“A Study on Identification of Indigenous Technology Knowledge (ITK) and its Utilization in Contemporary Modern Agriculture at Shajapur District of Madhya Pradesh”

THESIS

Submitted to the

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya

In partial fulfillment of the requirements for the Degree of

MASTER OF SCIENCE

In

AGRICULTURAL EXTENSION AND COMMUNICATION

by

Pankaj Sharma

Department of Agricultural Extension and Communication

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior

College of Agriculture, Indore (M.P.)

2020

CERTIFICATE-I

This is to certify that the thesis entitled **"A Study on Identification of Indigenous Technology Knowledge (ITK) and its Utilization in Contemporary Modern Agriculture at Shajapur District of Madhya Pradesh"** submitted in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE in Agricultural Extension and Communication of Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior is a record of the bona-fide research work carried out by Mr. Pankaj Sharma under my guidance and supervision. The subject of the thesis has been approved by the Student's Advisory Committee and the Director of Instructions.

No part of the thesis has been submitted for any other degree or diploma or has been published. All the assistance and help received during the course of this investigation has been acknowledged by scholar.

Date:

Place: Indore

(Dr. Sandhya Choudhary)

Chairman of the Advisory Committee

MEMBER OF STUDENT'S ADVISORY COMMITTEE

(Chairman) Dr. Sandhya Choudhary **……...**

(Member) Dr. S.K. Jain **……...**

(Member) Dr. S.K. Choudhary **……...**

(Member)Dr. K.S. Kumar **……...**

CERTIFICATE-II

This is to certify that thesis entitled **"A Study on Identification of Indigenous Technology Knowledge (ITK) and its Utilization in Contemporary Modern Agriculture at Shajapur District of Madhya Pradesh"** submitted by Mr. Pankaj Sharma to the Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior in partial fulfillment of the requirements for the degree of Master of Science in AGRICULTURE in the Department of Agricultural Extension and Communication has been accepted after evaluation by the External Examiner and approved by the Student's Advisory Committee after an oral examination of the same.

Date:
Place: Indore

(Dr. Sandhya Choudhary)
Chairman of the Advisory Committee

MEMBER OF STUDENT'S ADVISORY COMMITTEE

(Chairman) Dr. Sandhya Choudhary ……...

(Member) Dr. S.K. Jain ……...

(Member) Dr. S.K. Choudhary ……...

(Member) Dr. K.S. Kumar ……...

Head of the Section: ……

Dean of the collage: ……

Director of Instructions: ……

ACKNOWLEDGEMENT

Thanks to Almighty God for giving me this opportunity to express my heartfelt gratitude to all the dedicated people whose support and kind co-operation encouraged me during the course of investigation. I avail this opportunity to express my deep sense of gratitude and cordial thanks to my guide and Chairman of the Advisory Committee, **Dr. (Smt.) Sandhya Choudhary**, Professor and Head of Section Department of Agricultural Extension and Communication for her inspiring guidance even in the covid-19 time period, untiring interest, thought provoking comments, constructive criticism, constant encouragement and generous help online(during lockdown period) and offline throughout the course of investigation and writing this manuscript.

I am deeply obliged to all the members of my Advisory Committee, namely, **Dr. S. K. Jain,** Head of Section and professor, Department of Economics, **Dr. S. K. Choudhary,** professor of Agronomy and **Dr. K. S. Kumar,** Head of Section and professor, Department of Statistics. I also express my deep sense of gratitude to **Dr. M. M. Patel**, Former HOD of Department of Agricultural Extension and Communication and **Dr. Deepak Verma,** Contractual teacher for their valuable guidance.

I am also thankful to **S. K. Rao** Hon'ble Vice Chancellor, RVSKVV, Gwalior, **Dr. D. H. Ranade**, DFA, RVSKVV Gwalior, **Dr. A. K. Singh**, Director of Instruction, RVSKVV, Gwalior and **Dr. A. K. Sharma**, Dean College of Agriculture, Indore, for providing me the necessary facilities during the studies.

I feel short of words to express my gratitude to my parents Shri Jwala Prasad Sharma, Mother Smt. Shipra Sharma and Sisters Neha and Bindiya. I am also thankful to Friends Narsingh, Ashok, Anamika , Nikita , Bhupendra , Sunil , and Surendra .

Last, but not least, my grateful thanks are due to all the respondents for the study and staff of College of Agriculture, Indore of their co-operation during thesis work.

Place : Indore

Date : / / (Pankaj Sharma)

Contents

S. No.	TITLE	Page Range
1	Introduction	1 – 5
2	Review of Literature	6 – 17
3	Material and method	18 - 27
4	Results	28 – 50
5	Discussion	51 - 56
6	Summary, Conclusions and Suggestions for further work	57 – 62
	Bibliography	63-66
	Appendix	I – vi
	Vita	-

List of Tables

Table No.	TITLE	PAGES
1.	Distribution of the respondents according to their age	28
2.	Distribution of the respondents according to their education	28
3.	Distribution of the respondents according to their social participation	29
4.	Distribution of the respondents according to their size of family	29
5.	Distribution of the respondents according to their land holding	29
6.	Distribution of the respondents according to their annual income	30
7.	Distribution of the respondents according to their income generation	30
8.	Distribution of the respondents according to their farm power	30
9.	Distribution of the respondents according to their extension contact and mass media explore	31
10.	Distribution of the respondents according to their decision making	31
11.	Dispersion of respondents accordant Risk bearing ability	32
12.	Categorization of Indigenous Technical Knowledge items in Agriculture	36
13.	ITK users in contemporary modern agriculture	38
14.	Overall Adoption behaviour of ITK users in contemporary	39

15.	Relationship bettween age adoption of ITK use in contemporary modern agriculture	39
16.	Relationship between education and their adoption of ITK use in contemporary modern agriculture	40
17.	Relationship between social participation and adoption of ITK use in contemporary modern agriculture	41
18.	Relationship between family type and adoption of ITK use in contemporary modern agriculture	42
19.	Relationship between land holding and adoption of ITK use in contemporary modern agriculture	43
20.	Relationship between annual income and adoption of ITK use in contemporary modern agriculture	44
21.	Relationship between income generation and adoption of ITK use in contemporary modern agriculture	45
22.	Relationship between farm power and adoption of ITK use in contemporary modern agriculture	46
23.	Relationship between extension contact and adoption of ITK use in contemporary modern agriculture	47
24.	Relationship between decision making and adoption of ITK use in contemporary modern agriculture	48
25.	Relationship between risk bearing abilities and adoption of ITK use in contemporary modern agriculture	49
26.	Overall χ^2 Value	50

List of Figures

Table No.	TITLE	BETWEEN PAGES
1.	Distribution of the respondents according to their age	28 - 29
2.	Distribution of the respondents according to their education	28 - 29
3.	Distribution of the respondents according to their social participation	29 - 30
4.	Distribution of the respondents according to their size of family	29 - 30
5.	Distribution of the respondents according to their land holding	29 - 30
6.	Distribution of the respondents according to their annual income	30 - 31
7.	Distribution of the respondents according to their income generation	30 - 31
8.	Distribution of the respondents according to their farm power	30 - 31
9.	Distribution of the respondents according to their extension contact and mass media explore	31 - 32
10.	Distribution of the respondents according to their decision making	31 - 32
11.	Distribution of the respondents according to their Risk bearing ability	32 - 33
12.	Categorization of Indigenous Technical Knowledge items in Agriculture	36 - 37
13.	Adoption behaviour of ITK users in contemporary modern agriculture	39 - 40

CHAPTER-I

INTRODUCTION

India, the country of *rishi* and *krishi*, has a very rich heritage of traditional health control methods and several treatment system (Ayurvedic, Unani, Homeopathy). Moreover, history of Indian agriculture shows that most of its farming community relies on traditional methods and ecological agriculture such as 'panchagavya' the farming systems based on ancient techniques for soil and animal management. Organic agriculture, the innovative farming system can build on and enhance the traditional knowledge and practices of local and indigenous communities, and moreover, the interface between organic agriculture techniques and farmers. Traditional agriculture knowledge offers a fertile ground for this innovation and improvement in local agriculture productivity. This means farmers' knowledge of ecological systems, environment and their conventional wisdom has to play more role in making organic farming more sustainable.

Indigenous knowledge can play a key role in the design of sustainable agricultural systems, increasing the likelihood that rural populations will accept, develop, and maintain innovations and interventions. It can be defined as the sumof experience and knowledge of a given ethnic group that forms the basis for decision-making in the face of familiar and unfamiliar problems and challenges. Farmers of agrarian, as well as industrialized, societies have sophisticated ways of looking at the world.

The ITK is an explicit or "codified" knowledge that is transmittable in formal, systematic language. On the other hand, ITK is a tacit knowledge of the local or indigenous people, which is personal, content-specific, and therefore hard to formalize and communicate. Local or indigenous people acquire knowledge by actively creating and organizing their own experiences. Thus, the (traditional) knowledge that can be expressed in words and numbers represents only the "tip of the iceberg" of the entire body of knowledge possessed by indigenous people.

Accessing to indigenous knowledge would enforce primary foundation of sustainable development. On the one hand, indigenous knowledge is production of empirical learning process and at the other hand is test and error of few thousand years of one society in relation to its environment. It is obvious that this knowledge represents human's interaction with nature and displays features of climate and specifications of vegetarian and animal nature of one region and more important, it displays their interactions with human.

Why Investigate Indigenous Knowledge?

Many technological solutions that have been proposed to address problems in rural communities have failed in the field because they do not take into account the local culture, particularly society's preferences, skills, and knowledge. Success in development is more likely to be achieved when local people are involved in the planning and implementation of development projects; and project officials who are familiar with indigenous knowledge are better equipped to facilitate participation by the local populations.

Characters of indigenous knowledge:

The characters of indigenous knowledge like the definition of this knowledge are presented by experts in different ways which we will explain about them as follow:

1. It is based on experience: Indigenous knowledge is the result of people's experience during many centuries.
2. It was tested during centuries by working on it.
3. It is compatible with indigenous environment and culture: Indigenous knowledge was created through native societies and it was formed according to their needs and during time the things which were not compatible with indigenous environment were omitted, so what was remained was compatible with the environment and culture of that society.

4. It is dynamic and is changing: Simultaneously with changing indigenous culture, the indigenous knowledge was changing too.
5. The knowledge of rural people was not technical: This knowledge was consisted of rural people's wishes, values and preferences.
6. The rural people's knowledge is not statistic: This knowledge was formed according to people's culture, social and economic history. The history which was written by these rural people shows that their manner and activities were efficient in changing of their conditions.
7. Rural people's knowledge is not enough. Maybe the rural people are knowledgeable but they like to know more and more. Because they want to be powerful in their discussions with political, economic and social forces who made these people poor before give them technology.
8. Rural people's knowledge has root on their political economy and is more important in political field. The advantages that rural people can get from indigenous knowledge are the knowledge that is created and released locally and is on their authority and also depends on main factors in regional politic economy. So improvement of their livelihoods depends on interferences which were made to pervade on these main factors.
9. Most of the rural people are public-oriented Mostly, they have a little information about many things which is in contrast with academic educations. Specialist people in universities have deep knowledge in little fields.
10. Indigenous knowledge systems are holist: Local people consider the other people's problems as their problems and try to solve these problems in a whole frame with using their knowledge.
11. Indigenous knowledge systems combine the culture and religious believes. Religious believes as a part of indigenous knowledge are not separated from technical knowledge and these believes effect on people' do and don’t.
12. Indigenous knowledge systems prefer the less risk to most profit Escaping of risk is important for native people, for example a native person usually keeps some goats for possible cases such as disease of his children and he didn't expect any incomes of these cases.

Significance of the study:

Indigenous knowledge functions within the given socio-economic and spatial boundaries of the society and plays an active part in the culture of the population concerned, being preserved, communicated, and used by its members to serve some purpose in relation to productive activity within the society. Therefore, "**A Study on Identification of Indigenous Technology Knowledge (ITK) and its Utilization in Contemporary Modern Agriculture at Shajapur District of Madhya Pradesh"** was undertaken with the following objectives.

Specific Objectives:

1. To study the Socio personal, economic, agricultural, communication and psychological attributes of ITK users.
2. To document and classify the identified indigenous technology knowledge (ITK) perceived by ITK users.
3. To know the adoption behaviour of ITK users in contemporary modern agriculture**.**
4. To study the association between independent variables and the adoption of ITK users in contemporary modern agriculture.

Conceptual framework:

Indigenous knowledge in this study refers to the body of knowledge which is domestic to the farmers. This knowledge system is however not exclusive but can be modified with time. Whereas modern knowledge refers to concepts, ideas, values, beliefs which are imparted in the minds of the native by extension workers who are trained in scientific agriculture, it should be noted that in some cases the difference between indigenous knowledge and modern techniques is not distinct enough. To a large extent, improved agricultural research improves on already existing techniques. For instance mulching, fallowing and crop rotation fall under both indigenous and modern techniques of soil conservation and fertility improvement. In this study, crop rotation, mulching and fallowing have been

categorized under indigenous practices. The study was conceived on the theoretical premise that as many tries to adapt to the environment which he lives and derives his livelihood, he improves his knowledge, skills and strategies to harness natural resources in a sustainable manner. The knowledge and skills are derived from man daily interactions with the environment, observations and experiments. They greatly shape and model the decisions made by people regarding exploitation of resources. The knowledge, skills and practices relating to natural resources are passed down to generations through the cultural learning process. It is the outcome of all these among different groups and the environment that is termed indigenous, local, tradition or people's knowledge.

CHAPTER - II

REVIEW OF LITERATURE

A comprehensive review of literature is an essential part of any scientific investigation. Reviews constitute an important source of information and helps in clearing some concepts. It is well known fact that scientific approach in case of social sciences has limitations as these are not very much authoritarian and is less developed in technique in contrast to their use. Social science cannot be put to experimentation as much as the physical sciences. Also, there is great subjectivity and judgment which is weak on account of the temporary nature of the problems. Hence, after the problem has been decided upon, it becomes necessary to look into the previous work done on the subject or topic through the review of literature. Review of literature provides useful cause and effect relationship and helpful suggestions for significant investigation. Hence, in this chapter an attempt has been made to assimilate the previous works within the framework of present study, which are helpful in interpretation of results obtained during the research on the basis of the objectives of the study. In accordance with objectives of study the literature has been reviewed and presented under following subheads.

1. Socio personal, economic, communication and psychological attributes of ITK users.
2. Document and classify the identified indigenous technology knowledge (ITK) perceived by ITK users.
3. Adoption behaviour of ITK users in contemporary modern agriculture**.**
4. Association between independent variables and the adoption of ITK users in contemporary modern agriculture.

1. Socio personal, economic, agricultural, communication and psychological attributes and their association with ITK in modern technology.

Age:

Nirban (2006) reported that 8.45, 19.72 and 71.83 per cent of the respondents belonged to the 'young', 'middle' and 'old' age group, respectively. It was found that majority of the respondents were elder.

Mamum (2004) reported that majority of the respondents (62.50per cent) belonged to middle age group.

Maravi (2009) reported that most of the respondents (45.83per cent) belonged to middle age group (35 -50 years), followed by young (20 -35 years) 34.17 per cent and the respondents belonging to old age group (> 50 years) were 20.00 per cent.

Patidar (2013) reported that the phenomena with regards to the use of ITK on plant protection in vegetable would be related more by the middle aged group (33.27%.

Education:

Mamum (2004) reported that 15.00 per cent of the farmers were illiterate and 33.00, 38.00 per cent and 14.00 per cent had primary, secondary and above level of education.

Nirban (2006) reported that 15 (21.13per cent) respondents were 'illiterate', while 29 (40.85per cent) and 18 (25.35per cent) respondents had studied 'upto primary' and 'middle school' level, respectively. Two farmers (2.82per cent) and six farmers (8.45per cent) had studied upto 'high school' and 'pre-university' level. Only one farmer (1.40per cent) was 'graduate'. It is evident from the data, that majority of the farmers (66.20per cent) were educated upto or below middle school.

Reddy (2006) reported that in study area primary and middle school education was noticed to the extent of 25.83 and 29.17 per cent. But only 16.67 per cent were illiterate.

Maravi (2009) reported that higher per-centage of the respondents (33.33per cent) were educated up to primary level, whereas, 26.67 per cent middle level, 20.83 per cent Illiterate, 15.00 per cent high school and 4.17 per cent of the respondents were educated above high school.

Patidar (2013) reported that the phenomena with regards to the use of ITK on plant protection in vegetable would be related more by the educated group because about 69.00 per cent of the total population had education of different levels. Only about 31.00 per cent of them had no education or they got only formal education

Income generation:

Maravi (2009) studied in income generation that most of the respondents (63.33per cent) possessed farming and rest of them possessed one subsidiary occupation, followed by 30.00 per cent respondents possessing no subsidiary occupation and 6.67 per cent of the respondents possessed more than one subsidiary occupation

Annual income:

Chouhan (2003) reported that a higher per centage of tribal cotton growers (52.50per cent) belonged to low-income group, followed by respondents of medium income group.

Mamum (2004) reported that 23.00, 38.00, 12.00 and 27.00 per cent of the farmers belonged to low, medium, high and very high income groups.

Barodia *et al.* (2005) reported that most of the respondents (60.00per cent) belonged to low income group, followed by medium income group (33.34per cent).

Nirban (2006) reported that majority of the farmers (85.92per cent) were in ‘medium’ income category (Rs.12, 568.00 to 71,320.00). Three respondents (4.23per

cent) had ‘low' annual income (upto Rs.12, 567.44). While only seven (9.86per cent) respondents had ‘high’ annual income (Rs.71, 321.00 and above).

Reddy (2006) reported that around sixty per cent of respondents (58.33per cent) belonged to medium level of annual income (26,000 to 59,000).

Maravi (2009) reported that out of 120 respondents, 44.17 per cent had low annual income, 37.50 per cent had medium annual income and only 18.33 per cent respondents had medium income group.

Patidar (2013) reported that the phenomena with regards to the use of ITK on plant protection in vegetable would be related more by the low and medium (together) (37.94 %) income group. But on an individual group, the maximum number of vegetable growers (24.94%) had fallen into high income group

Social participation:

Patel (2004) reported that majority of the respondents (96.67per cent) had low participation and only 3.33 per cent had medium participation.

Patidar (2008) reported that the total 60 adopted farmers, 56.67 per cent had medium social participation, followed by 23.33 per cent respondents who had low social participation and only 20.00 per cent were found to have high social participation.

Maravi (2009) reported that most of the respondents (50.00per cent) had low social participation. The per-centages of participation regarding to medium and high level were observed 38.33 and 11.67 per cent respectively.

Bandode (2012) reported that most of the respondents 44.44 per cent were of medium participation group followed by high participation group 28.89 per cent and no participation group 26.67 per cent respectively.

Saad (2013) reported that the total beneficiaries, the majority of the beneficiaries 37 per cent were of high social participation group followed by low social

participation group 34 per cent and medium social participation group 29 per cent respectively.

Dohare (2014) reported that most of the tomato growers (46.66per cent) were of partial participation group followed by high participation group (29.17per cent) and low participation group (24.17per cent) respectively.

Land holding:

Lightfoot *et al*.(1995) suggested that indigenous knowledge system (ITK's) could help in the adoption of technology packages where there is farmers having medium and small size of land holding.

Mamum (2004) reported that 15.00, 45.00, 19.00 and 21.00 per cent of the farmers owned marginal, small, medium and large size of land holding.

Nirban (2006) reported that maximum number of the respondents (57.55per cent) and (22.54 per cent) were falling in the category of 'marginal' and 'small' farmers respectively, while 9(12.68per cent) and 5 (7.03per cent) respondents were 'semi-medium' and 'medium' farmers. Not a single respondent was having big land holding.

Reddy (2006) reported that majority of farmers were medium land holders (72.50per cent), whereas 19.17 per cent of farmers possessed large land holdings.

Maravi (2009) reported that 50.00 per cent of the respondents had medium size of land holding (5 -10 ha), 40.00 per cent low (< 5 ha) and 10.00 per cent of the respondents possess large size of land holding.

Patidar (2013) reported that the phenomena with regards to the use of ITK on plant protection in vegetable would be related more by the small and medium (together) farm size group. But on an individual group, the maximum number of vegetable growers had fallen into large farm size group

Farm implements:

Maravi (2009) reported that most of the respondents (50.00per cent) had medium category of farm implements (6-12 Scores), followed by 41.67 per cent respondents of low category (< 7 Scores) and 8.33 per cent of the respondents had high category of farm implements (>12 Scores).

Document and classify the identified indigenous technology knowledge (ITK) perceived by ITK users.

Vivekanandan (2000) reported that in Danta region of North Gujarat, farmers indigenously increased the fertility of soil. They used leaves of Khakhara (*Butea monostermg*) to increase the fertility of farm soil. Dried leaves were collected and spread in the field where previously wheat was grown. Then it was burnt along with the residues of stalks of wheat. This ash, when mixed with soil, increased fertility of soil.

James (2003) reported an interesting practice by the farmers in Amaravathy village in Idukki district of Kerala, for quick vermicomposting. The farmers found that the addition of cattle urine diluted with an equal quantity of water, reduced the duration of compost formation by 10 days. Moreover, 20 per cent increase in the number of worms was also observed in this period.

Ratan *et al.* (2003) reported that out of 42 ITKs documented through voluntary disclosures, 8 were selected for validation. Validation was done through using the Quantifying Indigenous Knowledge (QIK) tool of Participatory - Rural Appraisal (PRA), conducting on farm trials and laboratory experimentations. The selected ITKs were control of rice caseworm by tender bamboo minced water through use of Sali leaves and rice gallfly by parso/persu leaves, control of shoot and fruit borer in brinjal by tobacco soaked water, control of insect pests in cucurbits, cowpea and lady's finger by spraying urine of domestic animals mixed with tobacco soaked water, control of pests and diseases by spraying of starch, animal urine and

dusting of cowdung ash and control of termites in sugarcane by use of horse droppings and ploughing the fields by indigenous plough made up of neem wood.

Nandini *et al.* (2006) noticed that cent per cent of the farmers adopted summer ploughing. 70.00 per cent adopted organic manuring and 87.50 per cent adopted inter cropping as indigenous technological knowledge against the soil and water conservation practices.

Nirban (2006) reported that farmers did not use chemical fertilizers, insecticides etc. They are of the opinion that such chemicals killed the frogs and fishes in the field. These frogs and fishes feed on the insects like army worm, and even young ones of crabs. Consequently, a natural control is achieved. Almost all the farmers did not drive away the cranes in the ploughed field, which feed on insects in ploughed soil. Study also reported Application of fresh cow dung was avoided by the farmers to keep the crop free from disease and pest. The beetles/grubs which multiple in dung pit were likely to spread in the field. Fresh cow dung also invited the problem of termite infestation in the field. For control of karapa (rice blight) at later stage of crop growth, almost all the farmers dusted cow-dung ash uniformly all over the field by hand. Most of the farmers gave treatment to paddy seed for preservation. A thin slurry was prepared by mixing cow dung and urine of cattle in 1:2 proportion. Paddy seeds were then soaked in this solution for half an hour and dried in shade. Then, after completely drying, these seeds were stored in kanagi with Neem leaves (*Azadirachta indica*) and banyan leaves. At the end, the kanagi was smeared with cow dung slurry.

Majhi (2008) reported that paddy farming has been major agricultural activity in the village. The villagers have developed their own way of storing the harvested paddy. The structure is built out of paddy straw, locally called as Puri and the size is maintained based on the bulk of paddy harvested. This helps in storing the paddy seed for longer duration without reducing its quality.

Patil (2008) stated that 75.71 per cent of chilli growers used of indigenous technological practices in cultivation of both the crops. The sole cropping practice

was adopted by about 63 per cent of the respondents. The practice of treating seeds with panchagavya (prepared by mixing cow dung-10 kg, cow urine-5 litre, cow milk-250 ml, cow curd-250 ml, cow ghee-100g) and beejamrut (prepared by mixing cowdung-5 kg, cowurine-5litre, cow milk –1 litre, lime-250g, water –100 litre) was noticed with 58.57 per cent farmers. Lastly, the practice of mulching with sugarcane trash was noticed with 15 per cent of vegetable growers.

Shalini *et al*. (2008) reported that farmers of Gharwal for centuries have been managing their soils using traditional and indigenous knowledge. Some of the indigenous organic practices followed were application of FYM, mixed cropping, crop rotation, spraying of ash, terracing and in-situ manuring. The study revealed that in vegetable cultivation spraying of ash found to use as plant protection method.

Sharma *et al.* (2009) documented indigenous TJyapoo method of soil management and some 12 methods of indigenous soil fertility management. Use of farm yard manure, green manuring, in-situ manuring such as by keeping animals in sheds or in open fields and also by using migratory flocks of sheep and goats, mulching, use of nitrogen fixing plants, crop rotation, fallowing, terrace riser slicing, trapping flood water for fertigation, burning of trash, use of forest soils and black soils and burying of dead animals and mobile toilets are recognized as indigenous soil fertility management practices common in Nepal.

Lakra *et al.* (2010) reported that about 77 per cent of respondents used Parsa (*Cleistanthus Collinus*) leaf in rice and other field crop to control insect like yellow stem borer, case worm, gall fly and gandhi. Use of Sindwar (*vitex negundo*) leaf was reported by only 12 per cent of respondent for the control of insect pest infestation in stored grains of paddy and wheat.

3. Adoption behaviour of ITK users in contemporary modern agriculture.

Sharma (2003) reported that the indigenous practices being followed by some of the farmers may not be scientifically hundred per cent correct but since adopted by the farmers over generations, the way have some bass which need to be systematically evaluated by scientists. The objective of study was to provide

feedback to the scientists about practice being adopted by the farmers of operational area. If some of the indigenous practices prove scientifically incorrect, the farmers should be advised accordingly.

Nirban (2006) reported that slightly less than two third (64.78 per cent) of the respondents had ‘medium’ adoption of the IRCPs, more than one fifth (22.54 per cent) had adopted the IRCPs to ‘low’ degree, while 12.68 per cent had ‘high’ adoption of IRCPs. The mean score of adoption of IRCPs was 15.31 which indicated ‘medium’ adoption.

Reddy (2006) reported that more number of vegetable growers were noticed in medium adopter category of IPM practices in tomato (63.33per cent) and cabbage crop (59.17per cent).

Khare *et al.* (2007) reported different indigenous practices used in agriculture for sustainable agriculture development, the indigenous practices are; summer ploughing, fallowing in uplands and burn crop residue and grasses for land development. For water conservation they prepare bunds, pits ponds and use bamboo pipes (Ponga) for drainage of water from fields. Tribal farmers detect water below ground by presence of various trees and predict the weather based on observations of various animated and in animated objects around them like wind, humidity, temperature and the sun, the moon, colour of sky, birds, animals, plants and their parts etc. For soil conservation and soil fertility enhancement they mix amendments like manure and forest waste, cow urine, oilseed cakes and ash etc. For weed control farmers follow bushening, planking in standing paddy, growing tall varieties, pre germination of weed seeds, hand weeding etc. Control insects like termite and caterpillar by use of bamboo pipes, drenching salt or kerosene oil in termite houses etc. They judge maturity of crops by the colour of plant parts, their dryness and hardness of grain and harvest it by sickle or by pulling with hands. In their study reported that majority of the farmers (54.00per cent) adopted medium level of ITK followed by low level (26.00per cent) and high level of adoption (20.00per cent) respectively.

Maravi (2009) reported that majority of the respondents (46.67per cent) had medium level of adoption regarding to ITK in agriculture, 36.67 per cent low and 16.66 per cent of them high level of adoption of ITK in agriculture. Hence, it may be concluded that the level of respondents about adoption of ITK was medium to low.

Lakra *et al.* (2010) reported that the extent of adoption of various indigenous agricultural practices in Jharkhand. Study revealed that 90.00 per cent of the respondent adopted soil management practices followed by weed management adopted by 87.00 per cent with use of indigenous agricultural practices.

Badgujjar (2012) reported that as per extent of adoption of respondents ranked according to the components of practices, summer ploughing first ranked, Interculture and Application of FYM/NADEP compost second ranked, Use of hand weeding third ranked, Use of chilli/garlic fourth ranked, Use of insect resistant varieties fifth ranked, Use of neem leaf extract sixth ranked, Seed inoculation seventh ranked, Crop rotation eighth ranked, Installation of bird cage before flowering ninth ranked, Use of light trap / pheromone trap tenth ranked, Use of tricoderma S.P eleventh ranked, Use of N.P.V. twelfth ranked, Use of bio fertilizer thirteenth rank and Use of bio pesticide fourteenth ranked. It also concluded that the majority of respondents had medium adoption level of organic farming in study area followed by low and high.

4. Association between independent variables and the adoption of ITK users in contemporary modern agriculture.

Hossain (2001) reported that education, size of farm holding of the farmers was found to be positively and significantly related with their knowledge.

Sarker (2002) reported that education and size of farm holding of the farmers was found to be positively and significantly related with their knowledge.

Sana (2003) reported that education of the farmers was found to be positively and significantly related with their knowledge.

Mamum (2004) observed that education, annual income, size of land holding were positively correlated with their knowledge of Indigenous Technological Knowledge.

Maravi (2009) reported that in study it was found to highly significant association between age, education, caste, subsidiary, occupation, annual income and farm implements of respondent and extent of knowledge regarding ITK.

Suggestions for improvement in ITK:

Bajaj and Srinivas (2001) reported that sustainable agricultural practices that have evolved over the years could provide answers to the current crisis in the agriculture sector. It is therefore imperative that this knowledge is widely disseminated among the farming community, researchers, academicians, administrators, policy makers.

Squire (2001) suggested that research institutions should involve farmers in indigenous agriculture knowledge research by setting up the required situation where both the farmers and researchers will take risk either together of independently to transform the indigenous farming institutions. It is further suggested that the agriculture extension and training institution should blend the traditional and made knowledge system in their training programme and establish Indigenous Knowledge Centers.

Nirban (2006) reported that only two suggestions were given by the respondents. However, both the suggestions are important and indicative of the rational thinking and intent of farmers to find out some everlasting solutions for the problems. First suggestion was that, ‘strict rules should be set and observed to avoid the indiscriminate deforestation’. All the (100per cent) respondents gave this suggestion. Another valuable suggestion was given by 70.42 per cent farmers; they asserted that the government officials (extension personnel, scientists etc.) should look at the traditional knowledge with due consideration and be ready for its proper assessment.

Reddy (2006) suggested that majority of respondents possessed medium level of knowledge about IPM practices, hence it is of utmost importance to design more number of skill training, demonstrations and exposure visits by the development departments, central and state plant protection training centres to convince the farmers about IPM method for higher diffusion of IPM technology.

Maravi (2009) reported that main suggestions were “Some literatures about ITK’s should be made available to the farmers” followed by “The scientific rationality behind ITK’s should be tested”, “All further agricultural research should be based on these indigenous technologies”, “Some such farm equipments are made available to the farmers, which are cheaper, easily available, and easy to handle based on traditional wisdom” and “At last, some important and useful extinction indigenous technologies should be provided in the light of the day and launched in broad spectrum”

CHAPTER – III

MATERIALS AND METHOD

Materials and method was elaborate action plan of research.

1. Location of the current research area:

The present study has been conducted in Shajapur district of Madhya Pradesh. Shajapur District is a part of the Central Madhya Pradesh. The district is situated in the northwestern part of the state between latitudes 32"06' and 24"19' North and longitude 75" 41' and 77" 02' East. The district is bounded by Ujjain, Dewas and Sehore, Rajgarh, Jhalawar district of Rajasthan. The Geographical Area of the district is 6196 Sq Kms. The district has deep black and shallow black brown and alluvial soils of the northern region. Physic-cultural diversities in the district have led to sub-divide it into the following sub-micro regions:-

- Agar plateau.
- Shajapur Forested Upland.
- Kali Sindh Basin.
- Shajapur Upland.

2. Research Design

Research design was most crucial aspect of the materials and method. It is the integral procedure of provision and carrying out the investigation. To desire the response for the research question, a synchronic research plan was used in the research because it is dramatist phenomena with capable interpretation. It distinctly states the characteristics of the special position of grouping or individualist.

3. Sampling technique used

The sample of the present study was selected by proportionate random sampling method. The various stages of the sample were -

3. 1. Selection of the block

Study was circumscribe in Shajapur district which comprises 7 blocks namely Shajapur, Mohan Badodiya, Gulana, Shujalpur, Kalapipal, Avantipur Badodiya and

Polay kalan. Out of these only one block i.e. Shajapur was purposively selected for present study due to the fact that this district has the scope of identification and conservation of indigenous technologies exists in this area as suggested by the KVK, Shajapur.

3.2. Selection of the villages

Shajapur block comprises 154 villages, therefore in this study list of villages given by KVK, Shajapur was taken for agricultural season 2018- 2019. From this list 09 villages were selected randomly for this study.

3.3. Choice of the responsive

205 ITK users existed in the selected 9 villages as pre the information received from KVK, Shajapur. Out of this list, 120 ITK users were selected randomly on this study. The data was analyzed by using appropriate statistical tools.

Table- 3.2 List of selected villages and number of respondents chosen from each village.

S.N.	Name of village	No of selected farmers
1	Jamner	14
2	Khardown kla	14
3	Vaidag nagar	14
4	Gopipur	14
5	Tyngni	14
6	Mulikheda	14
7	Loharwas	12
8	Girwar	12
9	Patoli	12
Total		120

4. Operationalization of variables

S.NO.	Independent Variables:	Measurement
	Socio personal variable	
1.	Age	As per chronological
2.	Education.	No. of classes passed
3.	Social participation	Structured schedule
4.	Type of family	Structured schedule
	Economic variable	
5.	Size of land holding	Total land in ha.
6.	Annual income	Total annual income of the respondents through all sources.
7.	Income generation	Structured schedule
8.	Farm equipment	Total number of farm implement
	Communication variable	
9.	Extension contact	Structured schedule
10.	Mass media exposure	Structured schedule
	Psychological variable	
11.	Decision making	Structured schedule
12.	Risk bearing ability	Structured schedule
(B)	**Dependent Variable:**	
Identification of Indigenous Technology Knowledge (ITK) and Its utilization in Contemporary Modern Agriculture		For the Identification of Indigenous Technology Knowledge (ITK) a interview schedule was developed, and its utilization in Contemporary Modern Agriculture was assessed on the recommendation of mandatory function of KVK, Shajapur

(A) Independent Variables

1. Age

The variable age is mention to the: age of the responsive in complete year, i.e. written record age of the responsive. Actual age was record as told by the responsive at time of interrogation. The responsive were classified into following 3 age groups:

S. No.	Class	Age (years)
1.	Young age group	Between 21 to 34 years
2.	Middle age group	Between 35 to 49 years
3.	Old age group	Above 50 years

2. Education

Ability or inability to read and write and number of classes passed from formal education by responsive. Responsive were classified into 3 categories:

S. No.	Class	Education	Weight age
1.	Illiterate	Can not read and write	1
2.	Up to primary	Educated up to primary	2
3.	Up to middle	Educated up to middle	3
4.	Above High school	Educated high school and above	4

3. Social Participation

Level or component of participation of an single in ceremonial and unceremonial social group at village level, block level or district level. List of these organization was processed for aggregation of data. The responsive were further categorized into 3 categories on the basis of highest and low scores receive by them.

S. No.	Class	Score
1.	Low-level	Up to 5
2.	Intermediate	6-10
3.	Advanced High	Above 10

4. Type of family

Nuclear type family: Families constricted to husband, wife and their children. Joint type family: families having a large number of members living together and where individualist earning and communal manner of cooking were excavation jointly to run the family by family head.

S. No.	Category	Score
1.	Nuclear type family	1
2.	Joint type family	2

4. **Total land area**

Land area refers to entire area in hectares under cultivation obsessed by an individualist. Land holding has been categorized as under:

S. No.	Class	Weight-age
1.	Little (Less than 1 hectare)	1
2.	Intermediate (between 1.1 to 2 hectares)	2
	Large (more than 2 hectares)	3

6. Annual income

Total annual income of responsive has been refers to total income of the responsive receive from agricultural and related occupations. The responsive was categorized into 3 class:

S. No.	Class	Total income of responsive	Weight age
1.	Low-level	Less than100,001	1
2.	Intermediate	between 100,001 to 150,001	2
3.	Broad high	More than. 150001	3

7. Income generation

Income generation activity implementation to gracious of work through by the responsive in their family unit for excess earning for their sustenance in agriculture sector. The respondents were categorized into three occupational groups as follows -

S. No.	Class	Score
1.	Low-level	1
2.	Intermediate	2
3.	Advanced	3

8. Farm power:

It refers to the total farm machinery available by responsive and utilized in their farming sector for example self-propelled vehicle, labourer, pump sets, power tiller, seed drill sprinkler. Respondents were categorized into three categories on the basis of highest and lowest number obtained score.

S. No.	Class	Weight age
1.	Low-level (less than 3 items)	1
2.	Medium (between 3 to 8 items)	2
3.	High (more than 8 items)	3

9. Contact with extension agencies:

Extension contact refers to degree which a responsive was oriented to governmental or non-governmental agencies for prevailing agriculture information.

Consequence was transcribed on a 3 component: most often, often, and sometimes were taken 3, 2and 1 mark respectively. Following 3class were formulated as compass of mark receive.

S. No.	Class	Range
1.	Low-level	01 - 15
2.	Intermediate	16 - 30
3.	Advanced High	31 - 45

10. Decision making

The decision making of a respondent is operationally defined as the degree of weighing the available alternatives in terms of their desirability and their likelihoods and choosing the most appropriate one for achieving maximum profit on his farming. The scale developed by Supe (1969), and as adopted by Nagesh (2006) with suitable modifications was used. The scale consisted the weight ages of 3, 2 and 1 were assigned to the three rationality levels namely 'rational', 'intermediate' and 'less rational', respectively. Based on the total score obtained by respondents on decision making, they were grouped into following three categories:

S. No.	Class	Range
1.	Low	01 - 06
2.	Medium	06 - 12
3.	High	12 - 18

11. Risk bearing ability

The scale developed by Supe (1969) was used for measuring the risk orientation consisting of six statements with modification as per experts' views in

which five were positive and one was negative. The respondents were categorized into three categories such as low, medium and high.

S. No.	Categories	Range
1	Low	01 - 06
2	Medium	06 - 12
3	High	12 - 18

(B) Dependent variable:

Identification of Indigenous Technology Knowledge (ITK) and Its Adoption in the Contemporary Modern Agriculture

According to Rogers (1983) adoption has been operationalized as whether an individual practiced each of the selected Indigenous Technical Knowledge items over a period of time. The respondents were narrated about the selected Indigenous Technical Knowledge items one by one, each item enquiring whether they adopted completely or partially or not adopted the practice in the previous years. Each respondent was asked for his adoption in the crops grown by him. A single farmer was assessed for 7 items in agriculture on an average for his adoption.

The scores of all the Indigenous Technical Knowledge were added up for each respondent to arrive at total adoption score and the adoption index was worked out by using the following formula:

$$\text{Adoption Index} = \frac{\text{Score obtained by the individual respondent}}{\text{Total maximum score of all items applicable}} \times 100$$

The adoption index was used to find out the relationship between adoption and selected independent variables. Based on adoption coefficient values, the extent of adoption of Indigenous Technical Knowledge of different crops were grouped as low, medium and high based on mean and standard deviation.

The pattern followed in this study was:

S. No.	Class	Range
1.	Low-level	1
2.	Moderate	2
3.	High	3

5. Statistical analysis of data

The adoption index was used to find out the relationship between adoption and selected stability independent variables. Based on adoption coefficient values, correlations path the extent of adoption of Indigenous Technical Knowledge were grouped as low, medium and high based on the mean and standard of that deviation.

1. Percentage

$$Pi = \frac{Xi}{Ni} X\ 100$$

Where,

Pi = that means of Proportion in per cent

Xi = those means of Frequencies spreading

Ni = that means of the Total no. of accused personas

3. Arithmetic mean

An arithmetic mean of is well-defined in place of that of the very imp sum plus and the sum of wholly ideals of thought separated by means of that of the total very number of notes study.

$$\text{Arithmetic Mean } (\bar{X}i) = \frac{\sum Xi}{Ni}$$

Where,

∑xi = Those having to the Entirety of the rates of observations

Ni = Those showing the numeral of opinion in the model would chosen

5. The Chi-square test those having values

The suggestion of would unlike traits of the persons per as their espousal levels whose the confirmed via the chosen that of test chi-square (x^2).

Where, $$x^2 = \sum \frac{(Oi - Ei)^2}{Ei}$$

Oi = Considered as observed frequency in quiz

Ei = Considered as Expected frequency in class

∑i = considered as Precis done all variances in class

d.f. =considered as Mark of self-determination in class

8. Hypothesis:

1. There is no association between social participation of farmers and their adoption behaviour of ITK users in contemporary modern agriculture technology.
2. There is no association between allied agriculture activities of the farmers and their adoption behaviour of ITK users in contemporary modern agriculture technology.
3. There is no association between Extension contact and mass media exploreof the farmers and their adoption behaviour of ITK users in contemporary modern agriculture technology.
4. There is no association between decision making of the farmers and their adoption behaviour of ITK users in contemporary modern agriculture technology.
5. There is no association between risk bearing ability of the farmers and their adoption behaviour of ITK users in contemporary modern agriculture technology.

CHAPTER - IV

RESULTS

This chapter highlights the results of the work. The data collected during the investigation were coded, analyzed, interpreted and the results are presented objective-wise under the following heads:

1. Socio personal, economic, agricultural, communication and psychological attributes of ITK users.
2. Document and classify the identified indigenous technology knowledge (ITK) perceived by ITK users.
3. Adoption behaviour of ITK users in contemporary modern agriculture.
4. Association between dependent variables and the adoption of ITK users in contemporary modern agriculture.

Table 4.1: Classify the responsive reporting their age group

Classes of age group	Frequency	Per cent
Young group	30	25.00
Middle group	52	43.33
Older group	38	31.67

Table 4.1 represent majority of the responsive 43.33 per cent had middle age group, 31.67 per cent had old age group, while 25.00 per cent from young age group.

Table 4.2: classify the respondents reporting their educational level

Classes of educational level	Total number	Per cent
Illiterate	27	22.50
Primary education	29	24.16
Middle education	43	35.83
High school & above classes	21	17.51

Table 4.2 showed majority 35.83 per cent were found middle education group, 24.16 per cent found primary educational level, 22.50 per cent from illiterate and remaining 17.51 per cent from educated high school and above educational level.

Table 4.3: Classify the responsive reporting their social participation

Group of social participation	Frequency of respondents	Per cent
Low-level	49	40.83
Intermediate	39	32.50
Advanced	32	26.67

Table 4.3 represent majority 40.83 per cent responsive found to had low social participation, 32.50 per cent medium social participation and remaining 26.67 per cent from high social participation.

Table 4.4: Classify the responsive reporting to type of family

Classes	Total number of responsive	Per cent
Nuclear family	74	61.67
Joint family	46	38.33

Table 4.4 represented majority 61.67 per cent responsive had nuclear family, and38.33per cent responsive had joint family type.

Table 4.5: Arrangement of responsive accordant their total area of land holding

Land holding	No. Of responsive	Per cent
Little	15	12.50
Intermediate	71	59.17
Big	34	28.33

Table 4.5 reported majority 59.17 per cent responsive belonged to little farmers group, 28.33 per cent responsive were big farmers, while 12.50 per cent responsive belonged to intermediate farmers group.

Table 4.6: Dispersion of the respondents according to their annual income

Classes of income	Numbers	Per cent
Low-level	32	26.67
Average	72	60.00
Broad High	16	13.33

Table 4.6 showed majority 60.00per cent responsive had average income, 26.67 per cent responsive were from low-level income group, where as only 13.33 per cent were in broad income categories.

Table 4.7: Distribution of respondents according to their Income generation.

Income generation	Frequencies	Per cent
Low-level	49	42.14
Intermediate	41	32.14
Broad	30	25.72

Table 4.7 display majority 42.14 per cent responsive had low income generation, 32.14 per cent responsive had medium income generation and only 25.72 per cent responsive had high income generation.

Table 4.8: Concentration of responsive reported farm power

Farm power	Number of respondents	Per cent
Low	53	44.17
Medium	35	29.17
High	32	26.66

The Table 4.8 shows the information regarding farm power used by the respondents. It was found that 44.17 per cent respondents belonged to low farm power group, while 29.17 per cent respondents belonged to medium farm power group whereas 26.66 per cent had high farm power.

Table 4.9: Arrangement the respondents to their Extension contact and mass media exposure.

Extension contact	Number of respondents	Per cent
Reduced low	21	17.50
Average - intermidiate	75	62.50
Advanced	24	20.00

Table 4.9 expose majority 62.50 per cent responsive had medium extension contact and mass media explore, 20.00 per cent belonged to high extension contact and mass media explore group, whereas only 17.50 per cent were having low extension contact and mass media explore.

Table 4.10: Concentration of respondents reported to their decision making

Classes	Frequencies	Per cent
Down Low	27	22.50
Average Medium	72	60.00
Full High	21	17.50

Table 4.10 display that majority 60.00 per cent of respondents had belonged to medium decision making group, 22.50 per cent had belonged to low decision making group whereas 17.50 per cent belonged to high decision making group.

Table 4.11: Dispersion of respondents accordant Risk bearing ability

Classes	Frequencies	Per cent
Down low	25	20.83
Average medium	86	71.67
Broad high	9	7.50

Table 4.11 disclosed majority71.67 per cent of respondents had medium risk bearing ability, 20.83 per cent low risk bearing ability whereas 7.50 per cent showed high risk bearing ability.

Document and classify indigenous technology knowledge (ITK) perceived by modern farmers:

1. Soil management:

For soil management following ITK are used

- Deep ploughing of fallow land during summer/autumn season and deep ploughing of cultivated land after every 3 years.
- Ploughing the field 2 to 5 times before sowing.
- Braking the clods by wooden cylindrical shaped implements.
- Ploughing the field after every shower during summer.

2. Variety seed and their management:

For variety, seed and their management following ITK are used

- Before sowing, farmers sieve seeds in order to separate the poor seeds and impurities.
- Farmers select/demarcate healthy plots for seed purposes, through physical observations on the basis of phenotypic characters.

3. Seed treatment:

In seed treatment following ITK are used

- Seed treated of pulses with heang (Asafoetida) @ 10 gm/10 Kg seed control pod borer &wilt.
- Application of 100 gm mustard oil per 40 Kg of gram, control wilt disease.
- Farmers dip seeds in a soil pot for 12 hours after that they took it out and cover with straw or jute bags for early germination.
- Cow dung treated seeds are sown by the farmers.
- The rational behind the use of cow dung was hypothesized to be cow dung helps the seed by providing moisture for sprouting. A part from it cow dung contains minerals, so it provides plant nutrients. As a non chemical barrier it prevents the attack of pests and diseases.
- Oil treated seeds are sown the rationality behind it is oil act as a barrier for attack by pathogens as it can not be easily weathered and degraded by lower organisms like fungi and bacteria.

4. Manure and soil fertility:

In manure and soil fertility following ITK are used

- Practices of crop rotation.
- Farmers use cakes of mustard and neem to maintain the soil fertility and to protect from soil born insect and diseases.
- Farmers use green manuring crops (like pulses crops- Daincha, rajma, mung, urd) are sown in their crop rotation.

5. **Weed management**:

For weed management following ITK are used.

- Practice mixed cropping.
- Application of summer ploughing.
- Hand weeding.

6. **Insect control:**

In insect control following ITK are used

- Light trap/ yellow trap or used in the crop field against control of moth.
- The farmers practice putting of twigs in field crops for sitting of owl and birds to control the insect.
- Spreading ash in crop fields to control insects (mainly aphids).
- Spraying Neem solution to control insects in crop.
- The solution of neem leaf extract and water is ratio of 1:6.
- Applying diluted cattle urine to control insects. Cattle urine is collected in an earthen container and buried into the soil by covering the mouth with polythene sheet. After 25-30 days the urine is taken out of soil and mixed with water at the ratio of 1:4. The solution is very effective in controlling vegetable pests.
- Cutting of upper portion of leaves before transplanting of paddy to prevent the attack of stem borer.
- Spraying of diluted onion or garlic juice could control grasshopper and other leaf inhabiting insects on Maize crop.

7. **Disease and pest control:**

In disease and pest control following ITK are used.

- Planting of marigold after 8-10 lines of tomato or chilli to protect the crop from mosaic and nematode.
- Ash is used at the time of sowing of potato to minimize the soil borne diseases.
- Extract of garlic 5 kg + tobacco 250 gm + 500 gm Neem leaf is used by the farmers to control the yellow mosaic in vegetables.
- Mixed cropping of arhar & jowar to protect the arhar from wilt disease.

8. Other practices and management:

In other practices and management following ITK are used

- Spreading ash in leafy vegetables for better growth.
- Farmers reported that leafy vegetable become “more green” due to the application of ash.
- Dry neem leaves and karnja leaves are used by the farmers to store the grain like wheat, rice etc. Farmers are broadcasting ash to get higher yield of barseem.
- When grains can be easily cut by teeth, it indicates that crop is ready for harvesting.
- Pods of moong and urad when become black, paddy eartheads when become golden and bowed, then it can be harvested.
- Maize cob’s fibers (stigmas) when completely dried up, it is mark of it’s maturity.

Table 4.12: Categorization of Indigenous Technical Knowledge items in Agriculture

S. No.	Statement	Indigenous technology knowledge		
		Low	Medium	High
1.	**Soil management**	44(36.67)	59(49.17)	17(14.16)
2.	**Variety seed and their management**	53(44.17)	49(40.83)	18(15.00)
3.	**Seed treatment**	63(52.50)	29(24.17)	28(23.33)
4.	**Manure and soil fertility**	59(49.17)	34(28.33)	27(22.50)
5.	**Weed management**	61(50.83)	39(32.50)	20(16.67)
6.	**Insect control**	32(26.67)	53(44.17)	35(29.16)
7.	**Disease and pest control**	41(34.17)	56(46.67)	23(19.16)
8.	**Other practices and management**	55(45.83)	43(35.83)	22(18.33)
Overall		**51(42.50)**	**45(37.50)**	**24(20.00)**

Soil management

It could be observed that 49.17 per cent of respondent had medium knowledge 36.67 per cent of respondent had low knowledge whereas, only 14.16 per cent respondent had high knowledge related to soil management practices.

Variety seed and their management

It could be observed that majority 44.17 per cent of responsive had low knowledge, 40.83 per cent had medium knowledge whereas, only 15.00 per cent had high knowledge related to Variety seed and their management.

Seed treatment

Majority 52.50 per cent had low knowledge, 24.17 per cent had medium knowledge whereas, only 23.33 per cent had high knowledge related to seed treatment.

Manure and soil fertility

Majority 49.17 per cent had low knowledge, 28.33 per cent had medium knowledge whereas, only 22.50 per cent had broad knowledge related to Manure and soil fertility.

Weed management

Majority 50.83 per cent had reduced knowledge, 32.50 per cent had medium knowledge whereas, only 16.67 per cent had high knowledge related to Weed management.

Insect control

Majority 44.17 per cent had intermediate knowledge, 29.16 per cent had broad knowledge whereas, 26.67 per centhad low knowledge related to insect control.

Disease and pest control

Majority46.67 per cent had average knowledge, 34.17 per cent had low-level knowledge whereas, only 19.16 per cent had broad knowledge related to disease and pest control.

Other practices and management

Majority 45.83 per cent had low-level knowledge, 35.83 per cent had moderate knowledge whereas, only 18.33 per cent had broad high knowledge related to other practices and management.

Overall

Majority 42.50 per cent had low-level knowledge, 37.50 per cent had medium knowledge whereas, only 20.00 per cent had high knowledge in related to overall agricultural practise and management.

3. Adoption behaviour of ITK users in contemporary modern agriculture

Table 4.13: ITK users in contemporary modern agriculture

S. No.	Type of crop	Adoption behaviour of ITK users			Total score	Mean score
		Low	Medium	High		
1.	Maize	**20**	**83**	**17**	**237**	**1.97**
2.	Soyabean	**21**	**79**	**20**	**239**	**1.99**
3.	Horticulture crop	**13**	**69**	**38**	**265**	**2.20**
4.	Groundnut	**23**	**79**	**18**	**235**	**1.95**
5.	Wheat	**31**	**67**	**22**	**231**	**1.92**
6.	Pulses	**26**	**83**	**11**	**225**	**1.87**
7.	Oil seed	**18**	**76**	**26**	**248**	**2.06**
8.	Sorgham	**22**	**63**	**35**	**253**	**2.10**
9.	Weather forecasting	**37**	**56**	**27**	**230**	**1.91**

The data presented in the table 4.13 indicates the cultivated crops of respondents under indigenous technology knowledge that they realized the Adoption behaviour of ITK use in contemporary modern agriculture.The highest adoption is found in horticulture crop (mean score 2.20), fall out by Sorgham (mean score 2.10), oil seed crops (mean score 2.06), soyabean (mean score 1.99), maize (mean score 1.97), groundnut (mean score 1.95), wheat (mean score 1.92), weather forecasting (mean score 1.91), and pulses crops (mean score 1.87).

Table 4.14: Overall Adoption behaviour of ITK users in contemporary modern agriculture

Overall adoption	Total numbers	Per cent
Low	23	19.17
Medium	73	60.83
High	24	20.00

Table 4.14 display majority 60.83 per cent of respondents had medium adoption behaviour, 20.00 per cent of respondent had high adoption behaviour whereas, and 19.17 per cent respondent had low adoption behaviour in relate to overall agriculture practices and management.

4. Relationship between independent variables and the adoption of ITK users in contemporary modern agriculture.

Table 4.15: Relationship between age and adoption of ITK use in contemporary modern agriculture.

Classes	Adoption of ITK			Whole
	Low-level	Average	Broad	
Younger age group	7(23.33)	17(56.67)	6(20.00)	30
Middle age group	9(17.30)	31(59.62)	12(23.08)	52
Older age group	7(18.42)	25(65.79)	6(15.79)	38
Total	**23**	**73**	**24**	**120**

Value of chi square = 3.07 was not significant

Table 4.15 display that 30 respondents belonged to younger age group: 56.67 per cent had medium adoption of ITK, 23.33 per cent respondents had low adoption of ITK, whereas, 20.00 per cent of respondents had high ITK adoption categories.

52 respondents from middle age group: 59.62 per cent had medium ITK adoption categories, 23.08 per cent respondents had high ITK adoption categories, and 17.30 per cent respondents had low ITK adoption categories.

38 respondents from old age group, 65.79 per cent respondent had medium ITK adoption categories, 18.42 per cent respondents had low ITK adoption categories, 15.79 per cent respondents had high ITK adoption categories.

The chi square value 3.07 was not significant at 4 degree of freedom and 5 per cent significance level about adoption of ITK use in contemporary modern agriculture.

Hence, hypothesis was accepted and not any relation establish between age and adoption of ITK users in contemporary modern agriculture.

Table 4.16: Relationship between education and their adoption of ITK use in contemporary modern agriculture

Classes	Adoption of ITK			Whole
	Low-level	Intermediate	Broad	
Illiterate group	5(18.52)	16(59.25)	6(22.23)	**27**
Primary school	7(24.13)	17(58.62)	5(17.25)	**29**
Middle school	4(9.30)	31(72.10)	8(18.60)	**43**
High school & above classes	7(33.34)	9(42.86)	5(23.80)	**21**
Total	**23**	**73**	**24**	**120**

Chi square value = 11.80 was not significant

Table 4.16 display 27 responsive illiterate: 59.25 per cent had medium adoption of ITK, 22.23 per cent respondents had high adoption of ITK, whereas, 18.52 per cent of respondents had high ITK adoption categories.

43 responsive had middle education, 72.10 per cent respondent had medium ITK adoption categories, 18.60 per cent respondents had high ITK adoption categories, and 9.30 per cent respondents had low ITK adoption categories.

21 responsive passed from High school & above, 42.86 per cent respondent had medium ITK adoption categories, 33.34per cent respondents had low ITK adoption categories, 23.80 per cent respondents had high ITK adoption categories.

Chi square value 11.80 was not significant to 6 degree of freedom and 5per cent significance level aboutadoption of ITK use in contemporary modern agriculture.

Thus, hypothesis was accepted and not significant relation between education and adoption of ITK users in contemporary modern agriculture.

Table 4.17: Relationship between social participation andadoption of ITK use in contemporary modern agriculture

Group	Adoption of ITK			Total
	Low-level	Intermediate	Broad	
Low	8(16.33)	31(63.27)	10(20.40)	**49**
medium	6(15.39)	24(61.53)	9(23.08)	**39**
high	9(28.12)	18(56.25)	5(15.63)	**32**
Total	**23**	**73**	**24**	**120**

Chi square value = 4.99 was not significant

Table 4.17 amusement 49 responsive from low social participation group, 63.27 per cent had medium adoption of ITK, 20.40 per cent respondents had high adoption of ITK, whereas,16.33 per cent of respondents had low ITK adoption categories.

39 responsive from intermediate social participation group, 61.53 per cent had medium ITK adoption categories, 23.08 per cent respondents had high ITK adoption categories, and15.39 per cent respondents had low ITK adoption categories.

32 responsive from broad social participation group, 56.25 per cent respondent had medium ITK adoption categories, 28.12 per cent respondents had

low ITK adoption categories, 15.63 per cent respondents had high ITK adoption categories..

Chi square value 4.99 was not significant at 4 degree of freedom and 5per cent significance level aboutadoption of ITK use in contemporary modern agriculture.

Thus hypothesis was accepted and not significant relationship between social participation and adoption of ITK users in contemporary modern agriculture.

Table 4.18: Relationship between family type and adoption of ITK use in contemporary modern agriculture

Classes	Adoption of ITK			Whole
	Low-level	Moderate	Broad	
Nuclear type family	16(21.62)	46(62.17)	12(16.21)	**74**
Joint type family	7(15.22)	27(58.69)	12(26.09)	**46**
Total	**23**	**73**	**24**	**120**

Chai square value = 3.21 was not significant

Table 4.18 display that 74 respondents had nuclear family group, 62.17 per cent had medium adoption of ITK, 21.62 per cent respondents had low adoption of ITK, whereas,16.21 per cent of respondents had high ITK adoption categories.

46 respondents from joint family group, 58.69 per cent had intermediate ITK adoption categories, 26.09 per cent respondents had broad ITK adoption categories, and 15.22 per cent respondents had low-level ITK adoption categories.

Chai square value 3.21 was not significant at 2 degree of freedom and 5 per cent significance level aboutadoption of ITK use in contemporary modern agriculture.

Thus, null hypothesis was accepted and not significant relationship between family type and adoption of ITK users in contemporary modern agriculture.

Table 4.19: Relationship between land holding andadoption of ITK use in contemporary modern agriculture

Classes	Adoption of ITK			Whole
	Low-level	Intermediate	Broad	
Little	3(20.00)	9(60.00)	3(20.00)	**15**
Intermediate	12(16.90)	43(60.56)	16(22.54)	**71**
Big	8(23.53)	21(61.77)	51(4.70)	**34**
Total	**23**	**73**	**24**	**120**

Chi square value = 3.12 was not significant

Table 4.19 amusement15 responsive to little farmers: 60.00 per cent had intermediate adoption of ITK, 20.00 per cent respondents had low-level adoption of ITK, whereas, 20.00 per cent of respondents had high ITK adoption categories.

71 respondents from intermediate farmers, 60.56 per cent had moderate ITK adoption categories, 22.54 per cent respondents had broad ITK adoption categories, and 16.90 per cent respondents had low-level ITK adoption categories.

34 respondents from big farmers group, 61.77 per cent respondent had intermediate ITK adoption categories, 23.53 per cent respondents had low-level ITK adoption categories, 4.70 per cent respondents had broad ITK adoption categories..

Chi square value3.12 was not significant at 4 degree of freedom. 5 per cent significance level about adoption of ITK use in contemporary modern agriculture.

Thus, null hypothesis was accepted and not significant association between land holding and adoption of ITK users in contemporary modern agriculture.

Table 4.20: Relationship between annual income and adoption of ITK use in contemporary modern agriculture

Classes	Adoption of ITK			Whole
	Low-level	Intermediate	Broad	
Low-level	7(21.88)	19(59.37)	6(18.75)	**32**
Moderate	11(15.28)	46(63.88)	15(20.84)	**72**
Broad High	5(31.25)	8(50.00)	3(18.75)	**16**
Total	**23**	**73**	**24**	**120**

Chi square value = 4.87 was not significant

Table 4.20 display 32 responsive from low annual income group, 59.37 per cent had intermediate adoption of ITK, 21.88 per cent respondents had low adoption of ITK, whereas,18.75 per cent of respondents had high ITK adoption categories.

72 responsive who were from medium annual income group, 63.88 per cent had medium ITK adoption categories, 20.84 per cent respondents had high ITK adoption categories, and15.28 per cent respondents had low ITK adoption categories.

6 responsive who were from high annual income group, 50.00 per cent respondent had medium ITK adoption categories, 31.25 per cent respondents had low ITK adoption categories, 18.75 per cent respondents had high ITK adoption categories..

Chi square value4.87 was not significant at 4 degree of freedom and 5 per cent significance level aboutadoption of ITK use in contemporary modern agriculture.

Thus, null hypothesis was accepted and not significant relationship between annual income and adoption of ITK users in contemporary modern agriculture.

Table 4.21: Relationship between income generation and adoption of ITK use in contemporary modern agriculture

Classes	Adoption of ITK			Whole
	Low-level	Intermediate	Broad	
Low-level	13(26.53)	21(42.86)	15(30.61)	**49**
Moderate	8(19.51)	29(70.74)	4(9.75)	**41**
Advanced	2(6.67)	23(76.67)	5(16.66)	**30**
Total	**23**	**73**	**24**	**120**

Chi square value= 18.01 was significant

Table 4.21 display 49 responsive from down income generating group, 42.86 per cent had medium adoption of ITK, 30.61 per cent respondents had high adoption of ITK, whereas,26.53 per cent of respondents had low ITK adoption categories.

41 responsive from moderate income generating, 70.74 per cent had medium ITK adoption categories, 19.51 per cent respondents had low ITK adoption categories, and9.75 per cent respondents had high ITK adoption categories.

30 responsive who were from advanced income generating group, 76.67 per cent respondent had medium ITK adoption categories, 16.66 per cent respondents had high ITK adoption categories, 6.67 per cent respondents had low ITK adoption categories..

Chai square value 18.01 was significant at 4 degree of freedom. 5 per cent significance level; aboutadoption of ITK use in contemporary modern agriculture.

Thus, null hypothesis was rejected and significant relationship between income generating and adoption of ITK users in contemporary modern agriculture.

Table 4.22: Relationship between farm power andadoption of ITK use in contemporary modern agriculture

n=120

Classes	Adoption of ITK			Whole
	Low-level	**Intermediate**	**Broad**	
Low-level	11(20.75)	32(60.38)	10(18.67)	**53**
Moderate	7(20.00)	21(60.00)	7(20.00)	**35**
Broad	5(15.62)	20(62.50)	7(21.88)	**32**
Total	**23**	**73**	**24**	**120**

χ^2 = 1.55 non significant at 5 per cent level with 4 d.f.

Table 4.22 amusement 53 respondents had low-level farm power, 60.38 per cent had medium adoption of ITK, 20.75 per cent respondents had low adoption of ITK, whereas,18.67 per cent of respondents had high ITK adoption categories.

35 responsive who had moderate farm power group, 60.00 per cent had medium ITK adoption categories, 20.00 per cent respondents had high ITK adoption categories, and20.00 per cent respondents had low ITK adoption categories.

32 responsive who had broad farm power group, 62.50 per cent respondent had medium ITK adoption categories, 21.88 per cent respondents had high ITK adoption categories, 15.62 per cent respondents had low ITK adoption categories..

Chi square value1.55 was not significant at 4 degree of freedom. 5 per cent significance of level aboutadoption of ITK use in contemporary modern agriculture.

Hence the null hypothesis may be accepted and it could be concluded that there was not significant association between farm power and adoption of ITK users in contemporary modern agriculture.

Table 4.23: Relationship between extension contact andadoption of ITK use in contemporary modern agriculture

Grouping	Adoption of ITK			Whole
	Low-level	Intermediate	Broad	
Low-level	6 (28.57)	8 (38.09)	7 (33.34)	21
Moderate	9 (12.00)	57 (76.00)	9 (12.00)	75
Advanced	8 (33.33)	8 (33.33)	8 (33.34)	24
Total	**23**	**73**	**24**	**120**

χ^2 = 24.67 significant at 5 per cent level with 4 d.f.

Table 4.23 display 21 responsive who had low-level extension contact group, 38.09 per cent had medium adoption of ITK, 33.34 per cent respondents had high adoption of ITK, whereas,28.57 per cent of respondents had low ITK adoption categories.

75 responsive who had intermediate extension contact group, 76.00 per cent had medium ITK adoption categories, 12.00 per cent respondents had advanced ITK adoption categories, and12.00 per cent respondents had low-level ITK adoption categories.

24 responsive who had intermediate extension contact group, 33.34 per cent respondent had high ITK adoption categories, 33.33 per cent respondents had low ITK adoption categories, 33.33 per cent respondents had medium ITK adoption categories.

Chi square value24.67 was significant at 4 degree of freedom and 5 per cent significance level aboutadoption of ITK use in contemporary modern agriculture.

Thus, hypothesis was rejected and significant relationship between extension contact and adoption of ITK users in contemporary modern agriculture.

Table 4.24: Relationship between decision making and adoption of ITK use in contemporary modern agriculture

Classify	Adoption of ITK			Whole
	Low-level	Intermediate	Broad	
Low-level	10 (37.03)	11(40.74)	6 (22.23)	**27**
Moderate	8 (11.11)	49 (68.05)	15 (20.84)	**72**
Full	5 (23.80)	13 (61.91)	3 (14.29)	**21**
Total	**23**	**73**	**24**	**120**

Chai square value = 14.20 was significant

Table 4.24 amusement 27 responsive low decision making group, 40.74 per cent had medium adoption of ITK, 37.03 per cent respondents had low adoption of ITK, whereas,22.23 per cent of respondents had high ITK adoption categories.

72 responsive who had moderate decision making group, 68.05 per cent had medium ITK adoption categories, 20.84 per cent respondents had high ITK adoption categories, and11.11 per cent respondents had low ITK adoption categories.

21 responsive had full decision making group, 61.91 per cent respondent had medium ITK adoption categories, 23.80 per cent respondents had low ITK adoption categories, 14.29 per cent respondents had high ITK adoption categories.

Chi square value14.20 was significant at 4 degree of freedom and 5per cent significance level aboutadoption of ITK use in contemporary modern agriculture.

Thus, the null hypothesis was rejected and significant relationship between decision making and adoption of ITK users in contemporary modern agriculture.

Table 4.25: Relationship between risk bearing abilities andadoption of ITK use in contemporary modern agriculture

Class	Adoption of ITK			Whole
	Low-level	Intermediate	Broad	
Low-level	12 (48.00)	7 (28.00)	6 (24.00)	**25**
Intermediate	11 (12.79)	63 (73.25)	12 (13.96)	**86**
Full	2 (22.22)	3 (33.34)	4 (44.44)	**9**
Total	**23**	**73**	**24**	**120**

Chi square value = 30.47 was significant

Table 4.25 display 25 respondents had low-level risk bearing abilities group, 48.00 per cent had low adoption of ITK, 28.00 per cent respondents had medium adoption of ITK, whereas,24.00 per cent of respondents had high ITK adoption categories.

86 responsive had intermediate risk bearing abilities group, 73.25 per cent had medium ITK adoption categories, 13.96 per cent respondents had high ITK adoption categories, and 12.79 per cent respondents had low ITK adoption categories.

9 responsive who had full decision making group, 44.44 per cent respondent had high ITK adoption categories, 33.34 per cent respondents had medium ITK adoption categories, 22.22 per cent respondents had low ITK adoption categories..

Chi square value30.47 was significant at 4 degree of freedom and 5per cent significance level aboutadoption of ITK use in contemporary modern agriculture.

Thus, null hypothesis was rejected and significant relationship between risk bearing abilities and adoption of ITK users in contemporary modern agriculture.

Table 4.26: Overall χ^2 Value

S. No.	Characteristics	χ^2 Value
1.	Age	**3.07^{ns}**
2.	Education	**11.80^{ns}**
3.	Social participation	**4.99^{ns}**
4.	Type of family	**3.21^{ns}**
5.	Size of land holding	**3.12^{ns}**
6.	Annual income	**4.87^{ns}**
7.	Income generation	**18.01***
8.	Farm power	**1.55^{ns}**
9.	Extension contact and mass media explore	**24.67****
10.	Decision making	**14.20***
11.	Risk bearing abilities	**30.47****

Ns = non - significant, * = significant at 1 %, ** = highly significant at 5 %

Table depicts the chai square value indicating the association between profile of the respondents with their adoption of ITK use in contemporary modern agriculture The characteristics namely age, education, social participation, family type, extension contact, annual income, land holding, and farm power had no any significant relationship with their adoption of ITK use in contemporary modern agriculture at 5per cent level of significance. The result also depict that income generation, decision making and risk bearing abilities of the respondents establish significant association with their adoption of ITK use in contemporary modern agriculture.

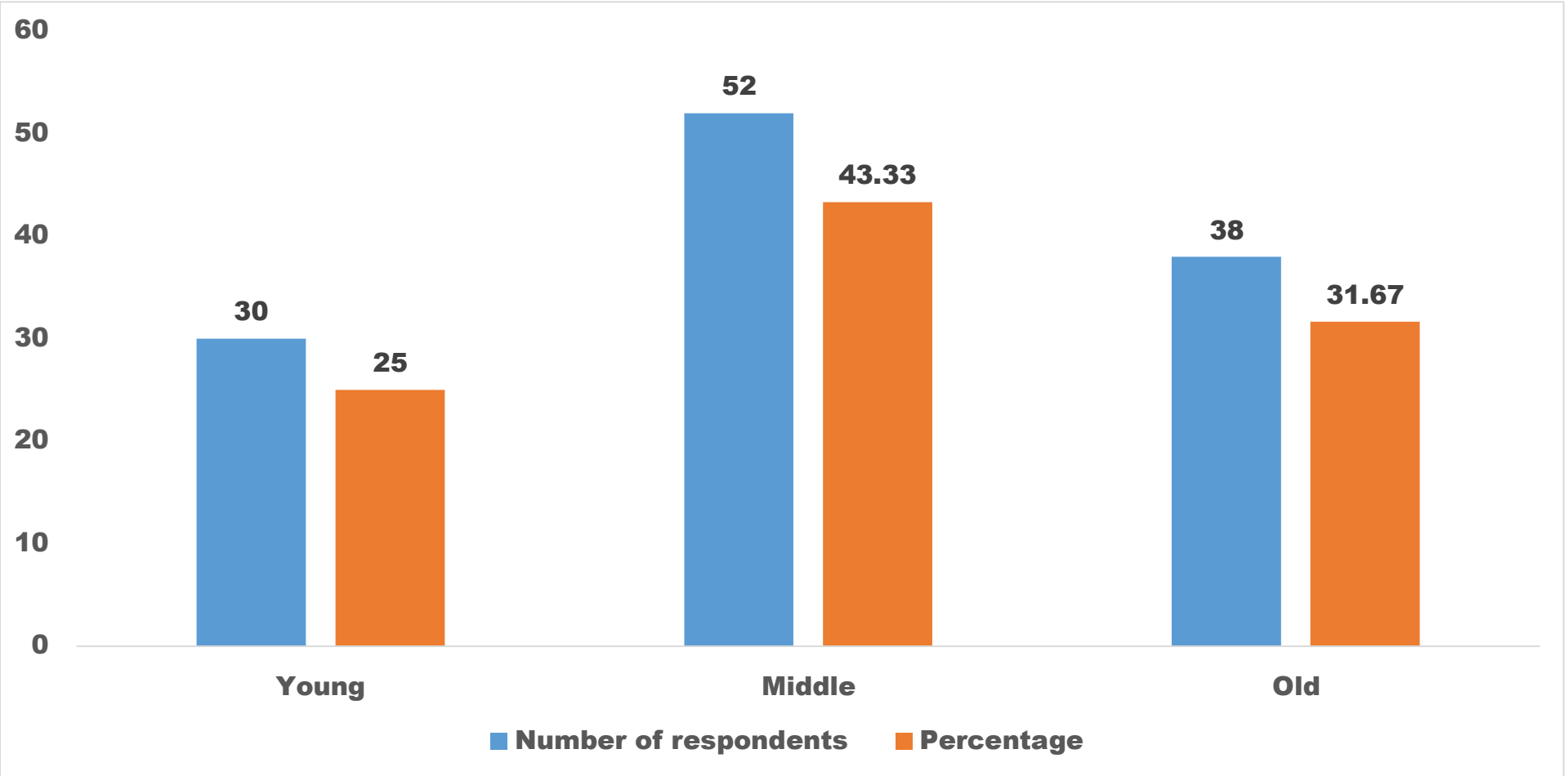

Fig 1: Distribution of the respondent according to their age

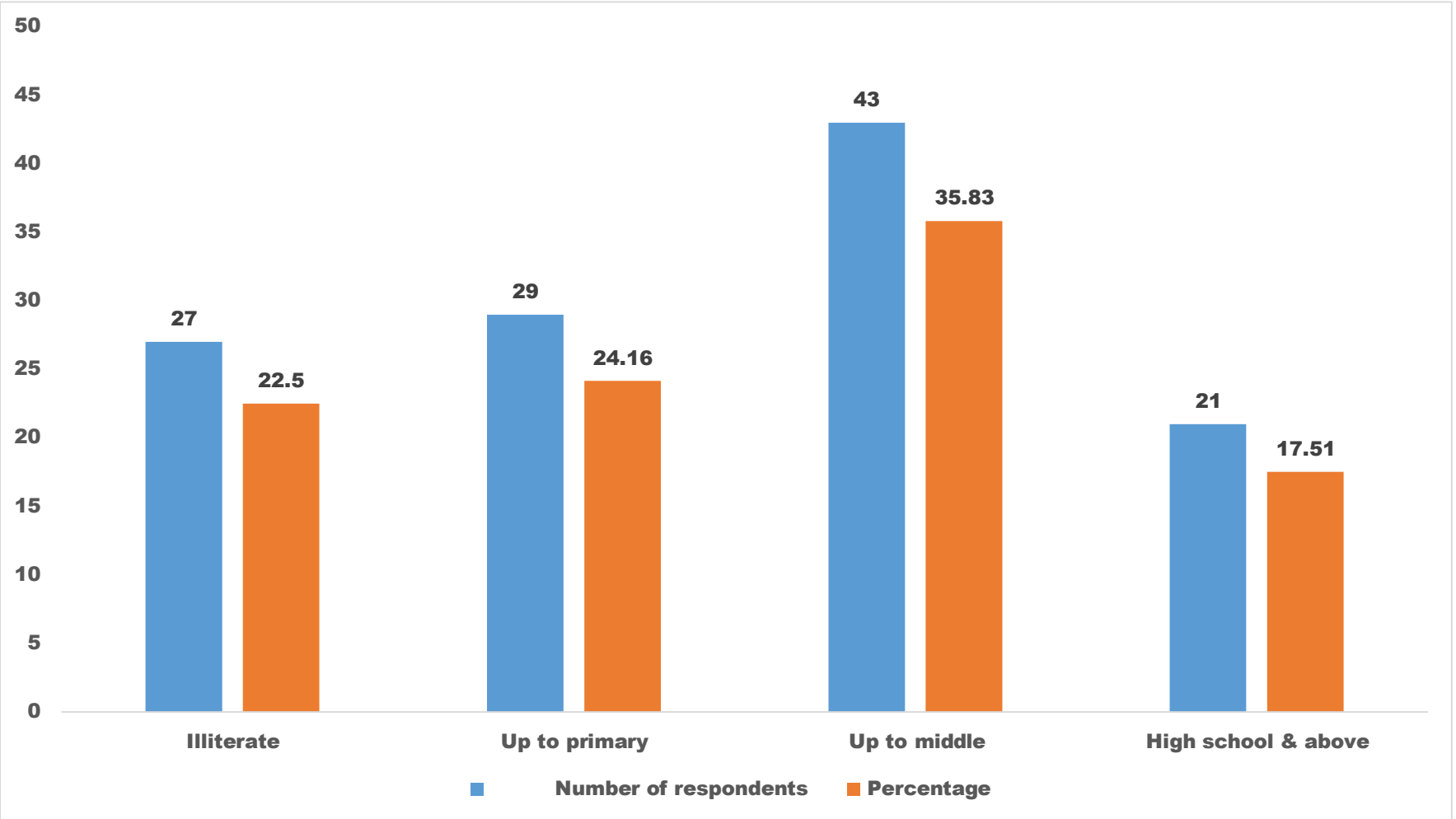

Fig 2: Distribution of the respondents according to their education

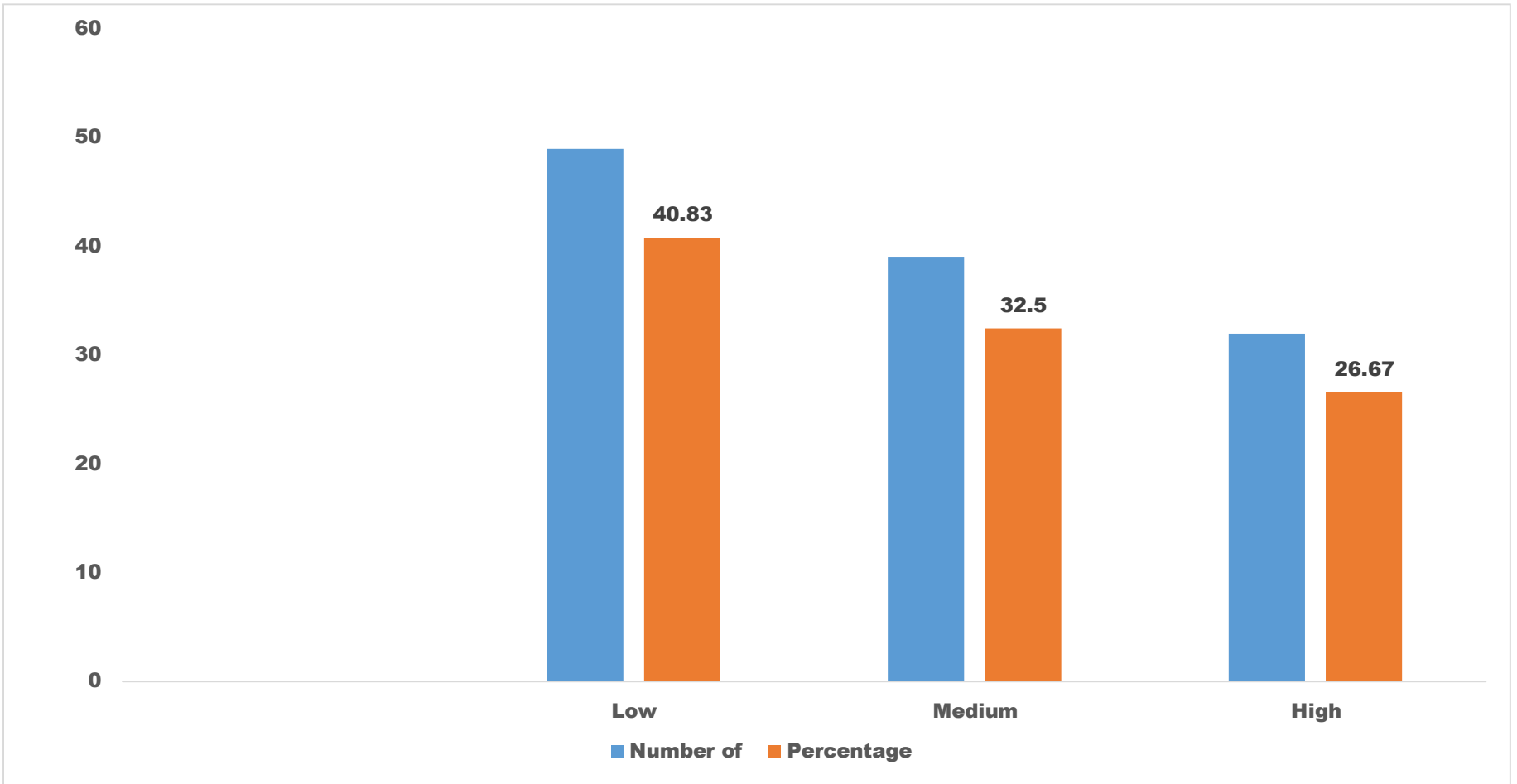

Fig 3: Distribution of the respondents according to their social participation

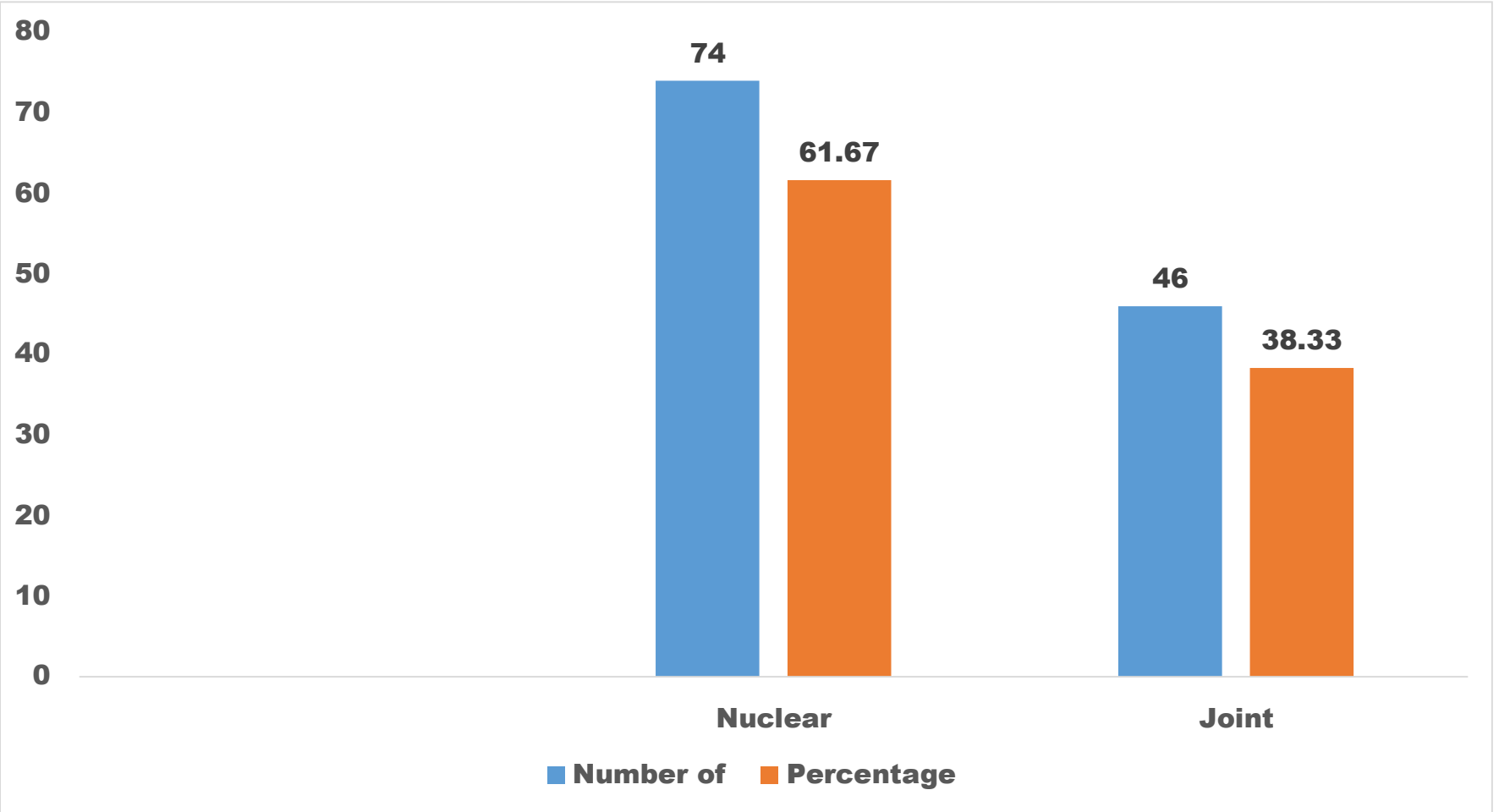

Fig 4: Distribution of the respondents according to their type of family

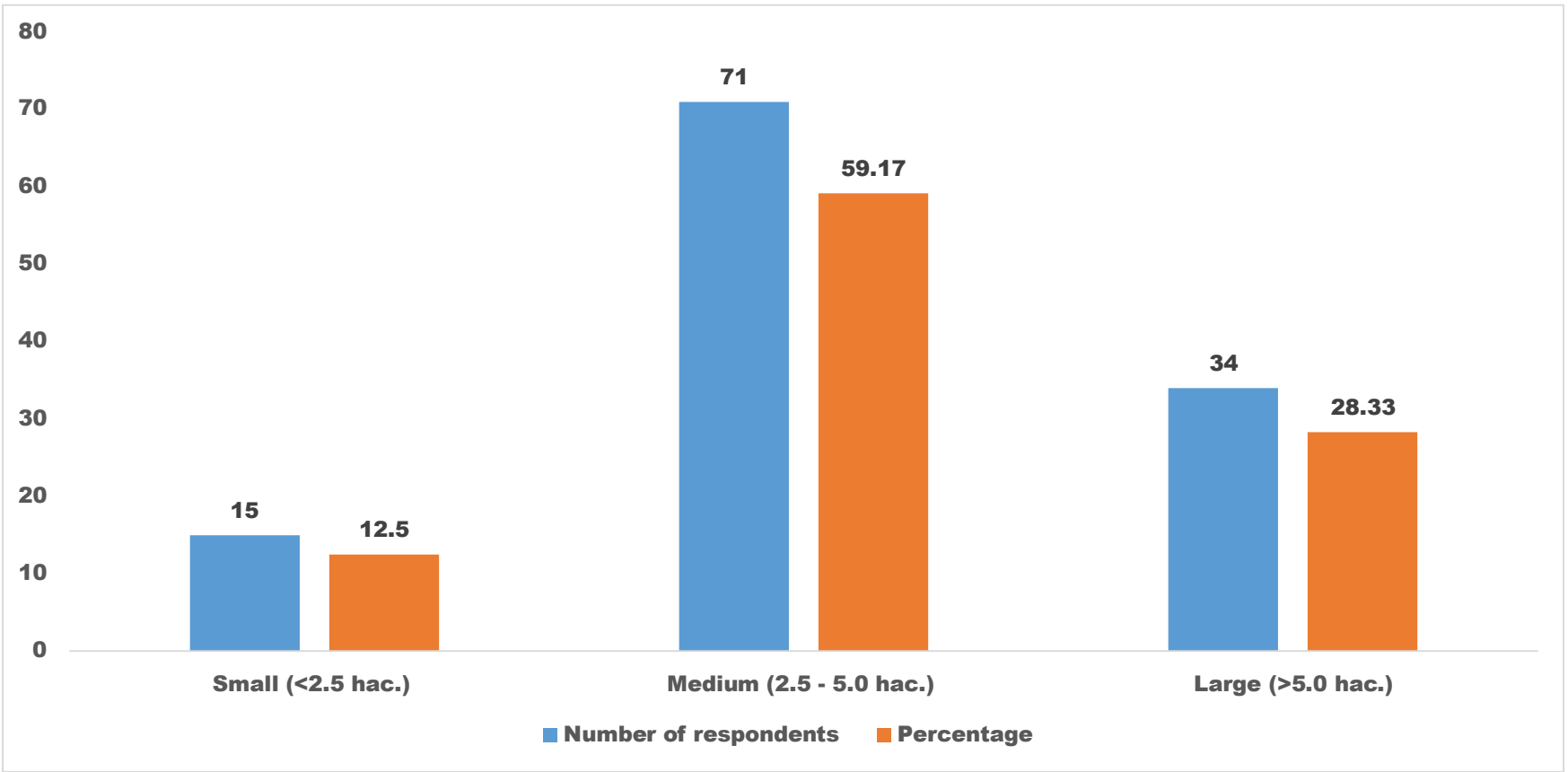

Fig 5: Distribution of the respondents according to their size of land holding

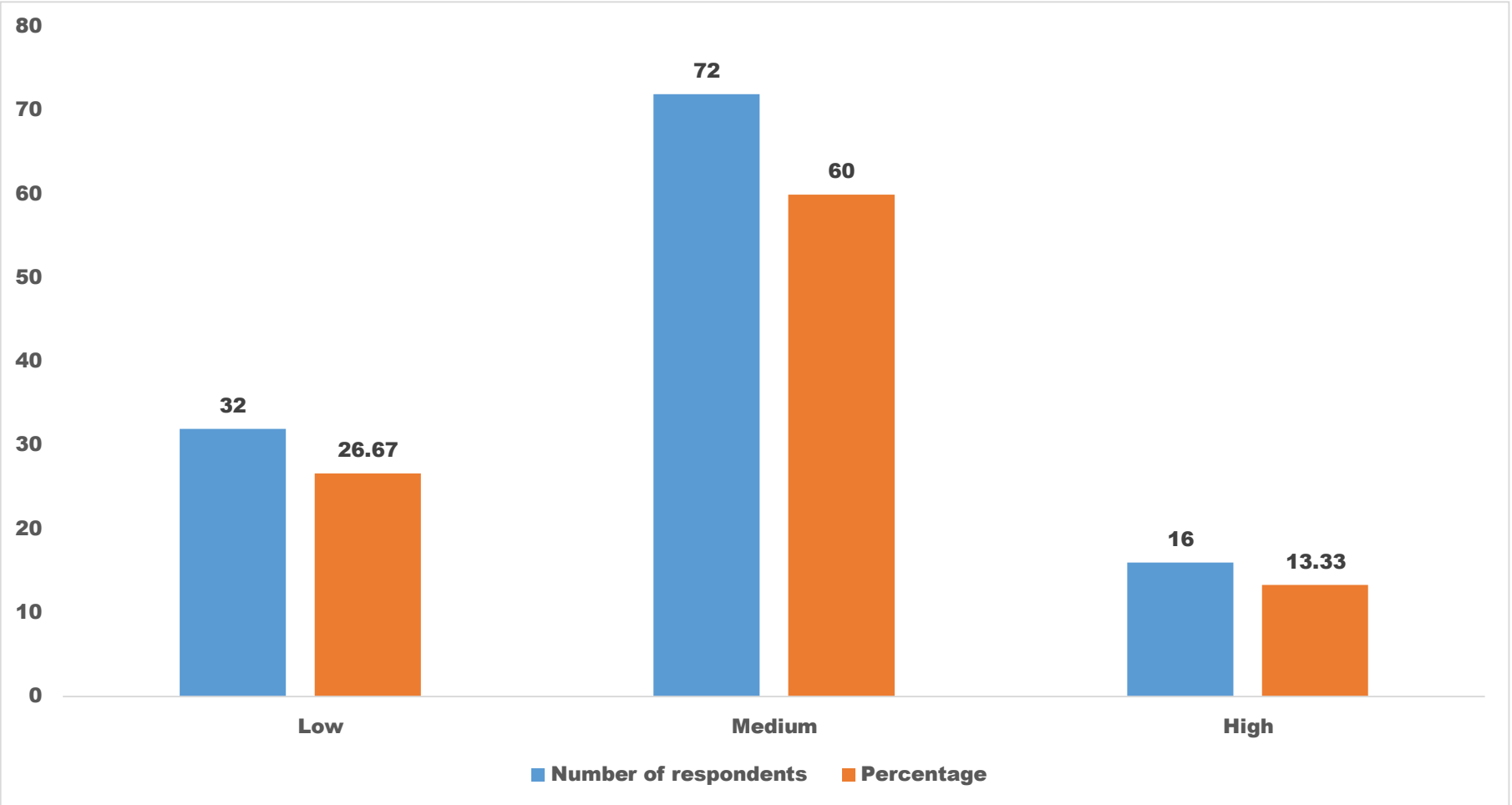

Fig 6: Distribution of the respondents according to their annual income

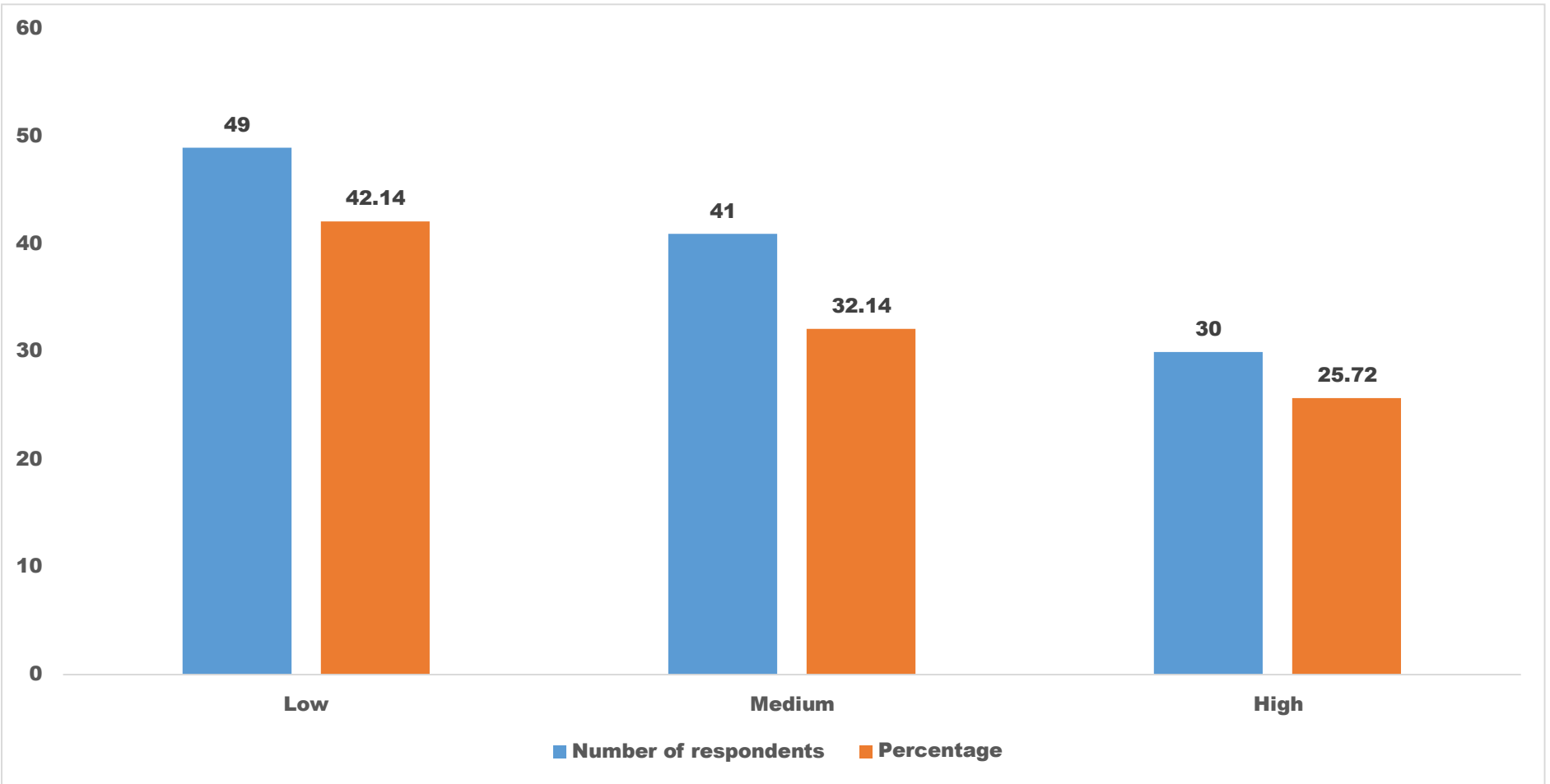

Fig 7: Distribution of the respondents according to their income generation

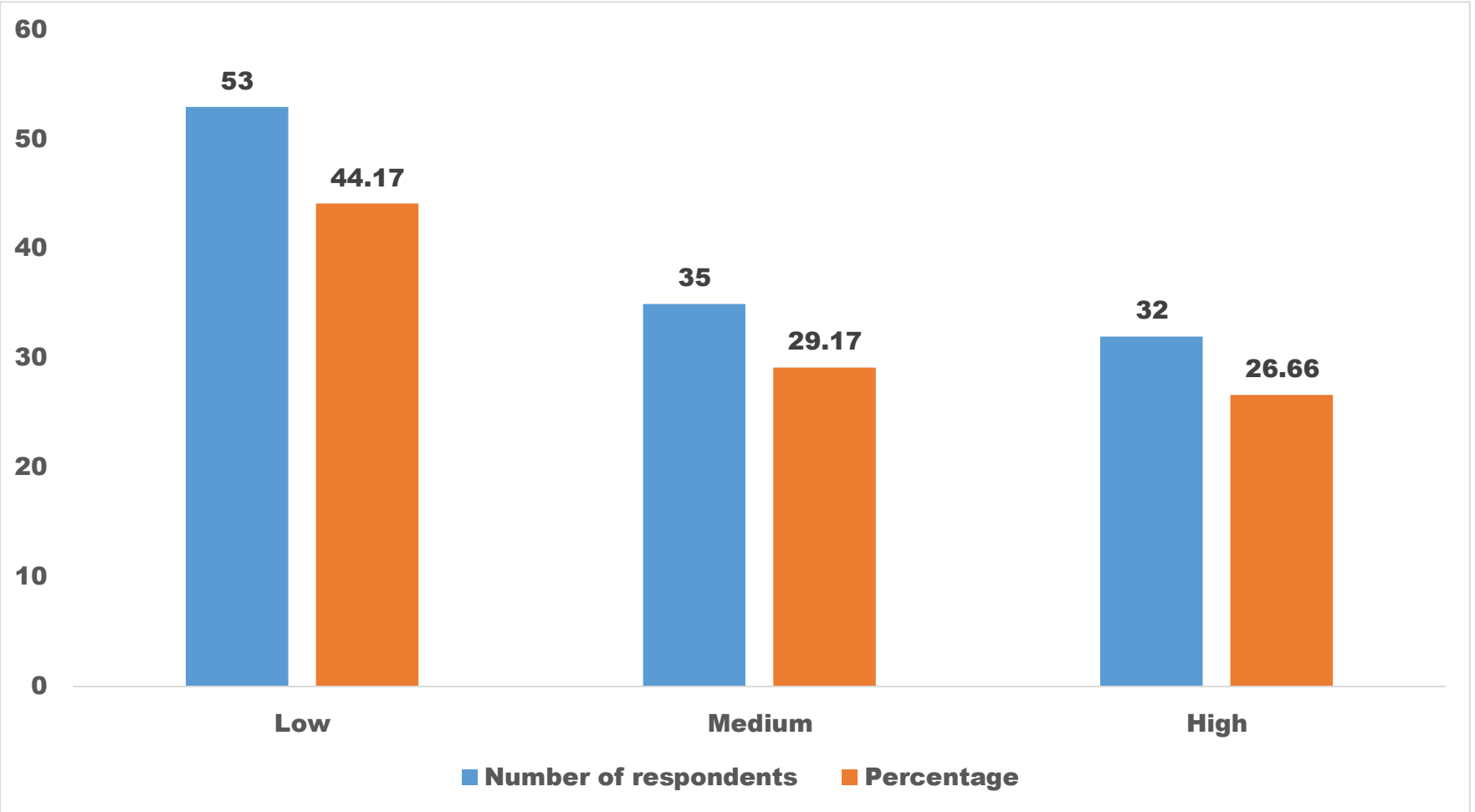

Fig 8: Distribution of the respondents according to their farm power

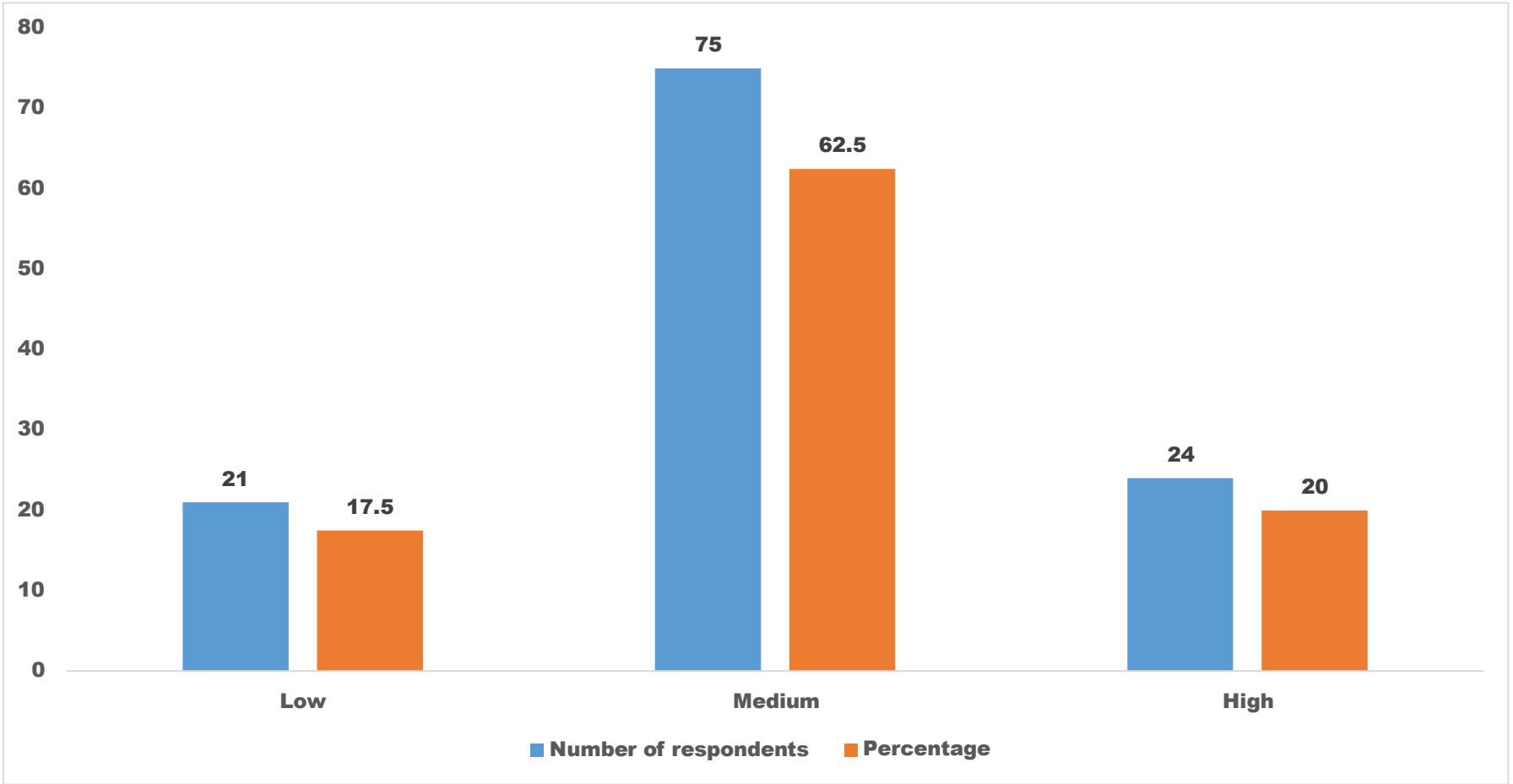

Fig 9: Distribution of the respondents according to their extension contact

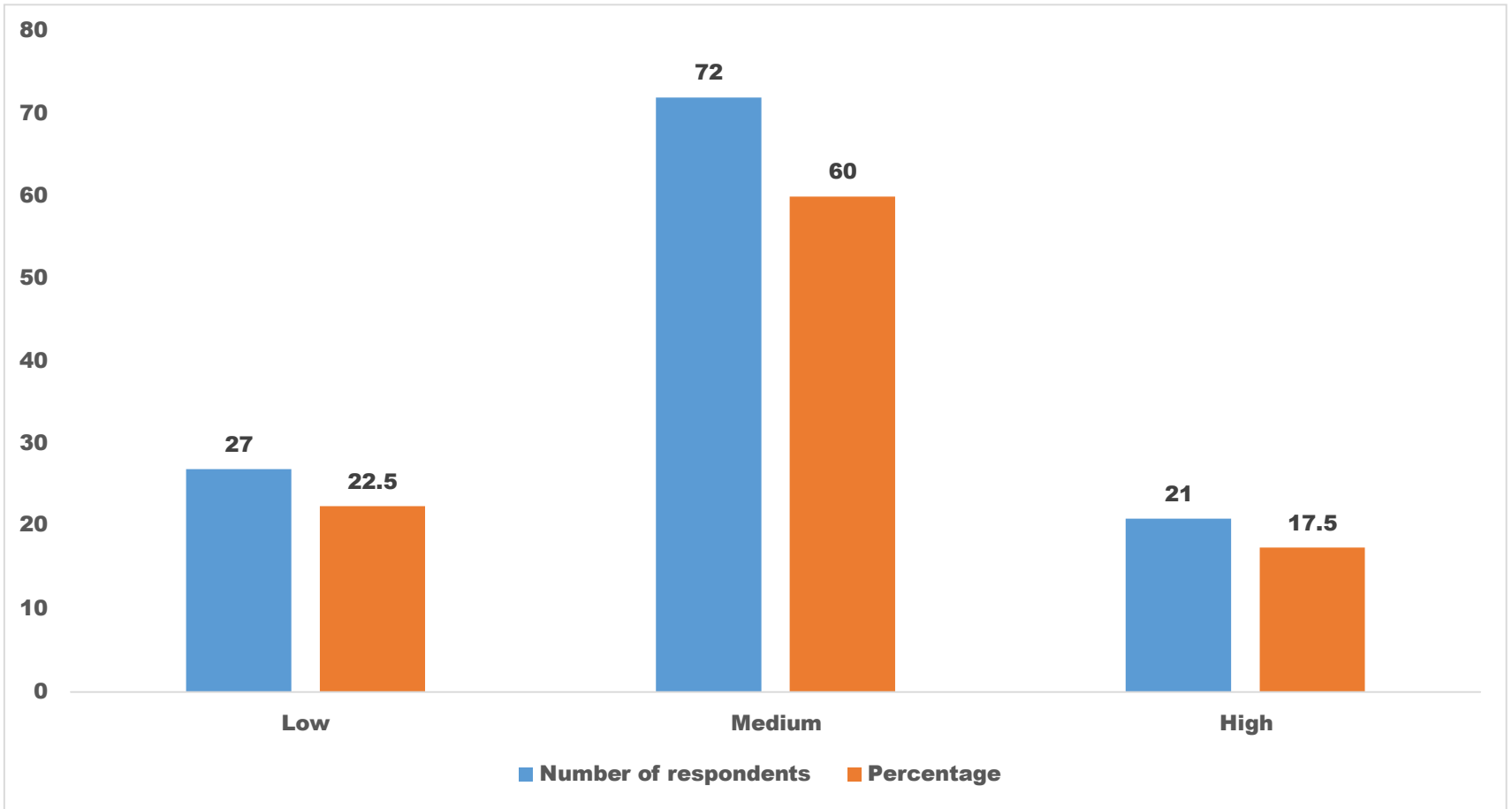

Fig 10: Distribution of the respondents according to their decision making ability

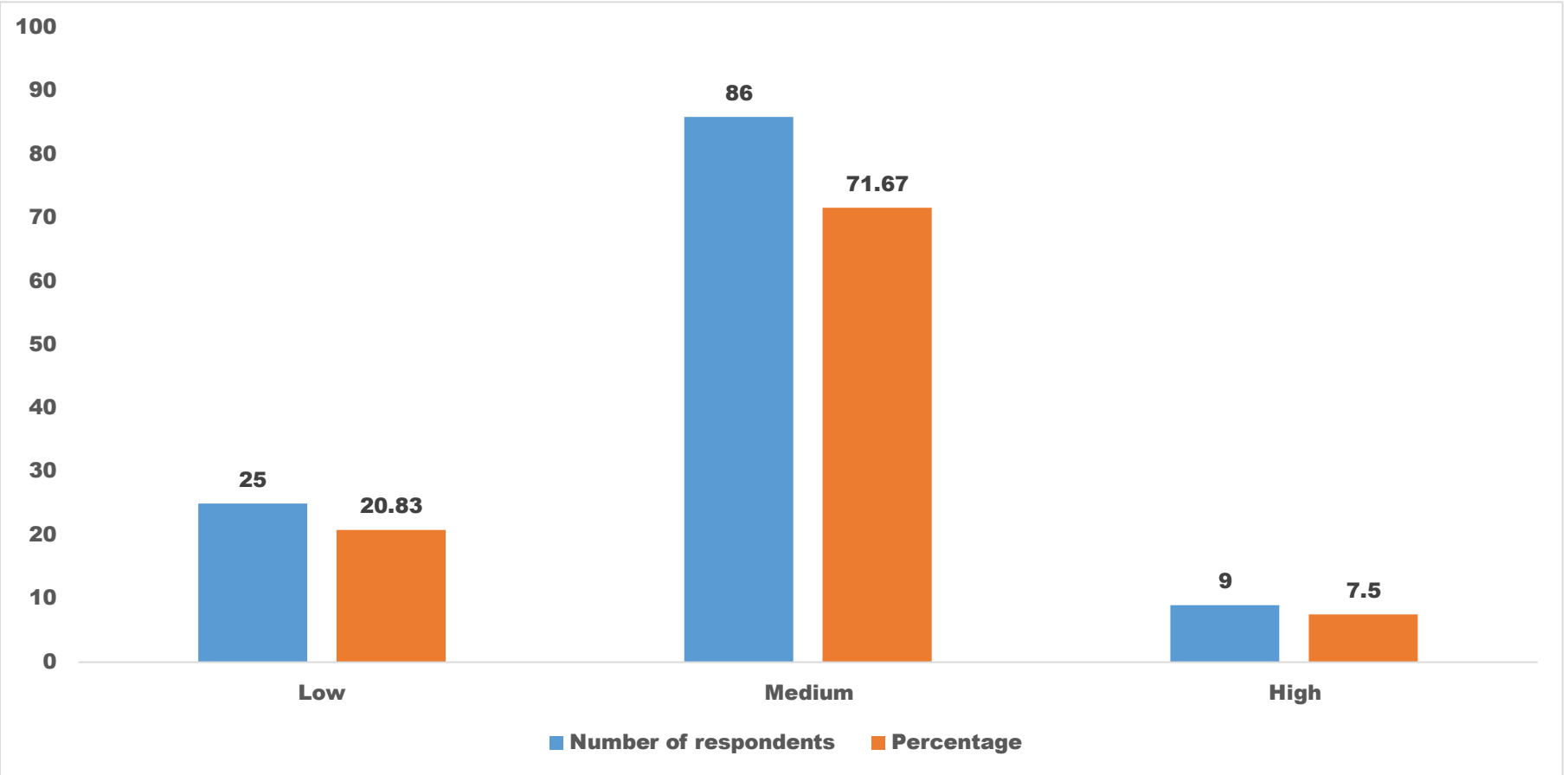

Fig 11: Distribution of the respondents according to their risk bearing ability

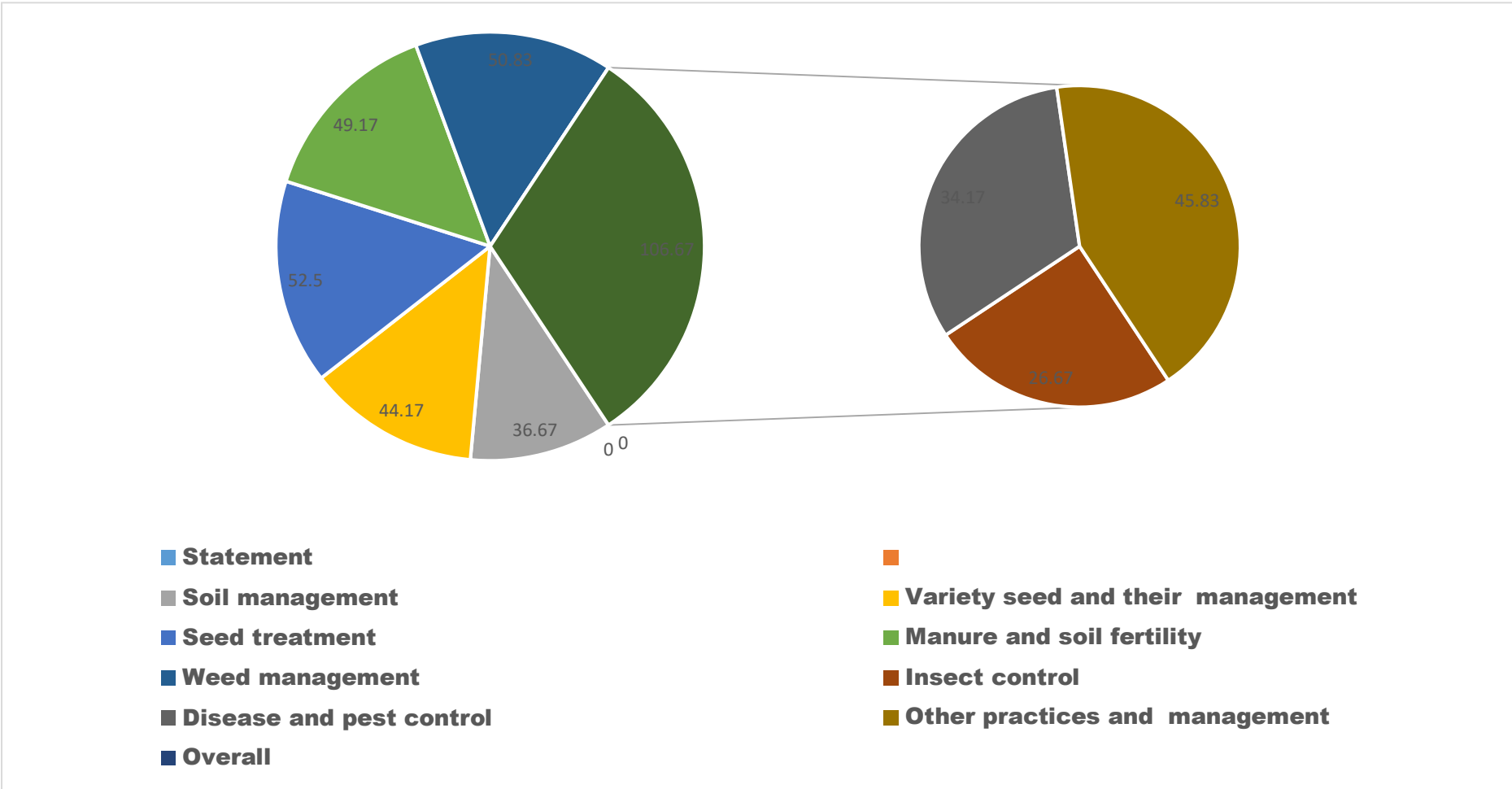

Fig 12: Categorization of Indigenous Technical Knowledge items in Agriculture

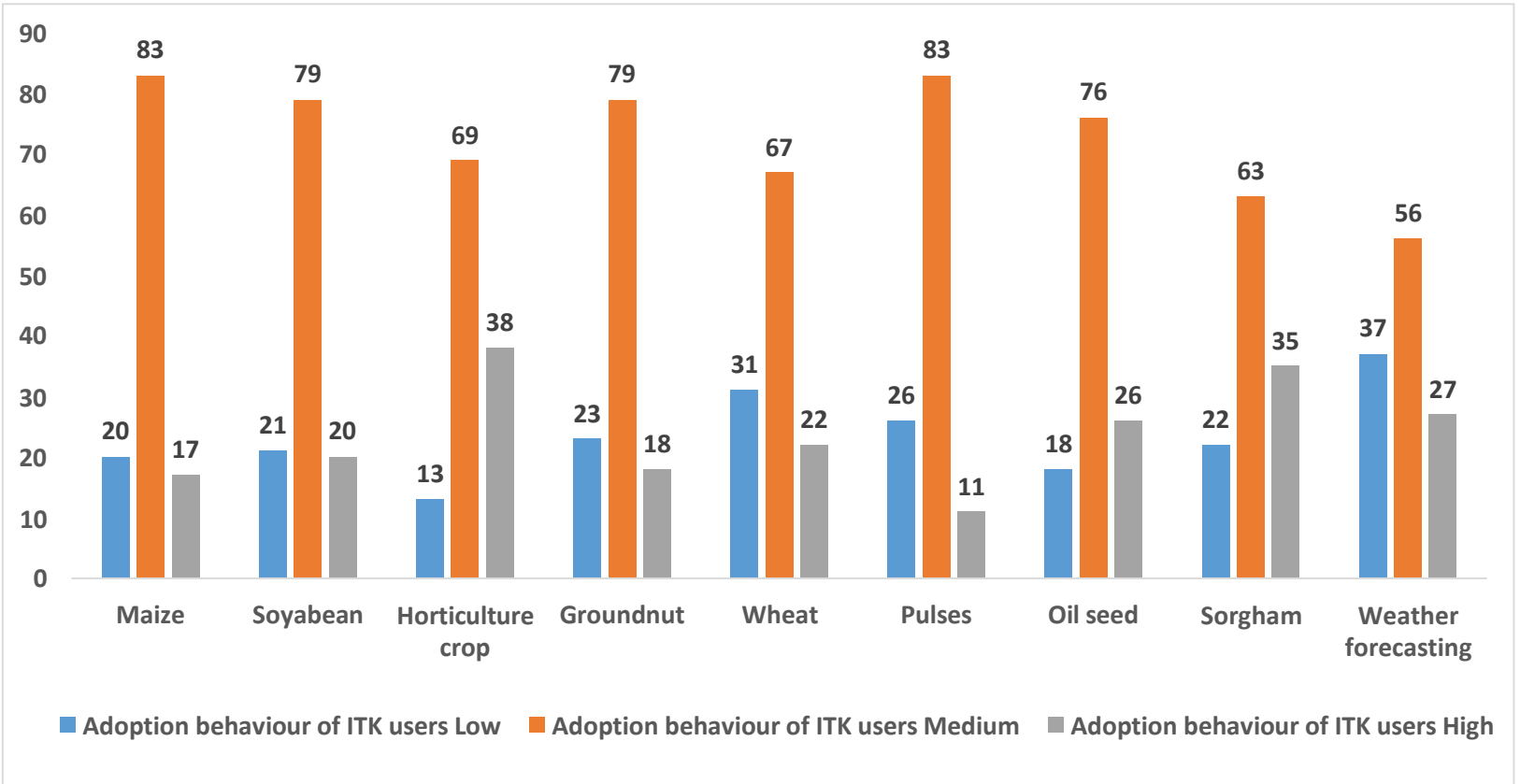

Fig 13: Adoption behaviour of ITK users in contemporary modern agriculture

Data collection for the completion of questionnaire

Indigenous technology knowledge

CHAPTER - V
DISCUSSION

Primary collection of the survey has been obstinate in this section.

Objectives:-

1. To study the Socio personal, economic, agricultural, communication and psychological attributes of ITK users.
2. To document and classify the identified indigenous technology knowledge (ITK) perceived by ITK users.
3. To know the adoption behaviour of ITK users in contemporary modern agriculture**.**
4. To study the association between independent variables and the adoption of ITK users in contemporary modern agriculture.

1. Socio personally, economical, agricultural, communication and psychological attributes of ITK users:

- Majority43.33 per cent responsive found to middle age group, 31.67 per cent responsive found to older age group, and 25.00 per cent responsive were from younger age group. The probable reason for such trend might be that, young aged farmers might have engaged in non-agricultural activities, less interested in agriculture sector and were moving away to other commercial enterprises. While the old aged farmers might not be doing farming activities. The findings are supported by Patidar (2013).

- The finding regarding level of education shows that out of 120 respondents 35.83 per cent were found to be in up to middle education group, 24.16 per cent were found to be educated up to primary level of education, 22.50 per cent were illiterate and remaining 17.51 per cent were educated high school and above. Most of the farmers entered farming at a very young age leaving education and some of farmers had different levels of education. The findings are supported by Maravi (2009).

- The percentage distribution of respondents according to their social participation display 40.83 per cent responsive were found to have low social participation, 32.50 per cent had medium social participation and remaining 26.67 per cent responsive had high social participation. The findings are in line with the finding ofPatidar (2013).
- Regarding distribution of respondents according to type of family, the results shows that majority 61.67 per cent responsive found to to nuclear family, and38.33 per cent of respondent belonged to joint family group. The findings are supported by By Maravi (2009)
- In respect of land holding, majority59.17 per cent belonged to small farmers group, 28.33 per cent belonged to large farmers group, while 12.50 per cent belonged to medium farmers group. The fact that majority of the respondents are depending on agriculture occupation, which suffers frequently with vagaries of monsoon and make them to have medium annual income. Fragmentation of the land from generation to generation led to even big farmers turned to small farmers over a period of time. The findings are supported by Reddy (2006) and patidar (2013).

- The finding regarding annual income, majority 60.00 per cent respondents belonged to medium income, 26.67 per cent belonged to low income from group, whereas only 13.33 per cent were having tendency of high income category .It is quite natural when the farmers are having small land holding with agriculture as a major occupation, farmers can earn only medium annual family income. The findings are supported by Reddy (2006).

- Out of 120 respondents. 42.14 per cent of respondents had low income generation, 32.14 per cent had medium income generation whereas 25.72 per cent had high income generation. The findings are supported by Maravi (2009).
- The finding regarding farm power, shows that majority 44.17 per cent respondents belonged to low farm power group, while 29.17 per cent

respondents belonged to medium farm power group whereas 26.66 per cent had high farm power. The findings are supported by Maravi (2009).

- In respect of extension contact, majority 62.50 per cent had medium extension contact and mass media exposure, 20.00 per cent belonged to high extension contact and mass media exposure group, whereas only 17.50 per cent were having low extension contact and mass media exposure. Respondents could be able to utilize the extension functionaries to the medium extent. The results emphasize that there is a need for strengthening the extension system in the villages so as to make the farmers aware of the suitable practices for improving the crop productivity.
- In respect of decision making, majority 60.00 per cent of respondents had belonged to medium decision making group, 22.50 per cent had belonged to low decision making group whereas 17.50 per cent belonged to high decision making group.
- Out of 120 respondents 71.67 per cent of respondents had medium risk bearing ability, 20.83 per cent had low risk bearing ability whereas 7.50 per cent had high risk bearing ability. This might be due to their small land holdings, medium annual family income, extension contact, mass media exposure and low education level.

2. Document and classify the identified indigenous technology knowledge (ITK) perceived by ITK users.

Soil management

It could be observed that 49.17 per cent of respondent had medium knowledge, 36.67 per cent of respondent have low knowledge whereas, only 14.16 per cent respondent have high knowledge related to soil management practices.

Variety seed and their management

It could be observed that majority 44.17 per cent of responsive had low knowledge, 40.83 per cent had medium knowledge whereas, only 15.00 per cent had high knowledge related to Variety seed and their management.

Seed treatment

Majority 52.50 per cent had low knowledge, 24.17 per cent had intermediate knowledge whereas, only 23.33 per cent had broad knowledge related to seed treatment.

Manure and soil fertility

Majority 49.17 per cent had low knowledge, 28.33 per cent had medium knowledge whereas, only 22.50 per cent had broad knowledge related to Manure and soil fertility.

Weed management

Majority 50.83 per cent had reduced knowledge, 32.50 per cent had intermediate knowledge whereas, only 16.67 per cent had broad knowledge related to Weed management.

Insect control

Majority 44.17 per cent had intermediate knowledge, 29.16 per cent had broad knowledge whereas, 26.67 per cent had low knowledge related to insect control.

Disease and pest control

Majority 46.67 per cent had average knowledge, 34.17 per cent had low-level knowledge whereas, only 19.16 per cent had broad knowledge related to disease and pest control.

Other practices and management

Majority 45.83 per cent had low-level knowledge, 35.83 per cent had moderate knowledge whereas, only 18.33 per cent had broad knowledge related to other practices and management.

Overall

Majority 42.50 per cent had low-level knowledge, 37.50 per cent had medium knowledge whereas, only 20.00 per cent had broad knowledge in related to overall agricultural practise and management.Similar study done by Patil (2008), Shalini *et al*. (2008), Sharma *et al.* (2009) and Lakra *et al.* (2010).

3. Adoption behaviour of ITK users in contemporary modern agriculture.

The finding regarding adoption behaviour of ITK users in contemporary modern agriculture: The highest adoption in horticulture crop (mean score 2.20), fall out by Sorgham (mean score 2.10), oil seed crops (mean score 2.06), soyabean (mean score 1.99), maize (mean score 1.97), groundnut (mean score 1.95), wheat (mean score 1.92), weather forecasting (mean score 1.91), and pulses crops (mean score 1.87). Similar study done by Reddy (2006), Khare *et al.* (2007) and Badgujjar (2012)

In scene of overall adoption majority 60.83 per cent responsive found to medium adoption behaviour, 20.00 per cent responsive found to high adoption behaviour whereas, 19.17 per cent responsive found to low adoption behaviour in relate to overall agriculture practices and management.

4. Association between dependent variables and their adoption of ITK users in contemporary modern agriculture.

The characteristics namely age, education, social participation, family type, extension contact, annual income, land holding, and farm power had no any significant relationship with their adoption of ITK use in contemporary modern agriculture at 5per cent level of significance. The result also depict that income

generation, decision making and risk bearing abilities of the respondents establish significant association with their adoption of ITK use in contemporary modern agriculture. Similar study done by Mamum (2004) and Maravi (2009)

The farmers who are generally more aged will have favourable attitude towards Indigenous Technical Knowledge. Hence the relationship is significant. Study also relevant by Maravi (2009)

Land holding was associated significantly with attitude of farmers towards Indigenous Technical Knowledge. Majority of the respondents were small farmers. They were depending on only crop enterprise, getting medium annual income leaving less scope for incurring money for adoption of costly improved technologies, thereby they have developed positive attitude towards Indigenous Technical Knowledge.Study relevant by Hossain (2001) and Sarker (2002)

Annual family income has significant relationship with attitude of tribal farmers towards Indigenous Technical Knowledge. Majority of the farmers were having medium annual income. The possible reason for this trend might be that non-availability of modern technologies in the reach of farmers and also the realization of low cost and environmentally friendly technologies within their reach.Study relevant by by Maravi (2009).

CHAPTER- VI

SUMMARY, CONCLUSION& SUGGESTIONS FOR FURTHER WORK

Indigenous knowledge can play a key role in the design of sustainable agricultural systems, increasing the likelihood that rural populations will accept, develop, and maintain innovations and interventions. It can be defined as the sum of experience and knowledge of a given ethnic group that forms the basis for decision-making in the face of familiar and unfamiliar problems and challenges. Farmers of agrarian, as well as industrialized, societies have sophisticated ways of looking at the world.

The ITK is an explicit or “codified” knowledge that is transmittable in formal, systematic language. On the other hand, ITK is a tacit knowledge of the local or indigenous people, which is personal, content-specific and therefore hard to formalize and communicate. Local or indigenous people acquire knowledge by actively creating and organizing their own experiences. Thus, the (traditional) knowledge that can be expressed in words and numbers represents only the “tip of the iceberg” of the entire body of knowledge possessed by indigenous people.

Accessing to indigenous knowledge would enforce primary foundation of sustainable development. On the on hand, indigenous knowledge is production of empirical learning process and at the other hand is test and error of few thousand years of one society in relation to its environment. It is obvious that this knowledge represents human’s interaction with nature and displays features of climate and specifications of vegetarian and animal nature of one region and more important, it displays their interactions with human.

Objectives:

1. To study the Socio personal, economic, agricultural, communication and psychological attributes of ITK users.

2. To document and classify the identified indigenous technology knowledge (ITK) perceived by ITK users.
3. To know the adoption behaviour of ITK users in contemporary modern agriculture.
4. To study the association between dependent variables and their adoption of ITK users in contemporary modern agriculture.

Methodology

1. Selection of the block

The proposed study was confined in Shajapur district of Madhya Pradesh which comprises 7 blocks namely Shajapur, Mohan Badodiya, Gulana, Shujalpur, Kalapipal, Avantipur Badodiya and polay kalan Out of these only one block i.e. Shajapur was selected purposively for present study due to the fact that this district has the scope of identification and conservation of indigenous technologies exists in this area as suggested by the KVK, Shajapur.

2. Selection of the villages

Shajapur block comprises 154 villages, therefore in this study list of villages given by KVK, Shajapur was taken for agricultural season 2018- 2019. From this list 09 villages were selected randomly for present research.

3. Selection of the respondents

205 ITK users existed in the selected 9 villages on the information from KVK. Out of this list, 120 ITK users were selected randomly on this study. The data was analyzed using appropriate statistical tools.

Independent variable

Age, education, social participation, type of family, size of land holding, annual income, income generation, farm equipment, Extension contact and mass media exposure, decision making and risk bearing ability.

Dependent variable

Identification of Indigenous Technology Knowledge (ITK) and Its utilization in Contemporary Modern Agriculture

Conclusions

1. To study the Socio personal, economic, agricultural, communication and psychological attributes of ITK users:

- Out of the 120 respondents 43.33 per cent belonged to middle age group.
- The finding regarding level of education shows that majority 35.83 per cent were found to be in up to middle education group.
- Distribution of respondents according to their social participation shows that majority 40.83 per cent belonged to low social participation.
- In respect of type of family, majority 61.67 per cent of respondents belonged to nuclear family.
- In respect of land holding, majority 59.17 per cent belonged to small farmers group.
- The finding regarding annual income, majority 60.00 per cent respondents belonged to medium income.
- Out of 120 respondents. 42.14 per cent of respondents had low income generation.
- The finding regarding farm power majority 44.17 per cent respondents belonged to low farm power group.
- In respect of extension contact, majority62.50 per cent had medium extension contact and mass media explore.

- In respect of decision making, majority60.00 per cent of respondents had belonged to medium decision making group.
- Out of 120 respondents 71.67 per cent of respondents had medium risk bearing ability.

2. To document and classify the identified indigenous technology knowledge (ITK) perceived by ITK users:

Soil management

It could be observed that 49.17 per cent of respondent have medium knowledge.

Variety seed and their management

It could be observed that out of 120 respondent, most of 44.17 per cent of respondents have low knowledge.

Seed treatment

It could be observed that out of 120 respondent, most of 52.50 per cent of respondents have low knowledge.

Manure and soil fertility

It could be observed that out of 120 respondent, most of 49.17 per cent of respondents have low knowledge.

Weed management

It could be observed that out of 120 respondent, most of 50.83 per cent of respondents have low knowledge.

Insect control

It could be observed that out of 120 respondent, most of 44.17 per cent of respondents have medium knowledge.

Disease and pest control

It could be observed that out of 120 respondent, most of 46.67 per cent of respondents have medium knowledge.

Other practices and management

It could be observed that out of 120 respondent, most of 45.83 per cent of respondents have low knowledge.

3. To know the adoption behaviour of ITK users in contemporary modern agriculture:

The finding regarding adoption behaviour of ITK users in contemporary modern agriculture: the highest adoption observed in case of horticulture crop (mean score 2.20), followed by Sorgham (mean score 2.10), oil seed crops (mean score 2.06), soyabean (mean score 1.99), maize (mean score 1.97), groundnut (mean score 1.95), wheat (mean score 1.92), weather forecasting (mean score 1.91), and pulses crops (mean score 1.87).

4. To study the association between dependent variables and their adoption of ITK users in contemporary modern agriculture:

The characteristics namely age, education, social participation, family type, extension contact, annual income, land holding, and farm power had no any significant relationship with their adoption of ITK use in contemporary modern agriculture at 5per cent level of significance. The result also depict that income generation, decision making and risk bearing abilities of the respondents establish significant association with their adoption of ITK use in contemporary modern agriculture.

Suggestions for Future Research

1. The study was confined to Shajapur districts of Madhya Pradesh on sample of 120 ITK users and the results are applicable to the area only. Hence,

further research in this field may be carried out in other areas so that generalization of results could be possible.

2. The limited independent variables were included in the study. Other relevant variables may also be included for further study.
3. More intensive statistical techniques should be used for improving contribution of different variables which might given more strength to the study.

BIBLIOGRAPHY

Badgujjar, M.K. (2012).A study on knowledge and adoption of organic farming practices among the farmers in Sehore district (M.P.).M.Sc. (Ag.). Thesis Submitted to Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior.

Bajaj, J.K. and Srinivas, M.D. (2001). Indigenous Knowledge and Resources for Sustainability in Agriculture. *Report Technical Knowledge In Agriculture Division of Agricultural Extension*. ICAR, New Delhi.

Bandode, S. (2012). A study on awareness and adoption of post harvest management practices in maize among the farm women in Khargone district M.P. M.Sc. (Ag.).Thesis Submitted to Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior.

Barodia, A. Agrawal, S.K.; Dubey M.K. and Pyasi, V.K. (2005). Factors affecting the adoption behaviour of vegetable growers. *Madhya Journal of Extension Education.* 8:29-33.

Chouhan, H.S. (2003). Effect of cotton production technology in terms of adoption and production among tribal farmers of Nisarpur block of Dhar District, M.P. M.Sc. (Ag.). Thesis (unpublished), J.N.K.V.V.,Jabalpur. pp: 47-83.

Dohare, R.K. (2014).A study on awareness and adoption of post harvest management practices in tomato cultivation among the farmers in Sehore district M.P. M.Sc.(Ag.).Thesis Submitted to Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior.

Hossain, M. I. (2001). Knowledge gained by the participating Farmers under crop cultivation programme of CARE in a selected Area of My mensingh District. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agriculture University My mensingh.

James, I .J. (2003). Quick vermicomposting. Honey Bee. 14(1).

Khare, N. K.; Khare, Y. R.; Pannase, S. K. and Shrivastava, A. (2007). Tribals indigenous technological knowledge for sustainable agricultural development in Madhya Pradesh *International Conference on Sustainable Agriculture for Food, Bio-energy and Livelihood Security, Abstracts*. 1:25

Lakra, V.; Singh, M. K.; Sinha, R. and Kudada, N. (2010). Indigenous technology of tribal farmers in Jharkhand. *Indian Journal of traditional Knowledge*. 9(2):261-263.

Majhi, S. K. (2008). Indigenous technical knowledge for control of insect pest and livestock disorders. *Indian Journal of Traditional Knowledge*. 7(3):463-465.

Mamum, Md. Al. (2004). Farmers' knowledge and attitude towards the use of Indigenous Technological Knowledge (ITK) for crop protection. M. Sc (Ag.) Thesis submitted to Bangladesh Agriculture University.

Maravi, M.S. (2009). Depiction of Indigenous Technological Knowledge (I.T.K) in agricultural aspects prevailing in Gwalior region of Madhya Pradesh. M.Sc (Ag.) Thesis Submitted to Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur.

Nagesh, (2006). A Study on entrepreneurial behaviour of pomegranate growers in Bangalkot district of Karnataka, M. Sc. (Agri) Thesis, Univ. Agril. Sci., Dharwad.

Nandini, N.; Chadrakandan, K. and Karthikeyan, C. (2006). Adoption of indigenous soil and water conservation practices by the clients of an NGO and government organization. *J. Extn. Edu.*7:1338-1340.

Nirban, A. A. (2006). A study on indigenous technical knowledge about rice Cultivation and bovine health management practices in konkan region of Maharashtra, College of agriculture, Dhadwad.

Patel, M. (2004). A study on extent of knowledge and adoption of cotton production practices and production level among farmers of Pandhana block of Khandwa district (M.P.). M.Sc. (Ag) Thesis (Unpublished), J.N.K.V.V. Jabalpur

Patidar, S. (2013). Indigenous Technological Knowledge on plant protection in vegetable in eastern part of U.P. M.Sc (Ag.) Thesis submitted to Banaras Hindu University, Varanasi

Patil M. (2008). A study on production and marketing management behaviour of organic vegetable growers in Belgaum district. M.Sc. (Ag.) Thesis submitted to the University of Agricultural Sciences, Dharwad.

Ratan, R. P.; Singh, B. N. and Sawaiyan S. K. (2003). Farmer participatory quantification of indigenous technical knowledge about plant protection in rainfed agriculture of Jharkhand. *Proceeding of First National Extension Congress*.

Reddy, V.S. (2006). Knowledge and adoption of integrated pest management practices among vegetable growers of Gadag distrsict in North Karnataka.M.Sc. (Ag.)Thesis submitted to the University of Agricultural Sciences, Dharwad.

Rogers E M and Floyd Shoemaker F 1983 Communication of innovations – *A cross cultural approach. The Free Press Collier* – MacMillan Limited, New York.

Saad, D. (2013). A study on impact of Balram Tal Yojna on benefits driven by participant farmers of Tonk Khurd block of Dewas district of Madhya Pradesh. M.Sc (Ag.) Thesis submitted to Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior.

Sana, M.C. (2003). Farmers' Knowledge of Shrimp cultivation in Assasuni Upazila under Satkhira District. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agriculture University, Mymensingh.

Sarker, M. R. A. (2002). Farmers' knowledge of and Attitude towards BRRI Dhan 29 varity of Rice. M.Sc. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agriculture University, Mymensingh.

Shalini, M.; Maikhuri, R.K. and Dhyani D. (2008). Indigenous soil management to revive below ground biodiversity. *Leisa India*.10 (2): 13.

Sharma, P.N. (2003). Use of indigenous knowledge in agriculture *Indian Journal of Extension Education*. 21(1&2):13-20.

Sharma, S.; Bajracharya, R. and Sitaula B. (2009). Indigenous Technology Knowledge in Nepal. *Indian Journal of Traditional Knowledge*. 8(4):569-576.

Squire, P. J. (2001). Preserving indigenous agricultural knowledge and skills through research, extension and training for sustainable agricultural development and production in third world countries. *Ind. J. Ext. Edu.*, 17:68-81.

Supe, S.V. (1969). Factors related to different degree of rationality in decision making among farmers in building district ph. D. thesis (unpublished), IARI, New Delhi.

Vivekanandan, P. (2000). For controlling aphids, Indigenous Communication System in Research and Development. *Journal of Extension Systems*. 4(1):75-86.

APPENDIX

राजमाता विजयराजे सिंधिया कृषि विश्वविद्यालय ग्वालियर (म. प्र.)
विस्तार शिक्षा विभाग, कृषि महाविद्यालय इंदौर

प्रमुख निर्देशक
डॉ. संध्या चौधरी
प्राध्यापक विस्तार शिक्षा विभाग
कृषि महाविद्यालय, इंदौर

शोधकर्ता
पंकज शर्मा
एम.एस .सी. कृषि विस्तार
कृषि महाविद्यालय, इंदौर

शोध की अवधि 2019-20

शोध का विषय

A Study on Identification of Indigenous Technology Knowledge (ITK) and its Utilization in Contemporary Modern Agriculture at Shajapur District of Madhya Pradesh

PART-A

Independent Variables

किसान का नाम ……..

1) आयु ……

2) शिक्षा

- **a) निरक्षर**
- **b) प्राथमिक शिक्षा**
- **c) माध्यमिक शिक्षा**
- **d) उच्च शिक्षा**

3) सामाजिक भागीदारी

आप किसी संगठन के सदस्य है ?

- **a) पंचायत**
- **b) एस. एच. जी.**
- **c) राजनिति**
- **d) त्योहारों के कार्यक्रम में योगदान**
- **e) अन्य**

4) परिवार का आकर

- **A. एकल परिवार**
- **B. संयुक्त परिवार**

5) जोत का आकर

कृषि योग्य भूमि ……हैक्टेयर में

6) वार्षिक आय ……..रुपयों में

7) इनकम जेनरेशन साधन

- **a) मकान/दुकान का किराया**
- **b) व्यवसाय**
- **c) खेती**

8) खेत मशीनरी

क्रमाँक	कथन	संख्या
1	ट्रैक्टर	
2	थ्रेसर	
3	स्प्रेयर	
4	डस्टर	
5	इलेक्ट्रिक पंप	
6	डिसील पंप	
7	प्लाउ	
8	कल्टीवेटर	
9	हाथ सिकल	
10	पावर टिलर	
11	ग्रेन सेपरेटर	
12	अन्य	

9) संपर्क विस्तार एजेंसी

क्रमाँक	कथन	हमेशा	अक्सर	कभी कभी
1	कृषि विज्ञान केन्द्र			
2	ग्रामीण विस्तार अधिकारी			
3	ब्लॉक कार्यालय			
4	प्रदर्शन			
5	फील्ड डे			
6	खेत पर जाएँ			
7	विस्तार समूह बैठक			
8	किसान मेला			
9	शैक्षिक दौरे			
10	प्रदर्शनी			
11	रेडियो			
12	समाचार एजेंसी			
13	टेलीविजन			
14	इंटरनेट			
15	अन्य			

10) निर्णय लेने का व्यवहार

क्रमाँक	कथन	हमेशा	अक्सर	कभी कभी
1	मैं निर्णय लेने में तेज हूं			
2	में खेती से सम्बन्धित निर्णयों पर पहुंचने से पहले सभी विकल्पों पर विचार करता हूं			
3	मैं खेती से संबंधित निर्णय लेने से पहले संबंधित व्यक्तियों से परामर्श करता हूं			
4	अधिकतम चर्चा के पश्चात हर विकल्प का			

	मुहैया करने के बाद निर्णय करता हूं			
5	मैं समय पर निर्णय लेने में अच्छा हूं			
6	में किसी निर्णय पर पहुंचने के दौरान अपने विचारो से परिणाम पश्चात नई योजना के बारे में सोचता हूं			

11) जोखिम वहन करने की क्षमता

क्रमाँक	**कथन**	हमेशा	अक्सर	कभी कभी
1	एक किसान जो औसत किसान की तुलना में अधिक जोखिम लेने को तैयार है, वह आमतौर पर आर्थिक रूप से बेहतर काम करता है			
2	एक किसान को छोटे लेकिन कम जोखिम वाले लाभ के साथ संतोष करने के बजाय बड़े लाभ बनाने में अधिक संभावनाएं लेनी चाहिए			
3	एक किसान को अधिक से अधिक जोखिम से बचने के लिए बड़ी संख्या में फसल उगानी चाहिए, जिसमें केवल एक या दो फसलें ही शामिल हैं			
4	किसान के लिए जोखिम उठाना अच्छा होता है जब वह जानता है कि उसकी सफलता की संभावना काफी अधिक है			
5	कोशिश कर रहा है एक पूरी तरह से नया अभ्यास या विधि में खेती द्वारा एक किसान द्वारा शामिल जोखिम			
6	यह बेहतर है कि एक किसान द्वारा नई तकनीक या विधि जब तक नहीं अपनाना चाहिए जब तक अधिक किसनों को इस विधि से लाभ मिला हो			

PART-B

Dependent Variable

फसल उत्पादन संबंधी पारंपरिक तकनीकी का ज्ञान एवं अंगीकरण के संबंध में

क्रमाँक	**कथन**	हमेशा	अक्सर	कभी कभी
भूमि विकास से संबंधित ज्ञान व अंगीकरण				
1.	जमीन को गैती, फावड़े से समतल करके			
2.	बंजर जमीन की जुताई करके गोबर की खाद, कंपोस्ट आदि का प्रयोग करके			
3.	मिट्टी की परत निकालकर			
4.	पाटा चलाकर भूमि को समतल करना			
5.	बंजर जमीन में हरी खाद की 2-3 फसल उंगा कर			
6.	अन्य पारंपरिक तकनीक			

जल संरक्षण तकनीकों से संबंधित ज्ञान व अंगीकरण				
7.	तालाब बनाकर			
8.	खेत के चारो ओर मेढ़ बनाकर			
9.	अस्थाई कुआ खोदकर			
मृदा उर्वरता प्रबंध तकनीकी का ज्ञान व अंगीकरण				
10.	मृदा को समय-समय पर पलट कर			
11.	कूड़ा करकट को सड़ा कर			
12.	फसल अवशेष को जुताई द्वारा पलट कर			
13.	जानवरों के गोबर मूत्र आदि का प्रयोग करके			
14.	जैविक या हरी खाद द्वारा			
15.	फसल चक्र अपनाकर			
16.	जंगलों से पानी के साथ बहकर आई उपजाऊ मिट्टी को रोककर			
मृदा क्षरण नियंत्रण से संबंधित ज्ञान व अंगीकरण				
17.	ढाल के विपरीत मेड बनाकर			
18.	ढलान के विपरीत दिशा में जुताई करके			
19.	खेतों के चारों ओर पेड़ लगाकर			
20.	फसल चक्र अपनाकर			
21.	फसलों के साथ-साथ वृक्षारोपण करके			
जल निकास विधियों से संबंधित तकनीकों के बारे में ज्ञान व अंगीकरण				
22.	फावड़े से खेत के बीचो-बीच नाली बनाकर			
23.	निचले मेड को फोड़ कर			
24.	मेड के किनारे नाली बनाकर			
25.	गड्ढा बनाकर खेत के निचले भाग में किनारे किनारे नाली बनाकर			
26.	पक्की नाली बनाकर			
मौसम संबंधित ज्ञान व अंगीकरण				
27.	पंचांग के आधार पर			
28.	किसान के अपने स्वयं के अनुभव के आधार पर			

29.	गांव में वृद्ध लोगों की जानकारी के अनुसार			
30.	पुरानी मान्यताओं के आधार पर			
31.	देशी पारंपरिक तकनीक			
भूमि जुताई से संबंधित ज्ञान व अंगीकरण				
32.	सामान्य रूप से खेत में घूम कर देखना			
33.	दबाकर देखना			
34.	कुदाली से खोद कर देखना			
35.	हाथ से मिट्टी को मसल कर देखना			
बीज बुवाई उपकरण या युक्तियों से संबंधित ज्ञान व अंगीकरण				
36.	हाथ से छिटक कर			
37.	टोकनी में रखकर			
38.	देशी हल के पीछे बुआई करना			
39.	फड़क से बुवाई			
40.	महिन व चिकने बीजों को राख से मिलाकर			
विभिन्न फसलों की देसी प्रजातियों का ज्ञान व अंगीकरण				
41.	मक्का के बड़े दाने, छोटे दाने, लाल बीज वाली			
42.	ज्वार - सफेद,पीली, नानी बाई ज्वार			
43.	चना - पीला, कांटे वाला, बिना कांटे वाला			
44.	गेहूं - मालवीय, पिस्सी, कठिया			
फसलों में खाद देने संबंधित ज्ञान व अंगीकरण				
45.	साड़ी गोबर की खाद			
46.	ह्यूमस/कंपोस्ट खाद			
47.	हरी खाद			
48.	तालाब के अंदर वाले मिट्टी को खेत में बिखेर कर			
49.	फसल चक्र अपनाकर			
खरपतवार नियंत्रण संबंधित विधियों के बारे में ज्ञान वर्गीकरण				
50.	हाथ से उखाड़ कर			
51.	भूमि तैयारी से पहले खेत में आग जला कर			

52.	खेत में पानी भरकर			
53.	खुरपी द्वारा			
54.	खड़ी फसल को जोत कर			
कीट नियंत्रण संबंधित विधियों का ज्ञान व अंगीकरण				
55.	पत्ती खाने वाले कीटों से सुरक्षा के लिए राख का भुरकाव			
56.	गर्मी के मौसम में गहरी जुताई करना ताकि कीड़ों के अंडे तेज धूप में नष्ट हो जाए			
57.	दीमक के नियंत्रण के लिए गेहूं की बुवाई के पहले नीम और महुआ की खली का उपयोग			
58.	रात में खेत के किनारे टायर वगैरह जलाकर ताकि गंधीबग और अन्य कीड़े आकर नष्ट हो जाए			
59.	खेत में पानी भरना			
60.	सोयाबीन में इल्ली के नियंत्रण के लिए छाछ+ तंबाकू+ नीम की पत्ती का घोल बनाकर छिड़काव करके			
रोग नियंत्रण तकनीकों का ज्ञान व अंगीकरण				
61.	रोग ग्रसित पौधों को उखाड़कर			
62.	बैक्टीरियल लीफ ब्लाइट के नियंत्रण के लिए गाय के गोबर का पानी में घोल बनाकर छिड़काव			
63.	नीम की पत्ती एवं निंबोली का काढ़ा बनाकर छिड़काव			
64.	गर्मी के मौसम में गहरी जुताई ताकि रोगाणु गर्मी से नष्ट हो जाए			
65.	बीजों को बोने से पहले गर्म पानी से उपचारित करके कुछ देर तक तेज धूप में सुखाना ताकि बीज जनित रोगों से बचा जा सके			
फसल पकने की पहचान संबंधित ज्ञान व अंगीकरण				
66.	फसल का पीलापन देखकर			
67.	दानों को मसलकर देखना			
68.	दानों को चबाकर			
69.	बीज को देखकर			
70.	अन्य पारंपरिक तकनीक			
फसल की कटाई के यंत्र से संबंधित ज्ञान व अंगीकरण				
71.	साधारण हसिये के द्वारा			

72.	दातेदार हसीये के द्वारा			
73.	अन्य पारंपरिक तकनीक			
फसल परिवहन के साधन के बारे में ज्ञान व अंगीकरण				
74.	बैलगाड़ी से			
75.	बोझा बांधकर सिर के द्वारा			
76.	कांवर में (भार बनाकर)			
77.	टोकनी को कंधे या सिर में रखकर			
78.	बोरे एवं गोहरी में बांधकर			
79.	अन्य पारंपरिक तकनीक			
फसल की ओसाई से संबंधित ज्ञान व अंगीकरण				
80.	सूपड़े के द्वारा			
81.	टोकनी में लेकर			
82.	प्राकृतिक हवा से			
83.	चादर द्वारा हवा देकर			
84.	अन्य पारंपरिक तकनीक			
बीज/अनाज भंडारण तकनीकों का ज्ञान व अंगीकरण				
85.	मिट्टी के दीवाल वाली कोठी में			
86.	बड़े-बड़े हंडी में			
87.	पत्थर और ईट से बनी और मिट्टी के प्लास्टर वाली कोठी में			
88.	अनाजों के भंडारण के लिए बुखारी में पहले गेहूं का भूसा बिछाकर नीम के पत्ते डालकर अनाज रखना			
89.	सभी बीजों के भंडारण के लिए प्याज और लहसुन का प्रयोग			

RAJMATA VIJYARAJYE SCINDHIA AGRICULTER UNIVERSITY GWOLIR (M.P.)

Agricultural Extension and Communication college of agriculture Indore

Chief Adviser

Dr. (smt.) Sandhya Choudhary

Dept. of Agricultural Extension and Communication

Researcher

Pankaj Sharma

Dept. of Agricultural Extension and Communication

Duration of research

Topic of research

A Study on Identification of Indigenous Technology Knowledge (ITK) and its Utilization in Contemporary Modern Agriculture at Shajapur District of Madhya Pradesh

General information

Part - A

1. Age ..... in years
2. Education qualification:
   - Illiterate
   - Primary education
   - Middle school
   - Higher education & above
3. Social participation

Member of any organization:

- Panchayat
- Self Help Groups
- Polity
- Participate in festivals
- Others

4. Size of family:
   - Nuclear family
   - Joint family
5. Size of land holding..... in hac
6. Annual income ..... in Rs.
7. Resources of income generation:
   - House/shop rent
   - Business
   - Farming

8. Farm power

S.no.	Implements	Numbers of implements
1.	Tractor	
2.	Thresher	

3.	Sprayer	
4.	Duster	
5.	Electrical pump	
6.	Di seal pump	
7.	Plough	
8.	Cultivator	
9.	Hand sickle	
10.	Power tiller	
11.	Grain separator	
12.	Others	

9. Extension contact agency:

S.no.	Statement	Always	Often	Sometimes
1.	KVK			
2.	RAEO			
3.	Block office			
4.	Demonstration			
5.	Field visit			
6.	Meeting of extension groups			
7.	Kisan mela			
8.	Educational tour			
9.	Exhibitions			
10.	Radio			
11.	News paper			
12.	Television			
13.	Internet			
14.	Others			

10. Behaviour of decision making

S.no.	Statement	Always	Often	Sometimes
1.	L am quick to judge			
2.	I consider all options before arriving at decision related to farming			
3.	I consult with the individuals concerned before making decisions related to farming			
4.	After maximum discussion, after providing every options, I decide			
5.	I am good at making timely decisions			
6.	While arriving at a decision, I think the new plan after the result from my thoughts			

Risk bearing ability:

S.no.	Statement	Always	Often	Sometimes
1.	A farmer who is willing to take more risks than average farmer usually dose a better			

	job financially			
2.	A farmer should take more chances in making big profits instead of being contact with small but low risk benefits			
3.	a farmer should grow a large number of crops to avoid maximum risk, which includes only one or two crops			
4.	It is good for the farmer to take risks when he knows that his chances of success are quite high			
5.	Risk involved by a farmer by farming in an entirely new practices or method			
6.	It is better that a farmer should not adopt new technology or method unless more farmers have benefited from this method			

Part - B

Dependent variable

Identification of Indigenous Technology Knowledge (ITK) and Its Adoption in the Contemporary Modern Agriculture:

S.no.	Statement	Low	Medium	High
Knowledge and adoption related to land development				
1.	Gatti the ground, leveling it with a shovel			
2.	By plough the barren land using dung manure, compost etc.			
3.	Soil layer			
4.	Leveling of land			
5.	By growing 2-3 crops of green manure in barren land			
6.	Other traditional techniques			
Knowledge and adoption related to water conservation techniques				
1.	Making a pond			
2.	Rams around the field			
3.	Dig a temporary well			
Knowledge and adoption of soil fertility management technology				
1.	Turning the soil periodically			
2.	Rotten garbage			
3.	By plowing crop residue			
4.	Using cow dung urine etc.			
5.	By organic or green manure			
6.	Harvest cycle			

7.	By stopping the fertile soil from the forests flowing with water			
Knowledge and adoption related to soil erosion control				
1.	Making the opposite of the shield			
2.	Plowing in opposite direction of slope			
3.	Planting trees around fields			
4.	Harvest cycle			
5.	By planting trees along with crops			
Knowledge and adoption of techniques related to drainage methods				
1.	Shovel through the middle of the shield			
2.	Bursting the lower med			
3.	By draining the edge of the med			
4.	By making a pit, making a drain along the shore at the bottom of the field			
5.	Make a drain			
Weather related knowledge and adoption				
1.	On the basis of almanac			
2.	Based on the farmer's own experience			
3.	According to the information of old people in the village			
4.	Based on old beliefs			
5.	Native traditional techniques			
Knowledge and adoption related to land plowing				
1.	Walking the field normally			
2.	Passed view			
3.	Spade			
4.	Kneading the soil by land			
Knowledge and adoption related to seed sowing equipment or devices				
1.	By hand			
2.	Put in the basket			
3.	Sowing behind native plow			
4.	Sowing			
5.	Mixing mahina and smooth seeds with ashes			
Knowledge and adoption of indigenous species of different crops				
1.	Large grains of corn, small grains, red seeds			
2.	Sorgham - white, yellow, nani bai jowar			
3.	Gram- yellow, thorny, thornless			
4.	Wheat- malaviya, pissi, kathia ete.			
Knowledge and adoption of fertilizers in crops				
1.	Saree dung manure			
2.	Humus/compost			
3.	Green manure			

4.	By spreading the soil inside the pond in the Field			
5.	harvest cycle			
Knowledge classification regarding weed control methods				
1.	Uprooted by hand			
2.	Before the land preparation, fire in the field			
3.	Filling the field			
4.	By holding the standing crops			
Knowledge and adoption of crop identification				
1.	Seeing the yellowness of the crop			
2.	Grind grain			
3.	Chewing the grains			
4.	Seeing the seed			
5.	Other traditional techniques			
Knowledge and adoption related to harvesting equipment				
1.	With a simple smile			
2.	By the groomed smile			
3.	Others traditional techniques			
Knowledge and adoption about crop transport				
1.	By bullock cart			
2.	Head-tied			
3.	In kanwar (by loading)			
4.	Placing the basket in the shoulders or head			
5.	Tie in sacks and gohri			
6.	Others traditional techniques			
Knowledge and adoption related to crop osai				
1.	By the way			
2.	In the basket			
3.	By natural wind			
4.	Sheet air			
5.	Others traditional techniques			
Knowledge and adoption of seed/grains storage techniques				
1.	In a mud wall			
2.	In a big pomade of stone and briquette and made of mud plaster			
3.	For the storage grains, put grains of neem leaves by laying wheat straw first in bukhari			
4.	Use of onion and garlic for storing all seeds			

VITA

The author of this thesis **Mr. Pankaj Sharma** s/o Shree Jwala Prasad Sharma was born on 12th Nov 1995 in agar (malwa) district of Madhya Pradesh. He completed his High School from Saraswati Shishu vidhya mandir H.S. School, Kanad, Shajapur in the year of 2010 with 68.50 percent and Higher Secondary School Examination from Govt. H. S. Excellence school No.1 Shajapur, in the year 2012 with
74.20 percent.

He was selected through entrance examination (P.A.T.) and joined the JNKVV College of Agriculture Tikamgarh, (M.P.) and obtained B.Sc. (Ag.) degree in 2018 with 7.29 OGPA out of 10.00 point scale.

The author continued his post-graduation from **College of Agriculture, Indore** (M.P.) to specialize in **Department of Agricultural Extension and Communication** and for partial fulfillment of the requirements for the award of the same, He was allotted with interesting problem as **A study on identification of indigenous technology knowledge (ITK) and its utilization in contemporary modern Agriculture at Shajapur District of Madhya Pradesh** for thesis work which has been duly completed by him and presented in this thesis.

He actively participated in all the cultural activities of the college. Now, he is submitting the thesis after completing the course with 7.01 OGPA out of 10.00 scale.

PANKAJ SHARMA