by Tharu and dalitthrid and fourth respectively. The cause behind caste cluster's categorization is that Muslims and Tharus are dwelling here since last many decades. Brahman/Chhetris are late commer in this place. In search of good opportunities, they migrated in Bhimdatta municipality massively from the hills and mountains especially from Baitadi and Darchula, therefore, the majority of Brahmin/Chhetris than Tharu and Muslims who are living there since last many decades. After the eradication of Malaria, Massive population migrated in Terai region as well as Bhimdatta Municipality. Hence, their presence can be seen there in majority.

4.1.3 Education level of the respondents

Education is the key indicator for reforming society and upgrading its economic and social status. Education enhances the ability and capability of human beings to disect what is right and what is wrong. It also plays the vital role in generating awareness regardig the use of pesticides in vegetable.

Table 4.3: Education level of the respondents

S.N.	Description	Number	Percentage
1	Illiterate	7	6.25
2	Literate	58	51.78
3	Secondary	31	27.67
4	Higher education	18	15.78
Total		114	100.00

Table 4.3 indicates that only 6.25 percent respondents were illiterate and rest of the respondents were literate. Among literate population 51.78 percent were literate followed by 27.67 percent were secondary and 15.78 percent were higher education respectively.

Inthis study area, literacy rate seems quite good. National indicator of literacy rate shows the 65.9 percent are literate, remaining 34.1 percent ware illiterate but in the study area only 6.25 percent were illiterate, which shows the big gap between National illiteracy and study area's educational status. The cause behind this big gap is that national literacy indicatorconsists of those people who are living in remote area of Nepal to metropolitan cities, but the people who were my respondents were from municipality. They were energetic, young, informative. Therefore, the educational status of the respondents seems high than national indicator.

4.1.4 Religious, status of the respondents

Religion to be followed depends upon individual interest even it can be influenced by family society and friends as well as other section of social life. Religion is a component of culture. The religion also determines daily habits as well as life style of person.It isone of the major identical weapons of the particular society. Religious status of the area study comprises of Hindu, Christian, Muslim and minor others enlisted in the following table 4.4:

Table 4.4: Religions status of the respondents

S.N.	Description	Number	Percentage
1	Hindu	65	57.01
2	Christian	14	12.28
4	Muslim	29	25.43
5	Others	6	5.26
Total		114	100.00

The table 4.4 shows that majority of the respondents 57.01 percent found Hindu, 12.28 percent found Christian, 25.43 percent found Muslim and 5.26 percent respondents were found others religious. From the table, it can be drawn that majority of people of respondents are Hindu. They are influenced by Aryan caste because of culture.

According to national CBS report (2011) 81.34 Hindu, 9.04 percent Boudha, 4.39 percent Islam, 3.05 Kirat, 1.42 percent Christian and 0.76 percent others, but the

situation of the study area is different. The main cause of heterogenity of with national religious indicator is that, western Christian missionary is root cause in this area. Nepalese caste based untouchability system which has been using by western missioinaries. Nepalese people in city areas are alluring towards Christian religion as they are providing certain funds too. Therefore, in this table christian religion seems in higher position. Muslims are dwelling here since their ancestral period, therefore their presence seems also high percentage.

4.2 General information of the respondents on pesticide

General information of respondents made the study report strong through the collection of their interrelated information.

4.2.1Land availability with vegetable growers

Land sometimes referred to as dry land in the solid surface of the earth that is not permanently covered by water. The vast majority of human activity occurs in land areas that support agriculture, habitat, and various natural resources. The table below shows distribution of respondents by land.

Table 4.5: Land availability with vegetable growers

S.N.	Particular	Number	Percentage
1	Less than 1 kattha	50	43.85
2	Less than 1-2 kattha	21	18.42
3	Less than 2-3 kattha	13	11.40
4	More than 3 kattha	30	26.31
Total		114	100.00

The table 4.5 shows that 43.85 percent respondents have less than 1 kattha land followed by 18.42 percent have 1-2 kattha, 11.40 percent have 2-3 kattha and 26.31 have more than 3 kattha land avail for the purpose of vegetable grow.

Bhimdatta municipality cover only 171.24 km^2 of 147181 kilometer square of Nepal. 1,04,599 people are living in Bhimdatta municipality. Population density is 610 km^2.

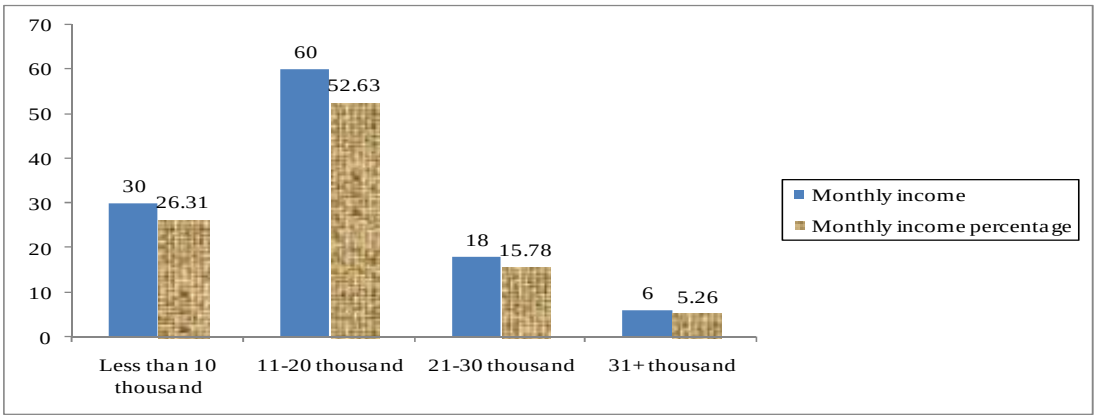
Nepal national average population density is 207 kilometer square comparison with national degree population density, Bhimdatta municipality population density is 3 times more than national population density. So, above land availability for the purpose of vegetable grows is normal.

It is essential and ingredient part for the farmers that they should own their land for agricultural activities. But, scenario of land availability seems with farmers is miserable. In this case, farmers are limited within the boundary of land limitedness. Farmers are compelled to take cultivated land in high rent. Therefore, they always in pressure grow more crops from that land. Consequently, they infested much fertilizer and pesticides in order to grow much crops. Although, chemicals and fertilizers help to grow more crops, but it directly hampers on farmers health as they apply it. The secondary problem goes to its consumers, they invest expensive price in order to buy crops, but unknowingly it hampers on their health. Therefore, government should provide cultivated land in reasonable price and encourage them use of less fertilizer and chemicals.

4.2.2 Monthly income of vegetable growers

Per capital of Nepalese people is 717$ (Nepal Fact and Figure 2017 CBS), calculate this for monthly basis the average income value is 7 thousand. So, per capital income is seems normal but the comparison with urban capital income this value is not sufficient. Nepal urban per capital income is 17.21 US dollar (Nepal Economic Survey Report, 2017, Government of Nepal, Ministry of Finance). The following diagram shows the monthly income of vegetable farmers.

Figure 4.1: Monthly income of vegetable growers



According to figure 4.1, 26.31 percent respondents were earned less than 10 thousand, 52.63 percent respondents were earned 11-20 thousand, 15.78 percent respondents were earned 21-30 thousand and 5.26 percent were earned more than 31 thousand as their monthly income after involving in agricultural activities.

Above data indicates that there was not any drastic change in the lives of farmers as majority of them were earning 11-20 thousands which is hardly sufficient for their livelihood. There were so many factors of their limited income. Limited land, hybrid seeds and modern technology as well as problem of easily available markets are their hindrances. Therefore, they should invest more labor, technology and less use of fertilizer and pesticides. They can ahead towards organic farming which is highly demanded in the society in a reasonable price which may be milestone in their farming business.

4.2.3 T.V. Radio facility and use for this to acquire knowledge on agriculture theme

Radio Nepal and Nepal Television nowadays deliberately broadcasting different types of agriculture programs on their channel and convey the various message including pesticide use, it's harms and benefit. Either respondent had taken any advantages trough such programmes or not, which is presented in the following table:

Table 4.6: T.V. Radio facility and use for agriculture information

S.N.	Facility			Listen for agriculture purpose		
	Particular	**Response**	**Percent**	**Particular**	**Response**	**Percent**
1	Yes	95	83.33	Yes	51	44.73
2	No	19	16.66	No	63	55.26
	Total	114	100.00		114	100.00

According to the table 6, a total of 16.66 percent vegetable growers have not the facility of T.V., Radio, 83.33 percent radio T.V. users did not the practice to listen agriculture programme on T.V. and Radio. Among the facility users they were not hearing and watching agriculture programme on T.V., Radio due to the lack of knowledge of agriculture programme.

The main aim of agricultural programmes broadcasted through audio and audio visual means of communication are make people aware about agricultural activities and related factors with it. Nepal is an agricultural country, butits people are compelled to import agricultural products to eat. Therefore, government of Nepal has tried its best to make people aware and teach them agricultural technics so as to make them able to produce organic agricultural vegetables. In the study area, majority of the respondents were seen agricultural programmes and of them in majority were implemented in their gardens too.In this sense, agricultural programmes transmitted by Radio Nepal mentions that such programmes were helpful to the farmers to improve farming methods. The farmers were received the agriculture programs transmitted by Radio Nepal and Nepal Television for information and knowledge. It was found that farmers were listened agricultural programmes eagerly like Sukrabar ko Budhi Aamai (The Old Mother on Friday), question answer on Friday, veterinary series on Tuesday, discussion on Thursday and farming program on Sunday.

4.3 Awareness of pesticide users

Due to pests farmers are suffering with serious problems such as loss in production, damage of production, decay and degeneration of production. Consequently, in order to make crops safe from pests, farmers use different types of pesticides. No matter pesticides prevents from such loses but it effects human health negatively. Farmers, who are aware of pesticides, use according to the technician, but so as to prevent crops from pests, they use dangerous pesticides. This is trend is rapidly ongoing in developing countries in the world. Among and between Nepalese farmers such dangerous pesticides are used. Non-patented, more toxic, environmentally persistent and inexpensive chemicals are being used intensively in Nepal. Usage of pesticides in Nepalese agriculture is regulated by Act and Law; however, law enforcement is almost absent in major vegetable growing areas. Given the limited or poor literacy skills of Nepalese farmers and widespread use of pesticides, it is expected that occupational exposure to pesticides is likely to be high. Thisstudy was carried out to assess awareness and practice of using pesticides in vegetable. Following subheadings deal with the level of awareness and practice regarding pesticides in the study area.

4.3.1 Educational status and pesticide use

Awareness regarding the correct use of pesticide by vegetable farmers is in poor condition. Hence,it should be improved through adequate training programs and the provision of safer alternative use of chemical and pesticide. Education is that very indicator which open ups the knowledge of human being and makes him/her dynamic. Therefore, education is essential for good knowledge regarding the use of pesticides use that are labeling as a precautions of its use. Time and again, news have been published human deaths and injuries of using poisonous food and food items, unaware used of poisons. Hence, education is must while dealing with pesticides and poisons that are deliberately used in vegetable farming in Nepalese gardens. The following table shows the educational level and their awareness regarding the use of pesticide.

Table 4.7: Educationwise awareness about the pesticide users

Education	Increase of productivity		To kill the pest		To prevent vegetable from pest		Others	
Illiterate	-	-	7	33.33	-	-	-	-
Literate	25	51.02	11	52.38	18	51.42	4	44.44
Secondary	15	30.61	3	14.28	9	25.71	4	44.44
Higher education	9	18.36	-	-	8	22.85	1	11.11
Total	49	100	21	100	35	100	9	100

Table 4.7 shows that 49 respondents used pesticide in order to increase crop productivity. Among them literate respondents were 51.02 percent, secondary respondents were 30.61 percent and the respondents with higher education were 18.36 percent. Illiterate respondents were used pesticide by means of killing pests. Similarly, out of 21 respondents who were used pesticide in order to kill the pest, among them, Illiterate respondents were 33.33 percent, literate respondents were 52.38 percent and the respondents with secondary education were 14.28 percent, which shows that educated people also are in dilemma why they are using it. Higher education respondents were not use pesticide in order to kill the pest.

Likewise, among 35 respondents who used pesticide to prevent vegetable from pest, literate were 51.42 percent, secondary were 25.71 percent respondents with higher education were 22.85 percent. Illiterate respondents were not used pesticide to prevent vegetable from pest. Moreover, 9 respondents used pesticide in vegetable by others means. Of them, literate were 44.44 percent, secondary passed were 44.44 percent and the respondents with higher education were 11.11 percent. Illiterate respondents were not used pesticidein vegetable by others means. The above data shows that, most of the respondents were using pesticide in vegetable by increase of productivity which shows their unawareness why they were used it.

Above information reveals that literate respondents were using pesticides in order to increase productivity rather protection from pests.It shows that people in the study area although they were educated unknown about the main objective of using pesticides. Among them, some were aware of using pesticide, they used to prevent vegetable from pest as well.

4.3.2 The place of pesticide purchase

Pesticides are prohibited to sell without taking government permission. Government provides authority of certain person who are trained of using pesticides. But in Nepalese context, pesticides are also available in anywhere else which shows the unawareness of sellers and buyers too. There is no strong body so as to control market. Therefore, dangerous pesticides and poisons can be found in food stalls too. In order to find out the availability of pesticide purchasing centers, following table shows the types of shop of selling pesticides.

Table 4.8: Pesticide shopping place

S.N.	Shopping place	Number	Percentage
1	Shop	10	57.01
2	Agriculture department	65	8.77
3	Authorized shop	35	30.70
4	Others	4	3.50
Total		114	100.00

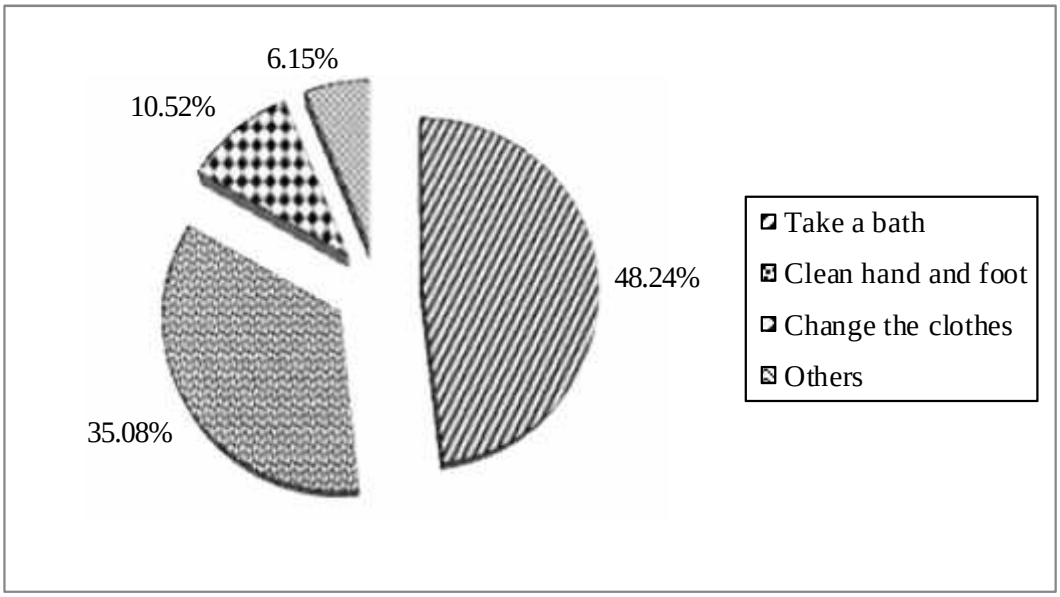
The table 4.8 shows that 57.01 percent vegetable farmers were purchased the pesticide by shops because shops were near by them, whereas 39.47 percent vegetable farmers were purchased pesticide by agriculture departments and authorized shops because of quality of the chemical/pesticide, service and authentication of pesticides, but 3.50 percent vegetable farmers were purchased pesticides wherever they got.

By the above information, it comes to knowledge that in the study area farmers were purchased pesticides mainly from three types of shops where other items also can be found, next pesticides available sots were agriculture department and authorized shop, where as third one were normal shops nearby their inhabitants.By this information, it is clear that agricultural farmers are not aware about the bad consequences of pesticides and poisons that they were used in vegetables. Not only farmers rather shopkeepers, government concerning body as well as local level people are also unaware about the negative consequences that can be fall as curse on human or animals loses.

4.3.3 Method adopted for personal hygiene right after the use of pesticide

In our skin is the biological protective barriers most of microorganism are block from skin. Pesticide is the chemical substance which was composed various chemical substance such as sulphuric acid, nitrogen, copper, phosphorus, and so on but our skin have good affinity with cupper or cupper and its alloys such as brass and Bronze are the anti-microbials which inherent in skin for long time after then other chemical are mixed with cupper then start skin infection so all this physiology controlled by person hygiene right after the use of pesticide. Personal hygiene was the best practice to prevent pesticide exposure.

Figure 4.2: Method adopted for personal hygiene right after the use of pesticide



According to the figure 4.2, of the respondents only10.52 percent respondents were changed the clothes right after the use of pesticide, 35.08 percent respondents were cleaned their hand and foot, 48.24 percent respondents were taken a bath and 6.14 percent respondents were used others way. Due to the lack of the knowledge about hazardous impact of pesticides in human health, respndents were opined different types of action they were followed after using of pesticides.

It is said that precaution is better than cure, keeping this in mind, the researcher was asked them about their behavior after spring pesticides in vegetables. All the respondents were claimed that their precautions was better than others. By this statement, it can be concluded that farmers at least were aware about the negative consequences of pesticides. Above information was taken from interview schedule which may be wrong. To prove whether respondents were expressed right or wrong information, researcher was also used observation checklist. The following table also incorporates the information taken from observation checklist as:

Table 4.9: Personal hygiene

Practice	No	Percent
Good	95	83.33
Satisfactory	19	16.66
Total	114	100.00

People clean hand and foot with detergent and take a bath were included in good; people only change the clothes and others were included in satisfactory.

The rating shows that the personal hygiene right after the use of pesticide, 83.33 percent of the respondents were good, 16.66 percent of the respondents were satisfactory. Therefore, people in the study area still have to make them aware regarding the health problem caused by pesticide use. While comparing and contrasting with table no 4.8 and 4.9 the result seems to be homogeneous. It means respondents were not telling fake information as the result does not seem in vast difference. Therefore, respondents were authentic of their saying and deeds. Comparing the interview schedule and observation adopted for personal hygiene right after the use of pesticide was found similar. Mostly people personal hygiene right after the use of pesticide aware was found in very good.

4.3.4 Pesticide affect to human health

Farm workers are regularly exposed to a variety of health hazards during farm work, particularly with respect to agricultural intensification and associated with pesticide use. Numerous studies have shown that overuse of pesticides in agricultural farms have adverse health consequences, such as headache, skin irritation, eye etc. (Beshwari, et al., 2004).The following table also shows the information about health problems due to pesticide use:

Table 4.10: Genderwise distribution of the pesticide affect o human health

Gender	Eye irritation		Headache		Skin irritation		Fever		Other response	
	No.	%	No.	%	No.	%	No.	%	No.	%
Male	20	57.14	10	50	27	64.28	4	40	4	57.14
Female	15	42.85	10	50	15	35.71	6	60	3	42.85
Total	35	100	20	100	42	100	10	100	7	100

Table 4.10 shows that 35 respondents were affected eye irritation among them 57.14 percent were male and 42.85 percent were female. Similarly, 20 respondents equally male and female were affected headache. Likewise, 42 respondents were affected by skin problem among them 64.28 percent respondents male and 35.71 percent respondents female. Moreover, 10 respondents were affected by fever comprises 40 percent were respondents male and 60 percent were respondents female. And 7 respondents were affected other problems among them 57.14 percent were male and 42.85 percent were femalerespondents.

Pesticides are substances that may cause significant harm or even death to an individual if even very small amounts of it enters into the body. These materials may enter the body in different ways. The most common route of exposure is through inhalation (breathing it into the lungs). Other routes include skin contact where some materials can easily pass through the skin and enter the body. Ingestion is another, less common, route of exposure in the workplace. Ingestion often occurs accidentally through poor hygiene practices such as eating food or smoking a cigarette using contaminated hands.Thus, the data revealed that the highest number of respondents affected that skin irritation. It shows that most of the respondents were careless when they are used pesticide in the vegetables. Use of pesticides without precautions ultimately turns to be problematic as non one were applied precautions such as spectacles, gloves, socks and others. Therefore, farmers have to make aware regarding the use of pesticides. Otherwise, be ready to face innumerable health impact in their lives.

4.3.5 Get information from the materials

Poster or pamphlets regarding use of pesticides materials are helpful to farmer for knowledge, attitude and behaviour. It is importance source of information about pesticide materials in terms how the toxic or pesticide is harmful to human health or it teaches about harm to human when exposurewith it, what mechanism of action, composition of pesticide, how to use it and some bottle labeled immediate sign and symptoms are inevitable.The further information regarding the knowledge of farmers whether they read the labels of pesticides while using it to their farmland is given in the following table:

Figure 4.3: Get information from the materials

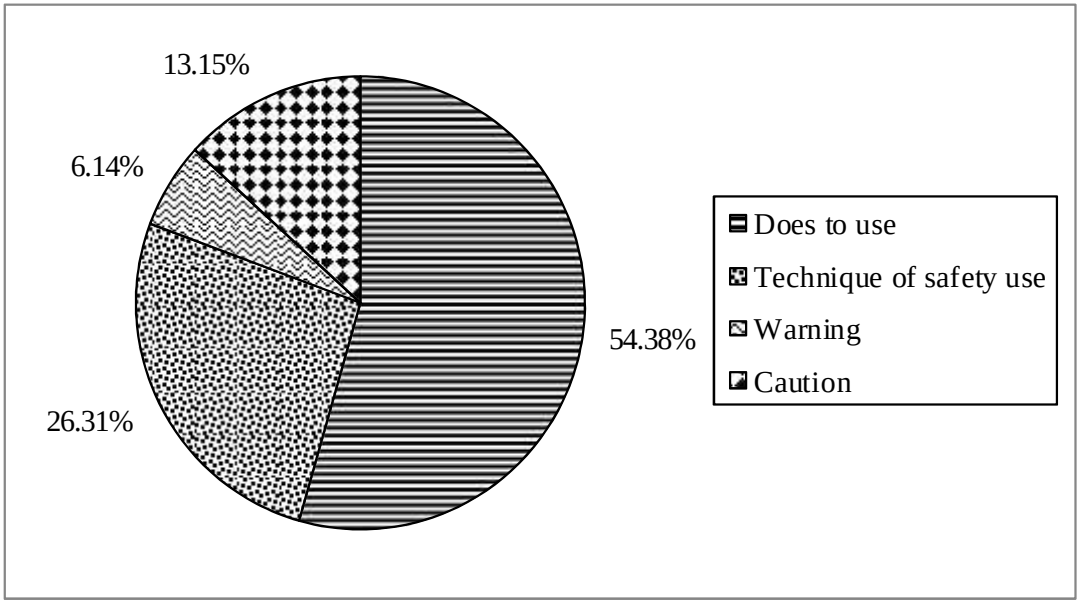


Figure 4.3 shows that all respondents were get information from the labeled of it, but striking factor is that they read different information, no one is completely were through whole information which is inevitable to them before its use.Of the total respondents, 13.15 percent respondents were get caution related information from the materials, 6.14 percent respondents were informed regarding warning related information,26.31 percent respondents were taken technique of safety related information and 54.38 percent respondents were taken dose to use related information from the labeled notification beside pesticides.

Pesticides are substances that may cause serious harm to an individual if it enters the body. In order to protect from such accident, precautions are also labeled as precautions which provides guidance on safe handling and storage practices, and how to work safely with toxic materials. More information about the hazards of toxic materials and how they are handled while using in vegetables, its effect on them is given detail but in the study area as farmers are illiterate and although they are literate, they do not pay any attention towards it. Consequently, they has to face several problems regarding it.

4.3.6Time interval between pesticide use and sale of vegetable

Vegetable production in Bhimdatta municipality is seriously affected by pests attack. To reduce damage, vegetable farmers indiscriminately use pesticides. In Nepal, the use of pesticides are used heavily. The presented study indicates that awareness and practice of pesticides represents a potential risk for the farmers and consumers. Normally, pesticide functional period is 10 to 15 days if pesticide come under the contract with fresh air otherwise it can be more time to dysfunction. The following table exposes the real situation of pesticides use and it selling behavior.

Table 4.11: Time interval between pesticide use and sale of vegetable

S.N.	Use / Sell practice of pesticide applied vegetable	Number	Percentage
1	1-4 days	46	40.35
2	5-8 days	30	26.32
3	9-15 days	25	21.93
4	Above 16 days	13	11.40
Total		114	100.00

The above table 4.11 reflects that 40.35 percent growers were used/sold vegetable during the 1 to 4 days period of pesticide application, 26.32 percent farmerswere used/sold vegetable during the 5 to 8 days period of pesticide application, whereas 21.93 percent farmerswere used/soldmore than 16 days.

According to the precaution labeled in "Malathin" pesticides which was deliberately used in the vegetables was written that "don’t use any contracted things before two weeks". It also shows that how dangerous is pesticides, but in the field respondents were used and sold contracted vegetables after its application within 1-4 days too, which is mostly dangerous to human health. Therefore, by the nature of farmers, they are not any knowledge about the harmfulness of toxic materials. In the study area majority of the respondents were found to be used before toxic's dysfunction.

4.4Practice of pesticide uses

Nepal has different legal provisions related to use of pesticides. Pesticide Act and Rule 1991 and 1994 regulate the import, manufacture, sales, distribution and use of pesticides within the country with a view to prevent risks on human health and animals. Nepal has approved the Stockholm Convention, Basel Convention and Rotterdam Conventions to minimizeenvironmentalpollutionandtomanageagrochemicals,includingpesticides.At present, Government of Nepal (GoN)has banned 14 chemicals (Chlorden, D.D.T, Dieldrin, Endrin, Aldrin, Heptachlor, Mirex, Toxaphen, B.H.C., Lindane, Phosphamidon, Organo-mercury fungicide, Methyl parathion, Monocrotophos) due to their toxicity, persistence, tendencies of accumulation and biomagnifications and long term serious threats to human and environment (Pant & Jayana, 2008).

4.4.1 Vegetable farmers' participation in agriculture occupation

Agriculture is the main occupation of Nepal. Most of the people engaged in it. They spent lot of time in it since their ancestral period. The following table shows the farmers participation in agricultural occupation in detail:

Table 4.12: Farmers participation in agriculture occupation

S.N.	Involvement occupation	Number	Percentage
1	Less than 10 years	16	14.04
2	11-20 years	61	53.51
3	21-30 years	24	21.05
4	Above 31 years	13	11.40
Total		114	100.00

The table 4.12 shows that 14.04 percent respondents wereinvolved since less than 10 years, 53.51 percent respondents were worked since 11-20 years, 21.05 percent respondents were worked since 21-30 years and 11.40 percent were worked since 3 decades in the field of agriculture. By this information it is clear that the farmers are included in this study have long period of experience in agricultural sector.

Although Nepal is known as agricultural country. Of the total population, 78 percent Nepalese people's main occupation is agriculture, but they are feeding their stomach importing edible stuffs from India, China, Bangladesh, Bhutan and so on.In this scenario, although people are engaging themselves in agricultural sector, they are not producing as much as crops due to lack of government assistant. Farmers could not get seeds during the time of plantation, they could not get fertilizer, drought like problems are major hindrances of the farmers in Nepal. In terms of providing substance agricultural products, local government has started to impose tax on it. Therefore although people are engaging themselves in agriculture, it is not satisfactory and future orienting. Simple training to the farmers should be given by government regarding 'how to use pesticides?' is not fortune for them and they are facing innumerable problems.

4.4.2 Working hour in a day on vegetable farming area

Most of countries of world have been adopting 8 hour's work after that they get chance to enjoy their life. But in the Nepalese society it is not fortunate to them, farmers are working from the early morning of the day to late evening. In doing so,

they are not able to join their hands with mouth. The working hours of the respondents is given in the following table:

Table 4.13: Working hour in a day on vegetable farming area

S.N.	Working hour in a day	Number	Percentage
1	Less than 3 hours	6	5.26
2	4 to 6 hour	21	18.42
3	7 to 9 hour	50	43.86
4	More than 10 hour	37	31.46
Total		114	100.00

According to table 13, more than 23.68 percent vegetable workers were worked 3 to 6 hours daily in the field, 43.86 percent vegetable workers were worked7 to 9 hours daily in the field and 31.46 percent found to be worked more than 10 hours in a day in their field. It shows that most of the time of day growers spent in the field.

Above table shows that a lot of toil is mixed up in the field as 31.45 percent farmers hard work in their field, which would be beneficiary to their life style, but while observing their lifestyle, they seem in miserable condition.Neither they are getting any help from government nor are they assisted from anywhere, rather they are rooted their life only for hand to mouth. By profession, they are farmers, they don't have even least knowledge about how to use pesticides. Traditional farming system is another obstacle in their life. No one is there except television programmes in order to assist them technically. Therefore, farmers are living their miserable life in traditional agricultural system.

4.4.3 Programs have been conducted by the organization/agency in the village

Nepal is a small land-locked mountainous country with diverse agro-ecologies, culture and agriculture. Agriculture is a key source of economic growth, poverty reduction and environmental sustainability in Nepal. It is the mainstay of the national economy, contributing one third of GDP and providing livelihood to more than two thirds of the population (MoF, 2013). The poverty rate is declining over the last two

decades, but it is still high with one-quarter of its population (25.1%) living below poverty line (CBS, 2012). Food cropsare the major components accounting for about 40% of AGDP, whilelivestock and fishery account for 30%, horticulture and cash crops 20%, and forestry about 10% (MoF, 2013). The situation of prosperity of Nepal seems in Agriculture. Therefore, government of Nepal should pay its special attention towards agricultural programmes in order to make them aware technically. The following table shows the situation of agricultural programmes that had conducted within their locality.

Table 4.14: Programs of organization / agency in the village

S.N.	Programs of organizational agency	Number	Percentage
1	District agriculture office	95	83.33
4	Others	19	16.67
Total		114	100.00

Table 4.14 shows that 83.33 percent programs were conducted by the district agriculture officein their locality, whereas 16.67 percent programs were conducted by others organization.

Programs have been conducted by the organization/agency related to safe use of pesticide is limited and training to the farmers should be promoted for the safe use of pesticide in the aspects like safe handling storage, disposal and application for better occupational safety and health of vegetable growers in the village. Above information shows somehow presumable indicator as most of programmes regarding were conducted by district agricultural office. But, district agricultural office should provide programmes regarding goal oriented. Although district agriculture office had conducted agricultural programmes time and again but farmers do not have knowledge about how to handle pesticides.

4.4.4 IPM knowledge and practice

Integrated pest management (IPM), also known as integrated pest control (IPC*)* is a broad-based approach that integrates practices for economic control of pests. IPM aims to suppress pest populations below the economic injury level. Integrated pest management is one of the better alternative agricultural practices that are more human health and environment friendly. It is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Following table deals with the knowledge and practice of IPM.

Table 4.15: IPM training and practice

S.N.	**Knowledge of IPM**	**Number**	**Percentage**
1	Yes	44	38.60
2	No	70	61.40
Total		114	100.00
S.N.	**Practice of IPM**	**Number**	**Percentage**
1	Yes	20	40
2	No	30	60
Total		50	100.00

Table 4.15 reflects that almost three quarters (61.40%) vegetable growers were not the knowledge of IPM, only 38.60 percent vegetable growers were the knowledge of IPM. Among the IPM practitioner, only 40 percent were used and still 60 percent were not used of IPM technique.

Those suggest that IPM program should be promoted for the better agricultural practices up to the community level because it is human health friendly. Government of Nepal and its concerning body should pay its special concern in promoting such technique. In informal talk, one of the farmer were said that IPM system is expensive than pesticides, therefore they are not following it. In this situation, government

should make them funding system in order to produce healthy and organic vegetable which is ecology friendly and human health friendly too.

4.4.5 Reason for not use IPM technique

People generally unaware about IPM system in agriculture because it is tedious while use than pesticides in crops. The UN's Food and Agriculture organization defines IPM as "the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest population and keep pesticides and other intervention to level that are economically justified and reduce or minimized risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.

Figure 4.4: Reason for not use IPM technique

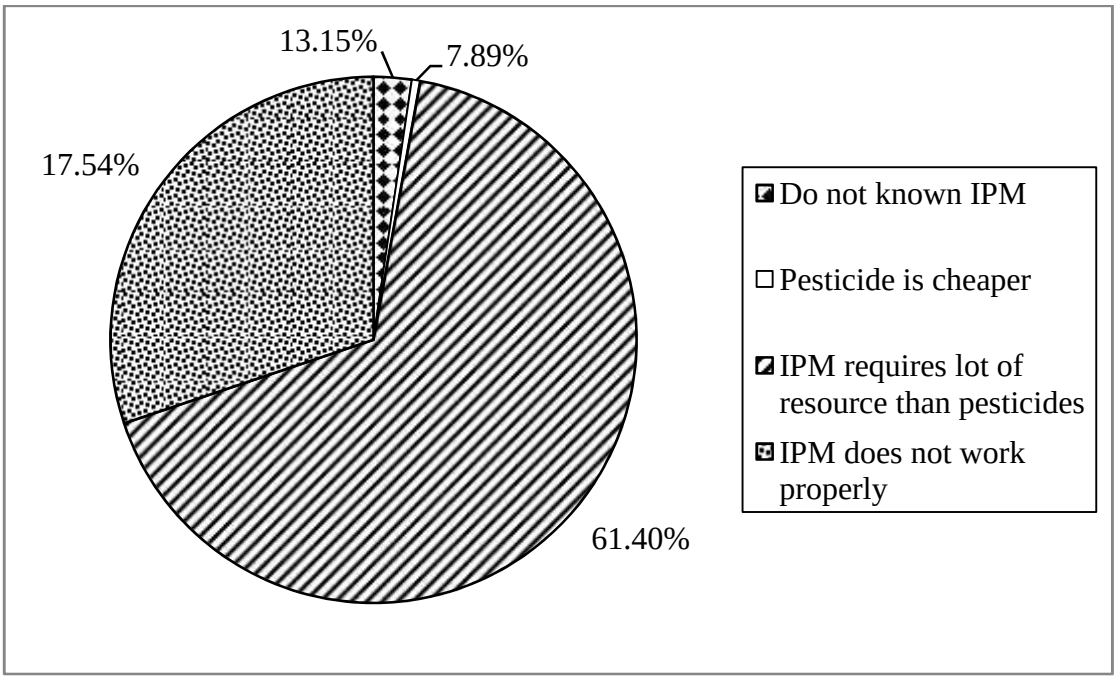


Figure 4.4 shows that 61.40 percent vegetable grower were not used IPM due to lack of knowledge, 13.15 percent were felt IPM technique was expensive, 17.54 percent vegetable growers were said that IPM was required lot of resources than pesticide application and 7.89 percent vegetable growers were said that IPM was not work properly.

Above mentioned opinions were responsible factor of not following IPM application in their farming. The main reason of not following IPM system was needs of lot of resourced to be mobilized which was out of their grip. Therefore, if government and its concern body want to eco-friendly vegetable farming, subsidy and secretarial help is necessary. Therefore, first of all, District Agricultural Office should conduct awareness programmes providing the positive aspect of IPM application, and secondarily technical as well as subsidy in purchasing agricultural instrument should be provided.

4.4.6 Waste disposal technique or method

Pesticide waste is characterized by high concentrations of a diversity of chemicals which are hazardous to human health therefore; it should be managed in a proper wayotherwise the remaining residues can contaminate the environment and come in contrast to human through various medium. In Nepal, water pollution is the most serious environmental quality issue that generated during improper handling, storage, transport, accidents and environmental contamination due to unsound disposal.

Table 4.16: Educationwise method of using pesticide disposal materials

Education	Use of another purpose		Burn		Sale		Bury	
	No.	%	No.	%	No.	%	No.	%
Illiterate	2	6.67	3	5.35	1	5.55	1	10
Literate	12	40	30	53.57	10	55.55	6	60
Secondary	9	30	15	26.78	5	27.77	2	20
Higher education	7	23.33	8	14.28	2	11.11	1	10
Total	30	100	56	100	18	100	10	100

Table 4.16 shows that 30 respondents were said that they were usedcans and pots of pesticides for another purpose. Among them illiterate respondents were 6.67 percent, literate respondents were 40 percent, secondary level education attainders were30 percent and respondents with higher education were 23.33 percent. Similarly, rest 84 respondents were disposed pesticides vessels and cans by using different disposal

means i.e. Burn, Sal and Bury. Majority of the respondents i.e. 56 respondents were burned, 18 respondents were sold whereas only 10 respondents were buried.Respondents were told that they were burn for pesticide waste materials among them illiterate were 5.35 percent, literate were 53.57 percent, secondary were 26.78 and higher education were 14.28 percent. Likewise, among 18 respondents were told that they were sold for pesticide waste materials, among them illiterate were 5.55 percent, literate were 55.55 percent, secondary were 27.77 and higher education were 11.11 percent. Moreover, 10 respondents were told that they were buried pesticide materials, among them illiterate were 10 percent, literate were 60 percent, secondary were 20 percent and the secondary with higher education were 10 percent.

The above data shows that, most of the respondents were burn for pesticide waste materials. They haven't proper technique about the pesticide waste materials. Among them some were aware of pesticide waste materials disposal technique; they used of another purpose and sale as well. In Nepal, no organized national survey and institute has so far been conducted periodically regarding the pesticide use and its waste materials disposal technique. So we can say pesticides analysis facility is limited in Nepal. In order to take the sound quality of soil, air and environment government should reduce the gap between the availability of manpower and its demand.Similarly, exchange visits, training and other supports by the donor agencies are necessary in order to improve the situation.

In order to find the factual information, the researcher was made observation checklist whether respondents are doing one thing and telling another one. The situation of waste disposal technique observed in the field is shown in following table.

Table 4.17: Waste disposal technique

Disposal technique	**No.**	**Percent**
Good	48	42.11
Satisfactory	10	8.77
Poor	56	49.12
Total	114	100.00

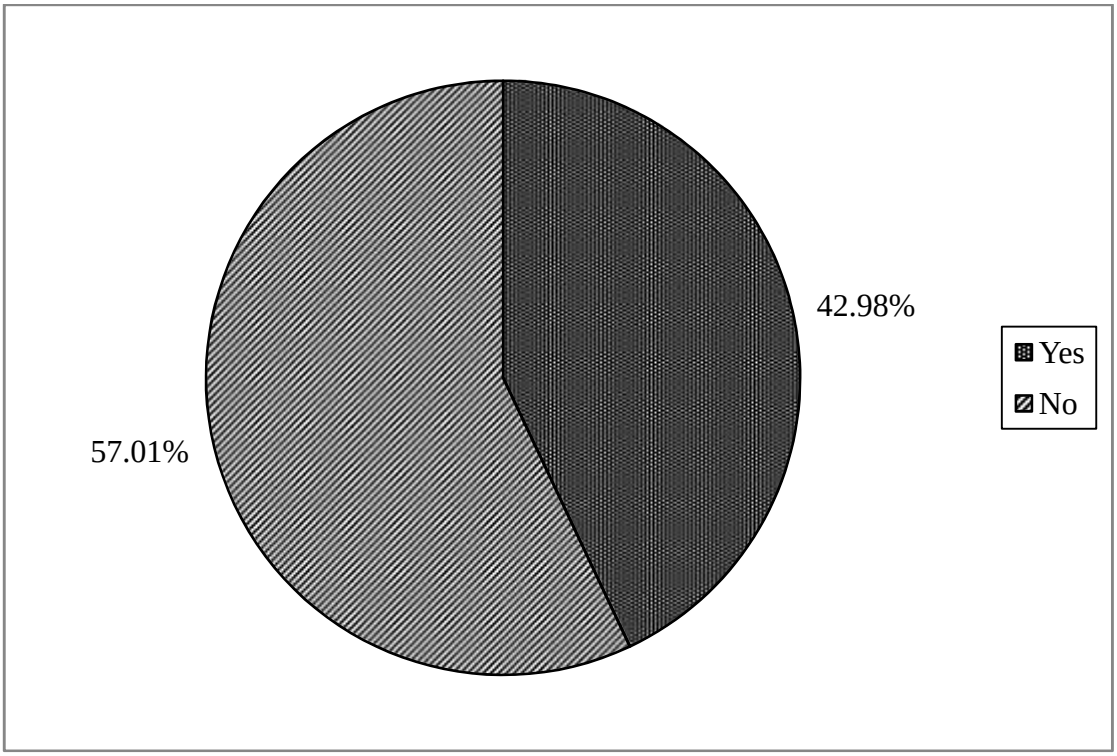
Above table 4.17 shows the information regarding observation checklist which was cross checkedwhether respondents were telling true or not. People who were using of another purpose, and sale waste pesticide materials were included in good; people who were burn of waste pesticide materials were included in poor; those who were using bury of waste pesticide materials were included in satisfaction.

Comparing the interview schedule and observation tool, method of waste disposal techniques was found good then they response. While asking questionnaire only 18 respondents were habit of selling pesticides vessels but, while observing less than that of people i.e.48 percent were selling habit. That indicates that people were kept hesitation of expressing their selling habit of pesticides vessels and pots. In agrarian society, people are still not practical. They perceive selling vessels as social shame. Therefore, although people were sold vessels rather told they born or bury it. From the perspective of health too, burning practice can be ill practice. Mostly waste disposal technique was found in poor condition i.e. burn was preferred to waste disposal technique by more population in the study area. It seems practical knowledge is needed to the people regarding the disposal system.

4.4.7 Use of personal protective equipment's and safety measures

Personal protective equipment's include clothing and other devices that protect the body from contact with chemical such as pesticides. Pesticides enter into the body through three main routes such as dermal/secular respiratory, inhalation and ingestion. When pesticides inters into the body, that react and result may lead towards human lose too. Therefore, personal protective equipment and safety measures are essential to apply while using pesticides. The following figure shows the knowledge and practice of personal protective equipment's and safety measures in the study area.

Figure 4.5: Use of personal protective equipment (PPE)



The results showed that only 42.98 percent of the farmerswere used personal protective equipment (PPE) during pesticide application and 57.01 percent were not used.

The majority of farmers in the study area were unaware of the harmful effects of pesticides so they may often adopt risky behaviors because of poor understanding of safe practices in pesticide use or they are more concerned with high economic returns from their crops than with their own health. Maximum number of the respondents in this study were literate or had formal education but did not receivedproper training or technical support in pesticide safety. Consequently, these farmers are hampered to understand pesticide risk, safe use and method to avoid the risks of exposure. The fact that the high number of the farmers (42.98%) indicated that they did not use PPE is a great cause for concern, and perhaps indicates a general ignorance of the importance of PPE in reducing exposure risk. Cleary it has seen that organization or institution related to agriculture or district agriculture office should conduct a program or training in order to save farmers from pesticides effect.

4.4.8Use of personal protective equipment (PPE) when before using of pesticide in the field

Personal protective equipment includes clothing and devices that protect the body from contact with chemicals such as pesticide. Pesticide enterer the body through three main routes such as dermal / ocular; respiratory / inhalation, and ingestion. PPE is designed to protect the route of exposure to human from a wide variety of pesticide type and toxicity. In the study area, respondents were using gloves, mask and whole body covering clothes that were made locally. PPES was the important equipment from protection of pesticide exposure.

Table 4.18: Use of personal protective equipment

S.N.	Equipment	Number	Percentage
1	Mask	56	49.12
2	Glass	0	0
3	Gloves	46	40.35
4	Full sleeve shirt	12	10.52
Total		114	100.00

Table 4.18 shows that 49.12 percent respondents were used mask when before using of pesticide in the field. Likewise, 40.35 percent respondents were used gloves before using of pesticide in the field. Moreover, 10.52 percent respondents were used full sleeve shirt while using of pesticide in the farm.

In this study, masks, sleeve shirt and gloves were considered as major PPEs. The most popular PPEs were masksonly which is not fully protectable from pesticides effect. All farmers used the chemical non-resistant PPEs which does not prevent completely from pesticide from entering the body. They did not follow the safety precaution resulting higher risk of exposure with pesticide intoxication.

Precautions are must while applying pesticides. During the time of interview all the respondents were replied that all of them were using different types of PPEs. In order to justify, whether they are telling lie or true, the researcher was used observation checklist. The following table shows whether they were telling truth or false statements.

Table 4.19: Use of PPEs

Use of PPEs	No.	Percent
Good	102	89.47
Satisfactory	12	10.53

The researcher was ratify the PPEs rating scale as if people were used mask, glass and gloves, they were included in good; if people were used only full sleeve shirt, it was included in satisfactory. The rating shows that use of PPEs before using of pesticide in the field, 89.47 percent of the respondents were good and 10.53 percent of the respondents were satisfactory.

Comparing and contrasting the interview schedule and observation tool, number of user of PPEs were found similar. Therefore, from this verification, it can be said that in the study area PPEs practice was found similar as they opined in interview schedule. Hence, in aggregate, the practice of PPE was in good condition.

4.4.9 Method of pesticide determination while before preparing usable

There are various methods of pesticide determination while using of it.Information given in level incorporates pesticide seller prescription, information given by ministry of agriculture. Methods of pesticide determination while before preparing usable of respondents are given table.

Table 4.20: Pesticide determination while before preparing usable

S.N.	Particular	Number	Percentage
1	According to information given in level	39	34.21
2	According to pesticide seller prescription	47	41.23
3	Follow the information given by ministry of agriculture	14	12.28
4	Use by own experience	14	12.28
Total		114	100.00

Above table 4.20 indicates that 34.21 percent pesticide user were prepared usable pesticide on the basis of information given on the pesticide cover, 41.23 percent user

were taken advice through pesticide seller, 12.28 percent user were used information of ministry of the agriculture and 12.28 percent user were prepared usable pesticide on their own knowledge.

Educated farmers are more knowledgeable about pesticide safety, have better ability to read, understand and follow hazard warnings on labels, and conceptualized the consequences of poor pesticide usage practices. Even when able to read, some respondents in this study acknowledged they were reluctant to read pesticide labels while some used the pesticide by own experience self which is more risky practice for individual health as well as environment. So, all farmers should be trained on IPM and regular monitoring from the government side is essential.

So as to verify information from collected questionnaire survey, researcher was made observation checklist too. Regarding the above information, a checklist observation was also made. The following table shows information collected by researcher using checklist observation.

Table 4.21: Pesticide determination

Determination of practice	No.	Percent
Good	61	53.51
Satisfactory	39	34.21
Poor	14	12.28
Total	114	100.00

People determination of pesticide method according to pesticide seller prescription and follow the information given by ministry of agriculture was included in good; determination of pesticide method according to information given in level was included in satisfactory; and pesticide determination own experience was included in poor.

The ratio shows that the determination of pesticide before preparing it usable, 53.51 percent of the respondents were remained good, 34.21 percent of the respondents were remained satisfactory and 12.28 percent respondents were remained poor.

Comparing the interview schedule and observation tool, method of pesticide determination while before preparing usable was found similar. Mostly pesticide determination practice was found in good conclusion.

4.5 Summary of findings

4.5.1 Summary

This research about awareness on pesticide in relation to study was undertaken as discover to the awareness and practice of pesticide among the vegetable farmers of Bhimdatta municipality. This study aims to find out the level of awareness and practice of pesticide usein vegetable farming.

This study has been undertaken within exploratory as well as analytical research design. The main sources of data for this study were primary source which were taken from vegetable farmers through the use of interview schedule and observation checklist. In this research primary sources of data were used, whereas secondary data from CBS report, unpublished thesis, journal, articles and books were used in order to make this study more informative.

For this study,114 vegetable farmers including 48.88 percent female and 57.01 percent male respondents were selected through purposive sampling method. In this study, information was collected with the help of interview schedule and observation checklist. The data were tabulated and analyzed according to the objective of the study. Simple statistical tool percentage is used in analyzing and interpreting the data. Information collected through observation checklist and questionnaire schedule have been presented through tables and figures.

The study shows that awareness level of vegetable farmers regarding use of pesticideswere poor. Poor awareness level on using pesticides and the current situation of pesticide application found to be miserable as they were dealt with the unsecure practices of pesticide application were dangerous practices. If the situation goes on in this way, unpredictable incident is inevitable in near future. The pesticide application trend is huge in nationwide pesticide application occurred many more

hazards but did not take functional action for controlling this through government and public level. So, this research, why not in a single practice, certainly tries to knock the door of its concerning authority.

With regards sharing of pesticide experiences, most vegetable farmers were used pesticidesin order to apply on vegetable without paying any attention towards safety. They believe that pesticides do not harm for man and vegetable, pesticidesside effects are normal for human health. According to Nepal occupational health act, it is strongly prohibited to sell during the functional period of pesticide, beside this act, practicability is quite opposite, vegetable farmers are deliberately selling vegetable during functional period. Most of vegetable growers were unknown of integrated pest management method as well as the use of personal protective equipment.

4.5.2 Findings

After analyzing and interpreting the collected information, the findings are derived. The summaries of finding of this study were presented by following.

a. Among 114 vegetable farmers, 42.98 percent were female and 57.02 were male comprising 48.24 percent Brahmins/Chhetri,18.42 percentTharu, 7.89 percent Dalit and 25.43 percent were Muslim.

b. Majority of the respondents (93.75%) were literate and (6.25%) percent were illiterate.Among them 43.85 percent were less than 1 Katta land, 18.42 percent were 1 to 2 kattha lands, 11.40 percent were 2 to 3 kattha lands and 26.91 percent were more than 5 kattha of their land. Among them26.9 percent respondent's monthly income was below 10 thousand, 52.69 percent respondents' income was 11 to 80 thousand, 15.78 percent respondents income was 21 to 30 thousands and 5.26 percent respondents income was 31 thousands.

c. Most of farmers used pesticide for to prevent vegetable from pest (44.73%), to kill the pest (28.07%), increase of productivity (21.92%) and 5.26 percent others used pesticide in vegetable by the farmers.

d. Of the respondents, 48.24 percent pesticide user take a bath right after the use of pesticide, 35.08 percent pesticide user clean hand and foot after the use of pesticide, 10.52 percent change the clothes after the use of pesticide and 6.14 percent pesticide user others do right after the use of pesticide.

e. Respondents were suffering from precaution less pesticides use, among them 40.35 percent respondents were eye irritation, 25.68 percent were headache, 24.56 percent were skin irritation,7.89 percent were fever and 3.50 percent were other problems.

f. Among them 54.38 percent respondents dose to use get information from the materials, 13.15 percent respondents caution get information from the materials, 6.14 percent respondent warning get information from the materials and 26.31 percent respondents technique of safety use get information from the materials.

g. Majority of the respondents i.e. 51.75 percent were not aware about functional period of pesticide. 40.35 percent growers use/sell vegetable during the 1-4 days period of pesticide application, 26.31 percent growers use/sell vegetable during the 5-8 days period of pesticide application, 21.92 percent growers use/sell vegetable during the 9-15 days period of pesticide and11.40 percent growers use/sell during above 16 days.

h. More than 55.26 percent vegetable growers are not trained in the basic training on pesticide management and application and 44.73 percent vegetable growers are trained in the basic training on pesticide management and application.

i. Almost the 61.40 percent vegetable growers have not the knowledge of IPM. Only 38.59 percent vegetable growers have the knowledge of IPM. Among the IPM knowledge having vegetable growers only 40 percent use any integrated pest management method still 60 percent were not practiced of IPMtechnique. 61.40 percent vegetable growers not use IPM technique because the reason for do not knowledge of IPM technique, 13.15 percent not use IPM technique because the reason for pesticide in cheaper, 17.54 percent not use IPM technique because the reason for IPM requires lot of resource than pesticide and 7.89

percent not use IPM technique because the reason for IPM does not work properly.

j. Majority of the vegetable growers i.e. 64.31 percent were disposedpesticide vessels with others waste technique, 21.98 percent vegetable growers bury, 8.77 percent vegetable growers sale and 4.38 percent vegetable growers use of another purpose.

k. Only 42.98 percent of the farmer used personal protective equipment (PPE) during pesticide application and 57.01 percent did not use it. Of the farmers87.71 percent were not used glove or hand protection only 12.28 percent was wear gloves during pesticide spraying, 58.77 percent were not used mask during pesticide spraying only. 41.28 percent respondents were wear mask, 91.22 percent were not used glass during pesticide spraying, only 8.77 percent were wear glass during pesticide spraying.

l. Of the respondents, 41.22 percent farmers were made pesticides solution useable according to pesticide seller prescription, 34.21 percent farmers were prepared according to information given in level, 12.28 percent farmers were prepared following the information given by ministry of agriculture and 12.28 percent farmer were made pesticides solutionon their own rational.

CHAPTER - V

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Vegetable growers from Bhimdatta municipality took part in the study that accesses their awareness and practice related to pesticide use in vegetable farms. Following are the key points concluded from this study. Demographic features of the vegetable growers showed that majority of them were literate. Their awareness about health hazards from pesticide was indicated by the response they gave to the interview schedule and observation checklist. Farmers of the Bhimdatta the study areas was a good level of awareness regarding pesticide they used, but in particular, the farmers seemed to be unaware of real pesticide risks and they looked safety education like, duration of reentering in the field, cleaning of application, using recommended level of pesticide and the hygiene and sanitation practices of the pesticide users require much more improvement. Pesticide use in increasing highly hazards pesticide (WHO class 1a and 1b) are stilling use. Vegetable growers rarely use safety measure during pesticide application. Avoid spraying in bright sunshine and windy condition and cover face with a piece of cloths (gloves and mask) was not practiced properly. Farmers known that pesticide should be used safely, but they are not conscious about risk in addition, they are applying the pesticides with the bare hand without using apron, mask, gloves etc. Similarly, they spray pesticide even in the bright sunshine. Meanwhile, it's to be notice that more than 30 percent of the applied pesticide ultimately returned to the soil, environment which in turn destroy the soil, environment which in turn destroy the soil micro-fauna. No adequate safety measures are adopted. Increasing pesticides use was affected farmers health. Farmers were unknown about negative health impact and were willing to pay more for safety alternatives.

In addition, the farm workers did not take enough protection measures, which may have exposed them to higher intoxication risk, integrated pest management (IPM) training, limited availability and non-use of PPE all contribute to the health hazards of

pesticide users many farmers are suffering from the different health hazards, but lack of awareness, about the health effects were seemed as well as were not reported. They may be crop rotation of inter cropping solzrization and phytosanitation and picking, mask collection and destruction which can be done easily and are safe for health. One of the worst practice followed vegetable farmers was not any consideration of waiting period. In one hand, farmer were using most toxic pesticide having waiting period more than15 days and in other hand, they were sold immediately even after spraying to make their business profitable without any considerations to the health of consumers.

5.2 Recommendations

After analysis and interpretation the whole data, the researcher had made following recommendations:

5.2.1 General recommendations

The general recommendations of the study are as follows:

a. First of all, pesticide users should be aware in order to make responsible themselves. Although they have knowledge about negative consequences of pesticides, they are using it without applying minimum precautions. So, it is required to organize continuous refresher training on pesticide use, handling and disposal.

b. Generally, people are applying pesticides without personal protective equipment due to unavailability in market or they do not buy it in orderto save money. In this case farmers can apply their locally available instrument such as cotton piece, white plastic piece, full sleeve shirt and pants, so as to covertheir nose, mouth, eye, bare hands and legs.

c. Government of Nepal, Ministry of Agriculture should be provided subsidy on agricultural equipment, PPEs, and pesticides through district agriculture office conducting at least one training with one month. If so, farmers would be aware

and refresh about side effect of pesticides, using techniques and precaution methods as well.

5.2.2 Recommendation for national policy

The recommendations for national policy are as follows:

a. The government policies must give emphasis on minimizing the use of chemical pesticide and should promote the non-chemical measures of pest control.

b. Government should regulate the use of pesticide and make the policy to give authorization to the farmers who are not following the waiting period consideration. Good policy so as to regulate the marketing, storage, disposal use and safe handling of pesticide.

c. Agricultural and environmental planners need to review their strategies including those relating IPM from a health perspective.

5.2.3 Recommendations for further research

The recommendations for further study are as follows:

a. Pesticides use in vegetables and its impact on human health can be done.

b. A research on gap between awareness and behavior of vegetable growers on pesticide application can be used.

c. Comparative study of organic farming and inorganic farming and its impact on human health can be conducted.

REFERENCES

Akhtar, A.; Ahmad M.; Ali, T. et al. (2007). *Vegetable growers' awareness about health safety measures and pesticide use in Pakistan.* Punjab: Punjab Press.

Atreya, K. (2010). *Pesticides use knowledge and practice: A gender difference in Nepal.* Kathmandu: Author.

Atreya, K.; Sitaula, B.K.; Hons, O.; Bajracharya, R.M. and Sharma, S. (2013). Knowledge attitude and practices of pesticide use and acetylcholinesterase depression among farm workers in Nepal. *International journal of environment health research*, downloaded by [HINARI] on: 26 may 2013 at 09:17.

CBS (2006). *Agriculture census Nepal 2001/02.* National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

Central Bureau of Statistics (CBS). (2012). Nepal Living Standard Survey (NLSS). 2010/11. National Planning Commission, Government of Nepal, Kathmandu.

Khatri, P. (2015). *Knowledge and use of pesticide and it's effect on the health of farmers at Devinagar VDC in Palpa district.* An unpublished M.Ed. thesis submitted to Health, Physical and Population Education Department, Tribhuvan University, Kirtipur.

Kishi, M.; Rahel, A.; Kenan, J., John T. and Sahel, N. (1995). *Pesticides and its effect on human health.* UK: University Press.

Koirala, P.,Dhakal, S. and Tamrakar, A.S. (2009). Pesticde and food safely issues in Nepal. *The journal of agriculture and environment.* Nepal: p. 36, vol. 10.

Manandhar, D. N. (2005). *Inventory of pesticides in Nepal.* Report submitted to POPs enabling activities project, Ministry of Environment, Science and Technology, Kathmandu, Nepal.

Ministry of Finance (MoF). (2013). Economic Survey, 2012-13., Government of Nepal.

N. Mahantesh & Singh, A. (2009). *A study on farmers knowledge, perception and intensity of pesticide use in vegetable cultivation in western uttar pradesh.* Pusa Agriscience, 32: 63-69.

NARC (2005). *Annual report entomology division.* Nepal Agriculture Research Council (NARC), Kathmandu, Lalitpur, Kathmandu.

Palikhe, B. R. (1998). *Challenges and options of pesticide use: In the context of Nepal.* Lalitpur: Plants Protection Directorate.

Panta, D. & Jayana, B.L. (2008). Study on major pesticides and fertilizers used in Nepal.*Scientific World*. Vol. 6 No. 6, Pp. 76-80.

Pesticides registration and management section (PRMS) (2006). *Pesticide registration and management program: Introduction, achievements and directives Nepal.* Ministry of Agriculture and Cooperatives Department of Agriculture.

PPD (2003). *Crop protection program: Introduction, achievements and operational procedures.* Plant protection directorate, Ministry of agriculture and cooperatives, Department of Agriculture, Kathmand, Nepal.

PPD (2008). *Plant protection program, plant protection directorate.* Department of Agriculture (DoA), Ministry of Agriculture and Cooperatives Hariuhar Bhawan, Nepal, p. 241.

Shreestha, P.; Koirala, P. & Tamrakar, S. (2010). Knowledge, practice and use of pesticides among commercial vegetable growers of Dhading district. *The journal of agriculture and environment, Nepal.* Vol. 11: 2010.

Thapaliya, A. (2014). *Hazardous aspect of pesticide use in agriculture of Bhandara VDC.* An unpublished M.A. thesis submitted to Rural Development Department, Tribhuvan University, Kirtipur.

WHO (2004). *Guidelines on situational analysis on public health pesticides management.* Geneva: WHO.

Yassin, M.M.; Abumourad, T.A. and Safi, J.M. (2002). *Knowledge, attitude, practice and toxicity symptoms associated with pesticide use among form workers in the Goza strip.* BMJ, OCCUP, Environ Med. 2002; 59: 87-394.

APPENDIX- I

QUESTIONNAIRE SCHEDULE

Dear respondents Namaste,

The purpose of this interview schedule is to study the awareness and practice of using pesticide in vegetables. Please provide your view on the following question the answer to be best of your knowledge and information.

Do you agree to participate in the interview?
(a) Yes (b) No

If yes, continue the interview.

(A) General Information

Name of respondents:- Age: Sex:
Address: Ethnicity:
Education level (Illiterate/literate/secondary higher education)

Relation to Guardians:-
Average monthly income:-
Major source of income:-

(B)Household Information

1. How much area of land does your family have ?
   (a) Less than1 katta (b) 1 to 2 katta
   (c) 2 to 3 katta (d) More than 3 katta

2. In how much area do you cultivate the vegetable ?
   .....

3. Do your family have radio/T.V. facilities ?
   (a) Yes (b) No

4. Do your family know agriculture program broadcasting on radio and television ?
   (a) Yes (b) No

(C) Awareness of Pesticides

1. Do you know about the pesticide ?
   (a) Yes (b) No

2. If yes, what is pesticide ?

   .....

3. Do you use pesticide in the vegetables ?

   (a) Yes (b) No

4. If yes, why should you use they pesticide in the vegetable ?

   (a) To kill the pest
   (b) To increase the productivity
   (c) To prevent vegetable from pest
   (d) Others

5. Do you know to use safety equipment ?

   (a) Yes (b) No

6. If yes, why do you use safety equipment ?

   .....

7. Do you know what types of pesticide use in the vegetables ?

   (a) Extremely hazardous (b) Highly hazardous
   (c) Moderately hazardous (d) Non-hazardous

8. From where do you think to buy the pesticide ?

   (a) Shop (b) Agriculture department
   (c) Authorized shop (d) Others

9. Which types of personal hygiene do you keep after the application of pesticides ?

   (a) Take a bath (b) Clean hand and foot
   (c) Change the clothes (d) Others

10. Why do you keep such hygiene ?

    (a) To secure from side effect of pesticide.
    (b) To minimize the effects of pesticide
    (c) Others.

11. Do you have heard any health hazards due to exposure / use pesticides ?

    (a) Yes (b) No

12. If yes, where ?

    (a) Community (b) Family
    (c) Neighbors (d) Others

13. What kind of effect does pesticide affect to human health ?

(a) Eye irritation (b) Headache
(c) Diziness (d) Diarrhoea
(e) Vomiting (f) Shortness of breathiness
(g) Favor (h) Skin irritation

14. Which types of information related materials do you get while buying the pesticides ?

(a) Posters (b) Pamphlets
(c) Others

15. What kinds of information do you obtain fro the materials ?

(a) Caution (b) Warning
(c) Does to use (d) Technique of safety use

16. Do you know functional period of pesticide ?

(a) Yes (b) No

17. After how many days difference do you use / sell vegetable the application of pesticides ?

(a) 1-4 days (b) 5-8 days
(c) 9-15 days (d) Above 15 days

(D) Practices of Pesticides

1. How many years you have been doing agriculture ?

(a) Less than 10 years (b) 11 to 20 years
(c) 21 to 30 years (d) Above 31 years

2. How many hours do you work in the field in a day ?

(a) Less than 3 hours (b) 4 to 6 hours
(c) 7 to 9 hours (d) More than 10 hours

3. Have you received basic training on safe handling and applying pesticides ?

(a) Yes (b) No

4. If yes, where ?

(a) District agriculture office.
(b) NGO
(c) INGO
(d) Others

5. Have there any types of programs been conducted in your village related to pesticide ?

   (a) Yes (b) No

6. If yes, by which organization / agency have the programs have been conducted ?

   (a) District agriculture office.
   (b) NGO
   (c) INGO
   (d) Others

7. Have you involved in those programs ?

   (a) Yes (b) No

8. Do you know about integrate pest management ?

   (a) Yes (b) No

9. If yes, do you currently practice any IMP technique ?

   (a) Yes (b) No

10. Which method do you use ?

    (a) Organic production (b) Biological control
    (c) Light trap (d) Rotation of crop
    (e) Manual clearing (f) Others

11. If not, why do you not practice IPM ?

    (a) Pesticides is cheaper ?
    (b) IPM requires lot of resources then pesticides
    (c) IPM doesn't work properly
    (d) Do not knowledge of IPM

12. Where do you store unused pesticides ?

    (a) Unlockcabinet inside the house
    (b) Outside the house
    (c) In a locked store room / shed
    (d) Others

13. What do you do with the pesticides containers ?

    (a) Use of another purpose
    (b) Bury
    (c) Sal
    (d) Others

14. Do you wear safety equipment while you working in the field ?

(a) Yes (b) No

15. If yes, what kind of safety equipments do you wear ?

(a) Gloves (b) Masks
(c) Glass (d) Sleeves shirts

16. In your family mainly who use pesticides ?

(a) Male (b) Female (c) Both

17. In your family children under 16 years age use pesticide or not ?

(a) Yes (b) No

18. If yes, why ?

(a) Lack of knowledge (b) Family compulsion
(c) High cost of labour (d) Lack of labour (e) Others

19. How do you determine amount of pesticide to use ?

(a) According to information given in levels
(b) According to pesticides seller prescription
(c) Follow the information given by ministry of agriculture
(d) Use of own experience

20. What do you do after spraying pesticide ?

(a) Clean the body with soap and water
(b) Clean the hand and foot with water and over soil
(c) Change the clothes
(d) Others

Thank you very much for your participation in this interview. Your answer will be extremely useful for the research, I assure that all the answers you have provided in this interview will be kept strictly confidential.

Thank you very much.

APPENDIX - II

CHECKLIST FOR INFORMATION

S.N.	Instruction	Yes	No
1	The farmer uses pesticides in vegetable.		
2	After using pesticides in the field he/she uses the following safely.		
	a) Wears mask		
	b) Wears glass		
	c) Wears gloves		
	d) Wears of full sleeves shirt		
3	After the use of pesticides, he/she cares about the following individual hygiene.		
	a) Wash the hand with detergent		
	b) Change the cloth		
	c) Take a bath		
	d) Others		
4	The farmer knows about the IPM techniques.		
5	The farmer follows the instruction according to the label of pesticides bottle/package.		
6	The farmer follows the departmental authorization while buyers and using the pesticides.		
7	The farmer aware the adverse effect of pesticides to his/her family.		
8	The farmer determines right the amount of pesticide to use.		
	a) According to the information given in label.		
	b) According to pesticide seller.		

	c) Following the information given by ministry of agriculture		
	d) Use by own experience		
9	The farmers displays a signboard or red flag or empty bottle in the sprayed area after an application in order to inform others.		
10	The farmer knows the classification of the pesticide according to their sensitivity.		
11	The farmer tears up / breaks the empty bottles / package and bury them under the ground.		
12	The farmer's children are involved in while spraying pesticides in the vegetables.		

Thank you for your meaningful participation.