A STUDY ON FARMER AWARENESS TOWARD ILL-EFFECT OF AGROCHEMICALS IN DHANAPUR BLOCK OF CHANDAULI DISTRICT, UTTAR PRADESH

काशी हिन्दू विश्वविद्यालय BANARAS HINDU UNIVERSITY

THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

Master of Science (Agriculture)

in

Extension Education

Supervisor

Prof. B. Jirli

Submitted by

Ram Gopal Jaisawal

DEPARTMENT OF EXTENSION EDUCATION
INSTITUTE OF AGRICULTURAL SCIENCES
BANARAS HINDU UNIVERSITY
VARANASI (U.P.) – 221005
INDIA

ID. No. 16412EXE011 **2020** **Enrolment No. 343077**

काशी हिन्दू विश्वविद्यालय BANARAS HINDU UNIVERSITY

कृषि विज्ञान संस्थान INSTITUTE OF AGRICULTURAL SCIENCES

Dr. B. Jirli
Professor and Head
+91 9450542832 (M)

Dept. of Extension Education
Institute of Agricultural Sciences
Varanasi – 221005

Ref. No..... *Dated .....*

CERTIFICATE

To,

The Registrar (Academic)
Banaras Hindu University,
Varanasi-221005 (India)

Through: The Head, Department of Extension Education, Institute of Agricultural Sciences, B.H.U, Varanasi.

Dear Sir,

This is to certify that the thesis entitled **"A study on farmer awareness toward ill-effect of agrochemicals in Dhanapur block of Chandauli district, Uttar Pradesh"** submitted in partial fulfilment of the requirements for the degree of **Master of Science (Agriculture)** in **Extension Education,** from Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (U.P). , is a record of bonafide research carried out by **Mr. Ram Gopal Jaisawal**, **ID. No. 16412EXE011**, under my supervision and no part of the thesis has been submitted for any other degree or institution.

I certify that the entire scheme of investigation reported here in was planned and carried out solely by the candidate under my guidance and supervision. The data presented in the thesis, to the best of my knowledge and belief, are genuine and have not been utilized for the award of other degree or distinction.

Thanking you,

Yours faithfully,

Forwarded by

(B. Jirli)
Supervisor

Head of Department

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APPROVED BY THE ADVISORY COMMITTEE

Chairman
Dr. B. Jirli
Professor and Head
Department of Extension Education
Institute of Agricultural Sciences
B.H.U., Varanasi, India

Member
Dr. Kalyan Ghadei
Professor
Department of Extension Education
Institute of Agricultural Sciences
B.H.U., Varanasi, India

Member
Dr. P.S. Badal
Professor
Department of Agricultural Economics
Institute of Agricultural Sciences
B.H.U., Varanasi, India

External Examiner

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Date:
Place: Varanasi *(Ram Gopal Jaisawal)*

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Chapter I

INTRODUCTION

Traditionally Indian agriculture was practiced using organic techniques. All the nutrients and plant protection mechanism required for plan growth obtained from plant and animal products. But due to rising population and other natural calamities led to severe food scarcity and the government was forced to import food from other countries. As importing food was not the only solution, government started its most important programme of Indian history *i.e.* 'Green Revolution' under the leadership of M. S. Swaminathan in 1960s. Because of green revolution large portion of land was brought under cultivation of high yielding variety seeds and several chemical fertilizers and pesticides were used in larger quantities. Agrochemical played a significant role in producing more food. These chemicals were widely used all over the world to raise agricultural production to control pest disease and weed other plant pathogens and to eliminate yield losses.

About 90 % of this quantity is comprised of insecticides and herbicides with about equal share each. Fungicides represent about 10 percent of the total. Use of pesticides in India is increasing at the rate of two to five percent per annum and is about three percent of total pesticides used in the world. About 90,000 metric tons of technical grade pesticides are currently produced and more than 67 percent is used in agriculture sector alone (Nigam and Murthy, 2000).

Unselective use of high dosage fertilizers has caused several problems on the farm as well as outside farm. Plants become more prone to pests and infections and their control could be effectively done by using high effectiveness poisonous chemicals. As a result, their residue on plants and in the soil had led to health threats (Malathi and Bangarusamy, 2001).

Similarly, additional nitrogen as nitrate and phosphate percolated through the soil and entered natural sources of drinking water also responsible for health risks. The negative effects of chemical fertilizers on plants are reduction in germination,

retardation in seedling growth, scorching and increased susceptibility to diseases (Asha *et al*., 2001). Methemoglobinemia (blue baby disease) in infants, cancer and respiratory illness in human beings etc. because of eutrophication and plant toxicity due to excessive availability of inorganic and organic nitrogen in surface water and soil (Addiscot, 1996).

Self-poisoning with pesticides accounts for 14–20% of global suicides, estimated 110,000–168,000 deaths each year, down from an estimated 371,000 in the late 1990s. (Bonvoisin, T., *et al*, 2020)

Currently, India is the fourth largest global producer of pesticides with an estimated market size of around $4.9 billion in FY17 after United States, Japan and China, and the per capita consumption of pesticides in India is 0.6 kg/ha. (Outlook of Indian Pesticide May 31, 2017)

Production of fertilizer has increase at CAGR 11% from FY15-18 due to increased consumption of fertilizers per hectare currently 165 kg/ha. Further government of India is providing fertilizers like Urea, DAP, Complex fertilizers in subsidize way which has increased consumption. (FICCI: Role of Agrochemicals in Sustainable Farming, 2019)

Indian farmers are not aware of the cost benefit ratio for use of pesticides due to lack of awareness on optimum pesticides use hence per capita consumption of pesticides of India stands at 0.27(kg/Ha) which is lower than other developed countries like China (13.06 kg/ha), Japan (11.85 kg/ha), Brazil (4.57 kg/ha) and other Latin American countries which in turn lowers food productivity causes loss of crops caused by pest attacks. (FICCI: Role of Agrochemicals in Sustainable Farming, 2019)

Paddy accounts for the maximum (26%-28%) share of pesticide consumption followed by cotton (18%-20%). Andhra Pradesh is leading consumer of agrochemicals with share of 24%. Eight states including Andhra Pradesh, Maharashtra, Punjab, Madhya Pradesh, Chhattisgarh, Gujarat, Tamil Nadu and

Haryana account for more than 70% usage of agrochemicals in India. (FICCI: Role of Agrochemicals in Sustainable Farming, 2019)

Maharashtra consumed the most chemical pesticides in India in the past five years at 61,138 tonnes, followed by Uttar Pradesh (UP) at 52,747 tonnes and Punjab at 29,394 tonnes, according to non-profit Pesticide Action Network (PAN).Maharashtra increased its pesticide consumption by 35.6 % between 2014-15 and 2018-19, while Uttar Pradesh reported an increase of 14.17 percent. Bio pesticides accounted for only 10 % of the total pesticides consumed, on an average. The country used 69,282 tonnes of pesticides (chemical and bio pesticides combined) in 2017-18 and 16 % higher than pesticides used in 2015-16. (https://www.downtoearth.org.in/news/agriculture/maharashtra-consumed-the-most-chemical-pesticides-in-5-years-report-69880)

Food crops must compete with 30,000 species of weeds, 3,000 species of nematodes, and 10,000 species of plant-eating insects. Agrochemicals are the last and one of the key inputs in agriculture for crop protection and better yield. Currently, India is the world's 4th largest producer of agrochemicals after the United States, Japan, and China and has emerged as the 13th largest exporter of pesticides globally. (Source: The Free Press Journal, 2020)

Agrochemicals can be broadly classified into 5 types: Insecticides, Fungicides, Herbicides, Bio-pesticides, and Others. Production of pesticides in India in 2014-15 was 186000MT, in 2015-16 was 188000 MT, in 2016-17 was 241000MT, in 2017-18 was 213000MT, in 2018-19 was 217000MT. (Ministry of Chemicals & Fertilizers, annual report, 2019-20)

Besides the choice of using chemical pesticides and bio-pesticides, the farmers always face a chief problem of accidently/unknowingly buying non-genuine/illegal pesticides. The market of non-genuine/illegal pesticides in India is rising day by day and it has become an alarming issue today.

The main reason for low per capita consumption of pesticides in India is low purchasing power of farmers and small land holdings. According to a report released by FICCI in association with Tata Strategic Management Group, in November 2015, the Indian crop protection market split shows that insecticides form the largest share accounting for 65 % of the total market. It is mostly because of severe infestation of white fly in cotton and land hopper in paddy. Fungicides and herbicides accounting for 15 and 16 %, respectively, of total crop protection chemicals' market split, respectively. (Source: Industry reports, Analysis by TATA strategic, 2015)

As years passed the chemical fertilizers and pesticides showed their late impacts on agriculture and these impacts were drastic. The land started losing its fertility and demanded even greater quantities of fertilizers. Insects and pests became immune and more toxic and expensive pesticides were now required. These extremely toxic agrochemicals got spread in the air, got absorbed by the soil or dissolved in the water and eventually reached everywhere in our environment. Pesticides also seeped into ground water which we consume and poisoned us. Besides, residual effect of pesticides also leads to very serious illnesses such as cancer and even death in both human beings and animals

Agrochemicals contact human body in four main ways: Oral exposure (when you swallow a pesticide), inhalation exposure (when you breathe in a pesticide), ocular (through the eyes) or dermal (through the skin) and exposure of the general population to agrochemicals occurs primarily through eating food and drinking water contaminated with agrochemical residues. It is apparent that agrochemicals will always remain fundamental tool to assure an abundant food supply but we can also not deny the fact that a major portion of applied agrochemicals may be lost to the surrounding environment, where they can adversely affect human and environmental health. Researches' have shown that agrochemical residues are continuously persisting and accumulating in human, animal body and environment causing harmful diseases. Some agrochemicals such as Carbofuran are highly noxious to human, only a few drops in the mouth or on the skin can cause extremely harmful effects. Other

agrochemicals such as Fenoxycarb are less toxic but too much exposure to them will also cause harmful effects

Agrochemicals can cause acute as well as chronic diseases. Patil and Katti in 2012 reported that acute problems like skin problems, itching, eye irritation and vision problems were very common among the farmers. A number of more severe symptoms were also reported like breathing problems, dehydration/ vomiting, and diarrhoea. It is also seen that the pesticides exposures are increasingly linked to various chronic diseases like immune destruction, hormone disturbance, diminished intelligence, reproductive irregularities and cancer.

In order to mitigate these health hazards and bring out natural balance and protection of ecosystems, the organic movement has started in several parts of the world, in which no chemical fertilizer and plant protection chemical is used in the cultivation of field crops, vegetables and fruits. The investigation of farmer's perception regarding pesticides impact on sustainable environment is an active area of research in crop science, agricultural extension and environmental studies. Already, more than a few studies have been conducted regarding farmers' perception, but they focused on climate change, untreated wastewater irrigation, or soil degradation *etc*. The present study is an attempt to investigate the farmer's perceptions towards ill effects of agro chemicals, their relationship with socioeconomic factors and suggestive measures to minimize the ill effects of agro chemicals as perceived by farmers

It is Important to find out the loop holes in the practices followed by farmers and bring about positive changes in them. It is also required to educate the farmers regarding the adverse effects of agrochemicals on their health and on environment. This study will help the scientists in making better package of practices for farmers for reducing the impact of agrochemicals on human health and environment. By spreading awareness among farmers regarding the proper use of agrochemicals, we can keep our environment clean and safe to live a healthy life.

Table 1.1: Insecticides and pesticides production data (Figures In 000' MT)

S. No.	Insecticides and pesticides	2017-18	2018-19
1.	PHENTHOATE	1.32	1.53
2.	PERMETHRIN TECH	1.53	1.86
3.	IMIDACALOPRID TECH	0.34	0.10
4.	CAPTAN & CAPTAFOL	1.76	1.93
5.	ZIRAM(THIO BARBAMATE)	0.72	0.76
6.	CARBENDZIM(BAVISTIN	0.03	0.02
7.	MANCOZAB	70.25	69.33
8.	HEXACONAZOLE	0.59	0.50
9.	M*ETC*ONAZOLE	0.40	0.34
10.	2, 4-D	25.83	24.24
11.	BUTACHLOR	0.00	0.00
12.	ETHOFUMESATE TECHNICAL	1.29	1.04
13.	THIAMETHOXAM TECHNICAL	3.28	5.57
14.	PENDIMETHALIN	3.78	2.82
15.	PHENTHOATE	1.32	1.53

Sources: Ministry of Chemicals & Fertilizers, annual report 2019-20)

Table 1.2: Consumption of chemical pesticides in Uttar Pradesh during 2016-17 to 2019-20

As on 13.04.2020		**Unit: Quantity in MT Tech. Grade**			
S. No.	**States/UTs**	2016-17	2017-18	2018-19	2019-20 (Prov.)
1	**Uttar Pradesh**	10614	10824	11049	12345

Source: States/UTs Zonal Conferences on Inputs (Plant Protection) for Rabi & Kharif Seasons. (Directorate of Plant Protection, Quarantine & Storage: 2020)

Statement of Problem

Decade by decade human population of India has been increased. So in respective ratio country need more food that's why Indian agriculture has been intensified during the last few decades. Then we applied indiscriminate amount of agrochemicals (fertilizers, fungicide and pesticides) for accomplishing the gap between food production and consumption; however, simultaneously unbalanced use of agrochemicals also cause environmental deterioration and severe challenges to aquatic and terrestrial ecosystems.

Looking to the immense importance of awareness on ill effect of agrochemical, the present study is planned entitled "A study on farmer awareness toward ill-effect of agrochemical in Dhanapur block of Chandauli district, Uttar Pradesh "of rural families of Dhanapur block of chandauli district of Uttar Pradesh with following specific objective -

1. To the study the profile of respondents.
2. To the study the awareness of respondents regarding ill-effects of agrochemicals on human health and environment.
3. To the study perceived severity of ill effect of the agrochemicals on human health and environment.

Scope of the Study

The study would indicate the awareness of farmers on effect of agrochemical on human health, problems faced by the farmers during agrochemical usage and signs and symptoms of illness of farmers due to agrochemical usage. Further, an attempt was made to study the socio-economic characteristics of farmer which may be useful to the extension functionaries in addressing the problems of farmer.

It may help the future researchers to get an insight into the problems faced by the farmers with regard to agrochemical usage, so that they may analyse the problems

in greater depth and suggest appropriate strategies for raising the awareness level of farmers.

Limitations of the Study

1. The present study is a single student's research hence the study was conducted in only one block Dhanapur of district Chandauli of UP state.
2. The study was carried out under limited period of time, finance and other resources.
3. The findings of the study were based on verbal expressions of the respondents. Therefore the findings were conditioned by the extent of reliable and valid information provided by those selected for the purpose of investigation.

Layout of the Thesis

This study is presented in five chapters as follows:

Chapter I: 'INTRODUCTION' gave a brief account of need and importance of the study, specific objectives, the scope as well as limitations of the study.

Chapter II: 'REVIEW OF LITERATURE', dealt with past studies, related to the present study.

Chapter III: Devoted for describing the 'METHODOLOGY' of the study including statistical tools.

Chapter IV: Dealt with 'RESULTS & DISCUSSION' of the study.

Chapter V: Dealt with 'SUMMARY AND CONCLUSIONS' of the study.

Chapter II

REVIEW OF LITERATURE

A comprehensive literature has become an essential part of any investigation, as it not only gives an idea about the work done in the past and helps to identify the gaps in the research findings. The review of the past research will be a forerunner of future research.

2.1 The profile of respondents.

2.2 Awareness of respondents regarding ill-effects of agrochemicals on human health and environment.

2.3 Perceived severity of ill-effect of the agrochemicals on human health and environment.

2.1 The profile of respondents

Vani (2002) studied in Guntur district of Andhra Pradesh and found that majority (43.33%) of the respondents belonged to middle age category, followed by young age (37.77%) and old age (18.90%) categories respectively.

Latha (2002) studied in Kurnool district of Andhra Pradesh and revealed that 35.00 per cent of respondents were educated up to high school level followed by middle school (28.33%), college and above (25.00%) and primary school (6.67%) in case of trained cotton farmers. Whereas, 36.67 per cent were illiterate followed by middle school (26.67%), primary school (16.67%) and functionally literate (11.67%) in case of untrained cotton farmers.

Latha (2002) studied in Kurnool district of Andhra Pradesh and reported that 40.00 per cent of trained cotton farmers had high level of mass media exposure followed by equal percentage of medium (30.00%) and low (30.00%) levels

Sangeetha (2004) studied in Madurai district of Tamil Nadu and revealed that majority (35.00%) of the cotton farmers were in middle age, followed by young (33.33%) and old age (31.67%) categories respectively.

Sangeetha (2004) studied in Madurai district of Tamil Nadu and found that majority of the cotton farmers (53.33%) were small farmers followed by medium farmers (31.67%) and large farmers (15.00%) respectively.

Faria *et al*. (2005) found out in their study in Southern Brazil that more than half of respondents were male and the prevalence of asthma symptoms was 12 % and chronic respiratory disease symptoms were 22%. Higher odd ratios for both asthma and chronic respiratory disease symptoms were found in women.

Ramu (2005) revealed that 26.67 per cent of the respondents were having middle school level of education followed by those having primary school (23.33%), high school (17.33%), functionally literate (13.33%), illiterate (10.67%) and college level and above (8.67%) education.

Kullayappa (2006) studied in Anantapur district of Andhra Pradesh found that majority (39.33%) of the groundnut farmers belonged to middle age category followed by old (30.67%) and young age (30.00%) categories.

Meharunnisa (2008) studied in Anantapur district of Andhra Pradesh and found that 58.33 per cent of groundnut farmers had medium farming experience followed by low (30.83%) and high experience (10.84%).

Meharunnisa (2008) studied in Anantapur district of Andhra Pradesh and revealed that majority 62.50 per cent of the groundnut farmers had medium level of mass media exposure followed by high (21.67%) and low (15.83%) levels of mass media exposure.

Sam *et al*. (2008) studied in south India and found that the effect of educational intervention among pesticide handlers and found out that educational programmes improved the knowledge, attitude and practice code for safe pesticide handling. It was recommended that continuous education and training programmes for

agricultural workers would promote awareness and reduce the threats of occupational pesticide.

Man and Sadiya (2009) studied in Malaysia and found that majority (81.20%) of rice farmers cultivated a small farm followed by medium (15.60%) and large (3.20%).

Kalyan (2011) studied in Chittoor district of Andhra Pradesh found that majority (52.50%) of the groundnut farmers belonged to middle age category followed by young (25.83%) and old age (21.66%) categories.

Kalyan (2011)) studied in Chittoor district of Andhra Pradesh found that majority (23.33%) of the respondents were educated up to middle school level followed by illiterate (20.00%), functionally literate (13.33%), primary school (13.33%), high school (12.50%) and intermediate (10.83%) categories and 6.66 % were educated up to college level.

Arathy (2011) studied in Thrissur district of Kerala and revealed that majority of the respondents had education level of high school (45.83 %) followed by higher secondary (20.00%), college level (15.00%), middle school (13.33%), primary school (4.17%), functionally literate (1.67%) and illiterate (0.00%) categories.

Kalyan (2011) studied in Chittoor district of Andhra Pradesh concluded that 58.33 % of the groundnut farmers are small followed by marginal farmers (29.16%) and big farmers (12.50%).

Slathia et al (2011) also found alike that lack of awareness regarding KCC (93.34%) and hesitation to make a telephone call to stranger (83.34%) were main constraints encountered by farm women while utilizing of Kisan Call Centre.

Pandey and Upadhyay (2016) studied in Udaipur, Rajasthan and found that knowledge about KCC service nearly one third of the respondents (30%) knew the name of KCC service and only21 per cent knew the purpose of KCC i.e. to make agriculture knowledge available at free of cost to the farmers as and when desired.

2.2 The awareness of respondents regarding ill-effects of agrochemicals

Cathey (1981) carried out a study in U.S.A. and found that earth worms, which were exposed under laboratory conditions to Aldrin, DDT, parathion and carboxyl in seven different concentrations ranging from 1.5 to 150 mg/gram of bedding and found that earthworms were able to tolerate doses of up to 14 mg/gram of bedding without significant moralities. Some behavioural and physical indications such as withdrawal responses and staining of the skin were noted in animals, where non-lethal dosages were employed. Aldrin and Endrin revealed most fatal effect of all insecticides tested

Agarwal and Mitta, (1986) studied in Delhi and find out the DDT residues in water, bottom sediments and certain non-target organisms from four different sites of the river Jamuna in Delhi, revealed that all the samples contained DDT residues in concentrations ranging from 0.04 to 3.42 mg/litre in water, 0.007 to 5.63 mg/kg in bottom sediments, 0.05 to 15.24 mg/kg in various invertebrates and 0.54 to 56.31 mg/kg in different fish.

Basu (1986) studied in Coimbatore and observed that owing to the very susceptible nature of cotton to numerous pests, farmers naturally resorted to unselective application of insecticides to control them. He reported that cotton growers of Coimbatore district adopted 36 rounds of spraying for their cotton crop. Such irrational and non-scientific practices of plant protection paved the way for resurgence of pests.

Biggs and Hagley, (1987) found that sterol inhibiting fungicides over the years increased the number of pest incidence on apple and decreased the number of beneficial arthropods.

Hallberg (1989) stated that in the Kansas state of USA 8 - 10 % of private rural drinking water supply wells and 10 % of susceptible public water supply wells exhibited pesticide pollution Surveys in Minnesota and Iowa with more intensive

pesticide usage suggest that 20 to 30 % of the more susceptible public water supply wells and 30 to 60 % of private wells exhibited pesticide residues.

Brussard and Ridder, (1990), found in study on the effects of long-term use of nitrogenous fertilizers at three different levels, found that endogenic species of' earthworms such as aporrectodea spp. were more strongly affected than the epidemic group of Lumbricus spp.

Ganganna and Satyanarayana, (1991), mentioning the findings of the experts of the Food and Agricultural Organization, stated that there was a list of 233 agricultural pests, which have become resistant to nine major groups of pesticides. They Further" reported that all pests may tum resistant to every available pesticide, given the necessary selection pressure. Use of pesticides sometimes causes an increase in the density of population known as a 'flareback'. There was another disturbing factor i.e., sub-lethal dose of pesticides, which have been found to slow down the growth of the enemies of the pests.

Mishra *et al*. (1991) studied in Georgia and found that Consumer Willingness to Pay for Pesticide-Free Produce (FPR) .The positive sign for the pesticide concern index, importance of testing and certification, hope of future financial status and sex of respondent indicates, as these variables increases, the probability of consumer readiness to pay a price premium for certified-FPR produce also increases.

Singh and Dhaliwal, (1993) stated that most of the chlorinated pesticides were non-biodegradable and thus leave residues in different components of our environment The presence of residues of pesticides in food commodities and other components of environment, a small quantities of their residues consumed daily along with food, can build up to high levels in the body fat .

Antle and Pingali, (1994) integrated the production data from a farm level survey with data collected from the same population of farmers to measure the impact of pesticide use on farmer health and the impact of farmer health on productivity in two rice producing regions of Philippines. Results shown that pesticide use had

harmful effect on farmer health and had a positive effect on productivity, and there were social gains from a reduction in insecticide use in Philippines rice production.

Bezbaruah (1994) reported that the soil fertility in cultivated soils due to excessive and continuous use of agro-chemicals including toxic plant protection chemicals was now a growing concern amongst all agriculturists.

Foster (1995) in his book mentioned that the early societies were vulnerable to regional environmental changes, which took place often as a result of human intrusions. He also cited that lessening of soil and over grazing was partly responsible for recurrent famine which in-tum led to epidemics.

Kumar (1995) studied externalities of pesticide use on Cole crops in Malur taluk of Kolar district of Karnataka. He revealed that all farmers in the study area experienced an increased price of plant protection chemicals. Pesticides formed 27 % of total cost of cultivation. Total family income and pest intensity were identified as major factors determining expenditure on pesticides. A large proportion of farmers (76 %) suffered from health problems such as conjunctivitis, headache and stomach-ache due to pesticide exposure. About 67 per cent of consumers were aware of pesticide residues in Cole vegetables and were willing to pay an average price of Rs.1.60 more per kg of pesticide-free cabbage at retail level.

Wilson and Tisdell, (2001) conduct study in Australia and found that why the farmers remain to use pesticides despite environmental, health and sustainability costs. The study reported that use of chemical inputs such as pesticides have increased agricultural production and productivity. However, negative externalities, too, have increased. The externalities include loss to the environment, agricultural land, fisheries, fauna and flora. Another major externality has been the involuntary devastation of advantageous predators of insects which has led to a virulence of many species of agricultural pests .

Kalaskar *et al.,* (2001) conducted a study on factors influencing awareness of cotton growers about integrated pest management practices in cotton revealed that 67.77 per cent of the farmers had medium level of awareness about IPM practices in cotton whereas almost an equal percentage of respondents had low (15.76%) and high (16.97%) awareness level.

Rajendran (2003) in his study revealed that pesticide residues were found in the environment many times higher than the maximum permissible limit. Pesticide residues present in the environment affect the soil, water, agricultural products, animals and plants. Absence of awareness among the farmers, deliberate suppression of facts, resource limitations, illegal approaches, public policies and poor alternative mechanisms are found responsible for the present state of affairs

Ejigu and Mekonnen, (2005) in their study found that the farm workers' health was affected by the unselective use of pesticides. The level of awareness and attitude on safe pesticide handling practices were low. It was recommended that appropriate type of personal protective device (PPD), in service training about the optimum use of chemical pesticides and periodic medical check-up, should be fulfilled to minimize the adverse health impact of chemical pesticides. .

Chitra *et al.* (2006) studied in Thanjavur district (South India) and perceived that use of pesticides in agriculture sector poses a serious environmental and public health problems. The relationship between the extent of pesticide-use and signs and symptoms of illnesses due to exposure among farmers of Thanjavur district (South India) was assessed. Farmers reported the following acute signs and symptoms: excessive sweating, itching of eyes, dry throat, and excessive salivation. These signs and symptoms had a higher prevalence among the sprayers. Among men, excessive sweating, "burning/stinging/ itching eyes, Dry throat were significantly associated with exposure to pesticides.

Garming and Waibel (2007) studied "Willingness to pay to avoid health risks from pesticides- A case study from Nicaragua" The results of the valuation for the two situations undertaken were "chronic" and "chronic and acute. The results for the

logistic regression on positive WTP in the situation for the farmers, chronic effects are more challenging to understand, so that the share of zero bids is much higher than for the scenario that includes acute health effects. Of the personal and household characteristics, respondents' age and number of household members are important, with a negative coefficient.

Indira (2007) studied the health injuries due to pesticide use in Kerala. She informed that 110,000 workers apply pesticides in Kerala. This means that the welfare loss in the region from pesticide exposure amounted to about Rs.180 million per year. It should be noted that these costs were conservative estimates and did not take into account long-term chronic disease and public expenditure health care. The economic cost of pesticide use was estimated using cost of disease approach .

Atreya (2008) studied in Nepal surveys of 291 households every week for seven months in 2005 to understand acute health symptoms and to estimate health costs related with pesticide exposure. The study finds that the magnitude of exposure to insecticides and fungicides significantly influenced the occurrence of acute symptoms. The predicted probability of falling sick from pesticide-related symptoms is pointedly higher among individuals who apply pesticides compared to individuals in the same household who are not directly exposed. This cost is nearly one-third of the total expenditure on health care services, but is small compared to the increase in farm production costs, thus when faced with a choice between the health care costs and increases in farm production costs, the individual opts for pesticides. However, the costs are nearly eight times higher compared to the population who were not directly exposed.

Abhilash and Singh, (2009) carried out a study on pesticide use and its use in Indian scenario and found that in the process of growth of agriculture, pesticides have become an significant tool as a plant protection agent for enhancing food production. However, exposure to pesticides both occupationally and ecologically causes a range of human health problems.

Sande *et al*., (2011) studied in Florida "Environmental impacts from pesticide use: a case study of soil fumigation in Florida tomato production". The results shown that methyl bromide has the highest EIQ value among all the fumigants. The rank order of the fumigants changes when application rate is incorporated into the Field Use EIQ so that half of the Midas products have a higher Field Use EIQ than methyl bromide. The Field Use EIQ of the Telone products also increases as application rate increases but none of these products exceed the Field Use EIQ of methyl bromide.

Adhikary (2012) in his study farmers' awareness on the impact of using pesticides on environmental pollution revealed that About 86.67 % of the respondents in the study area comprised of low to medium awareness category and 13.33 % had high environmental pollution awareness.

Chaudhary *et al.,* (2014) studied in Bhopal, Madhya Pradesh India and found relationship between the extent of pesticide used and signs and symptoms of diseases due to exposure among spray farmers, who sprayed pesticides by themselves and therefore were directly exposed to pesticides were assessed. 105 spray farmers were interviewed using previously designed questionnaires during a cross sectional survey. The 18 months exposed spray farmers reported maximum acute signs and symptoms like burning/stinging of eyes (18.42%), blurred vision (23.68%), skin redness/itching (50%), excessive sweating/shortness of breath (34.2%), dry sore throat (21.05%) and burning of nose (28.9%).

Sudha (2014) studied in Tamilnadu, "Economic and health consequences of pesticides used in cotton crop in Western region of Tamil Nadu". Environmental Impact Quotient Index (EIQ) was used to calculate the impact of pesticides on human health and environment in sample farms. The high EIQ values meant in non-IPM cotton (46.93) compared to IPM cotton. The important safety protections like using masks or gloves were followed by only very few farmers in all sample farms. Effects on health due to pesticide use in cotton cultivating sample farmers were more compared to paddy growers. Symptoms like allergic dermaties and tiredness were reported by about 78.33 % and 80.00 % of sample cotton grower farmers, respectively. More than 40 % of the sample cotton growers at the least informed other

problems. The analysis shown that more farmers reported these problems among the non-IPM cotton crops.

Bhandari (2014) in his study regarding the effects of pesticide and chemical fertilizer residues on nature, as well as farmers' awareness of these effects in Rupandehi district of Nepal revealed that (99.41%) individual's folly aware of how agrochemicals residues affect the quality of agricultural products.

Jeamponk *et al.,* (2014) studied in Thailand and found that in Farmers' Awareness and Behavior of Chemical Pesticide Uses found that the respondents' level of awareness and Behavior of Chemical Pesticide uses was high(85%), which could be ranked in 2 groups high level of awareness and low level of awareness.

Khan and Damalas, (2015) studied farmer's willingness to pay for less health risks by pesticide use in cotton belt of Punjab, Pakistan by using ordered probit model in contingent valuation method. Out of 318 respondents, 73 farmers (22.9 percent) were not willing to pay any premium. The zero responses were meaningfully higher in District Lodhran, as in District Vehari farmers were relatively more educated as well as having higher mean income and higher risk perception. Out of nine explanatory variables (i.e. education, perception, training, IPM, farm size, age, health effects, income, and district dummy Vehari), five are significant and have expected signs (*i.e.* education, perception, farm size, health effects and income).

Khan *et al.,* (2015) stated health effects due to usage of pesticide in cotton crop in Punjab and Pakistan. A large number of farmers stated episodes of skin irritation, eye irritation, dizziness, headaches, shortness of breath and vomiting after using pesticides and especially the poor farmers who were mostly affected.

2.3 Perceived severity of ill-effect of the agrochemical on human health and environment

Spynn (1989) stated that the pathogenic effects of pesticides exposure were manifested in another ways. Highly toxic and/or cumulative pesticides can cause

acute or chronic poisonings, alter immune responses, induce allergic reactions and produce mutagenic teratogenic or oxygenic effects.

Winter (1992) carried out a study, revealed that nearly 5,500 to 6,2000 of the current population of American pre-scholars eventually get cancer solely as a result of their exposure to pesticides or metabolites generally found in fruits and vegetables.

Krieger and Robert, (1992) carried out a study and revealed that the human exposure to pesticides occurred as a consequence of their use or persistence in a variety of media including air, water, soil, plants and animals. These continuous exposures may lead to lethal diseases like cancer and other diseases related to heart and central nervous system.

Mekonnen and Agonafir, (2004) carried out a study in Ethiopia and found that in Ethiopia nearly 17 % of the pesticide sprayers had signs of cough and breathlessness. Pesticide uses resulted in reduced lung function and evoking respiratory symptoms. Pesticide sprayers need to be sensitized to the harmful consequences of pesticide uses for human health and the environment. They should be encouraged to wear personal protective equipment during work on farms.

Faria *et al*. (2005) found in Southern Brazil more than half of respondents were male and the prevalence of asthma signs was 12 % and chronic respiratory disease signs were 22%. Higher odd ratios for both asthma and chronic respiratory sickness signs were found in women. The study results provided evidence that farming exposure to pesticides was associated with higher prevalence of respiratory symptoms, especially when the exposure was above two days per month.

Mann *et al*. (2009) carried out a study in Sydney Australia which examined some of the issues relating to exposure of amphibian populations to agrochemicals and placed emphasis on mechanisms of toxicity. Several mechanisms were highlighted, including those that may disrupt thyroid activity, retinoid pathways and sexual differentiation. Special emphasis was also placed on the numerous interactions

that may occur between different agrochemicals and between chemicals and other environmental factors.

Jesslin (2010) carried out study in the Indian scenario; pesticides were the most generally used poisoning agents. A total of 1045 poisoning related admissions were identified during the period January 2005 to September 2008. Among them, 68.40 % of cases were due to intentional poisoning and 31.60 % were due to accidental poisoning. Of the poisoning related admissions, 84.4 % of patients recovered, whereas in 7.6 % of cases condition did not improve. Mortality rate was observed 4 %.

Kabir *et al*. (2010) carried out a study in Bangladesh on farmers' perception on the harmful effects of agrochemicals on environment and found out that majority (68.8%) of the farmers had medium perception, while 15.6 and 15.6 % had low and high perception, respectively, on the harmful effects of agrochemicals.

Govind (2010) studied in Jabalpur M.P. malnutrition leading to cancer by some environmental threats. Environmental contaminants may cause malnutrition or cancer. Malnutrition ultimately causes many sicknesses, including cancer both in human beings and animals. The most important environmental or xenobiotic (foreign) chemicals causing malnutrition and cancer are polychlorinated biphenyl congeners, pesticides, food-related mycotoxin and its derivatives, ultraviolet screen, camphor, some metals, fungicides, algicides, oestrogens, retinoids, pyrethroid insecticides, pentachlorophenol, beta-hexachlorocyclohexane *etc*.

Chapter III

RESEARCH METHODOLOGY

This chapter deals with research design, sampling procedure, variables and their measurements, tools of data collection, statistical tests used and analytical procedures followed to interpret the data of the present study. The details of the materials and methods followed in the present investigation are presented under the following heads:

3.1 Research design

The design of research is the most important and crucial aspect of the research methodology. It is the entire process of planning and carrying out the research. To seek the answer for the research question, and an ex-post facto research design was used in the investigation because it is a sort of fact finding operation with adequate interpretation. It clearly states the characteristics of the particular situation of group or individuals. In this design the variables are to be known.

3.2 Locale of the Study

i. Selection of State

Uttar Pradesh was selected for the purpose of study because researcher belongs to this state and for convenience to collection of data and further study due to not available much of time and single researcher besides, it will be very easy to becoming well known about local language and culture for establishing good reliability and non-formal relation with the respondent.

ii. Selection of District

Out of the 75 districts of Uttar Pradesh one district *i.e.* Chandauli was randomly selected.

iii. Selection of block

The total number of blocks are nine, one block was selected namely Dhanapur randomly.

Table 3.1: Selection of block

S. No.	Name of Blocks of Chandauli District
1	Dhanapur
2	Chahniya
3	Sakaldiha
4	Chandauli
5	Barahani
6	Sahabganj
7	Chakiya
8	Naugarh
9	Niyamtabad

iv. Selection of villages

Selection of villages was randomly where large numbers of farmers lived and use agrochemicals in Dhanapur block.

v. Selection of Respondents

Total 150 respondents were selected randomly in which 15 respondents from Raipur village, 15 respondents from Babhaniyav village, 15 respondents from Hasimpur village, 15 respondents from Kusumhi village, 15 respondents from Dhanapur village, 15 respondents from Naulipatti village, 15 respondents from Amra village, 15 respondents from Jamurana village, 15 respondent from Awajapur village, 15 respondent from Papraul village and total was 150. There are 90 female respondents and 60 male respondents selected randomly.

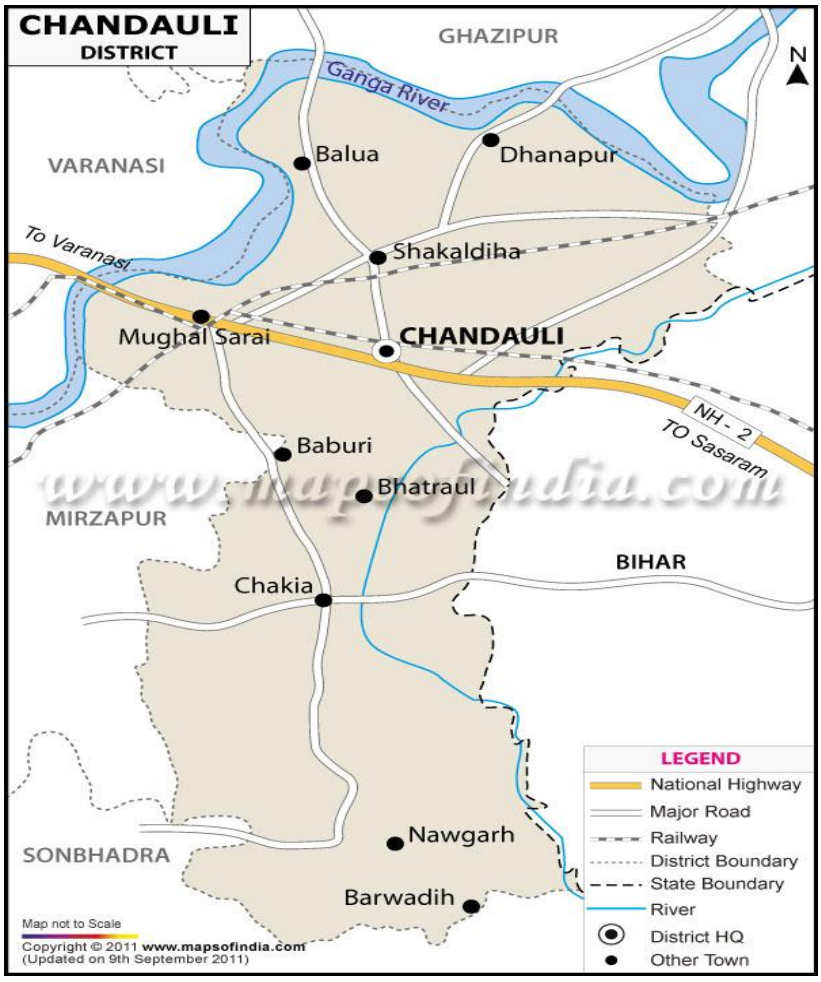

Fig 3.1 Map of Chandauli

Table 3.2: Selection of village and no. of respondents

S. No.	Name of Village	No of Respondents
1.	Raipur	15
2.	Babhaniyav	15
3.	Hasimpur	15
4.	Kusumhi	15
5.	Dhanapur	15
6.	Naulipatti	15
7.	Amra	15
8.	Jamurana	15
9.	Awajapur	15
10.	Papraul	15
11.	Total	150

3.3 Operationalization of variables and their empirical measurement

The variables of the study were selected based on the relevant review of literature on the subject, in consultation with experts in the field of research and extension and members of advisory committee.

The variables selected and empirical measurements followed are presented in Table 3.3.

Table 3.3: Variables and their empirical measurement

S. No.	Variables	Measurement
Independent variable		
1.	Age	Classification as reported by G.O.I. (2011)
2.	Gender	Direct questioning
3.	Level of Education	Direct questioning
4.	Size of land holding	Direct questioning
5.	Mass media exposure	Direct questioning
6.	Extension Contact	Direct questioning
7.	Awareness about KCC	Direct questioning
8.	Farming experience	Direct questioning

Dependent variable		
1.	Awareness of respondents regarding ill - effects of agrochemicals on human health and environment	Schedule was developed
2.	Perceived severity of ill effect of the agrochemicals on human health and environment	Schedule was developed

3.3.1 Independent variables

3.3.1.1 Age

It was operationalized as the number of completed years of the respondents at the time of data collection and it was determined by direct questioning, the respondents were categorized on the basis of government of India. Based on the age the respondents were categorised as follows:

Table 3.4: Categorization of respondents according to their age

Category	Age (in years)	Code
Young	Up to 35	1
Middle	35 to 50	2
Old	Above 50	3

Respondents were asked to indicate their age. The minimum and maximum codes of each respondent was 1 (One) and 3 (three) respectively. So code 1 (one) is given for young age respondents, code 2(two) is given for middle age respondents and code 3 (three) is given for old age respondents. And in this variable for a respondent maximum and minimum score is 3 and 1 respectively

3.3.1.2 Gender

Gender was operationally defined as the state of being male or female based on social and cultural difference categorization of respondent on the basis of gender is two that is female and male and giving code.

Table 3.5: Categorization of respondents according to their gender

S. No.	Gender	Code
1.	Female	1
2.	Male	2

Respondents were asked to indicate their Gender. The maximum and minimum codes of each respondent was 2 (two) and 1 (One) respectively. So here code 1 (one) is given for female respondents and code 2 (two) is given for male respondents. And in this variable for a respondent maximum and minimum score is 2 and 1 respectively

3.3.1.3 Level of education

Education is operationalized as the number of years of formal education the person has undergone. For each year of schooling, a code of one was given.

Table 3.6: Categorization of respondents according to their educational qualification

S.No.	Qualification	Code
1	Illiterate	0
2	Functionally literate	1
3	Primary	2
4	Middle	3
5	Secondary (up to matric)	4
6	Intermediate	5
7	Graduate and above	6

Respondents were asked to indicate their educational qualifications. The maximum and minimum code of each respondent was 6(six) and 0 (zero) respectively. So code 0 (zero) is given for illiterate respondents. Code 1 (one) is given for functionally literate respondents. Code 2 (two) is given for primary educational qualified respondents. Code 3 (three) is given for middle educational qualified respondents. Code 4 (four) is given for secondary educational qualified respondents. Code 5 (five) is given for intermediate educational qualified respondents and code 6 (six) is given for graduate and above educational qualified respondents.

3.3.1.4 Size of land holding

It was operationally defined as the total number of hectares of land owned and leased by an individual family at the time of investigation. Frequency and percentage distribution was used to classify the respondents were classified into landless, marginal, small, semi-medium, medium and large categories as follows (suggested by G.O.I. 2011).

Table 3.7: Categorization of farmers according to their land holding

S.No.	Category	Land holding (Ha.)	Code
1.	Landless	0	1
2.	Marginal	upto1	2
3.	Small	1.1-2.0	3
4.	Semi-medium	2.1-4.0	4
5.	Medium	4.1-10.0	5
6.	Large	>10	6

Respondents were asked to indicate their land holding. The maximum and minimum codes of each respondent was 6 (six) and 1 (one) respectively. So code 1 (one) is given for landless farmer. Code 2 (two) is given for marginal farmers. Code 3 (three) is given for small farmers. Code 4 (four) is given for semi medium farmers. Code 5 (five) is given for medium farmers and code 6 (six) is given for large farmers.

3.3.1.5 Mass media exposure

Table 3.8: Categorization of respondent according to their mass media exposure

S.No.	Particulars	Regular (2)	Occasionally (1)	Never (0)
1.	Radio			
2.	Television			
3.	News paper			
4.	Mobile			
5.	Magazine & Journal			

Respondents were asked to indicate their exposure towards mass media. The maximum and minimum code of each respondent was 2 (two) and 0 (zero) respectively. Code 2 (two) is given for regularly use of media. Code 1 (one) is given for occasionally use of media and Code 0 (zero) is given for never use of media.

3.3.1.6 Awareness about Kisan Call Centre

Respondent were asked to their awareness regarding kisan call centre number. The maximum and minimum code of each respondent was 1(one) and 0 (zero) respectively. Code one 1 is given for aware about kisan call centre and code 0 zero is given for unaware about kisan call centre.

Table 3.9: Categorization of farmers according to their awareness to kisan call centre

S.No.	Kisan call number	Code
1.	Yes	1
2.	No	0

3.1.7 Farming experience

It refers to the number of years the person is engaged in farming activities. The farming experiences of farmers were categories into three groups on the basis of mean and standard deviation of the sample.

Table 3.10: Categorization of farmers according to their farming experience

S. No.	Formula	Category
1.	$< \bar{x}$ -S.D.	Low experience
2.	$\bar{x}$ -S.D. to $\bar{x}$ + S.D.	Medium experience
3.	$> \bar{x}$ + S.D.	High experience

3.3.1.8 Extension contact

Respondents were asked to indicate their extension contact. The maximum and minimum code of each respondent was 20 (twenty) and 0 (zero) respectively. So code 0 (zero) is given for those farmers who never extension contact. Code 1 (one) is given for those farmers who extension contact whenever they need. Code 2 (two) is given for those farmer farmers who extension contact monthly. Code 3 (three) is given for those farmers who extension contact fortnightly. Code 4 (four) is given for those farmers who extension contact weekly.

Table 3.11: Categorization of farmers according to their extension contact

S. No.	Extension Official	Frequency of contact with extension personnel for queries related to agrochemicals				
		Never (0)	Whenever Needed (1)	Monthly (2)	Fortnightly (3)	Weekly (4)
1	KVK					
2	NRLM					
3	Scientists					
4	Progressive farmer					
5	NGO					

3.3.2 Measurement of Dependent Variables

3.3.2.1 Awareness of respondents regarding ill-effects of agrochemicals on human and environment

In the present study, knowledge was operationalized as awareness on agrochemical effect on human and environment. The awareness was calculated by categorizing the respondents into two categories as yes and no. A statement may contain two or more than two sub-statements. If yes for statement then denote 1(one) and if no then denote 0 (zero). "Yes'' statement denoted as 1 (one) and "No" denoted as 0 (Zero) in the table. Maximum and minimum score of each respondent for awareness of respondents regarding ill-effects of agrochemicals on human and environment is 35 and 0 respectively.

Table 3.12: Scoring pattern for measuring awareness of respondents regarding ill-effects of agrochemicals on human health and environment.

S.No.	Awareness	Code
1.	Yes	1
2.	No	0

3.3.2.1.1 Diseases in human beings caused due to agrochemicals

a. Major health impact from acute exposure

Table 3.13: categorization of major health impact from acute exposure

S.N.	Problems	Awareness regarding characteristics (yes /no)
i. Skin and Eye		
1	Body itching	
2	Body irritation	
3	Eye irritation	
4	Eye pain	
5	Redness in eyes	
6	Blister formation on skin and necrosis	
7	Redness on skin	
ii. Respiratory system		
1	Chest pain	
2	Breathing problems	
3	Slow pulse	
4	Bleeding from nose and gums	
iii. Digestive problems		
1	Stomach ache	
2	Digestion problems	
3	Vomiting	
4	Diarrhoea	

b. Major health impact from chronic exposure

Table 3.14: Categorization of major health impact from chronic exposure

S. No.	Particular	Awareness regarding characteristics (yes /no)
1.	Physical disability	
2.	Fluctuations in blood pressure	
3.	Learning and developmental disorders	
4.	Attention deficit hyperactivity dysfunction	
5.	Heart blockage	
6.	Mental disability	
7.	Developmental delay	
8.	Diabetes	
9.	Asthma	
10.	Cancer	

3.3.2.1.2 Awareness regarding effect of agrochemicals on environment

Table 3.15: Categorization of Awareness regarding effect of agrochemicals on environment

S. No.	Statement	Awareness
1	Saline soil	
2	Contamination soil	
3	Decrease in enzyme activity	
4	Reduced population of beneficial insects	
5	Loss of biodiversity	
6	Reduced population of birds	
7	Contaminated air	
8	Surface water contamination	
9	Ground water contamination	
10	Resistance in insects and pests against pesticides	

3.3.2.2 Perceived severity of ill-effect of the agrochemicals on human health and environment

In the present study, severity was operationalized as degree of awareness on agrochemical effect on human and environment.

The severity level was calculated by categorizing the respondents into three categories as none, mild, severe, and high severe using mean and standard deviation for group of statements. A statement may contain two or more than two sub-statements. If none for statement then denote 0 (zero), If mild for statement then denote 1 (one), If severe for statement then denote 2 (two), If none for statement then denote 3 (three). Maximum and minimum score of each respondent for perceived severity of ill-effect of the agrochemicals on human health and environment is 105 and 0 respectively.

Table 3.16: Scoring pattern for measuring perceived severity of ill-effect of the agrochemicals on human health and environment

S.No.	Particular	Code
1	None	0
2	Mild	1
3	Severe	2
4	High severe	3

3.3.2.2.1 Diseases in human beings caused due to agrochemicals

a. Major health impact from acute exposure

Table 3.17: Categorization of problem related to major health impact from acute exposure in severity

S.No.	Problems	Severity			
		None	Mild severe	Severe	High severe
i. Problem related to skin and eye					
1	Body itching				
2	Body irritation				
3	Eye irritation				
4	Eye pain				
5	Redness in eyes				
6	Blister formation on skin and necrosis				
7	Redness on skin				
ii. Problem related to respiratory system					
1	Chest pain				
2	Breathing problems				
3	Slow pulse				
4	Bleeding from nose and gums				
iii. Problem related to digestive problems					
1	Stomach ache				
2	Digestion problems				
3	Vomiting				
4	Diarrhoea				

b. Major health impact from chronic exposure

Table 3.18: Categorization of major health impact from chronic exposure in severity

S.No.	Particular	Severity			
		None	Mild severe	Severe	High severe
1	Physical disability				
2	Fluctuations in blood pressure				
3	Learning and developmental disorders				
4	Attention deficit hyperactivity dysfunction				
5	Heart blockage				
6	Mental disability				
7	Developmental delay				
8	Diabetes				
9	Asthma				
10	Cancer				

3.3.2.2.2 Awareness regarding effect of agrochemicals on environment

Table 3.19: Categorization of awareness regarding effect of agrochemicals on environment in severity

S.No.	Statement	Severity			
		None	Mild severe	Severe	High severe
1	Saline soil				
2	Contamination soil				
3	Decrease in enzyme activity				
4	Reduced population of beneficial insects				
5	Loss of biodiversity				
6	Reduced population of birds				
7	Contaminated air				
8	Surface water contamination				
9	Ground water contamination				
10	Resistance in insects and pests against pesticides				

3.4 Statistical Measures Used

The collected data were quantified by giving codes to each suitable answer as referred in earlier pages. Further, the statistical tests were applied in light of the objectives to appear at conclusions. The following statistical tools were used in the study for precise and meaningful analysis and interpretations of the quantified data.

i. Frequency and Percentage

Frequency was used to issue the respondents as per their frequencies over different categories of their selected predictor and reply variables of the study. It was measured as the number of responses in a particular category. Percentage was used to check the frequency.

ii. Arithmetic Mean (X)

Arithmetic mean is defined as the sum of all values of observation divided by the total number of observations. Mean is measure of central tendency of the observed phenomena. Symbolically, it is represented as;

$$\overline{x} = \frac{1}{N}\sum_{i=1}^{N} x_i = \frac{x_1 + x_2 + \cdots + x_N}{N}$$

Where,

$\overline{X}$ = Arithmetic Mean of population

Xi = an observation

N = Number of given observations

iii. Standard Deviation (SD)

The standard deviation is the most important measure of dispersion. It is found by taking the difference of each item in the series from the arithmetic mean (x),

squaring the difference ;summing all square differences dividing by number of item and them extracting the square root or in a formula:

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \overline{x})^2}.$$

Where,

$\overline{x}$ = Arithmetic Mean of population

xi = An observation

N = Number of given observations

Chapter IV

RESULTS AND DISCUSSION

Keeping in view the specific objectives, the empirical evidences obtained in terms of factual data through objective research procedures and design developed for the study, has been analysed by subjecting them to appropriate statistical and mathematical tests. The findings thus arrived were presented under the following sections:

4.1 The profile of respondents

4.2 Awareness of respondents regarding ill -effects of agrochemicals on human health and environment

4.3 Perceived severity of ill-effect of the agrochemicals on human health and environment

4.1 Profile characteristics

In social science, it is essential to analyse the profile characteristics of farmers, which would give a basic and clear picture about the background of the farmers. This would help in interpreting the data gathered in an effective way. The profile characteristics of the respondents are presented in detail.

4.1.1 Age

It is clear from the Table 4.1 that majority of farmers (58.00%) belonged to middle age group while 16.67 percent farmer belonged to old age category followed by farmer who belonged to young age group (25.33%).

Table 4.1: Distribution of the respondents according to their age

(N=150)

S. No.	Category	Respondents	
		Frequency	Percentage
1	Young Age (<35)	38	25.33
2	Middle Age (35to 50)	87	58.00
3	Old Age (>50)	25	16.67
	Total	150	100.00

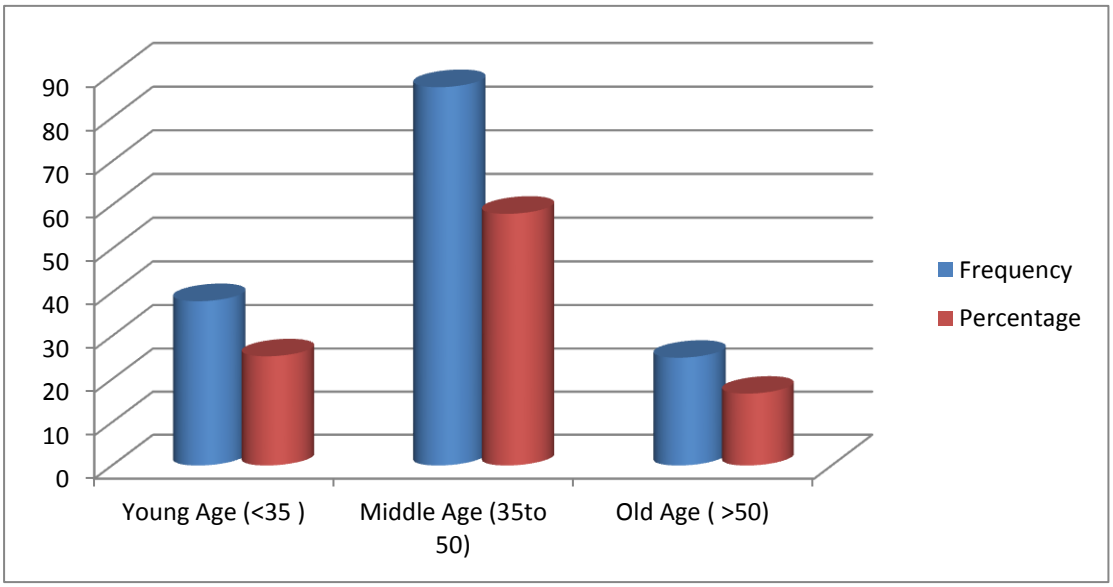

Fig 4.1: Distribution of respondents according to their age

4.1.2 Gender

It is clear from the Table 4.2 that majority of farmers (60.00%) belonged to female group while 40.00% farmer belonged to male category.

Table 4.2: Distribution of the respondents according to their gender

(N=150)

S. No.	Gender	Frequency	Percent
1.	Female	90	60.00
2.	Male	60	40.00

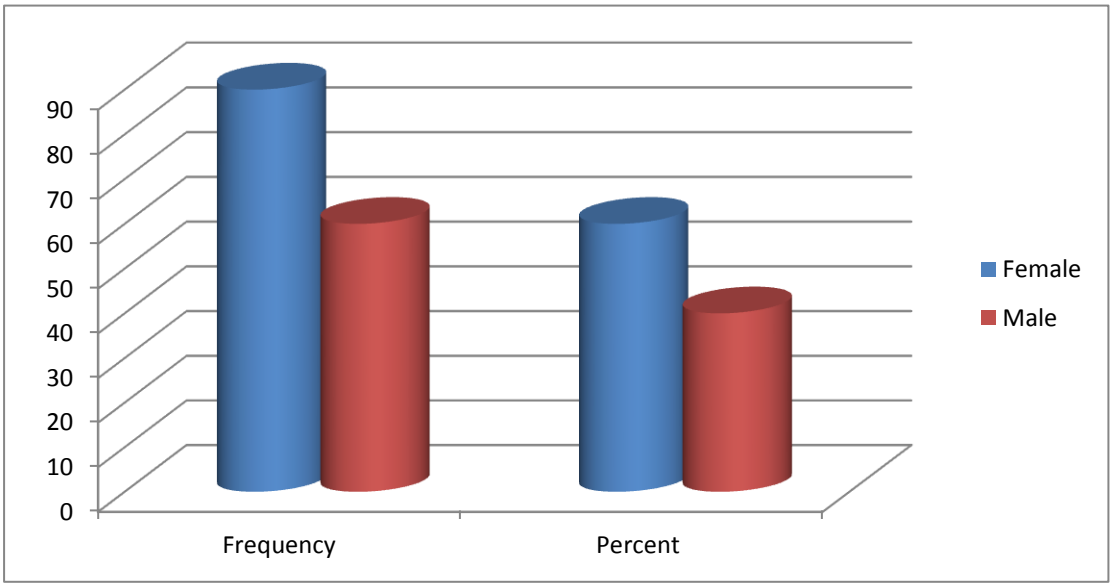

Fig 4.2: Distribution of respondents according to their gender

4.1.3 Level of Education

Education is generally believed to have effect on widening the mental horizon of a person and thereby prepares and influences him to be receptive to new ideas.

Table 4.3 reveals that the majority of respondents (22.67%) had illiterate and 9.33% respondents were functionally literate. The data further indicated that 16.00% were having education up to primary school followed by 14.67% were having middle education level, 11.33% were having graduation and above level of education, 10.67% were having high school and 15.33% of the respondents were intermediate.

Table 4.3: Distribution of the respondents according to their level of education

S. No.	Category	Respondents	
		Frequency	Percentage
1	Illiterate	34	22.67
2	Functionally literate	14	9.33
3	Primary school (1-5)	24	16.00
4	Middle school (6-8)	22	14.67
5	High school (9-10)	16	10.67
6	Intermediate (11-12)	23	15.33
7	Graduates and above	17	11.33
	Total	150	100

Respondents were asked to indicate their educational qualifications. The maximum and minimum code of each respondent were 6 and 0 respectively

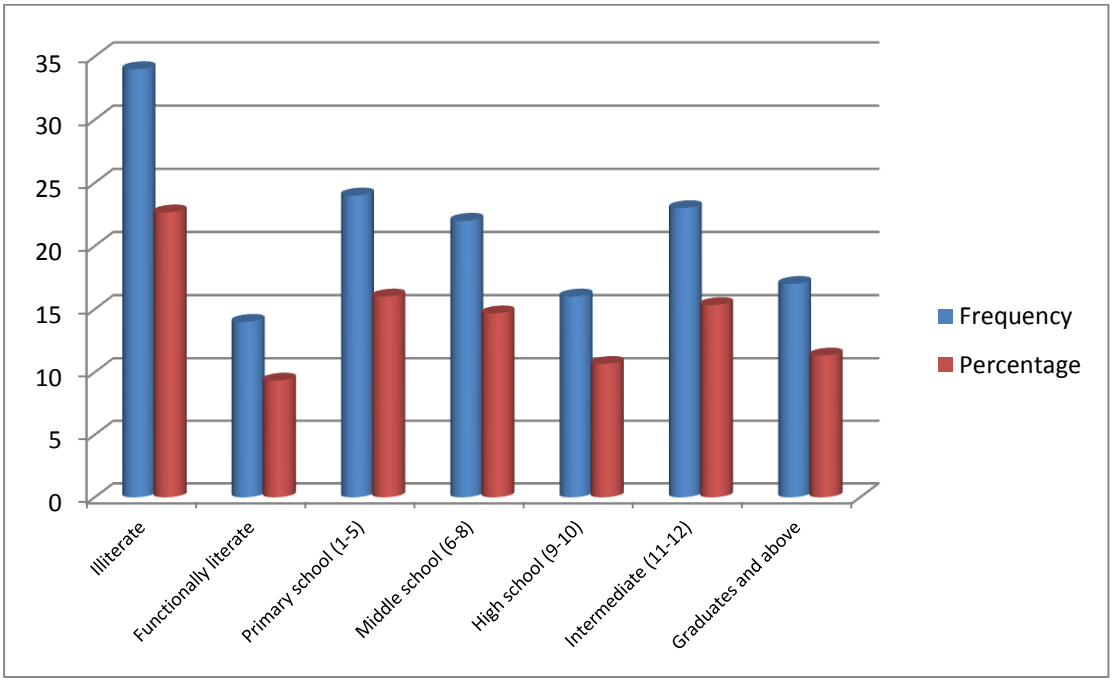

Fig 4.3: Distribution of respondents according to their education level

4.1.4 Size of land holding

Table 4.4 indicates that majority of the respondents (68.67%) had marginal size of operational land holding, followed by respondents having landless size (27.36%),small respondents is (5.26 %) .There were no semi-medium size, medium size and large Size land holding farmers found in my study. Thus it can be concluded that majority of respondents had marginal land holdings followed by landless land holdings.

Table 4.4: Distribution of respondents according to their size of land holding

(N=150)

S. No.	Category	Land holding(ha)	Frequency	Percentage
1	Landless	0	32	21.33
2	Marginal	up to 1	103	68.67
3	Small	1.1-2.0	15	10.00
4	Semi-medium	2.1-4.0	0	0
5	Medium	4.1-10.0	0	0
6	Large	>10	0	0
		Total	150	100

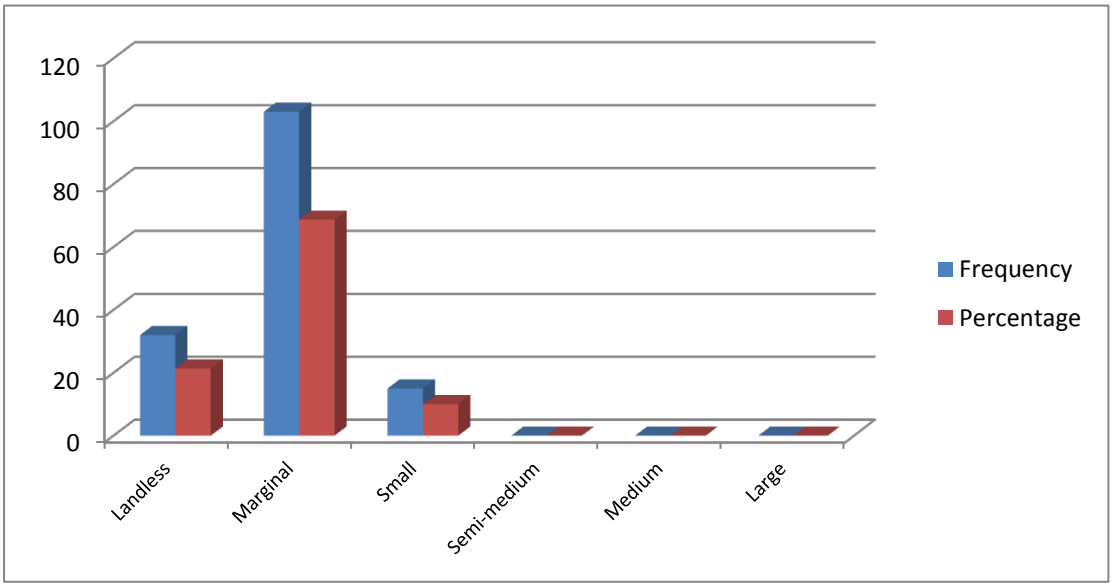

Fig 4.4: Distribution of respondents according to their size of land holding

4.1.5 Mass Media Exposure

Table 4.5: Distribution of respondents on the basis of mass media exposure

S. No.	Particulars	Frequency		
		Regular (2)	Occasionally (1)	Never (0)
1.	Radio	02	82	66
2.	Television	114	33	03
3.	News paper	58	35	57
4.	Mobile	116	28	06
5.	Magazine & Journal	13	51	86

Table 4.5 shows that frequency of mass media exposure of radio regularly, occasionally and never is 2, 82 and 66 respectively. Frequency of mass media exposure of televisions regularly, occasionally and never is 114, 33 and 03 respectively. Frequency of mass media exposure of Newspaper regularly, occasionally and never is 58, 35 and 57 respectively. Frequency of mass media exposure of Mobile regularly, occasionally and never is 116, 28 and 06 respectively. Frequency of mass media exposure of Magazine & Journal regularly, occasionally and never is 13, 51 and 86 respectively.

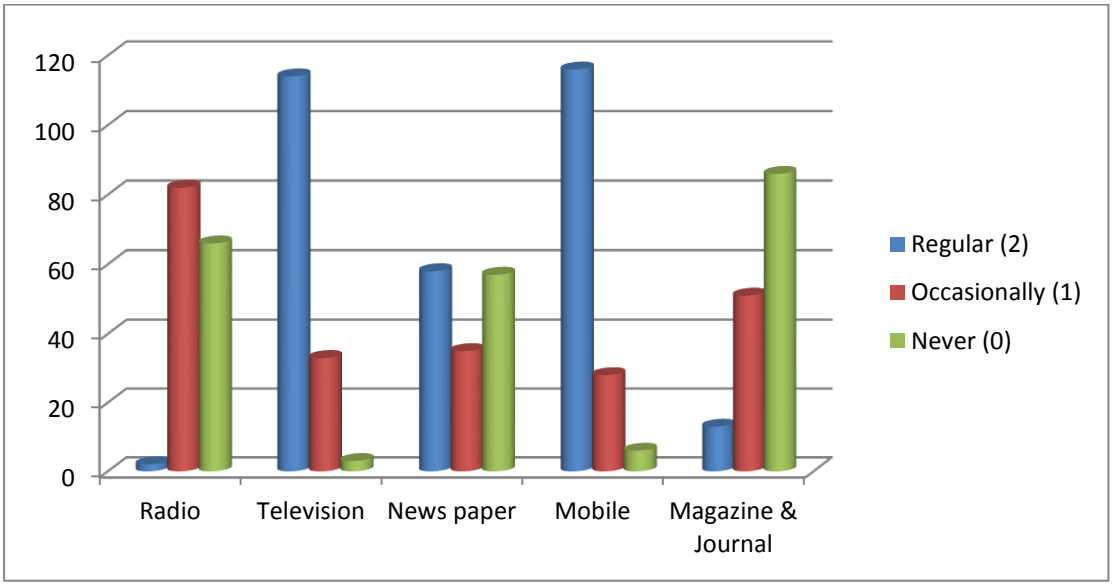

Fig 4.5: Distribution of respondents on the basis of Mass media exposure

Table 4.6: Distribution of respondents on the basis of Mass media exposure

S.No.	Category	Frequency	Percentage
1	Low (0 to 3.65)	23	15.33
2	Medium (3.65 to 6.85)	92	61.33
3	High (above 6.85)	35	23.33
	Total	**150**	**100**

(Mean = 5.25) (S.D. = 1.60)

Table 4.6 shows that majority (61.33%) of the respondents had medium mass media exposure group, while 15.33 % and 23.33 % of the respondent had low and high mass media exposure group respectively.

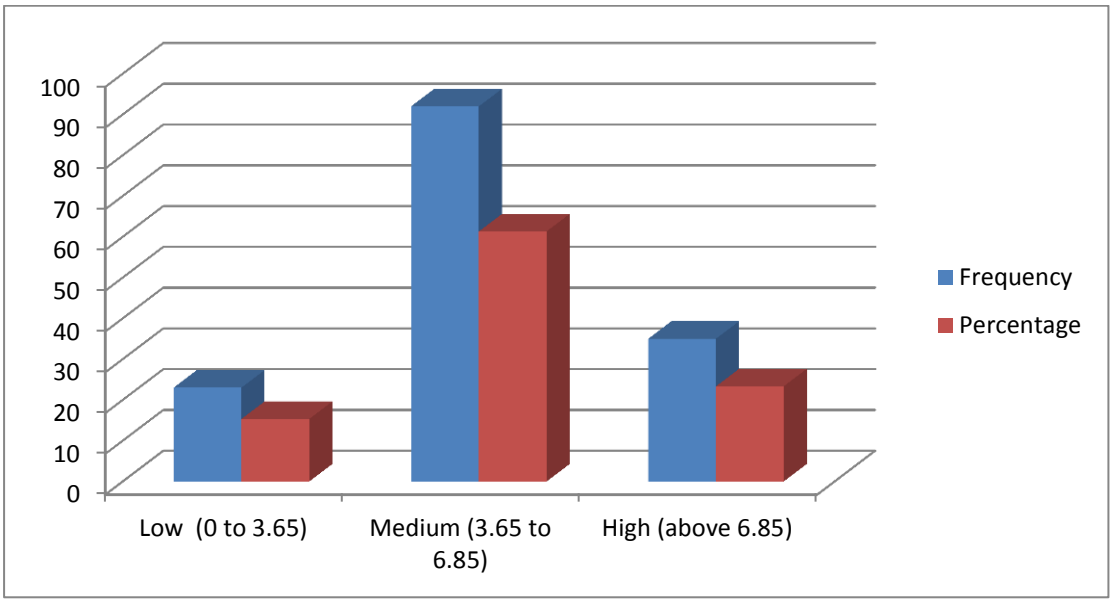

Fig 4.6: Distribution of respondents according to their mass media exposure

4.1.6 Awareness about Kisan call centre

Table 4.7: Distribution of respondents according to their awareness to kisan call centre

S.No.	Kisan call centre	Frequency	Percentage
1.	Yes	46	30.67
2.	No	104	69.33
	Total	**150**	**100**

Table 4.7 shows that majority (69.33%) of the respondents had no awareness about kisan call centre, while 30.67 % of the respondent had awareness about kisan call centre.

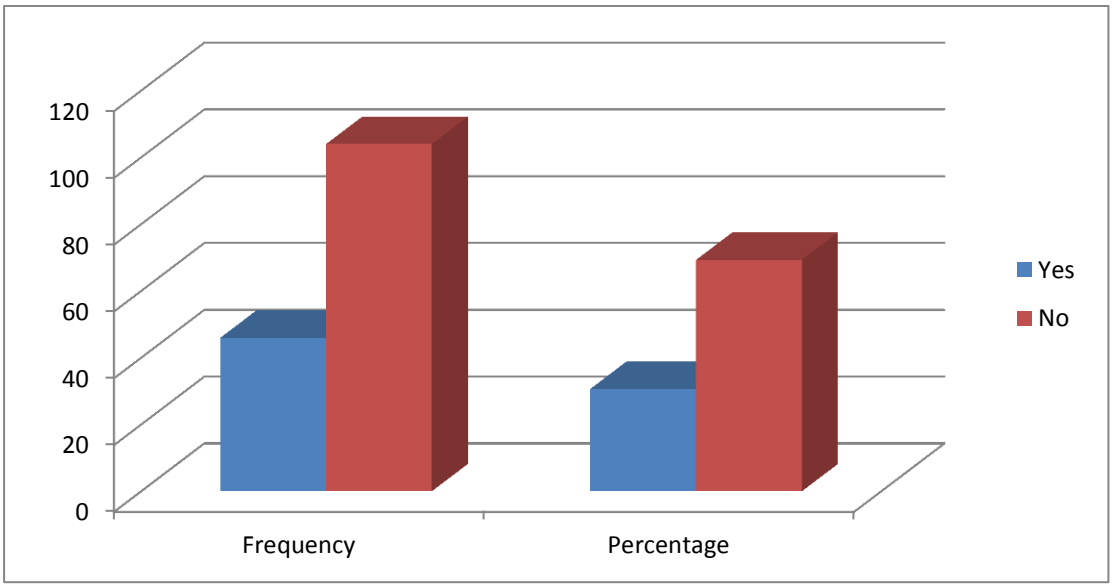

Fig 4.7: Distribution of respondents according to their awareness to Kisan call centre

4.1.7 Farming experience

Table 4.8: Distribution of respondents on the basis of their farming experience

S.No.	Category	Frequency	Percentage
1	Low (below 11.35)	15	10.00
2	Medium (11.38 to 28.39)	116	77.33
3	High (above 28.39)	19	12.67
	Total	**150**	**100**

(Mean =19.87, S.D. = 8.52)

Table 4.8 shows that majority (77.33%) of the respondents had medium farming experience group, while 10.00 % and 12.67 % of the respondent had low and high farming experience group respectively.

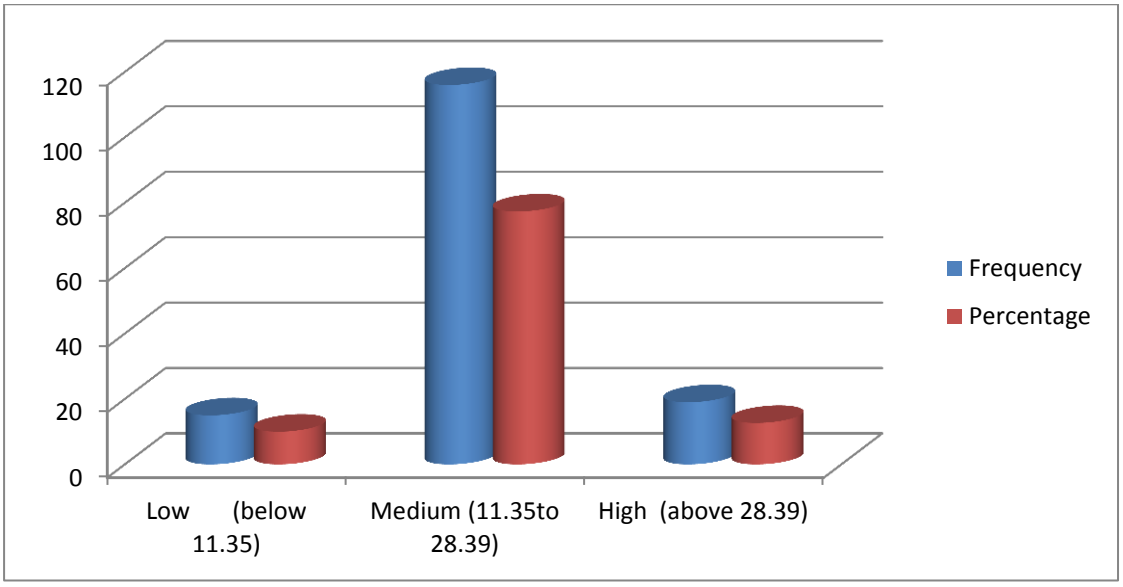

Fig 4.8: Distribution of respondents according to their farming experience

4.1.8 Extension contact

Table 4.9: Distribution of respondents on the basis of Extension contact

S. No.	Extension Official	Frequency of contact with extension personnel for queries related to agrochemicals				
		Never (0)	Whenever Needed (1)	Monthly (2)	Fortnightly (3)	Weekly (4)
1	KVK	104	46	0	0	0
2	NRLM	08	39	78	21	4
3	Scientists	43	70	34	03	0
4	Progressive farmer	72	76	02	0	0
5	NGO	133	17	0	0	0

Table 4.9 show that frequency of contact with KVK; never, whenever needed, monthly, fortnightly and weekly is 104, 46, 0, 0 and 0 respectively. Frequency of contact with NRLM, never, whenever needed, monthly, fortnightly and weekly is 08, 39, 78, 21 and 4 respectively. Frequency of contact with scientists, never, whenever needed, monthly, fortnightly and weekly is 43, 70,34,3 and 0 respectively. Frequency of contact with progressive farmer, never, whenever needed, monthly, fortnightly and weekly is 72, 76, 2, 0 and 0 respectively. Frequency of contact with NGO, never, whenever needed, monthly, fortnightly and weekly is 133, 17, 0, 0 and 0 respectively.

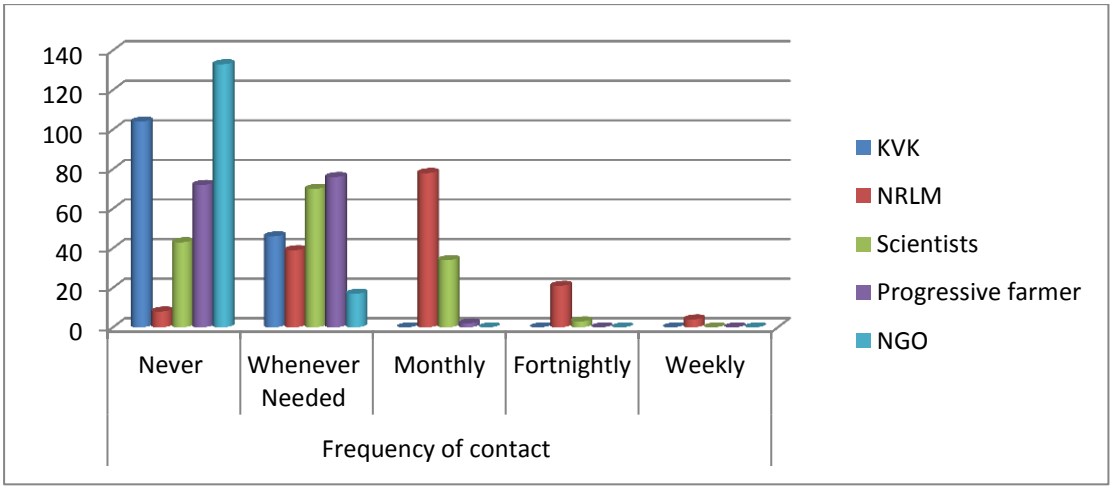

Fig 4.9: Distribution of respondents according extension contact

Table 4.10: Distribution of respondents on the basis of Extension contact

S.No.	Category	Frequency	Percentage
1	Low (below 2.39)	22	14.67
2	Medium (2.39 to 5.17)	112	74.67
3	High (above 5.17)	16	10.67
	Total	**150**	**100**

(Mean = 3.78) (S.D. = 1.39)

Table 4.10 shows that majority (74.67%) of the respondents had medium extension contact group, while 14.67 % and 10.67 % of the respondent had low and high mass extension contact respectively.

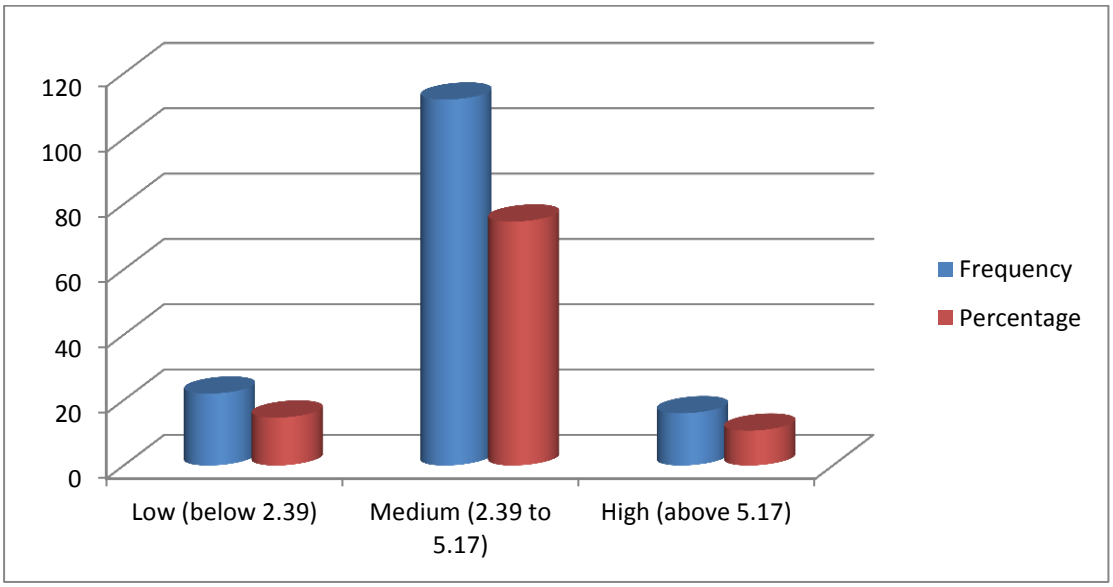

Fig 4.10: Distribution of respondents according to their extension contact

4.2 Awareness of respondents regarding ill-effects of agrochemicals on human health and environment.

4.2.1 Diseases in human beings caused due to agrochemicals

4.2.1.1 Major health impact from acute exposure of agrochemicals

i. Problem related to skin and eye

The data in table 4.11 revealed that in the first component that is skin and eye which shows that the majority of the respondents (75.33%) were aware about body itching, followed by body irritation were 65.83 %, Eye irritation were 68.33 %, eye pain 66.67 %, and redness in eyes 77.50 %, redness on skin 565 respectively. This shows that the farmers in the area were much aware about body itching.

Table 4.11: Awareness of respondents regarding problem related to skin and eye

S.No.	Problems	Frequency	Percentage
1.	Body itching	113	75.33
2.	Body irritation	106	70.67
3.	Eye irritation	94	62.67
4.	Eye pain	69	46.00
5.	Redness in eyes	67	44.67
6.	Blister formation on skin and necrosis	86	57.33
7.	Redness on skin	76	50.67

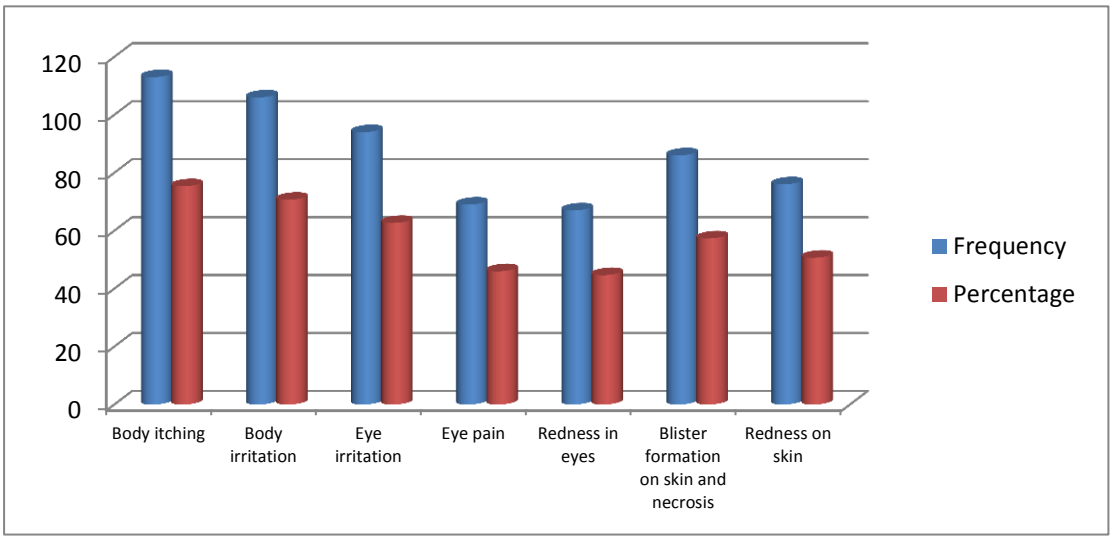

Fig 4.11: Awareness of respondents regarding problem related to skin and eye

ii. Problem related to digestive system

The data in table 4.12 revealed that In case of digestive which shows that the majority of the respondents (38.00%) were aware about vomiting, followed by stomach ache 32.00 %, digestion problems were 22.67 %, eye pain 66.67 %, and diarrhoea 11.33% respectively.

Table 4.12: Awareness of respondents regarding problem related to digestive system

S.No.	Problems	Frequency	Percentage
1	Stomach ache	48	32.00
2	Digestion problems	34	22.67
3	Vomiting	57	38.00
4	Diarrhoea	17	11.33

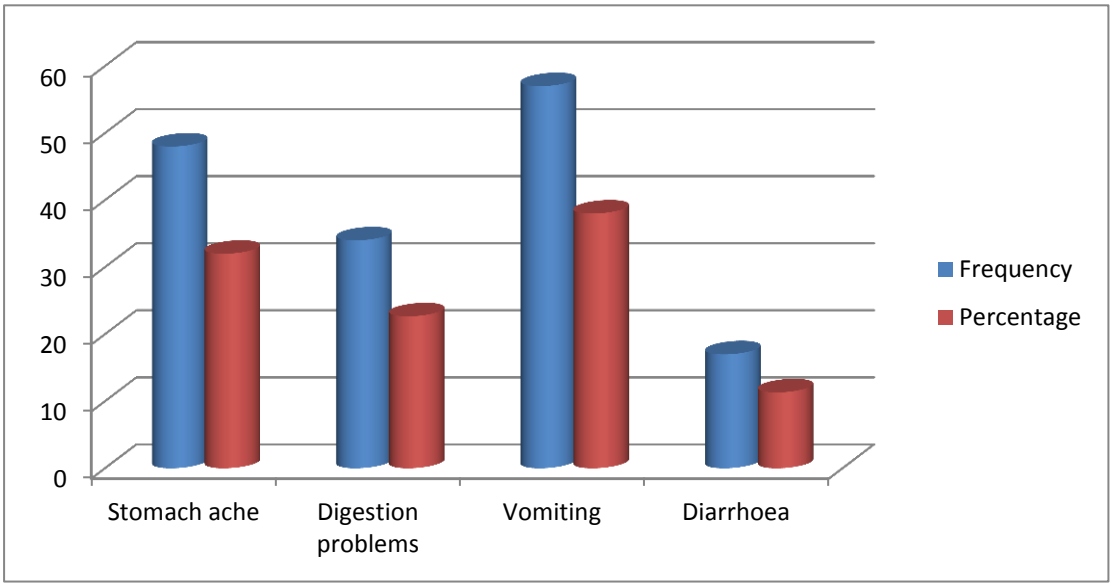

Fig 4.12: Awareness of respondents regarding problem related to digestive system

iii. Problem related to respiratory systems

The data in table 4.13 revealed In case of digestive which shows that the majority of the respondents (46.00%) were aware about chest pain, followed by breathing problem 28.67 %, slow pulse were 23.33 %, and bleeding from nose and gums 31.33% respectively.

Table 4.13: Awareness of respondents regarding problem related to respiratory system

S.No.	Problems	Frequency	Percentage
1	Chest pain	69	46.00
2	Breathing problem	42	28.67
3	Slow pulse	35	23.33
4	Bleeding from nose and gums	47	31.33

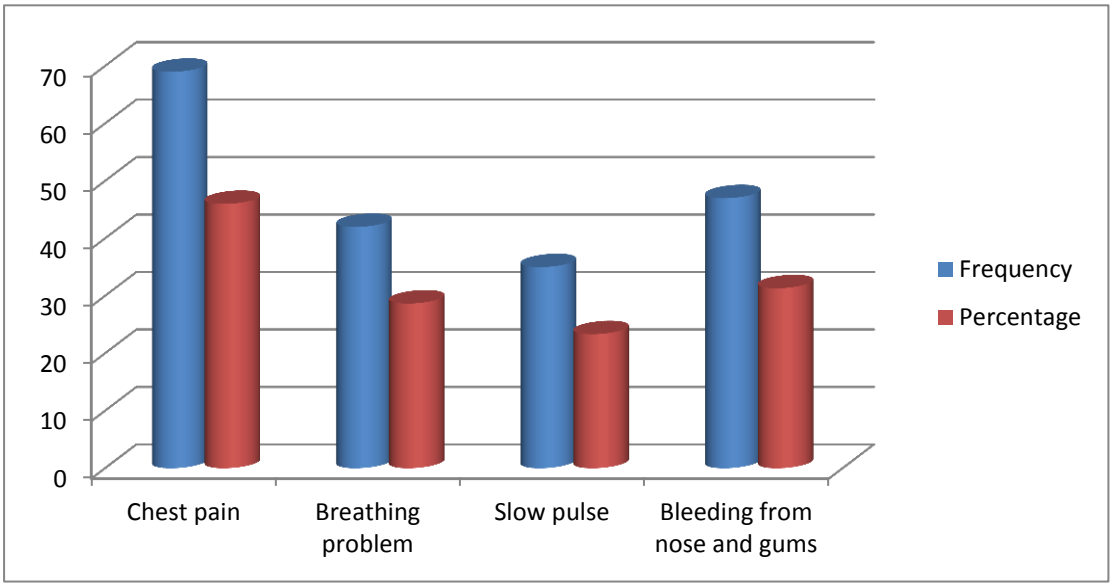

Fig. 4.13: Awareness of respondents regarding problem related to respiratory system

4.2.1.2 Major health impact from chronic exposure

The data in table 4.14 revealed In case of chronic exposure of agrochemicals which shows that the majority of the respondents (46.00%) were aware about learning and developmental disorders and heart blockage, followed by physical disability 48.00 %, fluctuations in blood pressure were 37.33%, attention deficit hyperactivity dysfunction 30.00%, mental disability 57.33 %, developmental delay 36.00%, diabetes 21.33%, asthma 14.00 % and cancer 60.67 % respectively.

Table 4.14: Awareness of respondents regarding major health impact from chronic exposure of agrochemicals

S.No.	Problems	Frequency	Percentage
1	Physical disability	72	48.00
2	Fluctuations in blood pressure	56	37.33
3	Learning and developmental disorders	98	65.33
4	Attention deficit hyperactivity dysfunction	45	30.00
5	Heart blockage	98	65.33
6	Mental disability	86	57.33
7	Developmental delay	54	36.00
8	Diabetes	32	21.33
9	Asthma	21	14.00
10	Cancer	91	60.67

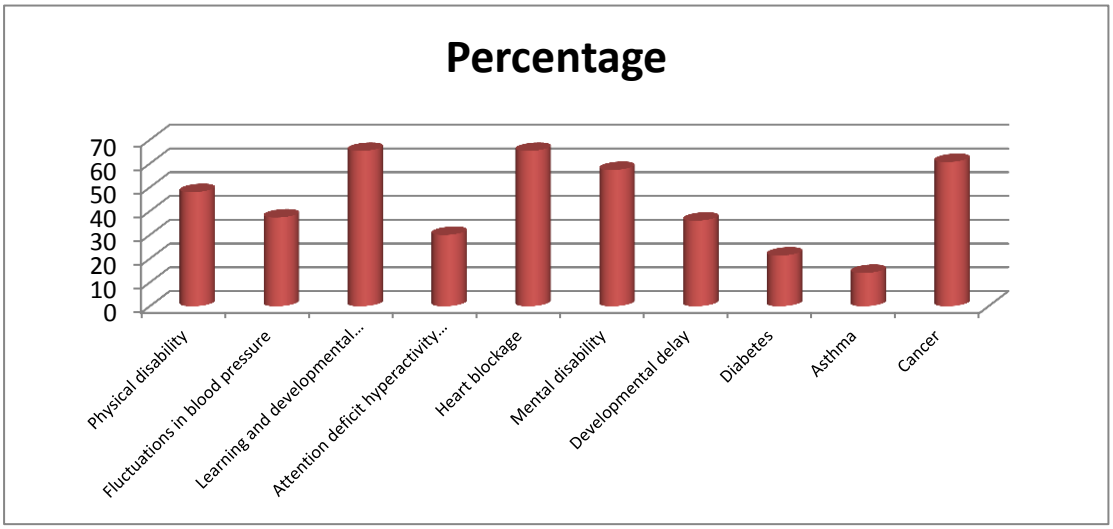

Fig 4.14: Awareness of respondents regarding major health impact from chronic exposure

4.2.2 Awareness regarding effect of agrochemicals on environment

The data in table 4.15 revealed In case of agrochemical effect on environment which shows that the majority of the respondents (46.00%) were aware about surface water contamination and ground water contamination, followed by saline soil 37.33 %, contamination soil were 59.33 %, decrease in enzyme activity 21.33%, reduced population of beneficial insects 29.33 %, loss of biodiversity 50.67% , reduced population of birds were 38.00 %, contaminated air were 66.00 % and resistance in insects and pests against pesticides 47.33 % respectively.

Table 4.15: Awareness of respondents regarding agrochemicals effect on environment

S. No.	Statement	Frequency	Percentage
1	Saline soil	56	37.33
2	Contamination soil	89	59.33
3	Decrease in enzyme activity	32	21.33
4	Reduced population of beneficial insects	44	29.33
5	loss of biodiversity	76	50.67
6	reduced population of birds	57	38.00
7	Contaminated air	99	66.00
8	Surface water contamination	102	68.00
9	Ground water contamination	102	68.00
10	resistance in insects and pests against pesticides	71	47.33

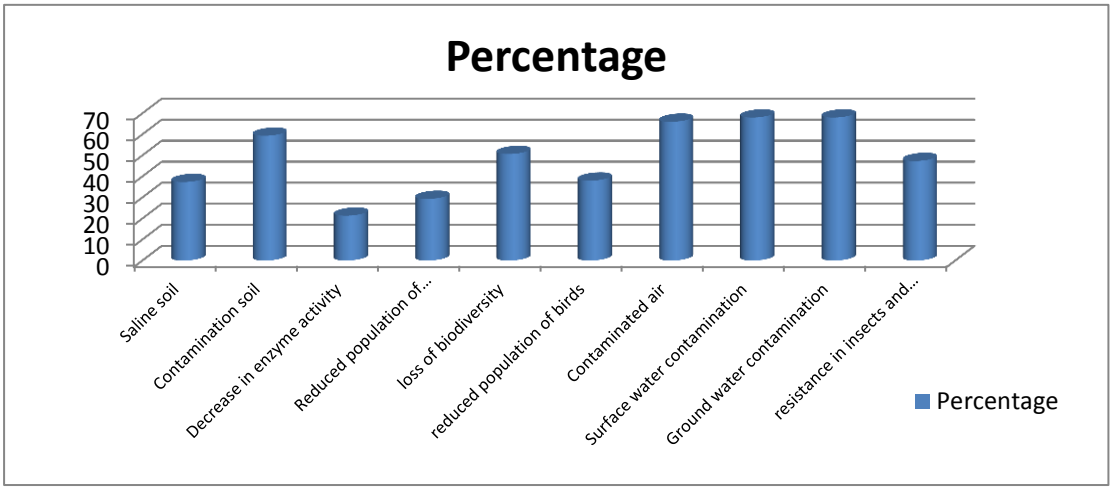

Fig 4.15: Awareness of respondents regarding effect agrochemicals on environment

4.3 Perceived severity of ill-effect of the agrochemicals on human health and environment

4.3.1 Diseases in human beings caused due to agrochemicals

4.3.1.1 Major health impact from acute exposure of agrochemicals

i. Perceived severity by respondents regarding problem related to skin and eye

Table 4.16 show that frequency of severity perceived by respondent to body itching with none, mild severe, severe, and high severe is 34, 83, 31 and 2 respectively. Frequency of severity perceived by respondent to body irritation with none, mild severe, severe, and high severe is 40, 89, 19 and 2 respectively. Frequency of severity perceived by respondent to eye irritation with none, mild severe, severe, and high severe is 55, 90, 5 and 0 respectively. Frequency of severity perceived by respondent to eye pain with none, mild severe, severe, and high severe is 81, 66, 2 and 1 respectively. Frequency of severity perceived by respondent to redness in eyes with none, mild severe, severe, and high severe is 76, 66, 6 and 6 respectively. Frequency of severity perceived by respondent to blister formation on skin with none, mild severe, severe, and high severe is 58, 83, 9 and 0 respectively. Frequency of severity perceived by respondent to redness on skin with none, mild severe, severe, and high severe is 73, 68, 9 and 0 respectively.

Table 4.16: Perceived severity by respondents regarding problem related to skin and eye

S.No.	Problems	Severity(frequency)			
		None	Mild severe	Severe	High severe
i. Skin and eye					
•	Body itching	34	83	31	2
•	Body irritation	40	89	19	2
•	Eye irritation	55	90	5	0
•	Eye pain	81	66	2	1
•	Redness in eyes	76	66	6	2
•	Blister formation on skin	58	83	9	0
•	Redness on skin	73	68	9	0

Table 4.17 revealed that majority of (64.67%) the respondents had perceived medium level of severity, followed by 22.67 % of the low and 12.67 % high level of severity category.

Table 4.17: Extent of severity perceived by respondents regarding problem related to skin and eye

S.No.	Category	Frequency	Percentage
1.	Low (below 3.05)	34	22.67
2.	Medium (3.05to 6.65)	97	64.67
3.	High (above 6.65)	19	12.67
	Total	**150**	**100**

(Mean = 4.85) (S.D. = 1.80)

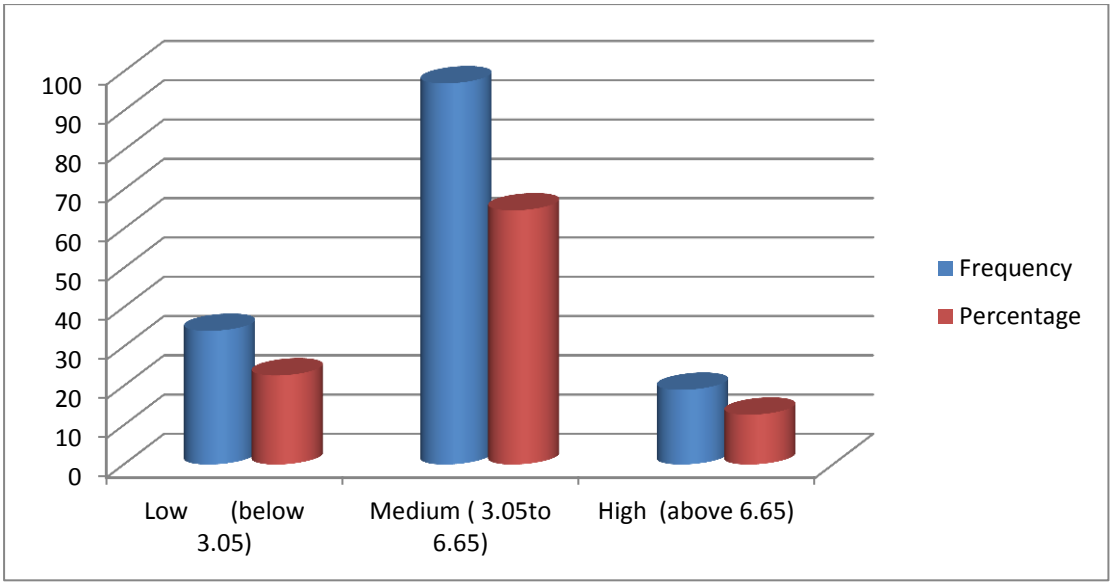

Fig 4.16: Extent of severity perceived by respondents regarding problem related to skin and eye

ii. Perceived Severity by respondents regarding problem related to respiratory system

Table 4.18 show that frequency of severity perceived by respondent to chest pain with none, mild severe, severe, and high severe is 81, 66, 2 and 1 respectively. Frequency of severity perceived by respondent to breathing problems with none, mild severe, severe, and high severe is 107, 40, 3 and 0 respectively. Frequency of severity perceived by respondent to body slow pulse with none, mild severe, severe, and high severe is 106, 23, 10 and 1 respectively. Frequency of severity perceived by respondent to bleeding from nose and gums with none, mild severe, severe, and high severe is 103, 39, 7 and 1 respectively.

Table 4.18: Perceived Severity by respondents regarding problem related to respiratory system

S.No.	Problems	Severity(frequency)			
		None	Mild severe	Severe	High severe
•	Chest pain	81	66	2	1
•	Breathing problems	107	40	3	0
•	Slow pulse	106	23	10	1
•	Bleeding from nose and gums	103	39	7	1

Table 4.19 revealed that majority of (44.67%) the respondents had perceived low level of severity regarding respiratory, followed by 35.33% of the medium and 20.00% high level of severity category.

Table 4.19: Extent of severity perceived by respondents regarding problem related to respiratory system

S.No.	Category	Frequency	Percentage
1.	Low (below 0.24)	67	44.67
2.	Medium (0.24 to 2.70)	53	35.33
3.	High (above 2.70)	30	20.00
	Total	150	100

(Mean = 1.47) (S.D. = 1.23)

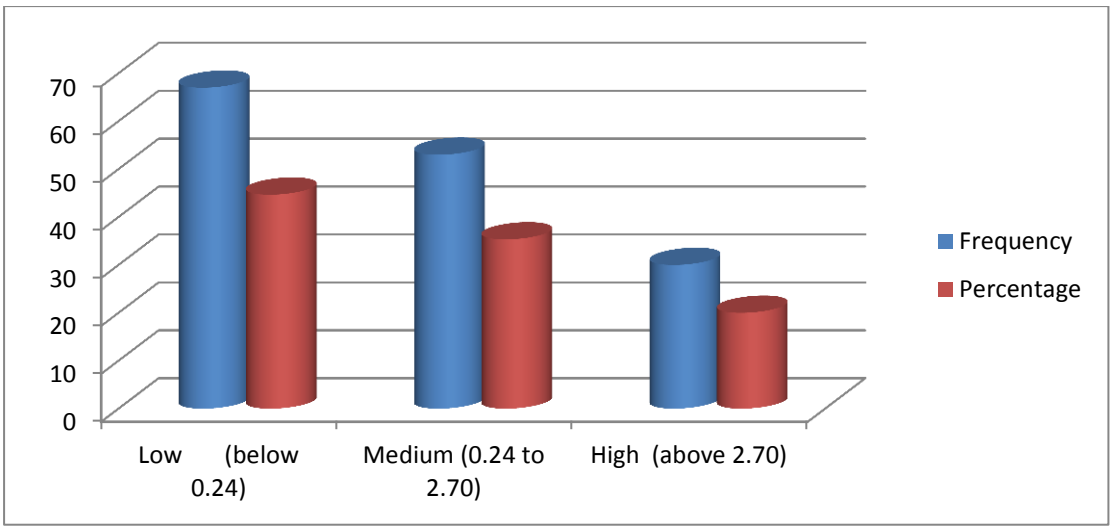

Fig 4.17: Extent of severity perceived by respondents regarding problem related to respiratory system

III Perceived severity by respondents regarding problem related to digestive system.

Table 4.20 show that frequency of severity perceived by respondent to Stomach ache with none, mild severe, severe, and high severe is 102, 46, 1 and 1 respectively. Frequency of severity perceived by respondent to digestion problems with none, mild severe, severe, and high severe is 116, 27, 3 and 4 respectively. Frequency of severity perceived by respondent to vomiting with none, mild severe, severe, and high severe is 93, 52, 5 and 0 respectively. Frequency of severity perceived by respondent to diarrhoea with none, mild severe, severe, and high severe is 132, 11, 7 and 0 respectively.

Table 4.20: Perceived severity by respondents regarding problem related to digestive system

S.No.	Problems	Severity(frequency)			
		None	Mild severe	Severe	High severe
•	Stomach ache	102	46	1	1
•	Digestion problems	116	27	3	4
•	Vomiting	93	52	5	0
•	Diarrhoea	132	11	7	0

Table 4.21 revealed that majority of (58.00%) the respondents had perceived medium level of severity regarding digestive, followed by 31.33 % of the low and 10.67 % high level of severity category.

Table 4.21: Extent of Severity perceived by respondents regarding problem related to digestive system

S.No.	Category	Frequency	Percentage
1.	Low (below 0.07)	47	31.33
2.	Medium (0.07 to 2.37)	87	58.00
3.	High (above 2.37)	16	10.67
	Total	150	100

(Mean = 1.22) (S.D. = 1.15)

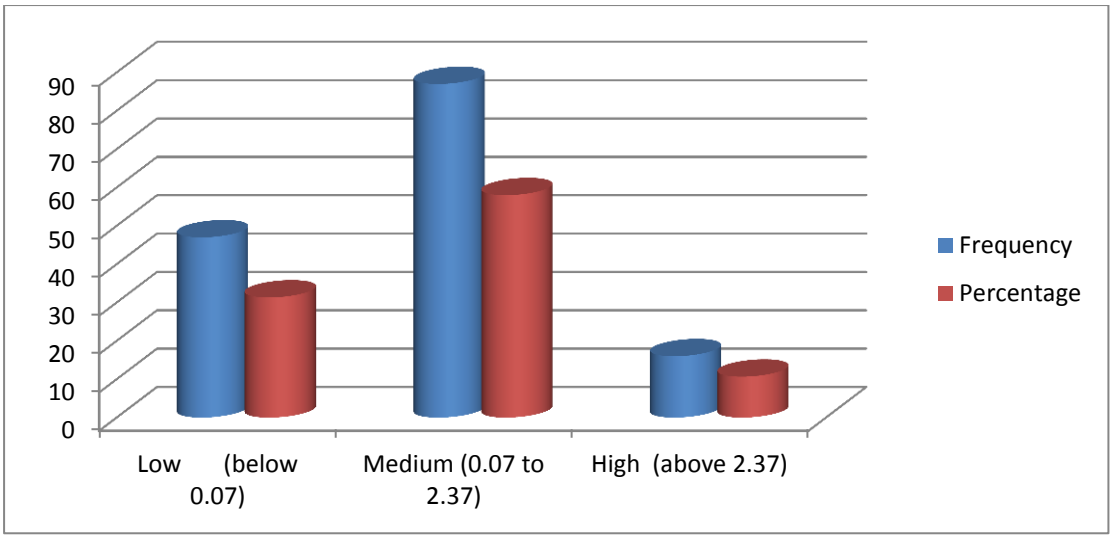

Fig 4.18: Extent of Severity perceived by respondents regarding problem related to digestive system

4.3.1.2 Perceived severity by respondents regarding major health impact from chronic exposure

Table 4.22 show that frequency of severity perceived by respondent to physical disability with none, mild severe, severe, and high severe is 77, 67, 6 and 0 respectively. Frequency of severity perceived by respondent to fluctuations in blood pressure with none, mild severe, severe, and high severe is 94, 56, 0 and 0

respectively. Frequency of severity perceived by respondent to learning and developmental disorders with none, mild severe, severe, and high severe is 52, 91, 7 and 0 respectively. Frequency of severity perceived by respondent to heart blockage with none, mild severe, severe, and high severe is 54, 91, 5 and 0 respectively. .Frequency of severity perceived by respondent to mental disability with none, mild severe, severe, and high severe is 64, 78, 5 and 3 respectively. Frequency of severity perceived by respondent to developmental delay with none, mild severe, severe, and high severe is 96, 50, 3 and 1 respectively. Frequency of severity perceived by respondent to diabetes with none, mild severe, severe, and high severe is 118, 30, 2 and 0 respectively. Frequency of severity perceived by respondent to asthma with none, mild severe, severe, and high severe is 129, 20, 1 and 0 respectively. Frequency of severity perceived by respondent to cancer with none, mild severe, severe, and high severe is 59, 86, 4 and 1 respectively.

Table 4.22: Perceived Severity by respondents regarding major health impact from chronic exposure

S.No.	Particular	Severity(frequency)			
		None	Mild severe	Severe	High severe
1	Physical disability	77	67	6	0
2	Fluctuations in blood pressure	94	56	0	0
3	Learning and developmental disorders	52	91	7	0
4	Attention deficit hyperactivity dysfunction	105	40	5	0
5	Heart blockage	54	91	5	0
6	Mental disability	64	78	5	3
7	Developmental delay	96	50	3	1
8	Diabetes	118	30	2	0
9	Asthma	129	20	1	0
10	Cancer	59	86	4	1

Table 4.23 revealed that majority of (59.33%) the respondents had perceived medium level of severity regarding major health impact from chronic exposure, followed by 10.00% of the low and 30.67 % high level of severity category.

Table 4.23: Extent of severity perceived by respondents regarding major health impact from chronic exposure

S.No.	Category	Frequency	Percentage
1.	Low (below 2.73)	15	10.00
2.	Medium (2.73 to 6.61)	89	59.33
3.	High (above 6.61)	46	30.67
	Total	**150**	**100**

(Mean = 4.67) (S.D. = 1.94)

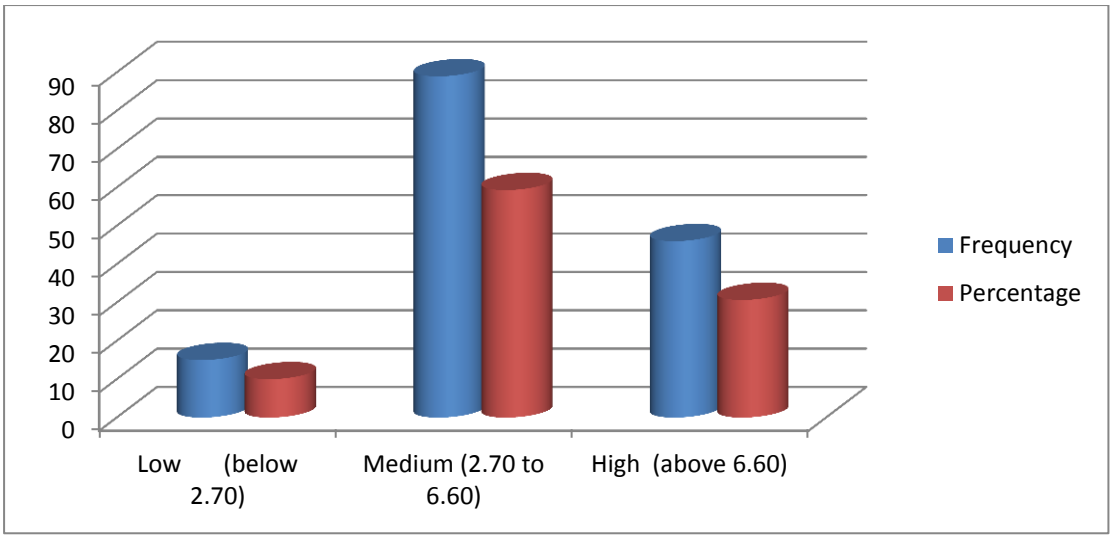

Fig 4.19: Extent of severity perceived by respondents regarding major health impact from chronic exposure

4.3.2 Perceived severity by respondents regarding agrochemical effect on environment

Table No. 4.24 show that frequency of severity perceived by respondents to saline soil with none, mild severe, severe, and high severe is 94, 51, 4 and 3 respectively. Frequency of severity perceived by respondent to contamination soil with none, mild severe, severe, and high severe is 61, 82, 5 and 2 respectively.

Frequency of severity perceived by respondent to decrease in enzyme activity with none, mild severe, severe, and high severe is 118, 31, 1 and 0 respectively. Frequency of severity perceived by respondent to reduced population of beneficial insects with none, mild severe, severe, and high severe is 108, 37, 5 and 0 respectively. Frequency of severity perceived by respondent to loss of biodiversity with none, mild severe, severe, and high severe is 74, 70, 5 and 1 respectively. Frequency of severity perceived by respondent to reduced population of birds with none, mild severe, severe, and high severe is 93, 52, 4 and 1 respectively. Frequency of severity perceived by respondent to contaminated air with none, mild severe, severe, and high severe is 51, 91, 5 and 3 respectively. Frequency of severity perceived by respondent to surface water contamination with none, mild severe, severe, and high severe is 48, 88, 11 and 3 respectively. Frequency of severity perceived by respondent to ground water contamination with none, mild severe, severe, and high severe is 48, 89, 8 and 5 respectively. Frequency of severity perceived by respondent to resistance in insects and pests against pesticides with none, mild severe, severe, and high severe is 79, 65, 4 and 2 respectively.

Table 4.24: Perceived Severity by respondents regarding agrochemical effect on environment

S.No.	Statement	Severity (frequency)			
		None	Mild severe	Severe	High severe
1	Saline soil	94	51	4	3
2	Contamination soil	61	82	5	2
3	Decrease in enzyme activity	118	31	1	0
4	Reduced population of beneficial insects	108	37	5	0
5	Loss of biodiversity	74	70	5	1
6	Reduced population of birds	93	52	4	1
7	Contaminated air	51	91	5	3
8	Surface water contamination	48	88	11	3
9	Ground water contamination	48	89	8	5
10	Resistance in insects and pests against pesticides	79	65	4	2

Table 4.25 revealed that majority of (63.33%) the respondents had perceived medium level of severity, followed by 19.33 % of the low and 17.33 % high level of severity category.

Table 4.25: Extent of severity perceived by respondents regarding agrochemicals effect on environment

S. No.	Category	Frequency	Percentage
1.	Low (below 3.30)	29	19.33
2.	Medium (3.30 to 7.50)	95	63.33
3.	High (above7.50)	26	17.33
	Total	150	100

(Mean = 5.40) (S.D. = 2.10)

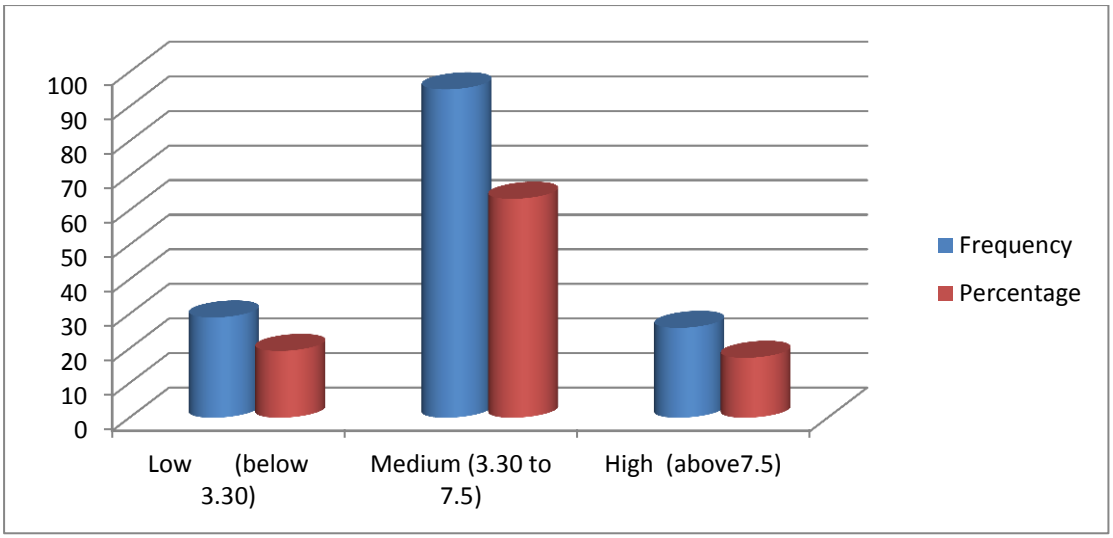

Fig 4.20: Extent of severity perceived by respondents regarding agrochemical effect on environment

Chapter V

SUMMARY AND CONCLUSION

5.1 Introduction

Major population of India is depending on agriculture and everybody need food for live. Nowadays not only sufficient food need but also we need balancing diet with all vitamins and nutrient. So all produce from field should be toxic free. After green revolution we apply much fertilizer, herbicides and insecticides which are much harmful to not only human but also to all animals and soil.

Earlier we apply in field organic manure such as NADEP manure, compost green manure vermin composting manure which is good nutrient source for soil and agricultural produce that we consume.

Unselective use of high dosage fertilizers has caused several problems on the farm as well as outside farm. Plants become more prone to pests and infections and their control could be effectively done by using high effectiveness poisonous chemicals. As a result, their residue on plants and in the soil had led to health threats (Malathi and Bangarusamy, 2001). Similarly, additional nitrogen as nitrate and phosphate percolated through the soil and entered natural sources of drinking water also responsible for health risks. The negative effects of chemical fertilizers on plants are reduction in germination, retardation in seedling growth, scorching and increased susceptibility to diseases (Asha *et al*., 2001).

Agrochemicals contact human body in four main ways: Oral exposure (when you swallow a pesticide), inhalation exposure (when you breathe in a pesticide), ocular (through the eyes) or dermal (through the skin) and exposure of the general population to agrochemicals occurs primarily through eating food and drinking water contaminated with agrochemical residues. It is apparent that agrochemicals will always remain fundamental tool to assure an abundant food supply but we can also not deny the fact that a major portion of applied agrochemicals may be lost to the

surrounding environment, where they can adversely affect human and environmental health. Researches' have shown that agrochemical residues are continuously persisting and accumulating in human, animal body and environment causing harmful diseases. Some agrochemicals are highly lethal to human, only a few drops in the mouth or on the skin can cause extremely harmful effects.

Objective

i. To the study the profile of respondents

ii. To the study the awareness of respondents regarding ill -effects of agrochemicals.

iii. To the study perceived severity of ill effect of the agrochemical on human health and environment.

5.2 Methodology

The study was conducted in Uttar Pradesh purposively. Uttar Pradesh has 75 districts and Chandauli is selected out of 75 districts randomly. Chandauli has 9 blocks namely Naugarh, Barahani, Shahabganj, Niyamtabad, Chandauli, Sakaldiha, Chahniya and Dhanapur. I selected block Dhanapur randomly. In Dhanapur I selected 10 villages randomly and out of 10 villages 150 respondents selected randomly. Out of 150 respondents, 90 female respondents and 60 male respondents randomly. A well-structured questionnaire was used for data collection. The data were analysed using simple statistical techniques like frequency, percentage, Mean and Standard deviation.

5.2.1 Independent Variable

Age, gender, education, farming experience, operational landholding, awareness of kisan call centre, mass media exposure, extension contacts.

5.2.2 Dependent Variable

1. Awareness of respondents regarding ill -effects of agrochemicals on human health and environment.
2. Perceived severity of ill-effect of the agrochemicals on human health and environment.

5.3 Major Findings

5.3.1 Profile of respondent

1. Majority of farmers (58.00%) belonged to middle age group while 16.67 percent farmer belonged to old age category followed by farmer who belonged to young age group (25.33%).
2. Majority of farmers (60.00%) belonged to female group while 40.00 percent farmer belonged to male category.
3. Majority of respondents (22.67%) had illiterate and 9.33% respondents were functionally literate. The data further indicated that 16.00 %were having education up to primary school followed by 14.67 %were having middle education level, 11.33 % were having graduation and above level of education, 10.67 % were having high school and 15.33 % of the respondents were intermediate.
4. Majority of the respondents (68.67%) had marginal size of operational land holding, followed by respondents having landless size (27.36%), small respondents is (5.26 %). Thus it can be concluded that majority of respondents had marginal land holdings followed by landless land holdings.
5. Majority (61.33%) of the respondents had medium mass media exposure group, while 15.33 % and 23.33 % of the respondent to had low and high mass media exposure group respectively

6. Majority (69.33%) of the respondents had no awareness about kisan call centre number, while 30.67 % of the respondent to had awareness about kisan call centre number.

7. Majority (77.33%) of the respondents had medium farming experience group, while 10.00 % and 12.67 % of the respondent had low and high farming experience group respectively.

8. Majority (76.00%) of the respondents had medium extension contact group, while 13.33 % and 10.67 % of the respondent to had low and high mass extension contact respectively

5.3.2 Awareness of respondents regarding ill -effects of agrochemicals on human health and environment

1. Majority of the respondents (75.33%) were aware about Body itching, followed by Body irritation were 65.83 %, Eye irritation were 68.33 %, Eye pain 66.67 %, and Redness in eyes 77.50 %, Redness on skin 565 respectively. This shows that the farmers in the area were much aware about Body itching.

2. Majority of the respondents (38.00%) were aware about vomiting, followed by stomach ache 32.00 %, Digestion problems were 22.67 %, Eye pain 66.67 %, and Diarrhoea 11.33% respectively

3. Majority of the respondents (46.00%) were aware about Chest pain, followed by breathing problem 28.67 %, slow pulse were 23.33 %, and Bleeding from nose and gums 31.33% respectively.

4. Majority of the respondents (46.00%) were aware about Learning and developmental disorders and Heart blockage, followed by Physical disability 48.00 %, Fluctuations in blood pressure were 37.33 %, Attention deficit hyperactivity dysfunction 30.00%, Mental disability 57.33 %, Developmental delay 36.00% , Diabetes 21.33 % , Asthma 14.00 % and Cancer 60.67 % respectively.

5. Majority of the respondents (46.00%) were aware about Surface water contamination And ground water contamination, followed by Saline soil 37.33

%, Contamination soil were 59.33 %, Decrease in enzyme activity 21.33%, Reduced population of beneficial insects 29.33 %, loss of biodiversity 50.67%, reduced population of birds were 38.00 %, Contaminated air were 66.00 % and resistance in insects and pests against pesticides 47.33 % respectively.

5.3.3 Perceived severity of ill-effect of the agrochemicals on human health and environment

1. Majority of (64.67%) the respondents had perceived medium level of severity regarding problem related to skin and eye followed by 22.67 % of the low and 12.67 % high level of severity category.
2. Majority of (44.67%) the respondents had perceived low level of severity regarding problem related to respiratory system, followed by 35.33 % of the medium and 20.00 % high level of severity category.
3. Majority of (58.00%) the respondents had perceived medium level of severity regarding problem related to digestive system, followed by 31.33 % of the low and 10.67 % high level of severity category.
4. Majority of (59.33%) the respondents had perceived medium level of severity regarding major health impact from chronic exposure, followed by 10.00 % of the low and 30.67 % high level of severity category.
5. Majority of (63.33%) the respondents had perceived medium level of severity, regarding agrochemicals effect on environment followed by 19.33 % of the low and 17.33 % high level of severity category.

5.4 CONCLUSION

A study was led on A Study on A study on farmer awareness toward ill-effect of agrochemicals in Dhanapur block of Chandauli district, Uttar Pradesh. Based on the finding of the study it was concluded that majority of the respondent to had medium level of awareness and perceived severity toward ill-effect of agrochemical. Majority of the respondents were middle age group, illiterate level of education, medium farming experience group, medium extension contact followed by respondents had marginal size of operational land holding, medium medium level of

mass media exposure. Majority of the respondents perceived medium level of severity. Majority of the respondents had perceived low level of severity regarding respiratory. Majority of the respondents had perceived medium level of severity regarding digestive. Majority of the respondents had perceived medium level of severity regarding major health impact from chronic exposure. Majority of the respondents had perceived medium level of severity.

5.5 IMPLICATION AND SUGGESTIONS

The following implications and suggestions were drawn based on the major findings of the study:

1. The Government/extension organisations have to promote environmental awareness groups at the village level to survey the natural resources available and to educate the people about the environmental threats caused by the excessive use of agro-chemicals.
2. Emphasis may be given for the protection of natural resources like land, plant and animal life, including predators and parasites. These groups should also strive to increase the bio-mass production and the use of naturally available organic manures compost, NADEP manure, green manure and vermicompost.
3. The Government may be required to available simple marketing channel for organic produce.
4. The agricultural researchers are required to contribute to the development of organic farming by developing and releasing of organically approachable varieties as well as pest resistance genotypes**.**

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APPENDIX

A Study on Farmer Awareness toward Ill-effect of Agrochemicals in Dhanapur Block of Chandauli district, Uttar Pradesh

(1) Name …….

(2) Age …….

(3) Gender …….

(4) Level of education

S.No.	Qualification	(√)
1	Illiterate	
2	Functionally literate	
3	Primary	
4	Middle	
5	Secondary (up to matric)	
6	Intermediate	
7	Graduate and above	

(5) Size of land holding

Category (in ha.)	(√)
Landless (0)	
Marginal (upto1)	
Small (1.1-2.0)	
Semi-medium (2.1-4.0)	
Medium (4.1-10.0)	
Large (>10)	

6. Mass media exposure

S. No.	Particulars	Regular	Occasionally	Never
1.	Radio			
2.	Television			
3.	News paper			
4.	Mobile			
5.	Magazine & Journal			

7. Do you aware about kisan call centre i.e.18001801551?

a) Yes b) No

8. Framing experience …….year.

9. Extension Contact

S.No.	Ext. Official	Frequency of contact with extension personnel for queries related to agrochemicals				
		Weekly	Fortnightly	Monthly	Whenever needed	None
1	KVK					
2	NRLM					
3	Scientists					
4	Progressive farmer					
5	NGO					

Dependent Variable

A) Diseases in human beings caused due to agrochemicals**.**

Major health impact from acute exposure

i. Problem related to skin and eye

S.No.	Problems	Awareness about characteristics	Severity		
		Yes/No	Mild	Severe	High Sever
1.	Body itching				
2.	Body irritation				
3.	Eye irritation				
4.	Eye pain				
5.	Redness in eyes				
6.	Blister formation on skin and necrosis				
7.	Redness on skin				

ii. Problem related to respiratory system

S.No.	Problems	Awareness about characteristics	Severity		
		Yes/No	Mild	Severe	High Sever
1.	Chest pain				
2.	Breathing problems				
3.	Slow pulse				
4.	Bleeding from nose and gums				

iii. Problem related to digestive system

S.No.	Problems	Awareness about characteristics	Severity		
		Yes/No	Mild	Severe	High Sever
1.	Stomach ache				
2.	Digestion problems				
3.	Vomiting				
4.	Diarrhea				

Major health impact from chronic exposure

S.No.	Problems	Awareness about characteristics	Severity		
		Yes/No	Mild	Severe	High Sever
1.	Physical disability				
2.	Fluctuations in blood pressure				
3.	Learning and developmental disorders				
4.	Attention deficit hyperactivity dysfunction				
5.	Heart blockage				
6.	Mental disability				
7.	Developmental delay				
8.	Diabetes				
9.	Cancer				

B)) Agrochemical effect on environment

S.No.	समस्या	Awareness about characteristics	Severity		
		Yes/No	Mild	Severe	High Sever
1.	Saline soil				
2.	Contamination soil				
3.	Decrease in enzyme activity				
4.	Reduced population of beneficial insects				
5.	loss of biodiversity				
6.	reduced population of birds				
7.	Contaminated air				
8.	Surface water contamination				
9.	Ground water contamination				