

**A STUDY ON ATTITUDE, PERCEPTION  
AND ADOPTION OF ORGANIC FARMING  
BY VEGETABLE GROWERS IN SELECTED  
DISTRICTS OF NORTH BENGAL**

**A THESIS  
SUBMITTED TO THE  
UTTAR BANGA KRISHI VISWAVIDYALAYA  
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY (AGRICULTURE)**

**IN  
Agricultural Extension**

**BY  
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[Regn. No. - A-2018-030-D]**



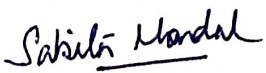

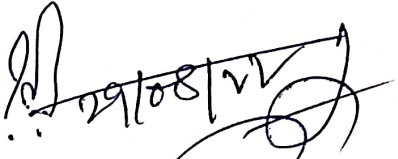


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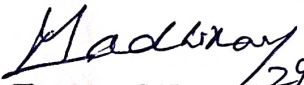

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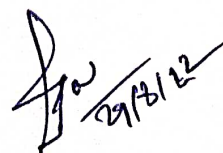
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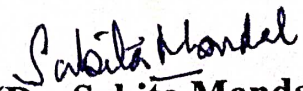
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## Abstract

Organic farming is a holistic production system, gaining momentum in the world at present. India ranks 1<sup>st</sup> in term of number of organic producers and 9<sup>th</sup>, in area under cultivation. Indian agro- climatic condition is suitable for vegetable cultivation. It contributes 14% of the total world production. West Bengal occupies the second position in vegetable cultivation whereas, North Bengal has only 20--30 % of organic vegetable growers and thus there is a huge scope to improve the scenario. Considering this, a study has been carried out to understand the attitude, perception and adoption of organic vegetable farming among the vegetable growers in North Bengal. The study has also attempted to find out the socio- economic status of the respondents, various sources of information and different constraints associated and factor influencing the attitude and adoption of the organic vegetable growers. Alipurduar and Coochbehar districts were taken for conducting the study. Total 5 block were selected. The districts and blocks were taken purposively. 200 organic vegetable growers (growing vegetable organically for atleast more than one year) were taken with simple random sampling method. Data was collected from March 2020 to August 2021 with the help of structured interview schedule. The data was recorded with personal interview method physically but due to pandemic situation some of the respondents were contacted over phone. Various socio- personal, socio- economic and socio- psychological variables were taken as independent variables. Perception, attitude and adoption were selected as dependent variable. Statistical tools like frequency, percentage, mean, coefficient of correlation, t test, z test, step wise regression etc were taken to analysis the data. SPSS (Statistical Package for the Social Science) was used to do the statistical analysis. The study found that the organic vegetate growers were mostly young, experienced, cosmopolite with high level of innovativenss. The respondents were found to have highly favorable attitude towards organic vegetable farming however, medium level of adoption was found among majority of the respondents. It has been found that they did not have full knowledge in many aspects of organic farming. Plant protection and economic constraints were found to be the major constraints. The study has recommended to develop a model organic farm to give them exposure along with motivational and skill-oriented training through appropriate and strong extension services. The study also recommends to improve the linkage between producers and consumers. The study suggests for input centres and better transport facilities in the study area to promote organic vegetable farming. The study has also pointed out the need for subsidy and credit facilities to support organic farming. All these provisions may be made through government initiative or other agricultural stakeholders. Finally, the study concludes that the approach of conversion should be "towards organic" in a gradual manner than immediate organic.

*Key Words: attitude, adoption, perception, vegetable farming, organic farming*

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Signature of Chairman

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Signature of the Student

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# Chapter-I

## INTRODUCTION

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### **Introduction**

The concepts of organic agriculture was developed during early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner and others. They believed that the use of manures, cover crops, crop rotation, and biological pest control result in better farming system. Howard had worked in India as an agricultural researcher and gained much inspiration from the traditional agriculture system, he has also advocated for their adoption in the West. Such practices further were promoted by various advocates like J.I. Rodale and his son Robert during 1940s and onward. He has published “*Organic Gardening and Farming*” magazine and a few text books on organic farming. The demand for organic food had improved in the 1960s due to the publication of “*Silent Spring*” by Rachel Carson, which had documented the environmental damage issues.

However, the population of the world was increasing and providing food for the world had become difficult. India is the second most populous country in the world. With this increasing population, the cultivable land resource is shrinking by each day. To meet the food, fuel, fibre, fodder and other needs of the increasing population, the productivity of land and soil need to be improved. Green Revolution occurred through use of modern agriculture technologies like use of synthetic chemicals like fertilizers and pesticides, adoption of high-yielding and nutrient responsive varieties of crops, greater use of irrigation sources etc. Which has undoubtedly increased the production and labor efficiency and made our country self-sufficient in food production. But indiscriminate and excess use of chemicals during that period has questioned sustainability of agriculture in the long run and concerns have been raised regarding its adverse effects on soil health and environment.

### **The concept of organic farming**

(IFOAM) International Federation of Organic Agriculture Movements, an international organization, established in 1972, for organic farming defines the goal of organic farming:

*“Organic agriculture is a production system, that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture*

*combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved...(Conserve-energy-future.com)*

Modern organic farming was developed as a result of environmental harm caused by the use of chemical pesticides and fertilizers in conventional farming and it has numerous ecological benefits. The process involves the use of organic inputs, avoiding synthetic substances to maintain soil health and ecological balance thus minimizing pollution and wastage. In other words, organic farming is a method that involves growing and nurturing crops without using synthetic fertilizers and pesticides. No genetically modified organisms(GMO) are permitted. It relies on ecologically balanced principles like crop rotation, green manuring, organic waste, biological pest control. Organic farming uses pesticides and fertilizers if they are natural and avoids the use of petrochemical fertilizers and pesticides.

### **Some Statistics as per Statista 2022**

Agriculture contributes 18% to India's GDP and employment to approximately 2/3rd of the total population. It ranks 9th in organic agricultural land and 1st in number of organic producers. Total area under certification process is 4339184.93 (2020-21) ha. According to union ministry of Agriculture and farmers welfare, 2% of cultivable net sown area (140.1 million ha) is under organic farming. India has produced 3496800.34 MT of certified organic product during 2020-21 and volume of the export was 888179.68 MT in 2020-21. Export realization was Rs.707849.52 lakhs during 2020-21. Production of vegetables was 176.2 million metric tonnes. India was the 2nd largest vegetable producer after China and could contribute 14% of total world vegetable production. Madhya Pradesh has the largest area under organic farming. Sikkim has converted the entire cultivable area under organic certification.

Sikkim became India's first "100 per cent organic" state in January 2016. Presently, total farming in Sikkim is carrying out without the use of synthetic fertilizers and pesticides. It could provide access to safer food choices and making agriculture a more environment-friendly activity. Even the state of Sikkim is now the world's first 100 per cent organic state. It has won the prestigious Future Policy Gold Award from the UN Food and Agriculture (FAO), after beating 51 nominations from across the world.

### **The need for organic farming**

Now a days, its normal to hear about extinct species and this should be a matter of concern. In the last century, approximately 75 percent of the agricultural crop diversity has

been wiped out. inclination towards one form of farming can be a reason for future disaster. A classic example is of a potato. There were number of varieties available in the market. But today, only one species of potato dominates. This is a dangerous situation because if pests knock out the remaining species of potato, available today, we won't have potatoes anymore. This is why we need organic farming methods that produces disease and pest-resistant crops to ensure a sustainable future.

Organic foods do not contain chemicals. This is because organic farmers don't use chemicals in food-growing process like conventional farmers. Organic farmers use natural farming techniques that won't harm human and the environment. These food product keep away dangerous diseases like cancer and diabetes .Studies revealed that a large section of the population consume toxic substances used in conventional agriculture and fallen prey to diseases like cancer. As organic farming avoids these toxins, it reduces the sickness and diseases caused by them.

For any product to get certified as organic food, it must undergo quality checks and the creation process undergoes rigorous investigation. The same rule applies to international markets also. This is a great thing for consumers as they are getting true organic foods. These quality checks weed out the quacks who want to get benefited from the organic food label. There is a misconception that organic foods are expensive. The truth is they actually are cheaper because they don't require expensive pesticides, insecticides, weedicides etc.

The quality of food also depends on its taste. Organic food tastes better than conventionally grown food. The sugar content in organically grown food provides them better taste. Organic plants also have greater metabolic and structural integrity in cellular structure than conventional crops. This makes the storage of organic food possible for a longer period.

Organic farming appears to be one of the best options for sustainability. As a result, there great is a interest in organic farming globally to hold sustainability of natural resources and environment along with better taste and nutritional availability in the food. During the last two decades, 'Organic Agriculture' has been established as a dynamic 'Alternate Farming System'.

### **Organic vegetable cultivation in India**

Vegetables are important constituents of Indian diet. They are rich in carbohydrate, proteins, vitamins, minerals, antioxidants, fibre, etc. They are consumed for nutrition, vigor, therapeutic values and prevention of diseases. The consumers are now, concerned about the

vegetables they eat. Both the international and domestic consumers have become cautious regarding issues like residues of poisonous chemicals in vegetables and their associated health and environmental issues. This has therefore made us think about alternate form of agriculture to produce chemical free food. Organic agriculture is one that supports the environment and restricts the use of synthetic inputs.

India with its varied agro-climatic zones is suitable to grow a wide variety of vegetables. It is the second largest vegetable producer country after China, with production level of 176.2 million metric tons of vegetables, accounting for 14% of the total world's vegetable production. India with its varied climate and soil, has a great potential for organic vegetable production. The wide product base, huge volume of production throughout the year, strategic geographic location, high demand, climatic condition and availability of labor at relatively low cost makes India an apt place for organic vegetable production.

However, the vegetable sector suffers through 25 % of post-harvest losses and only 5 % of it are either processed or exported. With an increase in population there is tremendous pressure on the agriculture sector to feed the entire population with decreasing land share. There is a constant battle between the quantity and quality of the food that can be produced from a given land. If one of them can be taken up as the objective the other one has to be forsaken. However, it would have been better if both of them could be achieved together. Indians have become more diet conscious and health conscious. Their income levels have increased and they have become interested in quality of the produce rather than the quantity of the food. Vegetables are one such commodity which are consumed on a daily basis. Its price fluctuates with their visual appeal i.e. freshness, color and odor etc. Cultivation practices followed to grow vegetables also effect the prices, people are happy to pay higher prices for the organically grown vegetables. The growing awareness among the masses about organic farming has raised its demand. Organic vegetables are gaining momentum across the world and emerged as an attractive source of income generation. Organic products are being preferred in developed countries and in urban centers of India. There is a great demand for organic food in both domestic and international market. Which is growing around 20-25 % annually, thus the area under organic vegetable farming in has been increasing consistently.

### **Organic Farming in West Bengal**

Bengal agriculture department, food processing industries, and horticulture departments have started organic farming activities across the state. The increasing demand for

organic vegetables, especially among urban people, has convinced the state government to formulate organic farming policy.

The food processing industries and horticulture departments have asked the rural agricultural farms to initiate organic farming and have assured them of technical promotional and marketing assistant. The department would supply greenhouses and pack houses as well as organic fertilizers. It will also provide transport to ferry those farm products to the market places. The department is also taking organic farming at their own farms. The agriculture department, has set a target to prepare 32 organic villages across the Bengal — especially in the districts of North and South 24 Parganas, Howrah and Hooghly. It has set up 120 clusters, 50 acres of each. Around 194 farmhouses under the department are also growing organic vegetables. Apart from this, the department under Swanirbhar Krishi Prakalpa is also collaborating with private agencies on organic farming (The Economic Times, E-paper).

#### **Advantages of Organic Farming:**

1. It creates higher level of resistance to pests and diseases.
3. This farming process supports soil health and pollinators.
4. There is no chance of genetically modified foods with organic farms.
5. The working environment for organic farmers is healthier and safe.
6. Organic farmers can often produce their own fertilizers at their own farming location.
7. It can be implemented in any geographic location or season.

#### **Constraints in organic farming**

1. There is no subsidy offered for most organic farmers.
2. It requires more work to produce that are ready for sale.
3. Organic farmers must be knowledgeable about localized growing systems.
4. There are unique marketing challenges for organic produce.
5. Organic farms and foods has to go through a rigorous certification process.
6. It usually is difficult to be competitive with organic farming.
9. Organic crop generally spoils fast.

### **1.1 The problem Statement**

Cooch Behar and Alipurduar districts have more than 20-30% of farmers, growing vegetables as summer and winter crops. Organic farming is taken in some of the part of the districts still majority of the farmers are still growing with conventional method. Organic vegetable farmers though have adopted some of the aspects of organic farming still many aspects of organic farming are not yet fully adopted. There is a lack of knowledge and adoption among farmers regarding vegetable organic farming. Thus, sustainability of agriculture and health of the people including our farmers is at stake.

## **1.2 Objectives of the study**

1. To assess the socio-economic characteristics of vegetable growers in the selected districts of North Bengal.
2. To find out different sources of information from where vegetable growers access information related to organic farming.
3. To study farmers' attitude, perception and adoption of organic farming in the selected districts of North Bengal.
4. To elicit out the various factors which are responsible for attitude, perception and adoption of organic farming in selected districts of North Bengal.
5. To suggest a policy framework to improve the organic farming scenario in the selected district.

## **1.3 Limitations of the study:**

- Only 200 vegetable growers were taken, 100 from Cooch Behar district and 100 from Alipurduar district hence, the result might not be generalized for entire district.
- Farmers were taken purposively hence; chances of homogeneity might exist.
- Regarding knowledge analysis only package of practices regarding production aspects considered.
- Due to Covid situation, along with physical interview data was collected over telephone also.

## **1.4 Scope of the study:**

- Similar study can be done with the same farmers in respect of other crops, they cultivate organically.

- Similar study can be done in other geographical areas with different set of farmers.
- The similar study can be done for non-adopters (organic farming) also.
- Can spread the importance of organic farming.

# Chapter II

## REVIEW OF LITERATURE

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### Review of Literature

An intensive study of the available literature is important in gaining an idea and understanding of the area of research. The reviews were collected according to the specific objectives of the research. Though, there are number of studies, conducted in the past regarding adoption, knowledge, technological gap and constraints in organic farming as a whole but still a lot to be studied about vegetable organic farming. Hence, some of the related literatures were studied and reviews were written.

The literature reviewed related to the present study under is presented with the following headings.

- 2.1 Socio-economic characteristics of vegetable growers.
- 2.2 Sources of information from where vegetable growers access information related to organic farming.
- 2.3 Farmers' attitude, perception and adoption of organic farming.
- 2.4 Factors which are responsible for attitude, perception and adoption of organic farming.
- 2.5 Policy framework to improve the organic farming scenario.

### **2.1 Socio- economic characteristics of organic growers**

Bimala (2000) found that majority of her respondents had small land holdings. The study also said that about 10 percent and 15 percent of the respondents possessed large and medium land holding respectively. The study was conducted in some villages of Haryana.

Ranganatha *et.al.* (2001) carried out a study in some selected villages of Srirangapatna, a taluk of Mandya district. They found that education, mass media, extension participation, scientific orientation, innovation proneness of the small farmers had a positive and significant relationship with their adoption of organic farming.

Manay and Farzana (2000) did a study in Kammansandra village of Bangalore and found that most of the families (87.8%) had small or medium land holding, less than five acres of area. Only 6.1 per cent of the respondents had more than five acres of area.

Ramesh and Santha (2003) had informed that in Pudukottai district of Tamil Nadu most of the organic farmers had medium size farm and had less cropping intensity. Majority of the farmers has shown medium level of category when they were classified against the variables farming experience, livestock possession, farm power, social participation, mass media exposure, extension agency contacts and information seeking behavior.

Wakle *et al.* (2003) did a study in western and central Maharashtra and said that majority of the rural farm women (70.50 %) had low socio- economic status followed with medium (28.10 %) and high (1.40 %) level of socioeconomic status.

Ramesh *et.al.* (2007) found that in selected study area of Madhya Pradesh, more number of large and medium farmers were involved in organic cultivation compared to small farmers.

Sanghi (2007) did a study in Andhra Pradesh and said, organic cultivation is an intensive process, limited basically to resource-rich farmers. The study also stated that export market depends on external support systems for price, certification and market intelligence and thus, there is little scope of coverage and social relevance of organic farming.

Sharma *et.al.* (2008) did a study in Bhabbhar region of Uttaranchal and found that most of the farmers were marginal farmers followed by small (22.62%). 13.12 % were Semi medium and 3.16 % were medium farmers. None of them was found to be large farmer.

Ranjan *et al.* (2011) reported that in Jalpaiguri district of West Bengal, average size of the land holdings for the selected respondents, under organic cultivation is from 0.32 ha - 0.84 ha in areas under NGOs' and 0.47 ha to 0.86 ha in Government areas. The overall average size of the organic farm was 0.60 ha.

Binod Chettri (2015) carried out a study on organic farming in Sikkim and revealed that there are observable changes in socio-economic profile of the farmers after adopting organic farming. With the increasing demand and supply of organic product, a better living standard, better health, infrastructural development and better cohesion among the farmers were observed within the village or community. When considered the group -based growers, majority of the groups were dominated by farm women, which ensures the empowerment the women.

Brockington, et al. (2016) carried out a study in south Indian village and stated that adoption rates were found to be very high among households, belong to upper wealth classes, where farm size was large and major proportion of individuals derived their primary occupation from cultivation. Low level of adoption was found among households belong to 'poor' and 'very poor' economic status.

Mazhar (2016) found that majority (60%) of the farmers in UP, India, were found to have low socio-economic status followed by 24.7 per cent farmers having medium socio-economic status and rest 15.3 per cent of respondents had high socio - economic status.

Poyyamoli and Padmavathy (2011) found that majority of the organic farmers in Bahor village of Puducherry, India, were of middle aged, had educational qualification from primary to collegiate level, possessed small sized farm, possessed high level of livestock, shown medium level of social participation, innovativeness and high level of economic motivation, information seeking behavior, scientific orientation and risk orientation. They had also mentioned that majority of the organic farmers believed that progress is impossible without risk.

## **2.2 Sources of information from where growers access information related to organic farming.**

Agwu *et al.* (2008) said that majority of the farmers in Enugu state, Nigeria will get benefitted from the radio broadcast regarding organic technologies.

Cacek *et al.* (2009) did a study in Central and Northern states of America and stated that organic farming is capable of competing economically with conventional farming when importance is given to proper approaches during conversion. Information needs of organic farmers must be studied and the delivery systems should be tailored to meet those required needs.

Zossou, et al. (2009) found that tools like video learning i.e Farmer-to-Farmer video to be more effective in transferring information on the technology characteristics rather than conventional training tools like Workshop, training, various integrated rural development approach, etc. The video and workshop could reach 74 and 22 percent of women respectively in the villages of Central Benin where interventions took place.

Nwachukwu (2010) shows that majority of the respondents (82.6%) in Imo state, Nigeria, had possession of radio sets and 64.3% of the respondents have asserted that radio is a useful source of information for organic agricultural technologies. It was concluded that

majority would get benefitted from radio broadcasting.

Sarker and Itohara (2010) conducted a study to find out the factors affecting the adoption of organic agriculture in Peshawar of Pakistan. The study concluded that organic farming not only increases the farmers' income but also protect environment by reduced use of toxic chemicals and fertilizers. The study suggested that government agencies as well as extension and research institutions must play a vital role in strengthening the awareness and advantages of organic farming.

Poyyamoli and Padmavathy (2011) found that majority of the organic farmers in Bahor village of Puducherry, India, were of middle aged, had educational qualification from primary to collegiate level, possessed small sized farm, had livestock, shown medium level of social participation, high information seeking behaviour, innovativeness, economic motivation and scientific/ risk orientation. They had also mentioned that majority of the organic farmers had high risk orientation.

Baker (2012) did a study in India and found that 44.2 percent of the farmers belong to middle age group. 100 percent of the farmers reported to watch TV programs, followed by 98.30 percent of the farmers who read newspaper, 96.70 percent of the farmers listen to radio, 83.33 percent of the farmers follow kissan call centre, 70.80 percent of the farmers read magazines,

29.20 percent of the farmers attended workshop/ training on organic farming whereas, only 19.20 percent of the farmers search online to search information related to organic cultivation.

Benabise and Banciles (2012) found that television/radio and reading materials were the least popular sources of information in Cagayan valley, Athens, regarding the environmental and economic impact of organic farming.

Mahapatra (2012) said that there is a need for assessing the lack of information among agricultural stakeholders in Odisha to assess their information need. Extension professionals must develop liasioning and empowering the farmers with improved technologies and farming practices. In modern digital era, farmers with information accessing ability, are not only limited to TV, radio and newspaper but inclined towards searching and releasing information through means of network (He, 2012).

Rezvanfer *et al.* (2012) revealed that the majority of the Iranian farmers used communication channels and sources of information at low and medium level.

Adebayo and Oladelf (2013) did a study in Southwest Nigeria and indicated that extension agents, neighbors, progressive framers, various farmers' organization and family members are the chief sources of information. Results show that respondents' information seeking behavior is informal. Therefore, information on organic farming should make use of these channels of information more frequently in combination to other available sources of information.

Fallys (2013) carried out a study in Central region in Malawai and found medium level of radio use among the farmers. Farmers were found to prefer print media more while accessing information. Farmers' use of various communication channels does not necessarily indicate that farmer prefer that channel however, in the absence of the preferred channel, other channels available to them would be used.

Manige *et al* (2013) stated that database of farmers in Gulbarg district of Karnataka and the internet-based application system, enabled the dissemination of need and demand-oriented information to the farmers in the form of text messages. This mobile SMS service was found to be encouraging. Farmers could find it very easy to follow.

Kumar et al. (2014) did a study in Madhya Pradesh and revealed that organic farmers had better interest, high inspiration, better education, high mass media exposure and faith in organic farming. Well educated farmers collect information regarding organic farming and importance of organic produce from different information sources like mass media (television, radio, newsletters and extension literature) as well as through consulting agricultural experts.

Sasidharan (2015) carried out a study in Kasaragod district of Kerala and revealed that organic farmers were consulting various sources information to for awareness and knowledge regarding various aspects of organic production system. Government policies initiated organic farming in the study area had caused a sudden change in farming system. Cluster members, extension officers, trainings and exposure visits were the major sources along with online information source.

Mittal and Mehar (2016) presented the combinations of information sources used by farmers in the study area in India. 9.5 per cent of the farmers are using single source of information and depend on other farmers for various information. One-third of the farmers were using combinations of 2-3 sources of information, whereas 21.6 per cent of the farmers were using upto four sources of information. The result also showed that socio-economic attributes of farmers like age, farm size and level of education were positively and significantly

related to farmer's use of sources of information regarding agriculture.

### **2.3 Attitude, perception and adoption of organic farming among organic vegetable growers**

Butler (1919) found that the main reasons for adopting the organic cultivation by the farmers in India, were soil health, plant growth, quality food, low cost and simpler technology, healthy environment, healthy life and consumer awareness about their health

Vine and Bateman (1981) and Wernick and Lockeretz(1977) found that farmers included in study conducted in England and Wales mainly adopted organic farming because of problems in inorganic farming. The difficulties faced by farmers in conventional farming included soil health and animal health problems.

Svensson (1991) and Vogtmann et al (1993) did a study in West Germany found that farmers mainly shifted to organic cultivation to secure better prices for their farm produce.

Codex Alimentarius Commission (FAO, 2001) stated that “organic agriculture is a holistic production management system that has reduced the use of synthetic fertilizers and pesticides. Avoids genetically modified organisms and minimizes pollution of air, soil, water as well as optimizes the health and productivity of interdependent communities.

Midmore et al (2001) conducted a study in England, revealed that organic farmers mainly made their decisions to shift based on their perceptions about the financial viability of the organic production and concern regarding environment. However, many conventional farmers perceived larger financial risks associated with organic farming due to unavailability of special markets for organic products.

Pugliese (2001) did a study in Italy and found that the spreading of organic farming methods and initiatives for sustainable rural development are in crucial stage in many places. It was suggested that organic farming can effectively contribute to sustainable rural development.

Tress (2001) identified Danish farmers' motivations for organic conversion and desires to improve animal health, provision of quality products to consumers and better work environment defy the production practices of conventional agriculture.

Howlett. *et. al.* (2002) carried out a study in Ireland and analyzed the views of farmers with regard to their perceptions about organic conversion process and their intention for conversion. The two motives for conversion were identified as producers' attitudes toward

finances and environment. When the farmers were asked about the benefits of organic farming, their view was “better prices,” and, “greater income.”

Nakro (2003) did a study in Nagaland and found that young farmers had more faith on organic paddy cultivation and age of the respondents were negatively but significantly correlated with adoption of organic farming.

Lauwere et al (2004) did a study and the study found that economic motives to be the least important among all categories of motives for organic conversion of farmers. Idealistic motives for conversion were cited most frequently by the farmers. Idealistic motives included farmers’ interest for better personal and family health, sustainable farming and relationships with consumers. Technical motives were mentioned as the second most important motive towards conversion. Furthermore, institutional motives, concern for a positive image and social acceptance, were cited as third most frequently mentioned motive by the Dutch farmers.

Bhattacharyya and Chakraborty (2005) did a study in India and suggested that the combination of organic and inorganic is definitely the best option as on today till the existing dietary system is changed. Rapid population growth may be considered as the main reason for the food and nutritional security. Authors suggested neither conventional nor organic farming can face this challenge.

Darnhofer et al (2005) carried out research in Austria and found that product sector characteristics were important considerations in farmers’ conversion to organic agriculture. The researcher showed that farmers without livestock and farmers that engage in sugar beet production were less likely to convert to organic farm management. The study explained the importance of these considerations by alluding to governmental policies associated with sugar beet production and livestock market factors.

Canavari et.al. (2008) did a study in Emilia-Romagna region, revealed that ethnocentrism could explain neither the present status of the farmers (organic vs. conventional) nor their future intentions regarding the adoption of agricultural methods of production. However, the absence of local origin is significantly affecting the choice of conventional farmers towards organic farming.

Kallas *et.al.*, (2009) carried out a study in vineyard holdings in the Spanish region of Catalonia and analyzed the decision to adopt organic farming practices among farmers. They used Duration Analysis (DA) to find the reason of adoption of organic farming. It has been found that farmers who are not risk averse are more inclined to adopt organic farming. Results

have identified the policy changes relevant in motivating adoption of organic farming practices.

Charyulu and Subho (2010) found that in India organic farming practices are being practiced successfully in diverse climates, like in the rain fed, mountainous and hills of the country. The area under organic cultivation increased substantially during 2005 and 2006 and is presently more than 500,000 hectares.

Constance and Choi (2010) did a study in United States and said that more than forty percent of the producers had some interest in organic production. They found a significant difference among the three groups regarding the structural and attitudinal characteristics related to organic farming adoption. For the conventional producers, increase in revenue was the main facilitator for adoption of organic farming. The high level of uncertainty regarding organic production, marketing and certification were the main constraints. They had concluded that increased institutional support could facilitate organic adoption.

Hall (2010) found a positive attitude of farmers toward using non-organic farming and a negative attitude toward using organic farming was observed. The barriers in adopting organic farming were reduced yields, more pest and disease, increased workload, higher weed infestations etc. This negative image of organic farming practices may have negative affect Ohio grain farmers' perception and attitude toward organic farming practices.

Jayavardhana and Sherief conducted (2010) a study and found that education, information seeking behavior innovativeness, risk orientation, self-confidence, market perception, knowledge, awareness, and attitude towards organic farming showed significant correlation with adoption. However, age, experience, livestock possession, training received negative and non-significant correlation with adoption of organic farming among the coconut-based farmers.

Assis and mohd (2011) conducted a study in Kundasang, Sabah, Malaysia to find out the knowledge, perception, attitude and practices of organic vegetable growers. They found that the knowledge of the respondents on organic farming especially regarding the use of chemical pesticides, herbicides and fertilizers, need to be improved. They still are dependent on the conventional practices to control pests and diseases.

Pornpratansombat *et al.* (2011) carried out a study in North-Eastern Thailand and found the influencing factors towards organic farming for organic farmers are demand for healthy products, human and animal health. They have also reported that organic food improves the

longevity and the organic farming mitigate harmful effect of chemicals.

Benabise and Banciles (2012) observed that organic compost was the top organic fertilizer that the farmers of Cagayan valley, Athens, were aware of and adopted. Bio-organic plant supplement made from fruit extracts and beneficial micro-organisms increase crop yields by as much as 30 per cent while reducing the use of chemical fertilizer by 50 per cent in the initial cropping. But, vermi-based fertilizers were gaining slow popularity and awareness.

Pandey and Singh (2012) found that the growth of organic farming is relatively slower. There are number of constraints small farmers face in adopting organic farming. The non-availability of sufficient organic input, bio fertilizers and market for organic produce are the main constraints of organic farming in India.

Prashanth and Reddy (2012) did a study in Karimnagar district of Andhra Pradesh and said that training could enhance the capacity of the farmers to understanding level and hence a positive and significant relationship was observed between the extent of adoption of organic practices and the training attended. They did not find any significant relationship between age and the extent of adoption of organic farming practices.

Devdas and Helen (2013) made an attempt to study attitude of farmers towards organic vegetable cultivation in India. Majority of the organic growers (86.67 percent) had shown favorable attitude towards organic farming. More than 80 per cent of the conventional farmers had shown favorable attitude towards organic farming. Above 90 per cent of the both, organic and conventional farmers, believed that use of organic farming practices is essential for improved quality of vegetables. Almost cent per cent of the conventional farmers have reduced the use of chemical fertilizer and had increased the application of organic manures.

Sukla et al. (2013) studied the current status of organic farming in India. They found that such farming can contribute to food security by improving nutritional intake, supporting livelihoods and enhancing biodiversity. It would also reduce vulnerability to climate change. They have concluded that, organic farming could sustain on an average 30 percent higher biodiversity compared to conventional farming.

Nenna (2014) studied the adoption level organic farming technologies. The organic farming adoption index of 0.45 implies that the farmers had 45 per cent adoption for all the organic farming technologies in the study area. The low adoption could also be due to the paucity of technical information on organic farming practices.

Panda (2014) did a study in Mohanpur block, West Tripura and found that lesser

adopted technologies are biological pest control and soil testing.

Borthakur *et al.* (2015) did a study in Assam state and concluded that majority of the farmers had not adopted bio-fertilizer. Low adoption is due to the lack of knowledge of bio fertilizers. Regarding seed rate, they were practicing conventional system. Traditional mindset of the farmers made them follow accurate seed rates.

Ramesh and Divya (2015) conducted a study in Coimbatore and found that there was a significant relation between education, qualification and organic food products. There was no relation between monthly income and level of price for organic food products. Majority of respondents, preferred quality of the product over other parameters. Consumer information was the main barrier in increasing the market share of organic products.

Ullah, *et. al.* (2015) did a study in Peshawar-Pakistan and found that farmers' perception about the adoption of organic cultivation plays an influential role in adopting or non-adopting organic cultivation. Adoption of organic cultivation has a positive and significant impact on the life of farmer. Hence, the farmers should be motivated and be aware of the advantages of organic cultivation through extension and research intuitions both to increase income and change their attitude and perception about improved technique of the farming. Adoption of organic cultivation is essential for farmers and thus comprehensive policy and strategies should be made for awareness of farmers.

#### **2.4 Factors which are responsible for attitude, perception and adoption of organic farming.**

Laureiro *et. al.* (2001) carried out a study in Zurich, Switzerland and found that higher the concern about the environment more would be the likelihood towards organic food.

MacDonald (2004) found that 95 per cent of the farmers from Europe and North America said their agricultural income raised after converting to organic agriculture, most of them were attributing this to the reduced cost of production and higher prices. They found organic cotton farming more profitable compared conventional.

Hattam and Holloway (2005) did a study in Mexico and said that alternative sources of income have a positive effect to aid adoption, also cultivation of other crops positively influenced the decision of organic farmers.

They rely more on family labor. Membership of social organization increases the likelihood of conversion to organic farming.

Lea and Worsley (2005) did a study in Australia and found that compared to the conventional food products, organic foods are perceived as healthier.

Lopez and Requena (2005) did a study in Spanish olive orchard and found that the organic farm productivity tends to be lower than that of the conventional growers because organic growers were less experienced as cultivators. None of the socio personal characteristics like, age, sex, marital status, amount of formal education etc. were found to be significantly associated with the adoption of organic farming.

Narayan (2005) presented the relevance and constraints of organic farming in India. As per the finding India is lagging far behind in adoption of organic farming. Only achievement seems to be the laying down of the NSOP and approval of 4 accreditation agencies. The study suggested that substantial financial assistance by government is necessary to promote organic agriculture. Marketing system for the organic produce is a vital factor to promote domestic sales.

Ramesh *et.al.* (2005) stated in the article “Organic farming: Its relevance to the Indian context” that increase in consciousness about conservation of environment and health issues associated with agro- chemicals and consumer choice to safe food are the factors that lead to growing interest in organic agriculture. The scope of organic agriculture in developing countries is increasing because it needs less financial input and pay more importance to rural and human resources. Organic farming does not need costly investments in inputs rather organic agricultural policies improve local food security. Lower input costs and favorable price can offset reduced yield and make organic farming profitable than conventional farming.

Stobbelaar. *et. al.* (2007) conducted a survey among pupils of Dutch said that organic farming is an established method of sustainable agriculture. Most of the techniques in organic farming, like inter cropping, mulching, raising animals etc are the same to various traditional farming system.

Chakrabarti (2010) found that price and limited availability of input were the most critical barriers in progress of organic farming in India.

Takagi (2010) conducted a study in West Java and Bali and result showed various factors associated with awareness of organic farming like location, gender, educational level, exposure to the pilot farms, information sources but they didn't show any statistically significant relationships between awareness and attitude toward the practices.

Devi, *et. al.* (2014) revealed from Kasargod, India that educational level, farming experience; returns from farming and extension of technical support received by the farmers were the major factors that influenced the decision making with regard to adoption of bio-agents.

Xie *et. al.* (2015) did a study in China and stated that premium prices and unavailability of input were the main barrier in increasing the market share of organic product.

## **2.5 Policy framework to improve the organic farming scenario**

Mahale (2002) said the Indian standards are based on the IFOAM basic standards and the seal “India Organic” has been established. In October 2001, the export of organic produce was brought under government regulation but not domestic market and import.

Balachandran (2004) said organic farming in Kerala facing a stiff challenge from different angle. The fundamental requirement is to spread awareness in the society regarding the ill effects of modern agriculture and the positive angle of organic agriculture. It was suggested that the government and other institutional agencies must support development of model organic farm in the state where farmers would learn the techniques. However, immediate transition to organic farming is not advisable, even phased reversion may cause temporary financial risk, which may be avoided if there is support from authorities.

Guthman (2004) carried out a study in California and stated that the role of regulations in supporting and controlling the organic farming is considered as beneficial by some, while others have shown concerns that this is leading to a system of institutionalization or ‘conventionalization’ of organic sector.

Darnhofer, *et al.* (2005) did a study in Austria and found that farmers were willing to take risk, foregoing some of the income.” Also, said that these growers were likely to convert once “technological uncertainties have been taken care off” and once the market for organic products is available.

Lopez and Requena (2005) did a study in Spanish olive orchard and suggested that some strategies could be easily taken by public institutions to encourage the adoption of organic olive cultivation, like promotion of training and education offering courses, conferences, etc. Expansion and creation of specialized public and private organizations responsible for diffusion of environment friendly agricultural practices; funding for training; incorporation of young people; development of training programs regarding agricultural management and business administration.

Halberg, Alroe, Knudsen & Kristensen (2006) did a study in Italy and stated that the scope of higher income has encouraged developing countries to participate in global organic market. Usually, they deal in fair trade through consolidation with different importing countries. Smallholder farmers in developing countries may face numerous difficulties towards adequate financing, management skills, consistency in workforce, cooperation and partnership, cultural differences etc.

Padel *et.al.* (2007) did a study in Europe and argued that organic farming is value-based however, not all of these values of organic farming are covered by minimum regulatory standards. There is concern that in a growing anonymous and globalized market these might be neglected.

Dabbert *et. al.*, (2008) carried out a study in New York and stated that as the basis of the current certification system was developed decades ago, and organic farming being in its early stage, the level of international trade being low, innovative and efficient certification process needs to be developed without making compromise in the certification quality.

Kilcher, Eisenring, & Menon (2008) found that the domestic organic market is growing rapidly at a rate of 30–40% annually. India Organic Trade Fair, annually organized by the International Competence Centre for Organic Farming (ICCOA) had helped in large for developing local organic market. Organic produces can also be found in retail shops which devote separate place for organic products, producer owned stores, informal haats , online stores etc.

Stolze Matthias and Nicolas Lampkin (2009) concluded that organic farming has become the focus of attention for policy-makers, consumers and farmers in Europe and state institutions are involved in regulating and supporting the organic sector. The study pointed out a varied and complex policy measure that could be developed and implemented to support the organic sector. However, the study stated that balancing societal and consumer goals and balancing institutional and private stakeholders' interests in the organic sector create challenges for policy making.

Kaur (2010) found that organic agriculture is very much needed in India. But the major constraint felt in the development of organic farming in India is the failure of the policy makers to take a concrete decision to promote organic agriculture.

Reddy (2010) argued that organic agriculture concept has been neglected in the agricultural Policy and there is less government assistance for the development of organic

agriculture in the country compared to the conventional agriculture where assistance in the form of subsidies and extension services are available. He said that proper encouragement may develop organic farming in India.

According to Agricultural and Processed Food Products Export Development Authority (APEDA, 2011), The government is promoting organic sector with financial assistance to organic farmers. Government's organic friendly policy has also motivated the private sectors to get involved in farming, certification process, processing, retailing system, exporting and bringing in new innovation.

Namdev *et al.* (2011) conducted a study in Jabalpur district of Madhya Pradesh and suggested that strong and appropriate attempt to be made by the extension personnel to motivate the conventional farmers to adopt improved production practices. Different inputs like manure and bio-fertilizer must be made available through societies or distribution centers at village to ensure supply of timely and quality inputs to the farmers.

Ozkan and Ceylan (2011) did a study in Turkey and recommended for strengthening the organic market for producers and both domestic and foreign consumers. These recommendations are expected to contribute to the progress of organic farming as well as production and consumption of organic produce, leading to higher demand and returns.

Rana (2011) reported that the system of farming in hill areas of India is organic in nature by default and they offer vast prospects of commercialization. The government has identified organic farming as one of the most important areas for development of agriculture and has implemented number of programmes for development of organic farming. Organic cluster project on 1200 ha at the cost of 26.7 million rupees (US \$490,000) has been initiated.

Subrahmanyeswari and Chander (2011) have carried out a study to find the possibility of using organic farming as a tool for promoting gender equality in India. The authors have asked around 200 respondents in Uttarakhand and they found that the state government has been encouraging women's participation formally. They have also suggested the need for further studies to compare conventional and organic systems on gender basis.

Pandey & Singh (2012) stated that Ministry of Commerce launched the National Organic Programme in 2000 in response of the detrimental impacts of Green Revolution in India. Organic industries are entirely export oriented wherein farmers are choosing organic because of economic benefit rather than sustainability.

Archana (2013) argued that for promoting organic agriculture government interference

is very much needed in Indian Agricultural sector specifically in organic farming. Provision of subsidies and knowledge of the adverse effects of inorganic agriculture may encourage organic agriculture.

Meena, *et. al.* (2013) did a study in India and suggested measures for promotion of Organic farming: (i) promoting appropriate and strong extension services (ii) establishing strong linkage between producer and consumers (iii) Reducing cost of certification (iv) Making organic inputs available to small farmers (v) Developing domestic market (vi) Provision of subsidies and credit facilities (vii) Improving infrastructural facilities (viii) improving linkages in the supply chain (ix) Promoting research on organic agricultural (x) Provision of training regarding organic agriculture.

Sirohi (2015) recommended to develop 'potential zones' and be named as 'Special organic farming system zone' like that of 'Organic Spice' zone in the state of Kerala or like tuber and special root crops in North Eastern Hilly region and also promoting these zones as Agro-eco tourism centres. Planning needs to be done for establishing organic inputs production units. Integrated organic farming system, 'Model Organic Farm' can also be promoted in every district for quick adoption of organic farming.

## Chapter-III

# MATERIALS AND METHODS

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### Materials and Methods

Research is a systematic and intensive process of carrying out a scientific method of analysis. As per Creswell (2008) "Research is a process of steps, used to collect and analyze information, to increase our understanding of a topic or issue". The scientific study of a problem requires that a researcher must follow appropriate methods and procedures in to reach reliable, unbiased and objective inferences. Whereas, methodology is the study, description, explanation as well as justification of methods. This chapter deals with various procedures, designed to plan, before conducting the enquiry and the method employed specifically according to the objectives and set for making decisions to evaluate and to draw inference. The present study delineated to find out the attitude, perception and adoption of organic vegetable farming among vegetable grower in North Bengal. The entire chapter has been made under the following sub-themes

- 3.1 Conceptual framework and design of the study
- 3.2 Selection of study area and respondents
- 3.3 Data collection tool, method and description of the schedule
- 3.4 Selection as well as measurements of variables
- 3.5 Data processing, tabulation and procedure of analysis
- 3.6 Statistical methods used

### **3.1 Conceptual framework and design of the study**

Organic farming system in India is not a new thing and it is being followed from ancient times. It is a method of farming which is primarily aimed at cultivating the land and raising crops in such a way so as to keep the soil healthy by use of various organic wastes like crop, animal and farm wastes, aquatic wastes etc. and other organic matter along with many beneficial microbes such as bio-fertilizers. It releases nutrients to crops for increased sustainability in production and for an eco-friendly pollution free environment. According to the definition of United States Department of Agriculture (USDA), "Organic farming is a

system which avoids or largely excludes the use of synthetic inputs such as fertilizers, pesticides, hormones etc. and to the maximum extent of feasible rely upon crop rotations, crop residues, manures, organic wastes and biological system of nutrient mobilization and plant protection”. FAO said that “Organic agriculture is a unique production system to promote and enhance agro-ecosystem, including biodiversity, biological cycles and soil biological activity and this is achieved by using on-farm agronomic, biological as well as mechanical methods in the exclusion of all synthetic off-farm inputs”.

### **3.2. Selection of study area and respondents**

#### **3.2.1 Sampling Frame:**

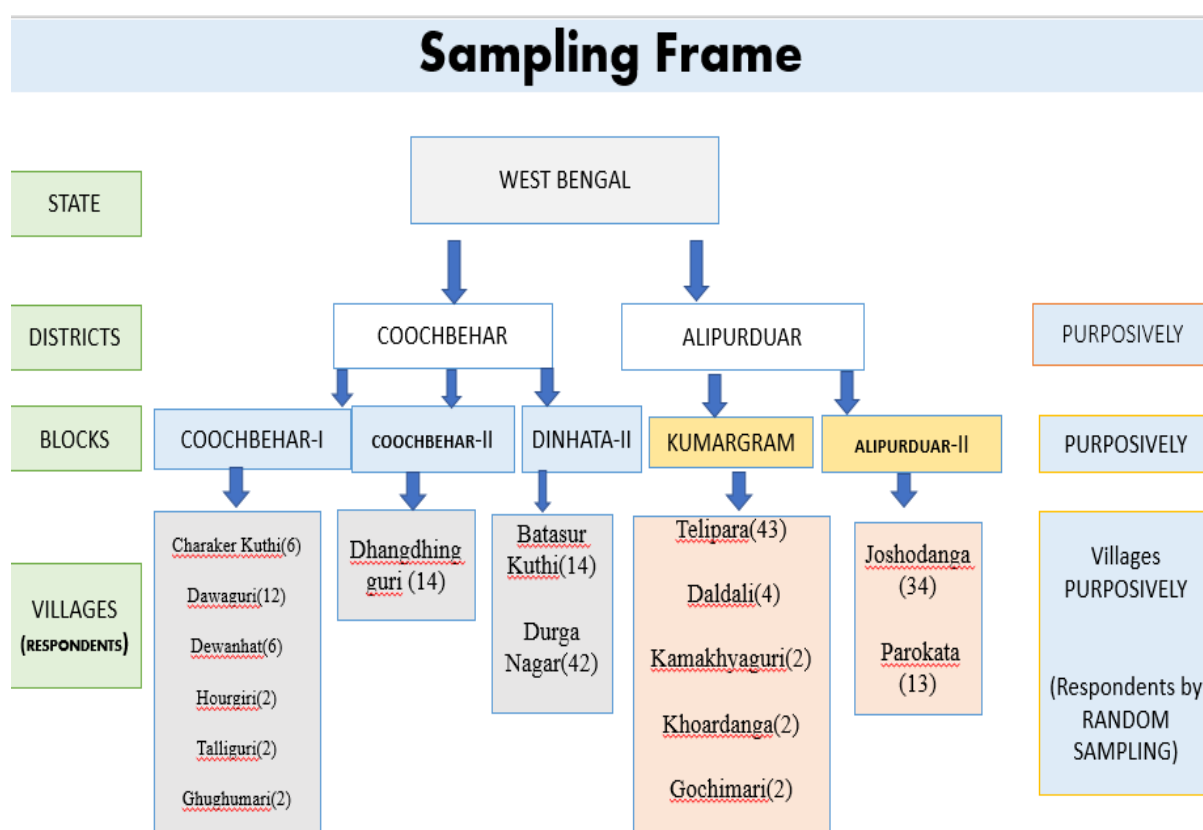
The study was carried out through a structured interview schedule. The interview undertook organic vegetable growers for assessing their socioeconomic characteristics, factors influencing their information seeking behaviour, attitude towards organic vegetables growing, perception regarding organic farming in case of vegetables, adoption of organic vegetable farming and finding out constraints faced by them.

#### **3.2.2 Selection of Study Units**

The study was conducted in Cooch Behar district and Alipurduar district of West Bengal, India. The districts as well as blocks were taken purposively due to convenience of the researcher and availability of vegetable growers as well presence of organic farming practices in vegetable cultivation. After conversing with district level officers of Agriculture Department, it was found that spread of organic farming especially in vegetables is increasing in these selected pockets and practiced by individual farmers as well as in groups. However, there is no systematic statistical record available with agricultural department. Keeping in consideration the benefits and need of organic farming, it is necessary to study more about the attitude of the farmers towards adopting it, in their farming system. The farmers of these two districts are practicing organic farming with own interest and self- initiative. The agricultural department as well as some NGOs are also working for promoting organic farming in these districts. So, the individual farmers have been selected from each district with simple random sampling based on the information gathered from office of Assistant Director of Agriculture of respective areas. Cochbehar-I, Coochbehar-II, Dinhata-II blocks were purposively and these were selected from Coochbehar district. The Blocks namely Kumargram and Alipurduar-II blocks were also purposively selected from Alipurduar district because of the presence of vegetable cultivation as well as familiarity of the researcher with these blocks. Total 16 villages

were selected randomly, from the selected five blocks. The villages are as follows

- Dhangdhinguri village from Coochbehar-II block.
- Charaker Kuthi, Dawaguri, Dewanhat, Hourgiri, Talliguri, Ghughumari villages from Coochbehar-I block.
- BatasurKuthi and Durganagar villages from Dinhat-II block.
- Telipara, Daldali, Kamakhyaguri, Khoardanga, Gochimari villages from Kumargram block.
- Joshodanga and Parokata villages from Alipurduar-II block.



**Fig. 3.1 Sampling frame**

### 3.2.3 Selection of organic vegetable growers for the study from selected districts

Total 200 respondents were taken for the study. 100 respondents from CoochBehar district and 100 respondents from Alipurduar district.

### 3.2.4 Description of Study Areas (Cooch Behar district and Alipurduar district)

### **3.2.4.1 The District- Cooch Behar**

#### **Geography**

The district is located between 25°57'40" and 26°32'20" North latitude. Between 88°47'40" and 89°54'35" East longitude. It has 3,38,700 ha geographical area. The district is located in the northeast of the state and surrounded by the district Jalpaiguri and Alipurduar in the north, Dhubri and Kokrajhar district of Assam are in the east and Bangladesh in the west and south. The district forms part of the Himalayan Terai zone of West Bengal. Total reporting area is 331565 ha, forest area is 4256 ha, area under non-agriculture use is 69431 ha, barren and uncultivated land is 263 ha, pasture and grazing land is 8 ha, land under miscellaneous trees and groves is 5800 ha, cultivable waste land is 286 ha, fellow land other than current fallow is 55 ha, current fallow land is 855 ha, and net area sown area is 250611 ha.

#### **Climate**

Annual Rainfall is 3200 to 3300 mm, agro-climatic region is eastern Himalayan region -2. The district experiences high level of humidity and abundant rainfall. The temperature is rarely ever excessive. The flora here are palms, bamboo, creepers, ferns, aquatic plants, fungi, timber, orchid, grass, vegetable, fruit etc.

#### **Topography**

Cooch Behar is a flat region with a southeastern slope through which the main river of the district flow. Most of the highland areas are in Sitalkuchi region and most of the low-lying lands are in Dinhata region. The rivers in the district generally flow from northwest to southeast. Six rivers in the district are Teesta, Jaldhaka, Torsha, Kaljani, Raidak, Gadadhar and Ghargharia.



**Fig 3.2 Position and map of Cooch Behar district**

### **Economy**

The economy of the district is solely dependent on agriculture. The inland marketing of the agricultural produce supports the economy of Cooch Behar. However, in supplement to the agriculture-based economy, some measures have been taken to ensure growth in the industrial sector. As the district is agrarian, the agro-based industries are the first priority.

### **Demographics**

According to 2011 census, Cooch Behar district has a population of 2,822,780. Population density is 833 inhabitants per square kilometer (2,160/sq mi) and the population growth rate over the decade 2001–2011 was 13.86 per cent. Cooch Behar has a sex ratio of 942 females per 1000 males. Literacy rate is 75.49 per cent. As per the census report of 2001,

cultivator's male no is 2,77,339, female no is 1,15,222 and total is 2,85,426.

### **Agricultural Scenario**

Cropping intensity is 204 per cent, total irrigated area is 130416 ha, agro-climatic zones are Terai, Teesta and Alluvial. No. of agricultural subdivisions are 4, no. of agril. blocks are 11 (Tufanganj block consisting of Tufanganj-I &II Panchayet Samiti), no. of small farmers are 50748 nos, no. of marginal farmers are 249437 nos. 85-90 per cent of the total population depends on agriculture and allied. In spite of the obstacles like poor soil status, acidic nature of soil, lack of irrigation facilities, the adoption of improved varieties and inclusion of high yielding varieties and hybrid varieties through on-going schemes like ATMA, NFSM, RKVY etc. The production and productivity of different crops are increasing, keeping pace with the increasing demand. No. of regulated markets are 6, no. of haats is 253, no. of cold storages is 12 (capacity of 16, 11, 423.05 qt), no. of input dealers is 1500, no. of farming families is 3, 27, 127, consumption of fertilizers is 52000 m.t, nitrogenous fertilizers is 30.2 ('000mt), phosphatic fertilizers is 12.2 ('000mt), potash fertilizers is 9.6 ('000 m.t).

#### **3.2.4.1.1 Cooch Behar-I block**

The block Cooch Behar-I consists of 15 nos of Gram Panchayats (GPs) and 149 villages. The total geographical area of the area is 362.42 sq. km. Net cultivable area is 23,899ha. The main sources of irrigation are river lift irrigation (7), deep tube well (10), shallow tube well (1107) etc. The soil is sandy loam and the climate is modestly dry with moderate rainfall. The total population is 258564 (male is 146298 and female is138266). Among this population, the total no. of Schedule Caste (SC) and Schedule Tribe (ST) population is 96082 and 886 respectively. The sex ratio is 945:1000 and the child sex ratio are 954:1000. Percentage of child population is 15.60%. The literacy rate (excluding upto 6 year's population) of the block is 67.98%. Total no. of literates is 163,277 (males are 95,668 and females are 67,609). 18,185 people are agricultural labor.



**Fig 3.3 Map of Cooch Behar-I block**

### 3.2.4.1.2 Cooch Behar-II block

The block Cooch Behar-II has of 13 Gram Panchayats (GPs) in its area of operation. The geographical area of the block is 362.36 sq. km. Net cultivable area is 24,011 ha. Agricultural land is 18,789 ha. Total irrigated area is 9811 ha. The main sources of irrigation are river lift irrigation (10), shallow tube well (718) and deep tube well (7). Soil is sandy loam and the climate is modestly dry with moderate rainfall. The total population of the block is 2,98,163 (males are 1,54,011 and females are 1,44,152). Among the population, the total no. of Schedule Caste (SC) and Schedule Tribe (ST) population is 1,19,479 and 2,904 respectively. The sex ratio is 936:1000 and the child sex ratio are 960:1000. The percentage of child population is 14.49%. The literacy rate (beyond 0-6 year's population) of the block is 74.56%. Total no. of literates [s 1,90,093 (males are 1,09,694 and females are 80,399). Among this 20,221 no people are associated with agricultural labour. No. of Below Poverty Line (BPL) families of this block is 31,226.



**Fig 3.4 Map of Cooch Behar Block-II**

### 3.2.4.1.3 Dinahata-II block

The block Dinahata-II has of 12 Gram Panchayats (GPs) in its area of operation. The total geographical area of the block is 103.30 sq. km. Net cultivable area is 18626 ha. Main sources of irrigation are river lift irrigation (18), shallow tube well (1290), deep tube well (8). Total population of the block is 205391 (males are 104443 and females are 100948). The population consists of, total no. of Schedule Caste 82324 and Schedule Tribe population is 843, respectively. The sex ratio is 967:1000 and the child sex ratio are 983:1000. The percentage of child population is 15.10%. The literacy rate (beyond 0-6 year's population) of the block is 66.57%. Total no. of literates is 116,080 (males are 67,841 and females are 48,239). Total no. of agricultural labourers is 19,830.

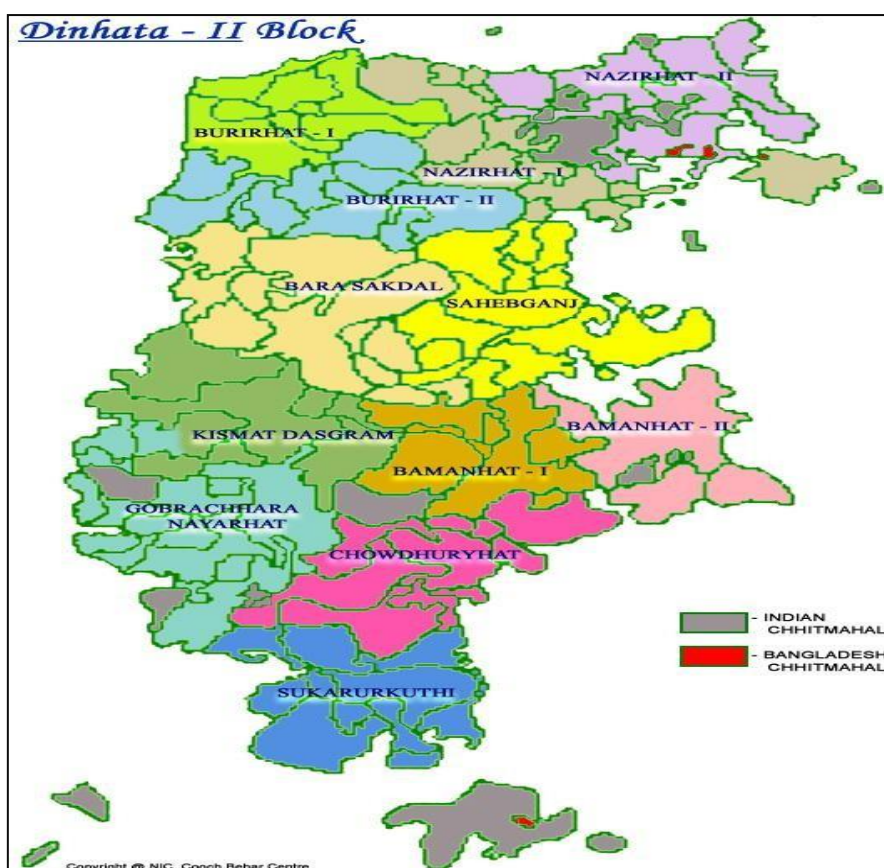


Fig 3.5 Map of Dinahata-II block

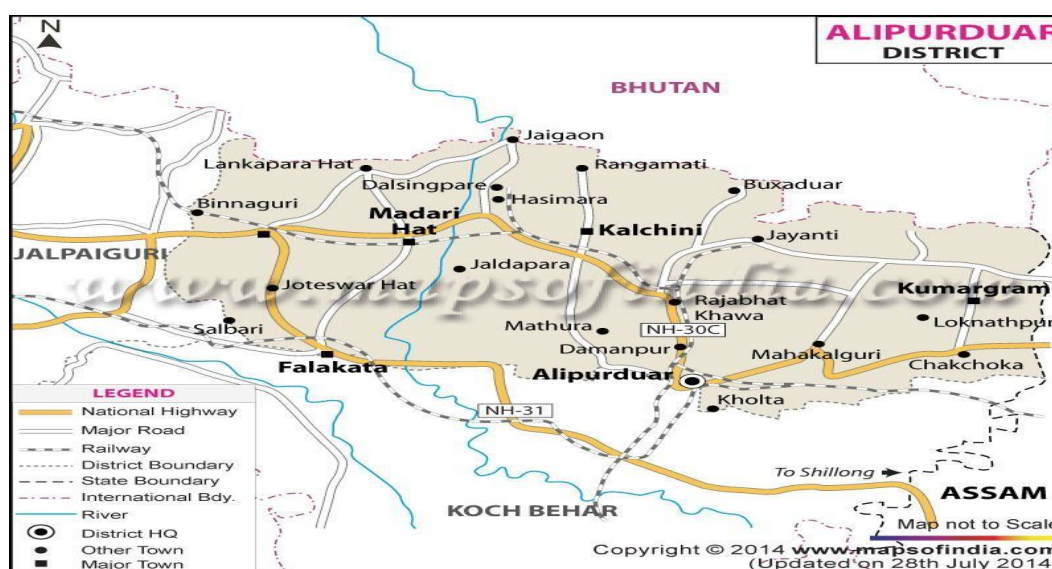
### 3.2.4.2 Alipurduar district

Alipurduar district, carved out from Jalpaiguri as on 25th June, 2014 as 20th district in the state of West Bengal, India. It consists of Alipurduar municipality and six community development blocks viz. Madarihata, Birpara, Alipurduar-I, Alipurduar-II, Falakata, Kalchini and Kumargram. There are 66 nos of gram panchayats and nine no of census towns. The district

has its headquarters at Alipurduar. It consists of mainly rural population. More than 80 percent of the population belong to SC/ST community. It's the hometown of various ethnic tribes like Rajbanshi, Santhals, Madasia, Rabha, Metch, Bodo, Toto & Oraons.

### Geography

Alipurduar shares the western part of Jalpaiguri District & eastern part of Assam State and is close to international borders with Bhutan in the North & South. It coordinates between 26.029 N & 89.034 E to 26.480 N 89.570 E. It has geographical areas measuring 3383 km<sup>2</sup> (1306 sq mile) and population of the district is almost 17.00 lakh.



**Fig. 3.6 Map of Alipurduar District**

### Climate

According to the classification, Alipurduar district falls under Tarai and Teesta alluvial zone. It has six blocks. Alipurduar District has a humid tropical climate, average air temp. 24.10 C and annual rainfall is 3160 mm to 3500 mm, temperature is 10<sup>0</sup> C to 32<sup>0</sup> C with relative humidity of 82 percent. The soil in the district is subjected to the following natural and man-made disasters due to the topography, drainage system, soil texture, agro- climatic conditions, land use and existing cropping sequences/ practices etc.

### Topography

Topography of the land is cut across by rivers, streams and hills, tea gardens and forests. Major rivers are Torsa, Raidak, Kaljani, Sankosh and Gadadhar. It has undulated land slope causes runoff in the catchments of watersheds, mainly in the northern part of the district. Flash floods are causing sand deposition in inundated areas of the river and rivulets. Poor capacity of

soil in this area, to retain adequate moisture and nutrients in the post monsoon period resulting in soil reaction, ranging from medium to highly acidic.

### **Economy**

There is huge possibility of development of Tourism as Industries in the Tea Gardens, Dense Evergreen Forest with Wild Lifes and Hills with flowing river. Jaldapara sanctuary, Buxa Tiger Reserve, Buxa Fort, are there in this district. Besides agriculture, people of this district, earn their livelihood from tourism, fishing, making of wood and cane-based furniture.

### **Demographics**

As per 2011 census, Alipurduar has a population of 15, 01, 983 out of which 7, 70, 905 are males and 7, 31, 078 are females. Sex ratio is 948 per 1000. Literacy rate for the adult population is 89.16 per cent and population density is 539 per Sq. Km.

### **Agricultural Scenario**

Soil is sandy loamy and loose textural class, prone to soil erosion, having less water holding capacity. Soil is deficient in organic matter and permeable to water and nutrient leaching. Tea is one of the main resources of income in this district. Tea plantation and processing are the only Industry, covering 52,566.4 Ha of land. The famous “Duars Tea” is also produced here. Most of the people of the district, depends on agriculture and grow Rice, Jute, Potato etc.

#### **3.2.4.2.1 Kumargram block**

Rural areas under Kumargram block have 11 no of gram panchayats viz. Chengamari, Khoardanga–I, New land Kumargram Sankos, Turturi khanda, Kamakhyaguri–I, Khoardanga–II, Valka Barabisa–I, Kamakhyaguri–II, Kumargram, Raidak, ValkaBarabisa–II. Urban area under the block consists of one town namely Uttar Kamakhyaguri. Kumargram police station serves the block. Headquarters of the block is in Kumargram. Barobisha / Barabisa is a fast developing business and cultural hub. Which is located on the National Highway 31 C, towards Assam. It’s 8 km away from Bengal-Assam border.



**Fig. 3.7 Map of Kumargram block**

### 3.2.4.2.2 Alipurduar II Block

The Alipurduar II Community Development block is located in the south-central part of the district. The Chiklajhord River flows through the eastern boundary of the community development block. It has hilly terrain which is the part of the sub-Himalayan range.

The Alipurduar II block is bounded by the Kalchini and Kumargram CD blocks in the north, Kumargram CD block in the east, Tufanganj I and Tufanganj II CD blocks are in Cooch Behar district, in the south and Alipurduar I CD block is in the east.

Alipurduar II CD block has an area of 318.92 sq km. It has 1 panchayat samity, 11 gram panchayats, 161 nos of nos of gram sansads (village councils), 79 nos of mouzas, 78 nos of inhabited villages and 2 census towns. Samuktala police station serves the block. Headquarter of this CD block is at Jashodanga.

Gram Panchayats of Alipurduar II block/ panchayat samiti are: Bhatibari, Chaporerpar I, Chaporerpar II, Kohinoor, Parokata, Mahakalguri, Majherdabri, Shamuktala, Tatpara I, Tatpara II and Turturi.



**Fig. 3.8 Map of Alipurduar-II block**

### **3.3 Data collection tools and description of the interview schedule**

The present study has considered qualitative as well as quantitative data, collected both from primary as well as secondary sources. The primary data were collected personal interview method with structured interview schedule.

#### **3.3.1 Pilot Study**

Due to pandemic situation, pilot study could not be conducted. Primary data could not be collected and many data were collected from secondary information sources like Panchayat office, ADA office etc.

#### **3.3.2 Construction of schedule after pre-testing**

Schedule is defined as a device having set of questions, asked and filled by the interviewer physically to another person. It aims to explore new information for testing an assumption. In the present study, the interview schedule was prepared for collection of information, keeping in mind the major objectives and variables of the present study. The draft schedule was pre-tested with 25 non-sample respondents from each district before presenting to the actual respondents. On the basis of analysis of the data and suggestions made by the respondents, the schedule was rechecked and modified with appropriate contents. Pre-testing helped in ensuring the validity of the content under local conditions. The schedule consisted of both open and close ended questions.

#### **3.3.3 Field Data Collection**

The data were collected during March 2020 to August 2021 with the help of the structured interview schedule constructed for the study. The data were than collected through personal interview method. The schedule was presented and explained to respondents in local language and the responses were recorded in English. The physical interview was carried out by the researcher herself.

### **3.4 Selection and measurements of variables**

A variable can be defined as something which can be observed and that is of such a nature that each observation can be defined into one and only one of a number which are of mutually exclusive classes (Kerlinger, 1978). Research evidences indicate that perception, attitude and adoption of organic farming are influenced by the antecedent factors. Considering the suitability of the variables to the present research, twenty-four independent variables and three dependent variables were identified for investigation. A detailed account of all the

variables with their measurement procedures are explained below. The variables for the study were selected on the basis of the review of literature, consultation with experts and from past studies conducted in the similar subjects. The variables, which were found to have importance with the present investigation, were than included in the study. The instruments are used to measure the variables together with their detailed procedure is presented here.

### 3.4.1 Measurement of independent variables

The independent variables (which had a direct or indirect bearing on the dependent variables) namely age, education, land holding, livestock possession, information seeking behavior, mass media exposure, exposure to training, extension participation, innovativeness, management orientation, scientific orientation, cosmo-politeness, socio-economic status, economic motivation and risk preference were taken in the investigation. The operational definitions of these variables and their measurement techniques have been described below.

<b>Sr. No</b>	<b>Independent variable(s)</b>	<b>Instruments used with partial modification(s)</b>
1.	Age	Scale developed by Trivedi (1963) used with required modification
2.	Caste	Scale developed by Trivedi (1963) used with required modification
3.	Education	Scale developed by Trivedi (1963) used with required modification
4.	Religion	Scale developed by Hanglem (2017) used with required modification
5.	Economic class	Scale developed by Hanglem (2017) used with required modification
6.	Land holding	Scale developed by Trivedi (1963) used with required modification
7.	Livestock possession	Schedule developed for the study
8.	Primary occupation	Scale developed by Trivedi (1963) used with required modification
9.	Secondary occupation	Scale developed by Trivedi (1963) used with required modification
10.	Family type	Scale developed by Trivedi (1963) used with required modification
11.	Family size	Scale developed by Trivedi (1963) used with required modification

<b>Sr. No</b>	<b>Independent variable(s)</b>	<b>Instruments used with partial modification(s)</b>
12.	Social Participation	Scale developed by Trivedi (1963) used with required modification
13.	Farm Experience	Scale developed by Sreedaya (2000) used with required modification
14.	Family members involved in agriculture	Schedule developed for the study
15.	Information seeking behavior	Scale developed by Singh (2002) used with required modification
16.	Mass media exposure	Scale developed by Bhatti (1985) used with required modification
17.	Exposure to training	Scale developed by Desai et al (1977) used with required modification.
18.	Extension participation	Scale developed by Kalaivani (1992) used with required modification
19.	Innovativeness	Scale developed by Moulik (1965) used with required modification
20.	Management orientation	Scale developed by Samantha (1977) used with required modification.
21.	Scientific orientation	Scale developed by Supe (1969) used with required modification.
22.	Cosmo-politeness	Scale developed by Sekar (1979) used with required modification.
23.	Economic motivation	Scale developed by Moulik (1965) used with required modification.
24.	Risk preference	Scale developed by Supe (1969) used with required modification.

#### **3.4.1.1 Socio personal Variables Age**

It refers to chronological age of the respondents at the time of interview. On the basis of their age, the respondents were placed under young (< 35 years), middle (35-50 years) and old age group (>50 years). It was measured by using the scale developed by Trivedi (1963). The scoring was done as mentioned below

<b>Categories</b>	<b>Age group</b>	<b>Score</b>
Young	Young (<35 years)	1
Middle age	Middle age (35-50 years)	2
Old	Old (> 50 years)	3

### **Caste**

The scale consisted of details of caste like General, Schedule Caste, Schedule Tribe and OBC. It was a categorical variable and 1,2,3 and 4 score were assigned to indicate the category. It was measured using the scale developed by Trivedi (1963) with required modification.

<b>Caste Category</b>	<b>Score</b>
General	1
Scheduled Caste	2
Scheduled Tribe	3
OBC	4

### **Education**

It refers to the years of formal education of farmers starting from illiterate to post graduation and above level of education. It was measured by the SES scale, developed by Trivedi (1963) for this purpose with slight modification. The scores were assigned like (i) Illiterate (0) (ii) Primary (1) (iii) Up to middle (2) (iv) Up to secondary (3) (v) Up to senior secondary (4) (vi) Graduate (5) (vii) Post Graduate and above (6).

<b>Education Level</b>	<b>Score</b>
Illiterate	0
Up to primary	1
Up to middle	2
Up to secondary	3

<b>Education Level</b>	<b>Score</b>
Up to senior secondary	4
Graduate	5
Post Graduate and above	6

### **Religion**

The variable consists of different religions like Hindu, Muslim, Christian and Others. It was also a categorical variable and 1,2,3 and 4 score/ scale value was assigned. It was measured by using the scale developed by Hanglem (2017) for this purpose with slight modification.

<b>Religion</b>	<b>Score</b>
Hindu	1
Muslim	2
Christian	3
Others	4

### **Economic class**

The variable comprises of BPL (Below Poverty Level) and APL (Above Poverty Line). It was also a categorical variable; 1 and 2 score/ scale value were assigned. It was measured by the scale developed by Hanglem (2017) for this purpose with slight modification.

<b>Economic class</b>	<b>Score</b>
BPL	1
APL	2

### **Land holding**

Land holding refers to the cultivated land, in terms of acres, possessed by the

respondents. The farmers were categorized into three groups on the basis of their land holding i.e. marginal farmers (Upto 2.5 acre), small farmers (2.6 to 5 acres), semi-medium farmers (5.1 to 10 acres) and medium farmers (> 10 acres). It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

<b>Farmers' type</b>	<b>Land Holding(acres)</b>	<b>Score</b>
Marginal	Upto 2.5	1
Small	2.6-5	2
Semi-medium	5.1-10	3
Medium	>10	4

### **Livestock possession**

Livestock possession was operationalized as the no of livestock possessed by the respondents such as cattle, buffalo, sheep and poultry. Livestock possession is the number of animals owned by the respondents. One number was assigned to each animal above the age of 1 year. Organic farming incorporates the concept that man and farm animals are parts of an ecological system (Gera 2010). Thus, respondents were divided into low, medium and high categories of livestock possession with the help of equidistance method of classification.

### **Primary Occupation**

The variable comprises of categories like wage labor, crop farming, business, service and Others. It was also a categorical variable and scores like 1,2,3,4 and 5 were assigned. It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

<b>Primary Occupation</b>	<b>Score</b>
Wage labor	1
Crop farming	2
Business	3
Service	4
Others	5

### **Secondary occupation**

The variable comprises of categories like wage labor, crop farming, business, service and Others. It was also a categorical variable and scores like 1,2,3,4 and 5 was assigned. It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

<b>Secondary Occupation</b>	<b>Score</b>
Wage labor	1
Crop farming	2
Business	3
Service	4
Others	5

### **Family type**

The scale included option of nuclear or single and joint family. It was a categorical variable and 1 and 2 scores, were assigned. It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

<b>Family type</b>	<b>Score</b>
Nuclear/single	1
Joint	2

### **Family Size**

The scale consists of categories like Small (upto 4 members), Medium (5-6 members) and Large (above 6 members) family size. It was also a categorical variable and scores like 1,2 and 3 were assigned. It was measured by the scale developed by Trivedi (1963) for this purpose.

<b>Family Size</b>	<b>Members (No.)</b>	<b>Score</b>
Small	Upto 4	1
Medium	5-6	2
Large	Above 6	3

### **Social Participation:**

The scale consists of details about the participation of respondents in any social organization and recorded as member of no organization, member of one organization, member

of more than one organization and office holder of any organization. It was a categorical variable and score like 0,1,2 and 3 were assigned. It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

<b>Social Participation</b>	<b>Score</b>
Member of no organization	0
Member of one organization	1
Member of more than one organization	2
Office holder of any organisation	3

### **Farm Experience**

The respondents were divided on the basis of their farm experience and classified into four categories (upto 10 years, 11-20 years, 21-30 years, above 30 years). It was measured by the scale developed by Sreedaya (2000) for this purpose with slight modification.

### **Family members involved in crop farming**

The respondents were divided on the basis their number of family members, involved in crop farming.

### **Information Seeking Behavior**

According to Rogers and Shoemaker (1971) communication behavior is the extent to which an individual is seeking information and advices. The information seeking behavior indicates the activities performed for collection of scientific and technical information regarding organic vegetable farming practices. A score of 2 was assigned for always, 1 for sometimes and 0 for never. The respondents were classified into low, medium and high level of categories. Further the six different information sources were ranked on the basis of total weighted score and weighted mean score to find out the importance of these six sources of information. The scale developed by Singh (2002) was used with required modification.

<b>Sr. No.</b>	<b>Information source</b>	<b>Frequency of utilization</b>		
		<b>Always (2)</b>	<b>Sometimes (1)</b>	<b>Never (0)</b>
1.	Friend/Neighbor/Relative			

2.	Progressive Farmer			
3.	Other Farmers of the village			
4.	Assistant Director of Agriculture (ADA)			
5.	Agricultural Scientist (University/KVK)			
6.	Company Representative/NGOs			

### Mass media exposure

It refers to the frequency of exposure to different mass media viz., radio, television, newspaper, farm magazine etc by the respondents to gain knowledge about organic vegetable farming. Different mass media sources were listed and respondents were asked to respond on how often they use these mass media sources. A score of 3, 2 and 1 was assigned to daily, often and sometimes response and the scores thus obtained by the respondents, for all the questions, in the schedule, were summed up to arrive at their final mass media exposure scores. The respondents were categorized in low, moderate and high level of categories. The level of mass media exposure was arrived based on the rank secured through weighted mean score. The scale developed by Bhatti (1985) with required modification is used for this purpose.

Mass Media Source	Frequency
Radio	Daily (3) / Often (2) / Sometimes (1)
Television	Daily (3) / Often (2) / Sometimes (1)
Newspaper	Daily (3) / Often (2) / Sometimes (1)
Farm magazine	Daily (3) / Often (2) / Sometimes (1)
Kisan call Centre	Daily (3) / Often (2) / Sometimes (1)
Online searching	Daily (3) / Often (2) / Sometimes (1)

### Training attended

Prashanth and Reddy (2012) stated that the trainings attended by a farmer contributes in his knowledge, skills and develops comprehensive abilities to acquire, process, understand and apply the information in appropriate situation. Training attended was operationalized as

the number of trainings attended by respondents in last 5 years. The respondents were classified into three groups (0-2 no of training, 3-4 no of training and 5-6 no of training) depending on the number of trainings they have attended. The scale developed by Desai et al (1977) and used with required modification.

### **Extension participation**

It indicates the extent of participation of the organic vegetable farmers in different extension activities like group discussion, meeting, result demonstration, method demonstration, field day, field visit, kisan diwas, kisan mela and campaign. The frequency of participation was scored as 2, 1 and 0 for regularly, occasionally and never respectively. The equidistance method of classification was used to categorize the respondents into low, medium and high level of categories. The different extension activities were than ranked based on weighted mean score. The scale of Kalaivani (1992) was used with required.

Sr. No.	Extension activity	Extent of Participation		
		Regularly (2)	Occasionally (1)	Never (0)
1.	Group Discussion/Meeting			
2.	Result Demonstration			
3.	Method Demonstration			
4.	Field Visit			
5.	Kisan Diwas			
6.	Field Day			
7.	Tour			
8.	Kisan Mela			
9.	Campaign			

### **Innovativeness**

The characteristic of innovativeness is an important determinant in acceptance of the innovations, is an established fact. Innovativeness means the degree of individual interest and desire to seek changes in farming practices and to introduce such changes into their own field when it would be practicable and feasible. The four statements of scale developed by Moulik (1965) were taken with required modification. The innovativeness scale has two options for each statement i.e agree and disagree. The statements were given a score of 1 for agreeing and

0 for disagreeing.

<b>Sr. No.</b>	<b>Statement</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	I feel restless until I try a new idea, I have heard about		
2.	I am cautious about trying a new practice		
3.	Often organic farm practices are not successful, However, if they are promising, I would surely like to adopt them		
4.	I discuss about organic farming information with fellow farmers before trial		

### **Management orientation**

It is the degree to which a respondent is oriented towards organic and scientific farm management consisting of planning, production and marketing functions. 12 statements were taken from scale developed by Samantha (1977) and used with required modification, four statements each for planning, production and marketing aspects. The management orientation scale has two responses for each statement i.e agree and disagree. The statements were score 1 for agreeing and 0 for disagreeing. Further, these four statements from each aspect were ranked on the basis of their total weighted score and weighed mean score.

<b>Sr. No</b>	<b>Statement</b>	<b>Response</b>	
		<b>Agree (1)</b>	<b>Disagree (0)</b>
	<b>A) Planning</b>		
1.	One should think in advance the crop to be grown		
2.	Prior decision about the variety of crop and time of sowing		
3.	The amount of fertilizer and pesticides for raising crop should be assessed before cultivation		
4.	Cost involved in raising crops must be calculated.		
	<b>B) Production</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	Timely planning of crop ensures a good yield		
2.	One should use organic fertilizers judiciously		

3.	Seed rate should be given as per recommended dose		
4.	Effective weed control is possible mainly by manual weeding		
	<b>C) Marketing</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	Market news is very useful to farmers		
2.	A farmer can get good price by grading his produce		
3.	A farmer can get better price for organically produce vegetables		
4.	One should grow those organic crops which has a demand in market		

### Scientific orientation

The variable scientific orientation means the degree to which a respondent was oriented with scientific methods in organic vegetable farming. This scale consisted of four statements with two responses. The responses were taken on 2-point continuum i.e 1 for agree and 0 for disagree. The scale was developed by Supe (1969) and was used with required modification and finally ranked based on weighted mean score.

<b>Sr. No.</b>	<b>Statement</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	Improved methods of farming gives better result to a farmer than old method		
2.	The way the forefathers farmed should be modified scientifically		
3.	Even a farmer with lot of experience should use new method of farming		
4.	Though it takes time for a farmer to learn new method in farming, it is worth the effort.		

### Cosmo-politeness

Cosmo-politeness is the tendency to have contacts outside one own environment, with the belief that all needs of an individual cannot be satisfied within the community. This variable was measured with the scale developed by Sekar (1979), and used with slight modifications.

Based on the total score of the individual respondent, they were categorise into low, medium and high categories using equidistance method.

### **Economic motivation**

Refers to the degree to which a farmer desire to increase his income and maximizes his profit from agriculture. The statements were taken from the scale of Moulik (1965) with slight modification, and scored on the basis of the degree of economic motivation. The responses were obtained on 2-point continuum i.e 1 for agree and 0 for disagree. The respondents were than categories into low and high categories, each statement was ranked on the basis of their weighted mean score.

<b>Sr. No.</b>	<b>Statement</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	All I want from my farm is to make a reasonable profit		
2.	I would like invest in organic farming if it ensures higher profits		
3.	I have no hesitation to borrow money to run the organic farming properly		
4.	Even though organic farming is costly practice, I follow it		
5.	It is OK to spend extra money, purchase inputs, transport conveyance to grow organically.		

### **Risk preference**

Risk preference is defined as the degree to which respondents were oriented towards risk and uncertainty and ready to face the problems in organic vegetable farming. The statements taken from the scale of Supe (1969) with required modification, the responses were obtained on 2-point continuum i.e 1 for agree and 0 for disagree. The respondents were than divided into low and high categories and different statements were ranked based on their weighted mean score.

<b>Sr.</b>	<b>Statement</b>	<b>Agree</b>	<b>Disagree</b>
------------	------------------	--------------	-----------------

No.		(1)	(0)
1.	One should try organic farming practices in own farm instead of advocating to others.		
2.	Adopting organic farming involves risk but it is worth doing.		
3.	A farmer who is willing to take greater risk than the average farmer usually does better financially.		
4.	Progress not possible without risk.		

### 3.4.2 Dependent variables

#### 3.4.2.1 Knowledge level of organic vegetable farming practices

Knowledge generally means familiarity gained by past experience. According to English and English (1961), it refers to a body of understood information, possessed by an individual /culture. Bloom et al. (1956) considered knowledge as that behavior and test situation which emphasized the remembering by recognition or by recall of ideas, materials phenomenon. It has been further said that knowledge is that personal information which is in line with the established facts. In this study, knowledge has been taken as the amount of understood information possessed by the respondents about organic vegetable farming practices. To measure the knowledge level of respondents, statements of the scale, developed by Bhatia (2015) were used with slight modification. Farmers were asked to reply questions regarding the concept of organic farming, use of organic manures and crop residues, knowledge of bio fertilizers, knowledge of vermicompost, weed management and pest management. The respondents were questioned for assessing their level of knowledge like full knowledge (full knowledge was operationalized as the complete knowledge the farmer possess without any ambiguity and the same has been assessed by asking them few questions on few aspects of organic farming cultivation, taken into consideration in the study, when they could answer appropriately all the questions asked to them, they were considered as fully knowledgeable in that particular aspect), partial knowledge (partial knowledge was operationalized as the incomplete knowledge or inappropriate knowledge possessed by the farmers in any aspect. In this study while analyzing their knowledge level in various aspect of organic farming cultivation, they were asked certain question related to that aspect, when they could not answer

all the questions or answered inappropriately regarding a particular aspect of organic farming cultivation, they were treated as partially knowledgeable in that aspect) and no knowledge (no knowledge has been operationalized as having no idea or concept of a particular issue, here in this study the farmers were asked few questions in different aspect of organic farming cultivation, when they couldn't answer any of the questions, they were taken as having no knowledge and assigned the score of 2, 1 and 0, respectively. But in some cases, they were asked whether they have any knowledge regarding a particular practice of organic vegetable farming and their responses were recorded as 'yes' or 'no' and assigned as 1 and 0 respectively. The scores thus obtained for various questions were summarized. The different practices were then ranked on the basis of score obtained.

#### **3.4.2.2 Measurement of "Evaluation of perception"**

Evaluation perception is the meaningful sensation of the respondent regarding the worth, efficiency, or value of organic farming practices in terms of various dimensions like simplicity, profitability, efficiency, flexibility, input availability and sustainability, based on their experience with the practice. The six dimensions were taken from the scale developed by Patel. C. Dhirubhai (2005) with slight modification.

The respondents were asked to give responses for each dimension of organic farming practices. Scores of 0, 1 and 2 were given to the responses for low medium and high respectively. The evaluation perception for each of these dimensions was arrived by adding the scores.

#### **3.4.2.3 Attitude towards organic farming**

Attitude refers to a tendency to respond, positively or negatively, towards any idea. The scale consisted of 18 statements and taken from the scale developed by Hangle (2017), used with slight modification. The responses were rated on five-point continuum starting from 'strongly agree' to 'strongly disagree' with (+)2 to (-)2 scores. The statements were then selected following the Likert scale developed procedure. The alpha-coefficient for the scale was 0.76.

#### **3.4.2.4 Adoption of organic farming**

According to Rogers and Shoemaker (1971), decision to make full use of new or improved ideas as the best course available. A well-structured interview schedule was prepared

on the basis of organic vegetable farming practices, recommended by International Federation of Organic Agriculture Movement (IFOAM), Germany. To measure the extent of adoption, the farmers were asked to reply about the use of each recommendation on three-point continuum i.e. full adoption (full adoption was operationalized as the adoption of all recommended practices of organic farming in all aspects of cultivation of organic vegetables), partial adoption (partial adoption was operationalized as adoption of not all recommended organic farming practices in vegetable cultivation, thus adoption was not done in true sense) and no adoption (no adoption was operationalized as adoption of no recommended practices of organic farming in vegetable production) and score of 2, 1 and 0 were assigned, respectively. The obtained scores were then summed up respondent wise and component wise. On the basis of weighted mean score, organic farming practices were ranked.

#### **3.4.2.5 Constraints faced by farmers in adoption of organic vegetable farming**

Constraints are ‘confinement’, the act to determine or ‘confine action’, ‘bound’ and ‘faltered condition’, restriction of liberty or free action. A list of possible constraints perceived by the respondents was prepared after consulting various literature after detailed discussion with scientists and extension personnel. Statements were taken with slight modification from the scale developed by Bhatia (2015). Constraints were then divided into seven groups i.e. technological constraints, economical constraints, manures and bio fertilizers constraints, pest management constraints, marketing constraints, transfer of technology constraints and other constraints. The respondents were asked to mention the constraints faced by them in organic vegetable farming cultivation. Frequencies of the constraints were measured with three-point scale i.e. ‘very serious’, ‘serious’ and ‘not so serious’ with score of 3, 2 and 1, respectively. The farmers were told to comment ‘very serious’ if the given constraint might have impact on human and animal health as well as detrimental to health of natural resources. Thus, need to be addressed with some alternative. The comment ‘serious’ was given to choose if the constraint is the cause of economic loss as well as needs to be resolved immediately. However, there were few constraints which the farmers felt as temporary and can be solved with awareness, knowledge and skill at farmers’ level. These constraints were asked to mark as ‘not so serious’. The frequency in each category was multiplied with score assigned to that category and the scores were then added up and divided by total number of respondents to get the weighted mean score of each constraint. Score for all the constraints were then worked out and rank order was assigned to all the constraints.

#### **Data processing, tabulation and presentation of data**

The filled-up structured interview schedules were systematically recorded on master table made on excel sheet and frequency tables were made meticulously. The data were then analyzed keeping the objectives of the study in mind.

### **3.5 Statistical Methods Used**

The statistical methods in this study include frequency, percentage, mean, Pearson's coefficient of correlation, one- way ANOVA, F-test, Z- test and stepwise regression.

#### **3.5.1 Mean**

The arithmetic mean is the average, which is most easily computed and understood, for it is calculated as the sum of the items divided by the number of items. The symbol for the mean is  $\bar{X}$  (read as X bar). The formula for the mean of a series of numbers is as follows

$$\bar{X} = \frac{\sum X}{N}$$

Where,  $\bar{X}$ - represents items to be averaged and N- represents the number of items.

#### **3.5.2 Percentage**

Percentage is used for making simple comparisons. For calculating percentages, the frequency of the particular cell was divided by the total number of respondents in that particular category and multiplied by 100. Percentage was calculated Upto two places after the decimal points.

$$\text{Percentage} = \frac{\text{Frequency}}{N} \times 100 \quad (\text{Where, } N = \text{represents the number of respondents})$$

### 3.5.3 Mean score

It was obtained by adding the weight of all the respondents or statements then dividing by the total number of respondents.

$$X = \frac{\sum Xi}{n}$$

Where,

X = Arithmetic mean  $\Sigma$  = Summation

$X_i$  = Each individual score

n = Total number of respondents

### 3.5.4 Frequency

Frequency is the statistical measure to represent the number of respondents in a particular category.

### 3.5.5 Total weighted score and weighted mean score

The assigned scores were multiplied with the frequencies of each statement and summed up to arrive at total weighted score and this total weighted score was divided by total number of respondents i.e. 200 to find out weighted mean score. This procedure has been followed for ranking of all independent variables and ranking different constraint statements.

### 3.5.6 Equidistance method

The equidistance method of classification was used to categorize the respondents into different level of categories.

### 3.5.7 Pearson's coefficient of correlation (simple correlation)

It is most widely used method of measuring the degree of relationship between two variables. This coefficient assumes the following:

- (a) that there is linear relationship between the two variables.
- (b) that the two variables are casually related which means that one on the variable is

independent and the other one is dependent

- (c) a large number of independent causes are operating in both variables so as to produce a normal distribution.

Pearson's coefficient of correlation can be worked out thus

$$r_{xy} = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

Where, r = coefficient of correlation

X and Y=original scores in variable X and Y N=Number of paired scores

$\Sigma XY$ = each X multiplied by its corresponding Y, then summed  $\Sigma$ =sum of X scores

$\Sigma X^2$ = each X squared, then summed  $(\Sigma X)^2$ = sum of X scores, squared  $\Sigma Y$ = sum of Y scores

$\Sigma Y^2$ = each Y squared, then summed  $(\Sigma Y)^2$ = sum of Y scores, squared

Pearson's coefficient of correlation 'r' lies between  $\pm 1$ . Positive values of 'r' indicate positive correlation between the two variables i.e. changes in both variables take place in the same direction, whereas negative valued of 'r' indicate negative correlation i.e. changes in the two variables taking place in the opposite directions. A zero value of 'r' indicates that there is no association between the two variables. When  $r = (+) 1$ , it indicates perfect positive correlation and when it is  $(-) 1$ , it indicates perfect negative correlation, meaning thereby that variations in independent variable (X) explain 100% of the variations in the dependent variable (Y). We can also say that for a unit change in independent variable, if there happens to be a constant change in the dependent variable in the same direction, then correlation will be termed as perfect positive. But if such change occurs in the opposite direction, the correlation will be termed as perfect negative. The value of 'r' nearer to +1 or -1 indicates high degree of correlation between the two variables.

### 3.5.8 One-way ANOVA:

To test significant difference between the means of independent categorical variables.

### 3.5.9 F test Purpose

Perform a two sample F test to determine whether the two standard deviation are equal.

#### Description

The hypothesis test is:

$$H_0: \sigma_1 = \sigma_2$$

$$H_a: \sigma \neq \sigma_2$$

#### Test Statistic:

$$F = S_1^2 / S_2^2$$

where S1 and S2 are the sample standard deviations Significance level: Typically set to .05

#### Critical Region:

$F < f(1-\alpha/2)(v_1, v_2)$  and  $F > f(\alpha/2)(v_1, v_2)$  where the critical region is determined from the F distribution function with (N1-1) and (N2-1) degrees of freedom and a significance level of 0.05.

**Conclusion:** Reject null hypothesis if T in critical region

### 3.6.10 Z Test Definition

A z test is conducted on a population that follows a normal distribution with independent data points and has a sample size that is greater than or equal to 30. It is used to check whether the means of two populations are equal to each other when the population variance is known. The null hypothesis of a z test can be rejected if the z test statistic is statistically significant when compared with the critical value.

#### Z Test Formula

The z test formula compares the z statistic with the z critical value to test whether there is a difference in the means of two populations. In hypothesis testing, the z critical value divides the distribution graph into the acceptance and the rejection regions. If the test statistic falls in the rejection region then the null hypothesis can be rejected otherwise it cannot be rejected. The z test formula to set up the required hypothesis tests for a one sample and a two-sample z test are given below.



### **3.6.11 Stepwise Regression:**

Often, theory and experience give only general direction as to which of a pool of candidate variables (including transformed variables) should be included in the regression model. The actual set of predictor variables used in the final regression model must be determined by analysis of the data. Determining this subset is called the variable selection problem.

Finding this subset of regressor (independent) variables involves two opposing objectives. First, we want the regression model to be as complete and realistic as possible. We want every regressor that is even remotely related to the dependent variable to be included. Second, we want to include as few variables as possible because each irrelevant regressor decreases the precision of the estimated coefficients and predicted values. Also, the presence of extra variables increases the complexity of data collection and model maintenance. The goal of variable selection becomes one of parsimony: achieve a balance between simplicity (as few regressors as possible) and fit (as many regressors as needed).

#### **Stepwise-Selection**

Stepwise regression is a combination of the forward and backward selection techniques. It was very popular at one time, but the Multivariate Variable Selection procedure described in a later chapter will always do at least as well and usually better. Stepwise regression is a modification of the forward selection so that after each step in which a variable was added, all candidate variables in the model are checked to see if their significance has been reduced below the specified tolerance level. If a nonsignificant variable is found, it is removed from the model. Stepwise regression requires two significance levels: one for adding variables and one for removing variables. The cutoff probability for adding variables should be less than the cutoff probability for removing variables so that the procedure does not get into an infinite loop.

#### **Assumptions and Limitations**

The same assumptions and qualifications apply here as applied to multiple regression. Note that outliers can have a large impact on these stepping procedures, so you must make some attempt to remove outliers from consideration before applying these methods to your data. The greatest limitation with these procedures is one of sample size. A good rule of thumb is that you have at least five observations for each variable in the candidate pool. If you have

50 variables, you should have 250 observations. With less data per variable, these search procedures may fit the randomness that is inherent in most datasets and spurious models will be obtained. This point is critical. To see what can happen when sample sizes are too small, generate a set of random numbers for 20 variables with 30 observations. Run any of these procedures and see what a magnificent value of R-Squared is obtained, even though its theoretical value is zero.

### **Analysis of data**

The data were finally, analysed with the application of statistical softwares like SPSS (statistical package for social science) analysis tool pack and MS Office Excel. The data were interpreted in the according to the objectives of the study.

## Chapter IV

### RESULT AND DISCUSSION

This chapter consists of the objective wise findings of the present study. In the backdrop of objectives of the study, data were collected from the respondents and were organized, tabulated and analyzed scientifically. The entire finding is presented in a systematic manner under the following subheading:

- 4.1 Assessment of Socio-economic characteristics of vegetable growers in the selected districts of North Bengal.
- 4.2 Sources of information from where vegetable growers access information related to vegetable organic farming.
- 4.3 Attitude, perception and adoption of organic farming among organic vegetable growers in the selected districts of North Bengal.
- 4.4 Factors influencing attitude, perception and adoption of organic vegetable farming in the selected districts of North Bengal.
- 4.5 Policy framework to improve the organic farming scenario in the selected districts.

#### **4.1 Objective 1: Assessment of Socio-economic characteristics of vegetable growers in the selected districts of North Bengal.**

Along with detailed Socio -economic characteristics, the study has also analysed the Socio personal characteristics of the organic vegetable growers and presented here before Socio economic characteristics.

##### **4.1.1 Analysis of Socio- personal characteristics**

**Table 4.1 Distribution of respondents according to their Socio- personal characteristics.**

**n=200**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
Age	Upto 35	20	10.0
	36-50	124	62.0
	> 50	56	28.0
Education	Illiterate	0	0

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
	Primary	11	5.5
	Middle	63	31.5
	Secondary	78	39.0
	Senior Secondary	22	11.0
	Graduate	24	12.0
	Post Graduate above	2	1.0
Religion	Hindu	186	93.0
	Muslim	14	7.0
Caste	General	54	27.0
	SC	118	59.0
	ST	2	1.0
	OBC	26	13.0
Extent of mass media exposure	Low (0-2)	93	46.3
	Moderate (3-4)	95	47.3
	High (5-7)	12	6

The table shows that majority of the organic vegetable growers i.e. 62 % belonged to the middle age group i.e.36-50 years. It has also been found that majority of the respondents (39%) had secondary level of education i.e. upto class 10 followed by middle level education (31.5%) i.e. upto class 8. None of them were found to be illiterate. Out of the total 200 respondents, most of the respondents (93.0%) were Hindu by religion. Majority of the respondents were from Scheduled Caste category i.e.59 % of the total respondents. 47.3 % out of 200 respondents had shown moderate level of mass media exposure whereas, 46.3% had low extent of mass media exposure.

#### **4.1.2 Analysis of Socio- economic characteristics**

**Table 4.2 Distribution of respondents on the basis of their land holding**

n=200

Variable	Category	Frequency	Percentage
Land holding	Marginal (upto 2.5 acre)	35	17.5
	Small (2.6 to 5 acres)	155	77.5
	Medium (5.1 to 10 acres)	8	4.0
	Large (> 10 acres)	2	1.0
	Total	200	100.0

The table shows that majority (77.5%) of the respondents are small farmers having 2.6-5 acres of land holding followed by 17.5% of marginal farmers with less than or equal to 2.5 acres of land. Hence, it can be said from the data that almost all the organic vegetable growers had small land holding.

**Table 4.3 Distribution of respondents on the basis of their possession of livestock**

n=200

Variable	Category	Frequency	Percentage
No. of livestock	1-6	166	83.0
	7-12	30	15.0
	>12	4	2.0
	Total	200	100.0

Possession of livestock in rural area is a sign of wealth and economic status of the people. It has been found and presented in the table that 83.0 % of the respondents had 1-6 no of livestock in their possession followed by 15 % of the sample, who had 7-12 livestock in their possession. It was found that they mainly reared cow and goat.

**Table 4.4. Distribution of respondents on the basis of their Economic Class**

n=200

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
Economic class	BPL	98	49.0
	APL	102	51.0
	Total	200	100.0

Economic class is basically a classification to indicate the economic status of the people. People of rural area are generally categorized into APL i.e. above poverty level and BPL i.e. below poverty level. It has been found that out of 200 respondents 102 i.e. 51% belonged to APL category and the rest were from BPL category. Which indicated that the sample taken for study had almost equal number of population from both APL and BPL category.

**Table 4.5 Distribution of respondents on the basis of their Primary Occupation**

**n=200**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
Primary occupation	Wage Labor	2	1.0
	Crop Farming	128	64.0
	Business	46	23.0
	Service	24	12.0
	Total	200	100.0

An occupation is called primary occupation when maximum income comes from that. It has been found that 64 percent of the sample taken, had farming as their primary occupation. Besides farming, it has been seen that 23 percent organic vegetable growers were also engaged in some or other type of business. 12 percent of the sample were found to had service as their primary occupation.

**Table 4.6 Distribution of respondents on the basis of their Secondary Occupation**

**n=200**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Secondary occupation	Wage Labor	4	2.0
	Crop Farming	143	71.5
	Business	28	14.0
	Service	21	10.5
	Others	4	2.0
	Total	200	100.0

The table shows that the organic vegetable growers were associated with some or other secondary occupation like wage labor, crop farming, business, service and some other odd jobs.

It can be seen from the above table that majority of the respondents (71.5 percent) were associated with farming as their secondary occupation, followed by 14 percent and 10.5 percent of the sample who were involved in some kind of business and services respectively.

**Table 4.7 Distribution of respondents on the basis of their Family Type**

**n=200**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Family type	Nuclear	93	46.5
	Joint	107	53.5
	Total	200	100.0

With modernization in society, family structure has undergone huge change. Due to the shift from joint family to nuclear family, the number of family members got reduced and hence the availability of family labor has declined. The same could also be seen in the study area also. The table shows that 46.5% of the total respondents had nuclear family and rest 53.5 % of the respondents had joint family. Thus, it can be concluded that the shift from joint to nuclear family is near to 50%.

**Table 4. 8 Distribution of respondents on the basis of their Family Size**

**n=200**

<b>Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
-----------------	-----------------	------------------	----------------

Family size	Small (upto 4)	93	46.5
	Medium (5-6)	80	40.0
	Large (>6)	27	13.5
	Total	200	100.0

Family size refers to the number of family members in a household. Due to the nuclear nature of the family the number of members also got reduced presently. It has been found that 46.5 % of the respondents had small family size consisting of upto 4 members. However, 40 % of the respondents had 5-6 no of family members. Thus, it can be said that the size of the family has reduced in the study area also.

**Table 4.9 Distribution of respondents on the basis of their extent of Family members involved in farming.**

**n=200**

Variable	Category	Frequency	Percent
Extent of family members involved	0-2	179	89.5
	3-4	21	10.5
	Total	200	100.0

In farm families, other members of the family like women also work as family labour. It has been found in the study area that 89.5 % of the respondents had involvement of upto 2 family members in their farm.

#### **4.1.3 Analysis of Socio-psychological characteristics**

In order to understand the perception, attitude, adoption as well as various problems of rural people, Socio- psychological analysis need to be done and hence, some of the Socio-psychological variables were taken and analyzed. The findings are as follows.

**Table 4.10 Distribution of respondents on the basis of their Socio-psychological characteristics.**

**n=200**

Variable	Category	Frequency	Percentage
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Extent of Cosmo-politeness	Low(0-2)	0	0
	Medium(3-5)	51	25.5
	High(6-8)	149	74.5
Level of innovativeness	Low(0-2)	82	41.0
	High(3-4)	118	59.0
Extent of management orientation	Low(0-4)	55	27.5
	Medium(5-8)	58	29.0
	High(9-12)	87	43.5
Extent of scientific orientation	Low(0-2)	22	11.0
	High(3-4)	178	89.0
Extent of economic motivation	Low(0-2)	19	9.5
	High(3-4)	181	90.5
Extent of risk preference	Low(0-2)	36	18.0
	High(3-4)	164	82.0
Extent of information seeking behavior	Low(0-4)	6	3.0
	Medium(5-8)	94	47.0
	High(9-12)	100	50.0
Extent of extension participation	Low(0-6)	98	49.0
	Medium(7-12)	102	51.0
	High(13-18)	0	0
Extent of training attended	0-2	181	90.5
	3-4	16	8.0
	>4	3	1.5
Social participation	Member of no organization	69	34.5
	Member of one organization	103	51.5
	Member of more than one organization	26	13.0
	Office holder	2	1.0
Farm experience	Upto 10 years	35	17.5
	11-20 years	97	48.5
	21-30 years	55	27.5
	>30 years	13	6.5

The table shows the distribution of respondents on the basis of their Socio-psychological characteristics. It has been found that the majority of the respondents (74.5%) had high Cosmo-politeness. 59% of the population were found to had high innovativeness.

Majority were found to had high management orientation (43.5%), 89% of the respondents had high scientific orientation. High economic motivation and risk preference were found in 90.5% and 82% of the respondents respectively. High extent of information seeking behaviour and medium level of extension participation were found in 50% and 51% of the respondents respectively.

Most of the respondents (90.5%) had attended upto 2 numbers of training and are member of one organization (51.5%). 48.5% of the respondents were found to had 11-20 years of farm experience. Thus, it can be concluded

that the sample, selected randomly, had mainly young farmers with high extent of Socio- psychological parameters and good amount of farm experience.

#### **4.2 Objective 2: Sources of information from where vegetable growers access information related to organic vegetable farming.**

**Table 4.11 Access of information source as per the preference of the farmers regarding organic vegetable farming n=200**

Sr. No	Information Source	Utilisation frequency			Total weighted score	Weighted mean score	Rank
		Always (%)	Sometimes (%)	Never (%)			
1	Friend/ Neighbor/ Relative	140 (70)	58 (29)	2 (1)	338	1.69	I
2	Progressive Farmer	126 (63)	72 (36)	2 (1)	324	1.62	II
3	Other Farmer of the village	111 (55.5)	79 (39.5)	10 (5)	301	1.505	IV
4	Agricultural Development Officer	113 (56.5)	77 (38.5)	10 (5)	303	1.515	III

Sr. No	Information Source	Utilisation frequency			Total weighted score	Weighted mean score	Rank
		Always (%)	Sometimes (%)	Never (%)			
5	Agricultural Scientist (University/KVK)	43 (21.5)	112 (56)	45 (22.5)	198	0.99	VI
6	Company Representative/NGOs	46 (23)	136 (68)	18 (9)	228	1.14	V

The table shows that majority of the farmers prefer friends/neighbour/relative and other progressive farmers, when it comes to seeking information regarding cultivation of organic vegetables and thus they ranked 1<sup>st</sup> and 2<sup>nd</sup> respectively. Respondents had also mentioned about frequently meeting ADA to get updated information in respect of organic farming practices. However, it was found that there was lack of communication between respondents and various Agricultural scientists of University and KVK. Thus, the gap between researchers and farmer needs to be reduced in order to diffuse improved package of practices regarding organic vegetable farming.

**Table 4.12 Mass media exposure of organic vegetable growers n= 200**

Sr.No	Information Source	Utilisation frequency			Total weighted score	Weighted mean score	Rank
		Always (%)	Sometimes (%)	Never (%)			
1	Radio	1 (0.5)	1 (0.5)	198 (98.5)	3	0.015	V
2	Television	70 (34.8)	70 (34.8)	60 (29.9)	210	1.05	I
3	Newspaper	54 (26.9)	90 (44.8)	56 (27.9)	198	0.99	II
5	Farm magazine	23 (11.4)	49 (24.4)	128 (63.7)	95	0.475	III
6	Kisan call	12	32	156	56	0.28	IV

Sr.No	Information Source	Utilisation frequency			Total weighted score	Weighted mean score	Rank
		Always (%)	Sometimes (%)	Never (%)			
	Centre	(6)	(15.9)	(77.6)			
7	Online searching	62 (30.8)	74 (36.8)	64 (31.8)	198	0.99	II

The table reveals that majority of the organic vegetable growers had preferred television followed by newspaper and internet searching to get updated information as well as skill regarding various improved organic vegetable cultivation. It has been found that radio was preferred the least among all mass media channels this shows that radio is not much popular now a days among the farmers. Kisan call centre was also not much preferred, might be due to the hesitation they feel, in making calls or due to the fact that they are more comfortable with TV programmes and internet searching.

**Table 4.13 Extension participation of organic vegetable farmers n=200**

Sr. No.	Extension Activity	Extent of participation			Total weighted score	Weighted mean score	Rank
		Regularly (%)	Occasionally (%)	Never (%)			
1	Group Discussion / Meeting	127 (63.5)	73 (36.5)	0 (0)	327	1.635	I
2	Result Demonstration	82 (41)	91 (45.5)	27 (13.5)	255	1.275	III
3	Method Demonstration	113 (56.5)	59 (29.5)	28 (14)	285	1.425	II
4	Field Visit	56 (28)	85 (42.5)	59 (29.5)	197	0.985	IV
5	Kisan Diwas	2 (1)	5 (2.5)	193 (96.5)	9	0.045	IX
6	Field Day	22 (11)	76 (38)	102 (51)	120	0.6	V
7	Tour	2	72	126	76	0.38	VII

Sr. No.	Extension Activity	Extent of participation			Total weighte d score	Weighted mean score	Rank
		Regularly (%)	Occasionally (%)	Never (%)			
		(1)	(36)	(63)			
8	Kisan Mela	6 (3)	66 (33)	128 (64)	78	0.39	VI
9	Campaign	0 (0)	14 (7)	186 (93)	14	0.07	VIII

The table shows that respondents in the study area finds meetings and group discussions more effective in making decision regarding adoption of improved package of practices of organic vegetable farming. They had also informed that had learned a lot from method demonstrations and result demonstrations and rely more when they see themselves. It improves their confidence, clear their doubt and provide them opportunity to discuss with other fellow farmers. Therefore, group discussion/meetings, method demonstration and result demonstration ranked I, II and III respectively.

**Table 4.14 Innovativeness of organic vegetable farmers**

**n=200**

Sr. No	Statements	Innovativeness		weighted score	Weighted mean score	Rank
		Agree (%)	Disagree (%)			
1	<b>I feel restless until I try a new idea, I have heard about</b>	<b>100 (55)</b>	<b>90 (45)</b>	<b>100</b>	<b>0.5</b>	<b>II</b>
2	I am cautious about trying a new practice	99 (49.5)	101 (50.5)	99	0.495	III
3	<b>Often organic farm practices are not successful, however if they are promising, I would surely like to adopt them</b>	<b>153 (76.5)</b>	<b>47 (23.5)</b>	<b>153</b>	<b>0.765</b>	<b>I</b>
4	<b>I discuss about organic farming information with fellow farmers before trial</b>	<b>153 (76.5)</b>	<b>47 (23.5)</b>	<b>153</b>	<b>0.765</b>	<b>I</b>

The table shows that respondents are interested to adopt an improved package of practice if it is promising and they like to verify that information with their fellow farmers before finally trying those on farm.

**Table 4.15 Management orientation of organic vegetable growers**

**n=200**

Sr. No.	Statement	Management orientation		Weighted score	Weighted mean score	Rank order
		Agree (%)	Disagree (%)			
<b>Planning</b>	One should think in advance the crop to be Grown	139 (69.5)	61 (30.5)	139	0.69	I
	Prior decision about the variety of crop and time of sowing	125 (62.5)	75 (37.5)	125	0.62	II
	The amount of fertilizer and pesticides for raising crop should be assessed before Cultivation	88 (44)	112 (56)	88	0.44	IV
	Cost involved in raising crops must be calculated.	93 (46.5)	107 (53.5)	93	0.46	III
<b>Production</b>	<b>Timely planning of crop ensures a good Yield</b>	<b>153 (76.5)</b>	<b>47 (23.5)</b>	<b>153</b>	<b>0.76</b>	<b>I</b>
	One should use organic fertilizers Judicially	101 (50.5)	99 (49.5)	101	0.50	IV
	Seed rate should be given as per recommended dose	104 (52)	96 (48)	104	0.52	III
	<b>Effective weed control is possible mainly by manual Weeding</b>	<b>133 (66.5)</b>	<b>67 (33.5)</b>	<b>133</b>	<b>0.66</b>	<b>II</b>

<b>Marketing</b>	<b>Market news is very useful to farmers</b>	<b>147 (73.5)</b>	<b>53 (26.5)</b>	<b>147</b>	<b>0.73</b>	<b>II</b>
	A farmer can get good price by grading his Produce	86 (43)	114 (57)	86	0.43	IV
	A farmer can get better price for organically produce vegetables	114 (57)	86 (43)	114	0.57	III
	<b>One should grow those organic crops which has a demand in market</b>	<b>168 (84)</b>	<b>32 (16)</b>	<b>168</b>	<b>0.84</b>	<b>I</b>

The table shows the management orientation of the organic vegetable cultivation in term of planning, production and marketing. It has been found that in respect of planning of the organic vegetable cultivation, respondents felt that deciding crop, variety and time of sowing before hand is very important. They had also informed that regarding production management timely planning of crops to be grown and manual weeding is more effective. They were of view that growing crops as per market demand is essential thus market information play a big role in taking decision.

**Table 4.16 Scientific orientation of organic vegetable farmers**

**n=200**

<b>Sr. No.</b>	<b>Statement</b>	<b>Scientific orientation</b>		<b>Weight ed score</b>	<b>Weighted mean score</b>	<b>Rank</b>
		<b>Agree (%)</b>	<b>Disagree (%)</b>			
1	<b>Improved methods of farming gives better result to a farmer than old method</b>	<b>188 (94)</b>	<b>12 (6)</b>	<b>188</b>	<b>0.94</b>	<b>I</b>
2	<b>The way the forefathers farmed should be modified scientifically</b>	<b>184 (92)</b>	<b>16 (8)</b>	<b>184</b>	<b>0.92</b>	<b>II</b>

Sr. No.	Statement	Scientific orientation		Weighted score	Weighted mean score	Rank
		Agree (%)	Disagree (%)			
3	Even a farmer with lot of experience should use new method of farming	180 (90)	20 (10)	180	0.9	III
4	Though it takes time for a farmer to learn new method in farming, it is worth the effort.	166 (83)	34 (17)	166	0.83	IV

The table shows the scientific orientation of respondents towards organic vegetable farming. It has been found that they agreed more with the fact that improved package of practices as well as scientific methods of cultivation are better than conventional cultivation practices. Hence, the conventional approach of cultivation should be modified in light of scientific and improved one.

**Table 4.17 Economic motivation of organic vegetable farmers**

**n=200**

Sr. No.	Statement	Economic orientation		Weighted score	Weighted mean score	Rank
		Agree (%)	Disagree (%)			
1	All I want from my farm is to make a reasonable profit	194 (97)	6 (3)	194	9.7	I
2	I would like invest in organic farming if it ensures higher profits	168 (84)	32 (16)	168	8.4	II
3	I have no hesitation to	107	93	107	5.35	V

	borrow money to run the organic farming properly	(53.5)	(46.5)			
4	Even though organic farming is costly practice, I follow it	157 (78.5)	43 (21.5)	157	7.85	III
5	It is OK to spend extra money, purchase inputs, transport conveyance to grow organically.	142 (71)	58 (29)	142	7.1	IV

The table shows the economic motivation of organic vegetable growers. It has been found that all they want from organic vegetable farming is reasonable profit and they are ready to invest if organically cultivated produce provides them more profit.

**Table 4.18 Risk preference of organic vegetable farmers**

**n=200**

Sr. No	Statement	Risk Preference		Weighted score	Weighted mean score	Rank
		Agree (%)	Disagree (%)			
1	<b>One should try organic farming practices in own farm instead of advocating to others.</b>	<b>176 (88)</b>	<b>24 (12)</b>	<b>176</b>	<b>0.88</b>	<b>II</b>
2	Adopting organic farming involves risk but it is worth doing.	164 (82)	36 (18)	164	0.82	III
3	A farmer who is willing to take greater risk than the average farmer usually does better financially.	131 (65.5)	69 (34.5)	131	0.655	IV
4	<b>Progress not possible without risk.</b>	<b>178 (89)</b>	<b>22 (11)</b>	<b>178</b>	<b>0.89</b>	<b>I</b>

The table shows the risk preferences of organic vegetable growers in the study area. It has been found that majority of the farmers are agreed with the fact that progress is not possible without taking risk and instead of advocating to others it should be practiced on own farm. This finding is might be due to the fact that majority of the respondents were young and had experience of 11-20years.

### 4.3 Attitude, Perception and Adoption of organic vegetable farming among organic vegetable growers in the selected districts of North Bengal.

Knowledge can affect a person’s perception in many ways. It helps an individual to recognize and interpret ideas and events. It is capable in creating perceptual difference among people of a category. It can lead to enrichment of perception and hence, before analyzing the perception of the respondents, their knowledge about organic vegetable cultivation was assessed and presented below.

#### 4.3.1 Knowledge of vegetable growers towards regarding vegetable cultivation

**Table 4.19 Knowledge of respondents regarding the concept of organic vegetable farming.** **n=200**

A.Concept of vegetable organic farming	Full Knowledge (%)	Partial Knowledge (%)	No Knowledge (%)
<b>Organic is a way forward to sustainable agriculture</b>	<b>52</b>	<b>45.5</b>	<b>2.5</b>
<b>Organic vegetable/food is Eco-friendly.</b>	<b>51.5</b>	<b>42.5</b>	<b>6.5</b>
Organic vegetable farming mitigates the hazardous effects of chemicals	48.5	44	7.5

The table shows that regarding concept of organic vegetable farming. In order to know their knowledge about different production aspect of organic farming, pre-existing scale was used with suitable modification and questions were asked to judge their level of understanding of the subject.it has been found that majority of the respondents are fully knowledgeable about the fact that organic farming can ensure sustainable agriculture and the produce is eco-friendly.

**Table 4.20 Knowledge of respondents regarding manures and crop residue management**

n=200

<b>B. Knowledge of organic manures and crop residues</b>	<b>Full Knowledge (%)</b>	<b>Partial Knowledge (%)</b>	<b>No Knowledge (%)</b>
<b>Proper time and quantity of FYM required.</b>	<b>85.5</b>	<b>13.5</b>	<b>1</b>
<b>Right method of FYM application.</b>	<b>82.5</b>	<b>16.5</b>	<b>1</b>
<b>Accurate method /procedure of FYM preparation.</b>	<b>78.5</b>	<b>19.5</b>	<b>2</b>
Organic/solid waste management.	58	37	5
Crop to be selected for green manuring and the sowing time.	42.5	42.5	15
Stage at which green crop to be incorporated in field.	40.5	33.5	26

The table shows that a good percentage of respondents are fully knowledgeable about the time, quantity and right method of farm yard manures (FYM) application. Majority of the respondents are having full knowledge of accurate method and procedure of farm yard manure preparation.

**Table 4.21 Knowledge of respondents regarding Bio fertilizers**

n=200

<b>C. Knowledge of bio fertilizers</b>	<b>Percentage (%)</b>
<b>Bio fertilizers by name.</b>	<b>57.5</b>
Effect on yield	46
Cheaper than conventional practices	39.5
<b>Useful for all types of soils</b>	<b>50</b>
Reduction in consumption of chemical fertilizers	40.5
Pollution free practice	40.5
Decrease the insect pest & disease infestation.	42.5
<b>Improve soil fertility.</b>	<b>51</b>
Remain in the soil for a longer period and it has good effect on next crop also.	44
Become useless after its expiry date.	45
Recommended time of application of bio fertilizers.	47.5

Table shows that majority (above 50%) of the respondents are having knowledge about

various bio fertilizers. They know them by name and the fact that they are useful for all type of soils. However, less percentage of respondents(39.5%) are knowledgeable about the fact that they are cheaper than conventional practices.

**Table 4.22 Knowledge of the respondents regarding Vermicompost n=200**

D. Knowledge of vermicompost	Full knowledge (%)	Partial knowledge (%)	No Knowledge (%)
<b>Vermicompost and its benefit.</b>	<b>29.5</b>	<b>49.5</b>	<b>21</b>
<b>Proper method of preparation.</b>	<b>24.5</b>	<b>41.5</b>	<b>34</b>
Vermi-wash	20.5	17	62.5

The table shows that respondents don't have proper knowledge about benefits and preparation of vermicompost. Even less number of respondents are knowledgeable about vermi-wash. Less percentage of people possess full knowledge, more percentage of people have partial knowledge and many of them don't have any knowledge about benefit, preparation or about vermi-wash.

**Table 4.23 Knowledge of the respondents regarding Weed Management**

**n=200**

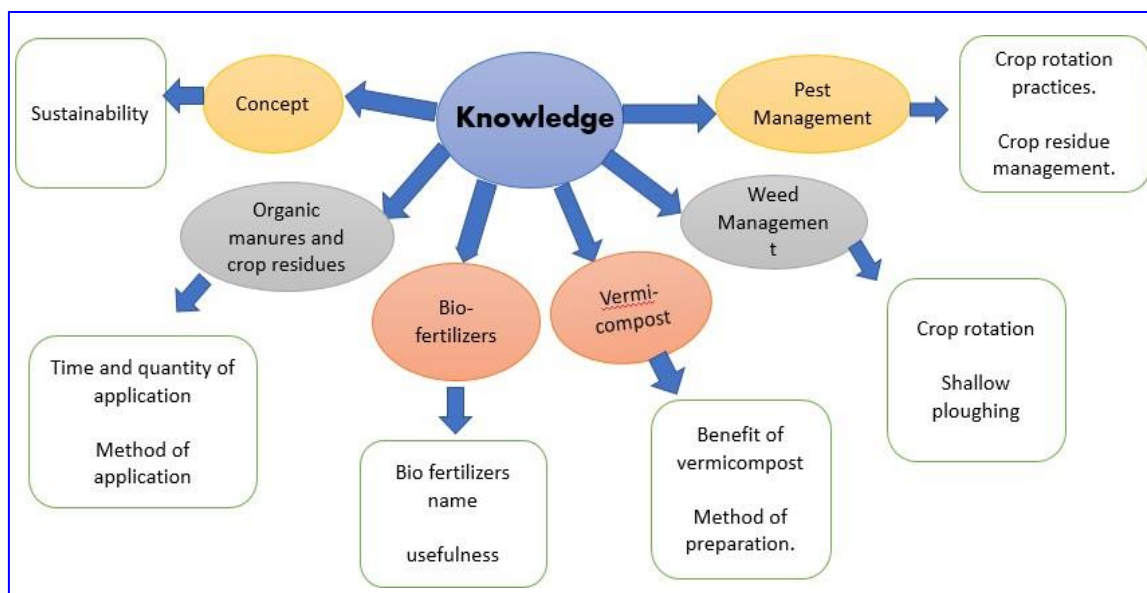
E. Knowledge of weed management	Percentage (%)
<b>Crop rotation and shallow ploughing</b>	<b>92</b>
Polythene sheet use	46.5
Closer planting of seedlings	29.5
<b>Mechanical method of weeding</b>	<b>59.5</b>
Bio-herbicide weed control	4

It has been found that 92% of the respondents have knowledge about practice of crop rotation and shallow ploughing. 59.5% of the organic vegetable growers have knowledge about mechanical method of weeding. This must be due to the fact that majority of the respondents were young and experienced(11-20years)

**Table 4.24 Knowledge of the respondents regarding Pest Management****n=200**

F. Knowledge of pest management	Percentage (%)
Benefit of summer ploughing	12
<b>Crop debris free bed, stubble incorporation and weed free bunds</b>	<b>63.5</b>
Seed rate/proper spacing/adjusting transplanting time have effect on pest/disease population	58
<b>Crop residue management</b>	<b>79.5</b>
Ploughing immediately after harvesting removes egg masses/larvae	22.5
Resistant varieties	1
Flooding and draining water 3-4 days removes/control larvae	6.5
Sticky traps	61
Bio agents	62.5
Bio pesticides (plant extracts)	63.5
<b>Crop rotation</b>	<b>94.5</b>
Elimination of weeds	11
Installing fishtail palm/wild saccharum attracts predatory birds	3
Traditional methods for proper storage	33.5
Collection and destruction of eggs, larvae	7.5

It is clear from the table that majority (more than 50%) of the respondents had knowledge about various aspects of pest management like maintaining crop debris free bed, weed free bunds, crop rotation, crop residue management, sticky traps, bio agents, bio pesticides, spacing and planting time. Whereas, very small percentage of people had knowledge about resistant varieties, installing fishtail palm, collection and destruction of eggs larvae etc.



**Fig.4.1 Knowledge of the respondents regarding various aspects**

### 4.3.2 Farmers’ perception towards organic vegetable farming.

Perception refers to an organized process through which an individual interprets a situation or an idea and draw subjective and personal conclusion or inferences which help them to take certain action or behave in a particular manner. Thus, perception about organic farming leads to further attitude towards it. The researcher has therefore attempted to analyze the perception dimensions regarding various attributes of organic vegetable farming and presented as below.

**Table 4.25 Perception dimension wise distribution of organic vegetable growers’**

**n=200**

Sr. No	Characteristics	Perception Dimension			Total weighted score	Weighted mean score	Rank
		High (%)	Medium (%)	Low (%)			
1	Simplicity	108 (54)	82 (41)	10 (5)	298	1.49	III
2	Profitability	99 (49.5)	66 (33)	35 (17.5)	264	1.32	IV
3	Efficiency	119 (59.5)	75 (37.5)	6 (3)	313	1.565	II

Sr. No	Characteristics	Perception Dimension			Total weighted score	Weighted mean score	Rank
		High (%)	Medium (%)	Low (%)			
4	Sustainability	139 (69.5)	55 (27.5)	6 (3)	333	1.665	I
5	Input availability	28 (14)	137 (68.5)	35 (17.5)	193	0.965	V
6	Flexibility	39 (19.5)	104 (52)	57 (28.5)	182	0.91	VI

The table presents the distribution of respondents on the basis on their perception dimensions towards organic vegetable cultivation. It has been found that they have a clear perception about the sustainability and efficiency dimensions of organic vegetable cultivation.

#### 4.3.3 Farmers' attitude towards organic vegetable farming.

Attitude refers to how we see a situation as well as behave towards it. It can be defined as a learned predisposition in a consistently unfavorable or favorable manner towards an object or a situation. Hence, the attitude of the organic vegetable growers taken as respondents was analyzed and presented below.

**Table 4.26 Distribution of respondents according to their level of Attitude**

**n=200**

Sl.No	Particulars	No. of Respondent	Frequency (F)	Percentage (%)
1	Attitude Level	Less favorable (Up to 30)	10	5
2		Moderately favorable (31 to 60)	8	4
3		<b>Highly favorable (&gt; 60)</b>	<b>182</b>	<b>91</b>

The table shows the attitude level of respondents towards organic vegetable farming. It has been found that the majority of the organic vegetable growers (91%) have highly favorable attitude towards organic vegetable. Thus, it can be concluded that vegetable growers of the study area had better attitude towards organic vegetable cultivation. It is assume that a favorable attitude help to take a positive action towards an idea or situation.

So, further to see the effect of attitude of the organic vegetable growers, on their act or

behaviour , the adoption level of the respondents were studied the findings of the same are presented below.

#### 4.3.4 Adoption of organic vegetable farming among the vegetable growers.

**Table 4.27 Distribution of respondents according to their level of adoption**

**n=200**

<b>Sr. No.</b>	<b>Adoption level</b>	<b>No of farmers</b>	<b>Percentage of farmers</b>
1	Low (<Mean-1SD)	41	20.5
2	Medium (between Mean+ SD)	134	67
3	High (>Mean+1SD)	25	12.5

Mean=29.53, SD=11.641

It has been found that majority of the respondents have shown medium level of adoption towards organic vegetable farming though they have highly favorable attitude towards organic vegetable farming. This indicates their lack of confidence in adopting the technology.

#### 4.3.4.1 Adoption of various package of practices for production of organic vegetable.

**Table 4.28 Adoption of various package of practices for production of organic vegetable.**

**n= 200**

<b>Sr No.</b>	<b>Organic farming aspects</b>	<b>Adoption level</b>	<b>Score range</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Weighted Mean score</b>	<b>Rank</b>
1	Use of organic manures and crop residues	Low	0-4	11	5.5	0.66	I
		Medium	5 – 10	143	71.5		
		High	11 – 14	46	23		
2	Use of Bio fertilizer	Low	0 – 3	117	58.5	0.35	III
		Medium	4 – 8	24	12		
		High	9 – 12	59	29.5		
3	Vermicompost	Low	0 – 1	143	71.5	0.26	IV

Sr No.	Organic farming aspects	Adoption level	Score range	Frequency	Percentage	Weighted Mean score	Rank
		Medium	2 -4	18	9		
		High	5 – 6	39	19.5		
4	Weed management	Low	0 – 3	93	46.5	0.38	II
		Medium	4 – 8	107	53.5		
		High	9 – 12	0	0		
5	Pest management	Low	0 -9	84	42	0.35	III
		Medium	10 – 20	113	56.5		
		High	21-30	3	1.5		

The table shows the adoption level of various package of practices for production of organic vegetables. It can be concluded from the table that use of organic manure and crop residue management has been adopted more than any other aspect of organic farming practices and hence, it ranked 1<sup>st</sup> followed by weed management which has ranked 2<sup>nd</sup>.

A detailed study has been done to find out the adoption level of specific practices for various aspect of organic farming.

**Table 4.29 Adoption level of organic vegetable growers with respect to organic manures and crop residues**

n=20

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
1	Application of FYM or compost in any crop, Quantity of FYM/compost applied per ton/acre	135 (67.5)	63 (31.5)	2 (1)	333	1.66	I
2	Application time and method of FYM/compost use	131 (65.5)	67 (33.5)	8 (4)	329	1.64	II

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
3	Method of FYM preparation	125 (62.5)	67 (33.5)	8 (4)	317	1.58	III
4	Crop residue incorporation in the soil	113 (56.5)	74 (37)	13 (6.5)	300	1.5	IV
5	Organic/ solid waste management	103 (51.5)	82 (41)	15 (7.5)	288	1.44	V
6	Adoption of green manure crop	48 (24)	50 (25)	102 (51)	146	0.73	VI
	selected and sowing time						
7	Stage of incorporating green manure crop in your field	44 (22)	48 (24)	108 (54)	136	0.68	VII

The above table shows that the selected organic vegetable growers have adopted FYM in recommended quantity. They are following proper time and method of application regarding use of FYM but in case of adoption of green manure they still are lacking behind.

**Table 4.30 Adoption level of organic vegetable growers with respect to bio fertilizers**

**n=200**

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
1	Bio fertilizers applied in vegetable crop	65 (32.5)	22 (11)	113 (56.5)	152	0.76	I
2	Reduces chemical fertilizers use	51 (25.5)	32 (16)	117 (58.5)	134	0.67	IV
3	Seed treated with bio fertilizer for vigour growth/disease control	57 (28.5)	28 (14)	115 (57.5)	142	0.71	III

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
4	Seedlings dipped in biofertilizer solution	57 (28.5)	28 (14)	115 (57.5)	142	0.71	III
5	Dose of biofertilizer used	61 (30.5)	28 (14)	111 (55.5)	150	0.75	II
6	Biofertilizers purchased from authorized source	59 (29.5)	32 (16)	109 (54.5)	150	0.75	II

The table shows that the organic vegetable growers have adopted the use of bio-fertilizer in organic vegetable cultivation as well as they have also adopted the recommended dose for those bio fertilizers, they are also purchasing the same from authorized sources.

**Table 4.31 Adoption level of organic vegetable growers with respect to use of vermi - compost** n=200

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
1	Vermicompost application	43 (21.5)	28 (14)	129 (64.5)	114	0.57	I
2	Vermicompost preparation method	43 (21.5)	20 (10)	137 (68.5)	106	0.53	II
3	Application of Vermi-wash	39 (19.5)	20 (10)	141 (70.5)	98	0.49	III

The above table reveals that many of the organic framers have adopted the use of vermicompost in vegetable cultivation. They have also learned and started preparation of vermicompost. Few of them have also adopted application of vermi-wash but still many of them have not yet adopted Vermicompost use in vegetable farming, the reason might be the lack of knowledge, as it has been found that 62.5 percent respondents have shown no knowledge about vermicompost. The reason might also be the unavailability of the input.

**Table 4.32 Adoption level of organic vegetable growers with respect to weed management**

**n=200**

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
1	<b>Practiced crop rotation and shallow ploughing for weed control</b>	<b>139 (69.5)</b>	<b>53 (26.5)</b>	<b>8 (4)</b>	<b>331</b>	<b>1.65</b>	<b>I</b>
2	Spread of polythene sheet in nursery	54 (27)	39 (19.5)	107 (53.5)	147	0.73	III
3	Transplanted two seedlings per hill for closer spacing to control weed population	0 (0)	37 (18.5)	163 (81.5)	37	0.18	IV
4	<b>Employed labour for manual weeding</b>	<b>80 (40)</b>	<b>85 (42.5)</b>	<b>35 (17.5)</b>	<b>245</b>	<b>1.22</b>	<b>II</b>
5	Used bio-herbicide for weed control	0 (0)	8 (4)	192 (96)	8	0.04	V

The table shows that regarding weed management, respondents have adopted practicing of crop rotation, shallow ploughing as well as manual weeding more than other weed management practices. However, use of bio herbicide is still negligible. The practice of closer spacing to avoid weed population and spreading of polythene sheet in nursery is still not

popular among organic vegetable farmers.

**Table 4.33 Adoption level of organic vegetable growers with respect to pest management**

**n=200**

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
1	Practiced summer ploughing	6 (3)	0 (0)	194 (97)	12	0.06	XIII
2	Clean seed bed/buds from crop debris and stubbles incorporated	69 (34.5)	58 (29)	73 (36.5)	196	0.98	VI
3	Maintained proper spacing to check pest/disease population	49 (24.5)	51 (25.5)	100 (50)	149	0.745	VIII
4	Crop residue managed properly to check major pest and disease	79 (39.5)	82 (41)	39 (19.5)	240	1.2	III
5	Ploughed field after harvest	72 (36)	88 (44)	40 (20)	232	1.16	IV
6	Sown resistant varieties for pest/disease control	5 (2.5)	4 (2)	191 (95.5)	14	0.07	XII
7	Flooding and draining fields control larvae	2 (1)	15 (7.5)	183 (91.5)	19	0.095	XI

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
8	Installed light traps / pheromone traps to kill adult pests	77 (38.5)	48 (24)	75 (37.5)	144	0.72	IX
9	Bio agents / predators adopted for pest control	84 (42)	23 (11.5)	93 (46.5)	191	0.955	VII
10	Bio pesticides like BT and plant extracts used	90 (45)	33 (16.5)	77 (38.5)	213	1.065	V
<b>11</b>	<b>Follow crop rotation for pests controls</b>	<b>140 (70)</b>	<b>49 (24.5)</b>	<b>11 (5.5)</b>	<b>329</b>	<b>1.645</b>	<b>I</b>
<b>12</b>	<b>Weeds removed to control pests/diseases</b>	<b>92 (46)</b>	<b>87 (43.5)</b>	<b>21 (10.5)</b>	<b>271</b>	<b>1.355</b>	<b>II</b>
13	Installing fishtail palm/ wild saccharum for predatory birds	0 (0)	2 (1)	198 (99)	2	0.01	XIV

Sr.No.	Organic farming practices	Adoption level			Total weighted score	Weighted mean score	Rank
		Full (%)	Partial (%)	No (%)			
14	Adopted indigenous / traditional methods for proper storage	6 (3)	19 (9.5)	175 (87.5)	31	0.155	X
15	Collected and destroyed eggs larvae and pupae of crop pests	5 (2.5)	4 (2)	191 (95.5)	14	0.07	XII

The table shows that respondents of the study area have adopted crop rotation, weed removal and crop residue management as pest management techniques more, compared to other available techniques of pest management. However, many other techniques are still to get popularity like installing fishtail palm, collecting and destroying eggs larvae and pupae, flooding and draining fields and practicing summer ploughing etc.

#### 4.3.5 Relation between various Socio personal, Socio economic, Socio psychological variables with Perception, Attitude and Adoption of the organic vegetable growers.

**Table 4.34 Co-efficient of correlation between various Socio- personal, Socio economic and Socio- psychological variables with Perception, Attitude and Adoption of of organic vegetable farming.**

N=200

Independent variables	Perception	Attitude	Adoption
Family members involved	-0.04	-0.10	0.10
Training	<b>0.14**</b>	0.04	<b>0.38**</b>
Farm Experience	-0.12	0.09	<b>0.15*</b>

<b>Independent variables</b>	<b>Perception</b>	<b>Attitude</b>	<b>Adoption</b>
Innovativeness	<b>0.46**</b>	<b>0.86**</b>	<b>0.38**</b>
Management orientation	<b>0.71**</b>	<b>0.51**</b>	<b>0.52**</b>
Scientific orientation	<b>0.47**</b>	<b>0.43**</b>	<b>0.35**</b>
Economic Motivation	<b>0.21**</b>	<b>0.15*</b>	0.07
Risk preference	<b>0.53**</b>	<b>0.45**</b>	<b>0.30**</b>
Extension participation	<b>0.49**</b>	<b>0.28**</b>	<b>0.59**</b>
Social participation	<b>0.14*</b>	0.06	<b>0.29**</b>
Information seeking behavior	<b>0.23**</b>	<b>0.36**</b>	<b>0.47**</b>

(\*\*0.01% level of significance \*0.05% level of significance)

The table shows that the variables like training, innovativeness, management orientation, scientific orientation, economic motivation, risk preference, extension participation, social participation and information seeking behavior are positively and significantly associated with the dependent variable perception.

Further the table reveals that innovativeness, management orientation, scientific orientation, economic motivation, risk preference, extension participation and information seeking behavior are positively and significantly associated with the attitude of the organic vegetable growers.

The table also shows that training, farm experience, innovativeness, management orientation, scientific orientation, risk preference, extension participation, social participation and information seeking behavior are positively and significantly associated with adoption of the organic vegetable growers.

Thus, it can be concluded that socio- psychological attributes had contributes a lot in framing the perception, attitude and adoption of organic vegetable cultivation among the vegetable growers of the selected study area.

In order to see if socio personal and socio-economic variable had any impact on the dependent variables (perception, attitude and adoption) one way ANOVA and F test was carried out and the findings are as follows.

**Table 4.35 Influence of different socio- personal, socio- economic and socio- psychological variables on perception, attitude and adoption of organic vegetable farming.**  
n=200

Variable	Perception	Attitude	Adoption
Education	<b>2.85*</b>	0.92NS	0.96NS
Livestock possession	0.89NS	<b>4.97**</b>	<b>3.04*</b>
Age	1.41NS	1.34NS	1.52NS
Land Holding (Farmers' type)	2.43NS	1.00NS	0.03NS
Caste	<b>7.64**</b>	<b>8.78**</b>	<b>5.02**</b>
Primary occupation	<b>6.12**</b>	2.09NS	<b>5.78**</b>
Secondary occupation	<b>3.86**</b>	<b>4.63**</b>	<b>4.35**</b>
Family size	0.13NS	0.06NS	<b>8.19**</b>
Religion	<b>5.25*</b>	<b>4.69*</b>	0.00NS
Cosmo- politeness	<b>26.67**</b>	<b>13.10**</b>	<b>24.95**</b>

(\*\*0.01% level of significance \*0.05% level of significance)

One-way ANOVA was done to see if the socio personal, socio economic and socio psychological variables (categorical variables here, irrespective of the number of categories) have any influence on dependent variables namely Perception, Attitude and Adoption. It has been found that education has a significant influence on perception. Livestock possession was found to be significant with attitude and adoption however, age and land holding were found to be not significant with any of the selected dependent variable. Whereas, caste, Cosmo politeness and secondary occupation were seen as significant with all the dependent variables. Primary occupation and family size were significant with adoption of vegetable organic farming, primary occupation was also found significant with perception. Religion is found to be significant with perception and attitude of the respondents towards organic vegetable farming.

In order to see if there is any significant difference between the categories of the categorical variable towards perception, attitude and adoption of organic vegetable farming exists, F test and z test were carried out with the help of SPSS.F test was done for variables having more than two categories (education, family type, caste, primary occupation, secondary

occupation and family size) and z test was done for variables having upto two categories namely religion, Cosmo politeness, economic class and family type. The results are presented as follows.

**Table 4.36 Multiple Comparison Test using Duncan method; Education with Perception  
n=200**

<b>Education category</b>	<b>Perception (Mean)</b>
Primary	9.36a
Middle	7.61a
Secondary	7.43a
Senior Secondary	8.90a
Graduate	8.33a
Post graduate	12.00b
F value	<b>2.85**</b>

(\*\*0.01% level of significance \*0.05% level of significance)

(Categories with mean, bearing same symbol like a and b have no significant difference among them in perception towards organic vegetable farming)

It has been found that there is no significant difference among the education categories like primary, middle, secondary, senior secondary and graduate in perception towards organic vegetable farming. But there is a significant difference in the perception of respondents with Post Graduation, towards vegetable farming, when compared to respondents of other above-mentioned category. This can be explained with the fact that higher education always yields better perception.

**Table 4.37 Multiple Comparison Test using Duncan method: Farmers type with perception  
n=200**

<b>Farmers type</b>	<b>Perception (Mean)</b>
Marginal Farmers (Up to 2.5 acres)	7.74b
Small (2.6 to 5 acres)	7.97b
Medium (5.1 to 10 acres)	8.75b
Large (> 10 acres)	3.00a
F value	<b>2.43*</b>

(\*\*0.01% level of significance \*0.05% level of significance)

(Categories with mean, bearing same symbol like a and b, have no significant difference among them in perception towards organic vegetable farming)

It has been found that there is no significant difference among the categories of farmers' type like marginal, small, and medium in perception towards organic vegetable farming. But there is a significant difference in perception of large farmers towards vegetable farming, when compared to respondents of another above-mentioned category. This can be explained with the fact that farmers with more area under cultivation are inclined towards diversified cropping and thus they find it difficult to follow organic farming in all crops, might be because the study area has lack of input availability as well as the inputs are costlier.

**Table 4.38 Multiple Comparison Test using Duncan method; Caste with Perception, and Attitude n=200**

<b>Caste category</b>	<b>Perception (Mean)</b>	<b>Attitude (Mean)</b>
General	7.90b	68.25b
SC	8.37b	74.91b
ST	10.00b	80.50b
OBC	5.69a	62.73a
<b>F value</b>	<b>7.64**</b>	<b>8.76**</b>

(\*\*=0.01% level of significance \*=0.05% level of significance)

(Categories with mean, bearing same symbol like a and b, have no significant difference among them in perception towards organic vegetable farming)

This table shows that there is no significant difference in the perception and attitude of the respondents belong to categories like general caste, SC, ST towards organic vegetable farming. However, the category, OBC has shown a significant difference in perception and attitude when compared to other categories towards organic vegetable farming.

Perception and attitude mean of OBC category has comparatively shown less extent of perception and less favorable attitude towards organic vegetable farming, when compared to the respondents of another category like general, SC and ST.

**Table 4.39 Multiple Comparison Test using Duncan method; Primary occupations with Perception** **n=200**

<b>Primary Occupations</b>	<b>Perception (Mean)</b>
Wage labor	5.00a
Crop farming	7.49b
Business	8.21b
Service	9.83b
<b>F value</b>	<b>6.12**</b>

(\*\*=0.01% level of significance \*=0.05% level of significance)

(Categories with mean, bearing same symbol like a and b have no significant difference among them in perception towards organic vegetable farming)

The table shows that there is no significant difference in the perception of the respondents belong to different categories, based on primary occupation, like crop farming, business and service towards organic vegetable farming. However, the perception of the wage labor towards organic vegetable farming is different than other categories of respondent belong to above mentioned categories. The perception mean of wage labor is comparatively less. It can be explained with the fact that the wage labor is not much concern about the hazardous effect of chemicals on the soil because they are not the owner of the land as well as they are only bothered about their wages.

**Table 4.40 Multiple Comparison Test using Duncan method; Secondary occupation with adoption** **n=200**

<b>Secondary Occupation</b>	<b>Adoption (mean)</b>
Wage labor	24.00b
Crop farming	27.72b
Business	35.82b
Service	33.85b
Others	19.00a
<b>F value</b>	<b>4.35**</b>

(\*\*0.01% level of significance \*0.05% level of significance)

(Categories with mean, bearing same symbol like a and b, have no significant difference

among them in adoption of organic vegetable farming)

The table shows that the respondents with secondary occupation like wage labor, crop farming, business and service have no significant difference in their adoption towards organic vegetable farming. However, the respondents with other occupation as secondary occupation have shown significant difference in their adoption towards organic vegetable farming when compared to all other respondents with different categories of secondary occupation.

The adoption mean shows that the respondents with other occupation as secondary occupation have shown less adoption level when compared to other above-mentioned categories with different secondary occupation.

**Table 4.41 Multiple Comparison Test using Duncan method; Family size with Adoption**

**n=200**

<b>Family Size</b>	<b>Adoption (mean)</b>
Small (Upto 4 members)	26.80a
Medium (5-6 members)	29.30a
Large (Above 6 members)	37.00b
F value	<b>8.19**</b>

(\*\*0.01% level of significance \*0.05% level of significance)

(Categories with mean, bearing same symbol like a and b have no significant difference among them in perception towards organic vegetable farming)

The table shows the respondents of the categories, small and medium family size, have shown no significant difference in their adoption towards organic vegetable farming. However, the farmers with large family size have shown significant difference in adoption of organic vegetable farming when compared to respondents with either small or medium family size.

The adoption mean of category with large family indicates that they have better adoption level for organic vegetable farming compared to the respondents having various other family size.

Four of the independent variables have upto two categories only and thus z test was done to analyse the difference between the categories towards their perception, attitude and

adoption. The results are as follows.

**Table 4.42 Z test of perception scores for different socio- economic variables**

**n=200**

<b>Variables</b>	<b>Category</b>	<b>Mean</b>	<b>z</b>	<b>Probability</b>
<b>Religion</b>	<b>Hindu</b>	<b>8.03</b>	<b>2.29*</b>	<b>0.02</b>
	<b>Muslim</b>	<b>6.28</b>		
<b>Cosmo-politeness</b>	<b>Medium</b>	<b>6.33</b>	<b>4.96**</b>	<b>0.00</b>
	<b>High</b>	<b>8.45</b>		
Economic class	APL	8.18	-1.40	0.16
	BPL	7.63		
Family type	Nuclear	7.80	-0.41	0.67
	Joint	7.91		

(\*\*=0.01% level of significance \*=0.05% level of significance)

The table shows that there is a significant difference in perception towards organic vegetable farming, between the respondents of Hindu and Muslim community. A significant difference has been also found between the high cosmo polite respondents and medium cosmo polite respondents in perception towards organic vegetable farming.

**Table 4.43 Z test of attitude scores for different socio- economic variables**

**n=200**

<b>Variables</b>	<b>Category</b>	<b>Mean</b>	<b>z</b>	<b>Probability</b>
<b>Religion</b>	<b>Hindu</b>	<b>72.14</b>	<b>2.16*</b>	<b>0.03</b>
	<b>Muslim</b>	<b>64.28</b>		
<b>Cosmo-politeness</b>	<b>Medium</b>	<b>65.98</b>	<b>-3.62**</b>	<b>0.00</b>
	<b>High</b>	<b>73.51</b>		
Economic class	APL	72.46	-0.95	0.34
	BPL	70.68		
Family type	Nuclear	71.41	-0.10	0.91
	Joint	71.61		

(\*\*0.01% level of significance \*0.05% level of significance)

The table shows that there is a significant difference in attitude towards organic

vegetable farming, between the respondents of Hindu and Muslim community. A significant difference has been also found between the high

Cosmo polite respondents and medium Cosmo polite respondents in attitude towards organic vegetable farming.

**Table 4.44 Z test of adoption scores for different socio- economic variables n=200**

<b>Variables</b>	<b>Category</b>	<b>Mean</b>	<b>z</b>	<b>Probability</b>
Religion	Hindu	29.19	0.05	0.95
	Muslim	29.00		
<b>Cosmo politeness</b>	<b>Medium</b>	<b>22.37</b>	<b>-4.99**</b>	<b>0.00</b>
	<b>High</b>	<b>31.51</b>		
Economic class	APL	30.70	-0.18	0.06
	BPL	27.59		
Family type	Nuclear	26.80	<b>-3.06**</b>	0.00
	Joint	31.80		

(\*\*0.01% level of significance \*0.05% level of significance)

A significant difference has been also found between the high Cosmo polite respondents and medium Cosmo polite respondents in adoption towards organic vegetable farming.

Factors which are responsible for attitude, perception and adoption of organic farming in selected districts of North Bengal.

Above tables have shown that there is a significance association between various socio personal, socio economic and socio psychological variables with the perception, attitude and adoption of organic vegetable cultivation among the selected vegetable growers.

To find out the major factors that had framed the perception, attitude and adoption among the selected vegetable growers step wise regression was done and the findings are as follows.

**Table 4.45 Stepwise regression between Perception and selected socio personal, socio economic and socio psychological variables**

**n=200**

Model	Equation	R Square value	Adj. R square value
8.	$\text{Perception} = 3.15 + 0.28X_1^{**} - 0.45X_2^{**} + 0.22X_3^{**} - 0.07X_4^{**} + 0.48X_5^{**} + 0.66X_6^{**} - 0.53X_7^{**} + 0.11X_8^{**}$	0.63	0.62

(\*\*0.01% level of significance \*0.05% level of significance)

$X_1$  =Management orientation,  $X_2$ =Caste,  $X_3$ =Extension participation,  $X_4$ =Farm experience  
 $X_5$ =Risk preference,  $X_6$ =Cosmo-politeness,  $X_7$ =Social participation,  $X_8$ =Mass media exposure

The above table of stepwise regression shows that variables like Management Orientation, Caste, Extension Participation, Farm Experience, Risk Preference, Cosmo-Politenss, Social Participation, Mass Media Exposure are the most significant factors that had contributed towards the perception of the respondents. Together these eight independent variables could explain 63% of variability in the dependent variable perception. This indicates that there were many other variables which had contributed in the perception of the respondents but not considered in the study.

**Table 4.46 Stepwise regression between Attitude and selected socio-personal, socio-economic and socio- psychological variables**

**n=200**

Model	Equation	R Square value	Adj. R square value
9.	$\text{Attitude} = 38.38 + 17.39X_1^{**} + 0.70X_2^{**} - 0.70X_3^{**} + 2.02X_4^{**} - 1.77X_5^{**} - 6.46X_6^{**} + 3.13X_7^{**} - 0.36X_8^{**} - 1.51X_9^{**}$	0.81	0.81

(\*\*0.01% level of significance \*0.05% level of significance)

$X_1$  =Innovativeness,  $X_2$ =Mass media exposure,  $X_3$ =Management orientation,  $X_4$ =Scientific orientation,  $X_5$ =Economic motivation,  $X_6$ =Religion,  $X_7$ =Social participation,

X<sub>8</sub>=Extension participation, X<sub>9</sub>=Primary occupation

The above table of stepwise regression shows that independent variables like Innovativeness, Mass media exposure, Management orientation, Scientific orientation, Economic motivation, Religion, Social participation, Extension participation and Primary occupation are the most significant factors contributed towards the dependent variable attitude of the respondents.

Together these nine variables had explained 81% of the variability in dependent variable attitude. This indicates there were few more factors that had contributed to the attitude of the respondents.

**Table 4.47 Stepwise regression between Adoption and selected socio-personal, socio-economic and socio- psychological variables** **n=200**

Mod el	Equation	R Square value	Adj. R square value
5.	$\text{Adoption} = 3.28 + 1.37X_1^{**} + 1.30X_2^{**} + 2.25X_3^{**} + 1.07X_4^{**} + 1.48X_5^*$ <p>(3.48)</p>	0.56	0.53

(\*\*0.01% level of significance \*0.05% level of significance)

X<sub>1</sub>= Extension participation, X<sub>2</sub>=Mass media exposure, X<sub>3</sub>=Caste, X<sub>4</sub>=Information seeking behavior, X<sub>5</sub>=Scientific orientation

The above table of stepwise regression shows that Extension Participation, Mass Media Exposure, Caste, Information Seeking Behavior,

Scientific Orientation were found to be the most significant factors contributing to adoption of organic vegetable cultivation among the selected respondents.

Together the five independent variables could explain 56% of the variability in the dependent variable Adoption. There must be many other variables that had contributed towards adoption of organic vegetable cultivation among vegetable growers of the selected area.

#### 4.4 Policy framework to improve the organic farming scenario in the selected districts.

In order to frame a policy frame work for improving the adoption of organic vegetable framing in the selected area, it was essential to find out the various constraints hindering the full adoption of vegetable organic vegetable in the selected area.

Different types of constraints were analyzed and finally specific constraints were identified to construct the policy framework for the selected study area. The constraint analysis result is presented below.

**Table 4.48 Types of constraints faced by the organic vegetable growers in the study area. n=200**

<b>Type of Constraints</b>	<b>Percent (%)</b>	<b>Rank</b>
Technological Constraints	65.15	III
<b>Economic Constraints</b>	<b>70.69</b>	<b>II</b>
Manure and bio fertilizer Constraints	53.86	VII
<b>Plant Protection Constraints</b>	<b>75.38</b>	<b>I</b>
Marketing Constraints	63.40	V
Constraints related to Transfer of Technology	63.91	IV
Other Constraints	58.33	VI

It has been found that the major constraints organic vegetable farmers faced in the study area were plant protection constraint and economic constraints. The reason might be the lack of knowledge about various available plant protection measures and costly organic inputs.

The specific constraints under each type of constraint were also identified for generating suggestions and presented below.

**Table 4.49 Different constraints related to technological and production aspects of organic vegetable cultivation. n=200**

Sr. No.	Constraints	Constraint frequency			Total weighted score	Weighted mean score	Rank
		Very serious (%)	Serious (%)	Not so serious (%)			
1	<b>Problem about human labour</b>	<b>84 (42)</b>	<b>100 (50)</b>	<b>15 (7.5)</b>	<b>467</b>	<b>2.33</b>	<b>III</b>
2	Low production of organic vegetable	14 (7)	68 (34)	118 (59)	296	1.48	XIV
3	Lack of knowledge of recommended package of practices on organic vegetable growing	35 (17.5)	67 (33.5)	98 (49)	337	1.68	XII
4	Lack of knowledge about organic plant protection management	37 (18.5)	82 (41)	81 (40.5)	356	1.78	X
5	Organic farming is a slow process	39 (19.5)	116 (58)	45 (22.5)	394	1.97	VI
6	Lack of proper trainings by Govt. Personnel /NGOs/ research institutes	45 (22.5)	75 (37.5)	80 (40)	365	1.82	VII
7	Unavailability of organic inputs	26 (13)	103 (51.5)	71 (35.5)	355	1.77	XI
8	Lack of knowledge about organic weed management	51 (25.5)	92 (46)	57 (28.5)	394	1.97	VI
9	Lack of knowledge about crop residue management	48 (24)	64 (32)	88 (44)	360	1.80	IX
10	<b>Limited amount of information and research available</b>	<b>123 (61.5)</b>	<b>58 (29)</b>	<b>19 (9.5)</b>	<b>504</b>	<b>2.52</b>	<b>II</b>
11	Lack of capital	69 (34.5)	99 (49.5)	32 (16)	437	2.18	IV
12	<b>Predominance of the inorganic farmers in the locality</b>	<b>124 (62)</b>	<b>66 (33)</b>	<b>10 (5)</b>	<b>514</b>	<b>2.57</b>	<b>I</b>
13	Knowledge about seed variety, seed rate seed treatment & right time of sowing	17 (8.5)	69 (34.5)	114 (57)	303	1.51	XIII
14	Proper irrigation facilities	28 (14)	108 (54)	64 (32)	364	1.82	VIII
15	Lack of technical know how to get organic vegetable certified from authorized agencies	67 (33.5)	83 (41.5)	50 (25)	417	2.08	V

Out of the fifteen specific constraints given as options to the respondents, predominance of the inorganic farmers in the study area, limited amount of information and research outcome and availability of labor were mentioned as the major constraints in adopting inorganic

vegetable cultivation in the study area.

It has been found that many farmers in the study area were involved in inorganic vegetable cultivation and hence they found to follow organic cultivation difficult in the adjacent fields. The lack of information about improved practices and research outcomes were also said as constraints this might be due to the lack if interaction /association with universities and scientist.

Shortage of labour for organic farming was also seen as constraint, this might be due to the migration of the labour to neighbouring states for odd jobs.

**Table 4.50 Different constraints related to economic aspects of organic vegetable cultivation.** **n =200**

Sr. No	Constraints	Constraint frequency			Total weighted score	Weighted mean score	Rank
		Very serious (%)	Serious (%)	Not so serious (%)			
1	Less premium prices	85 (42.5)	85 (42.5)	30 (15)	455	2.27	III
2	Lack of subsidy/ incentives	89 (44.5)	80 (40)	31 (15.5)	458	2.29	II
3	No minimum support price (MSP)	101 (50.5)	89 (44.5)	10 (5)	491	2.45	I
4	Lack of bulk local demand	73 (36.5)	53 (26.5)	74 (37)	399	1.99	V
5	Lack/Poor cooperative societies at local level	64 (32)	84 (42)	52 (26)	412	2.06	IV
6	Farmers have no access for direct exports of organic vegetable	34 (17)	60 (30)	106 (53)	328	1.64	VI

It has been found that unavailability of any MSP (Minimum Support Price) for organic vegetable was identified as the major constraint followed by lack of subsidies and incentives by government. Along with these, less premium price was also quoted as a major constraint towards adoption of organic vegetable cultivation in the study area. Thus, economic constraint was mentioned as the biggest constraint among all.

**Table 4.51 Different constraints related to manures and bio fertilizers use for organic vegetable cultivation. n =200**

Sr. No.	Constraints	Constraint frequency			Total weight score	Weighted mean score	Rank
		Very serious (%)	serious (%)	Not so Serious (%)			
1	Inadequacy of required manures & bio fertilizers	11 (5.5)	73 (36.5)	116 (58)	295	1.47	V
2	<b>Long process of organic manure preparation</b>	<b>25 (12.5)</b>	<b>99 (49.5)</b>	<b>76 (38)</b>	<b>349</b>	<b>1.74</b>	<b>II</b>
3	<b>Costly manures and bio fertilizers</b>	<b>41 (20.5)</b>	<b>72 (36)</b>	<b>87 (43.5)</b>	<b>354</b>	<b>1.77</b>	<b>I</b>
4	Knowledge about type and recommended doses	22 (11)	55 (27.5)	123 (61.5)	299	1.49	IV
5	<b>Supply agencies at</b>	<b>35 (17.5)</b>	<b>48 (24)</b>	<b>117 (58.5)</b>	<b>318</b>	<b>1.59</b>	<b>III</b>

The table shows various constraints in respect of manures and bio fertilizer in adopting organic vegetable farming. It has been found that Cost of manures and fertilizers was the main

constraint followed by time consuming manure preparation and less availability of supply agencies in the vicinity. It might be due to the non -availability of inputs in the locality.

**Table 4.52 Different constraints related to pest management aspects of organic vegetable cultivation.** **n =200**

Sr. No.	Constraints	Constraint frequency			Total weighted score	Weighted mean score	Rank
		Very serious (%)	Serious (%)	Not so serious (%)			
1	Inclination towards chemical pesticides	153 (76.5)	22 (11)	25 (12.5)	528	2.64	I
2	Lack of Knowledge about bio-pesticides, application time, method and proper dose	71 (35.5)	59 (29.5)	70 (35)	401	2.00	VI
3	Unavailability of biopesticides	67 (33.5)	95 (47.5)	38 (19)	429	2.14	V

4	Lack of	96	54	50	446	2.23	III
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	<b>supply centre</b>	<b>(48)</b>	<b>(27)</b>	<b>(25)</b>			
5	Difficult method of biopesticides production/preparation	88 (44)	61 (30.5)	51 (25.5)	437	2.18	IV
<b>6</b>	<b>Lack of skilled labour</b>	<b>95 (47.5)</b>	<b>79 (39.5)</b>	<b>26 (13)</b>	<b>469</b>	<b>2.34</b>	<b>II</b>

The table shows that in case of pest management the major constraints were the inclination towards chemical pesticides due to the fact that they are readily available in the local market. Few more constraints identified as major by the respondents were lack of skilled labour in the locality and lack of supply centre for input in the study area. This might be the reason that many of the farmers of the study area were still involved in conventional vegetable cultivation.

**Table 4.53 Different constraints related to marketing aspects of organic vegetable cultivation. n =200**

Sr. No.	Constraints	Constraint frequency			Total weighted score	Weighted mean score	Rank
		Very serious (%)	Serious (%)	Not so serious (%)			
1	Lack of agencies to purchase	36 (18)	82 (41)	82 (41)	354	1.77	VI
2	Dependence/interference of middleman for disposal	58 (29)	60 (30)	82 (41)	376	1.88	IV

3	Lack of	50	53	97	353	1.76	VII
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	marketing news	(25)	(26.5)	(48.5)			
4	Poor communication channels	34 (17)	95 (47.5)	71 (35.5)	363	1.81	V
5	<b>Purchase agencies at long distance</b>	<b>44</b> <b>(22)</b>	<b>99</b> <b>(49.5)</b>	<b>57</b> <b>(28.5)</b>	<b>413</b>	<b>2.06</b>	<b>III</b>
6	<b>Lack of storage facilities</b>	<b>46</b> <b>(23)</b>	<b>125</b> <b>(62.5)</b>	<b>29</b> <b>(14.5)</b>	<b>417</b>	<b>2.08</b>	<b>I</b>
7	<b>More transportation charges</b>	<b>71</b> <b>(35.5)</b>	<b>73</b> <b>(36.5)</b>	<b>56</b> <b>(28)</b>	<b>415</b>	<b>2.07</b>	<b>II</b>

The table show that regarding marketing facilities the respondents have cited lack of storage facilities, high transportation charges as well less unavailability of purchase agencies in the locality as the major issues.

However, these problems are common in rural Bengal and need to be addressed as a whole.

**Table 4.54 Different constraints related to transfer of technology aspect of organic vegetable cultivation.** **n =200**

Sr. No.	Constraints	Constraint frequency			Total weighted score	Weighted mean score	Rank
		Very Serious (%)	Serious (%)	Not so serious (%)			
1	Lack of timely and appropriate transfer of organic vegetable farming practices by extension organization /Agri. Deptt./private agencies.	44 (22)	46 (23)	110 (55)	334	1.67	IV

<b>2</b>	<b>Lack of coordination between various service, supply and marketing agencies/organic promoting organizations.</b>	<b>53 (26.5)</b>	<b>94 (47)</b>	<b>53 (26.5)</b>	<b>400</b>	<b>2.00</b>	<b>II</b>
<b>3</b>	<b>Lack of dedicated and competent extension personnel for organic vegetable promotion</b>	<b>41 (20.5)</b>	<b>98 (49)</b>	<b>61 (30.5)</b>	<b>380</b>	<b>1.90</b>	<b>III</b>
<b>4</b>	<b>Lack of published information regarding various practices of organic vegetable farming</b>	<b>59 (29.5)</b>	<b>102 (51)</b>	<b>39 (19.5)</b>	<b>420</b>	<b>2.10</b>	<b>I</b>

Effective transfer of technology is the most important aspect for adoption of any improved technology. It has been found that lack of published information regarding various practices of organic vegetable farming, Lack of coordination between various service, supply and marketing agencies/organic promoting organizations and lack of dedicated and competent extension personnel for organic vegetable promotion were the most faced constraints as mentioned by the respondents of the study area.

This shows an overall lack of information and knowledge about the technology among farmers as well as extension functionaries.

**Table 4.55 Different other constraints in organic vegetable cultivation**

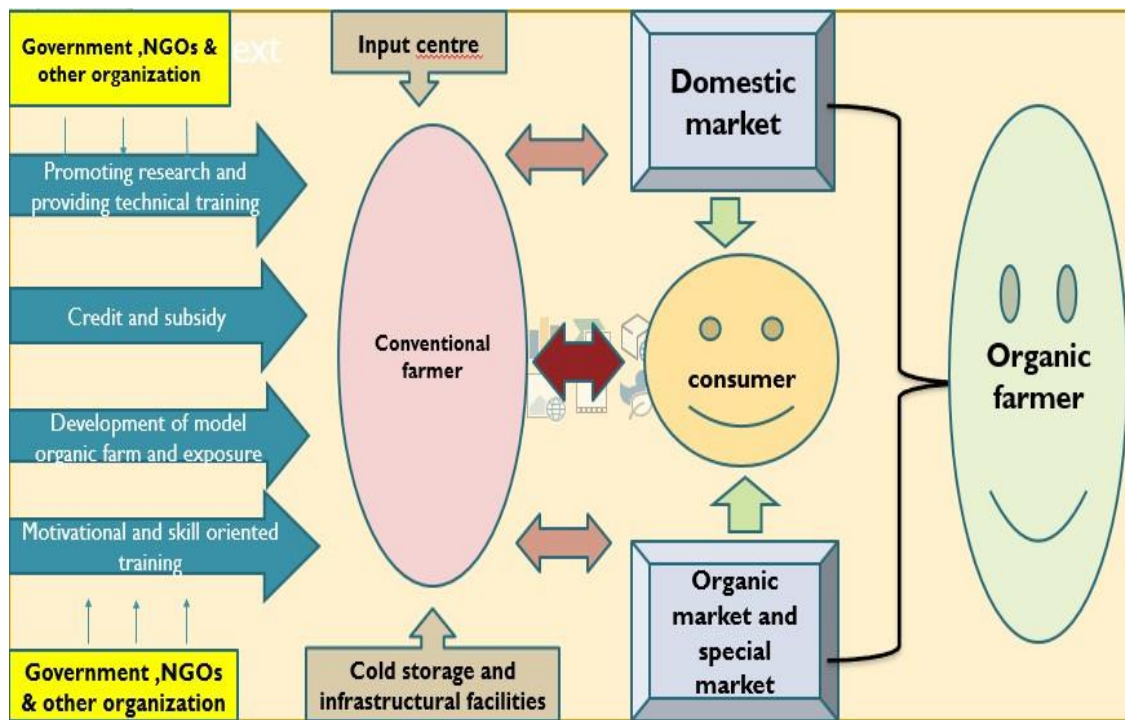
**n=200**

Sr. No.	Constraints	Constraint frequency			Total weighted score	Weighted mean score	Rank
		Very Serious (%)	Serious (%)	Not so Serious (%)			
1	Lack of proper guidance and training on organic vegetable practices	29 (14.5)	49 (24.5)	122 (61)	307	1.53	III
2	<b>Irregular visit of agriculture officers</b>	<b>33 (16.5)</b>	<b>47 (23.5)</b>	<b>120 (60)</b>	<b>313</b>	<b>1.56</b>	<b>II</b>
3	<b>Lack of risk ability</b>	<b>98 (49)</b>	<b>90 (45)</b>	<b>12 (6)</b>	<b>486</b>	<b>2.43</b>	<b>I</b>
4	Lack of testing facilities (soil and water)	22 (11)	52 (26)	126 (63)	296	1.48	IV

Along with all major type of constraints few others constraints were also studied and found that lack of risk ability among the vegetable growers was a serious constraint in adoption of organic vegetable cultivation over conventional method of cultivation. Respondents had also mentioned about less interaction with agriculture officers, as a constraint.

This indicated that there is a lack of confidence among the vegetable growers due to insufficient required guidance and motivation to shift from conventional to organic vegetable cultivation.

## Policy framework for improvement of the organic farming scenario in the study area



**Fig4.2 Policy framework for improvement of organic farming scenario in study area**

In light of various constraints and other factors, influencing the attitude and adoption of the organic vegetable cultivation in the study area, a policy framework has been framed. The figure is self-explanatory. It indicates that promoting research and providing research output in the form of technical training as well as publishes material to the vegetable grower can overcome their lack of knowledge in the concern field of organic farming. Along with that developing a model organic farm or village to provide them the required exposure, might improve their confidence level the same can be supported with various motivational and skill orientated training by competent extension personnel, to make them more competent in practicing the technology. A strong linkage between farmers and extension personnel might help in the overall development of the knowledge, perception, attitude and adoption of the organic vegetable farming, among the farmers of the study area. However, economic constraint was found to be the biggest constraint hence, credit facilities along with provision of subsidy may motivate the farmers further to shift to organic cultivation from conventional practice. All these initiatives may be taken by government, NGOs' and other stake holders of agriculture.

However, mere development and motivation of farmers might not result positively and

hence input centres run by local youth or societies might prove helpful to provide cost effective and locally available inputs. Some other infrastructural constraints as mentioned by the respondents of the area advocates the availability of cold storage and transport facilities in the vicinity, as vegetables are most perishable agricultural produce.

Marketing constraint was also mentioned as a major constraint in adopting organic vegetable farming hence development of domestic markets along with organic markets and special markets would be helpful for farmer to get premium price for their produce. These are few of the interventions, if taken, might lead to an improved and better environment for farmers and accelerate them towards organic vegetable cultivation.

## CHAPTER V

### SUMMARY AND CONCLUSION

The concepts of organic agriculture was developed during early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner and others. They believed that the use of manures, cover crops, crop rotation, and biological pest control result in better farming system. Green Revolution occurred through use of modern agriculture technologies like use of synthetic chemicals like fertilizers and pesticides, adoption of high-yielding and nutrient responsive varieties of crops, greater use of irrigation sources etc. Which has undoubtedly increased the production and labour efficiency and made our country self-sufficient in food production. But indiscriminate and excess use of chemicals during that period has questioned sustainability of agriculture in the long run and concerns have been raised regarding its adverse effects on soil health and environment.

The population of the world is increasing and providing food for the world had become difficult. India is the second most populous country in the world. With this increasing population, the cultivable land resource is shrinking by each day. To meet the food, fuel, fibre, fodder and other needs of the increasing population, the productivity of land and soil need to be improved. IFOAM (International Federation of Organic Agriculture Movements), an international organization, established in 1972, for organic farming defines the goal of organic farming: *“Organic agriculture is a production system, that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved...”* (Conserve-energy-future.com)

Organic farming appears to be one of the best options for sustainability. As a result, there great is an interest in organic farming globally to hold sustainability of natural resources and environment along with better taste and nutritional availability in the food. During the last two decades, ‘Organic Agriculture’ has been established as a dynamic ‘Alternate Farming System’. However, the vegetable sector suffers through 25 % of post-harvest losses and only 5 % of it are either processed or exported. With an increase in population there is tremendous pressure on the agriculture sector to feed the entire population with decreasing land share. There is a constant battle between the quantity and quality of the food that can be produced

from a given land.

Indians have become more diet conscious and health conscious. Their income levels have increased and they have become interested in quality of the produce rather than the quantity of the food. Vegetables are one such commodity which are consumed on a daily basis. Its price fluctuates with their visual appeal i.e. freshness, colour and odour etc. Cultivation practices followed to grow vegetables also effect the prices, people are happy to pay higher prices for the organically grown vegetables. The growing awareness among the masses about organic farming has raised its demand. Organic vegetables are gaining momentum across the world and emerged as an attractive source of income generation. Organic products are being preferred in developed countries and in urban centers of India. There is a great demand for organic food in both domestic and international market. Which is growing around 20-25 % annually, thus the area under organic vegetable farming has been increasing consistently.

Cooch Behar and Alipurduar district have more than 20-30% of farmers, growing vegetables as summer and winter crops. Organic farming is taken in some of the part of the districts still majority of the farmers are growing with conventional method. Organic vegetable farmers though have adopted some of the aspects of organic farming still many aspects of organic farming is yet to be adopted. There is a lack of knowledge and adoption among farmers regarding vegetable organic farming. Thus, sustainability of agriculture and health of the people including our farmers is at stake.

In this back drop, the study was carried out to see the attitude, perception and adoption of vegetable growers towards organic vegetable farming in North Bengal with the following objectives.

### **Objectives of the study**

1. To assess the socio-economic characteristics of vegetable growers in the selected districts of North Bengal.
2. To find out different sources of information from where vegetable growers access information related to organic farming.
3. To study farmers' attitude, perception and adoption of organic farming in the selected districts of North Bengal.
4. To elicit out the various factors which are responsible for attitude, perception and adoption of organic farming in selected districts of North Bengal.

5. To suggest a policy framework to improve the organic farming scenario in the selected district.

### **Major limitation of the study**

Only 200 vegetable growers were taken, 100 from Coochbehar district and 100 from Alipurduar district hence, the result might not be generalized for the entire population of North Bengal.

### **Future scope of the study**

- Similar study can be done with the same farmers in respect of other crops they cultivate organically.
- Similar study can be done in other geographical area with different set of farmers.
- Similar study can be done for non-adopters (organic farming) also.

### **Some review of literature**

Stobbelaar. *et. al.* (2007) said that organic farming is an established method of sustainable agriculture. Most of the techniques in organic farming, like inter cropping, mulching, raising animals etc are the same to various traditional farming system.

Takagi (2010) Result showed various factors associated with awareness of organic farming like location, gender, educational level, exposure to the pilot farms, information sources but they didn't show any statistically significant relationships between awareness and attitude toward the practices.

Pandey & Singh (2012) stated that Ministry of Commerce launched the National Organic Programme in 2000 in response of the detrimental impacts of Green Revolution. Organic industries are entirely export oriented wherein farmers are choosing organic because of economic benefit rather than sustainability.

Meena, *et. al.* (2013) suggested measures for promotion of Organic farming: (i) promoting appropriate and strong extension services (ii) establishing strong linkage between producer and consumers (iii) Reducing cost of certification (iv) Making organic inputs available to small farmers (v) Developing domestic market (vi) Provision of subsidies and credit facilities (vii) Improving infrastructural facilities (viii) improving linkages in the supply chain (ix) Promoting research on organic agricultural (x) Provision of training regarding organic agriculture.

## **Methodology**

The study was conducted in Cooch Behar district and Alipurduar district of West Bengal, India. The districts were taken purposively, due to convenience of the researcher and availability of vegetable growers as well presence of organic farming practices in vegetable cultivation. Coochbehar-I, Coochbehar-II, Dinhata-II blocks were taken purposively and these were selected from Coochbehar district. Whereas, Kumargram and Alipurduar-II blocks were purposively selected from Alipurduar district. The villages and total 200 respondents (Organic vegetable growers) were taken randomly.

Due to pandemic situation, pilot study could not be conducted. Secondary data were collected from secondary information sources like Panchayat office, ADA office etc. An interview schedule was prepared for collection of information, keeping in mind the major objectives and variables of the present study. 200 organic farmers, having grown at least one organic vegetable in last one year were taken as respondents. The data were collected during March 2020 to August 2021 with the help of the structured interview schedule constructed for the study through personal interview method as well as over telephone.

The data was recorded with personal interview method physically but due to pandemic situation some of the respondents were contacted over phone. Various socio- personal, socio-economic and socio- psychological variables were taken as independent variables. Perception, attitude and adoption were selected as dependent variable. Statistical tools like frequency, percentage, mean, coefficient of correlation, t test, z test, step wise regression etc were taken to analysis the data. SPSS (Statistical Package for the Social Science) was used to do the statistical analysis.

## **Conclusion**

The study concludes that organic vegetable farming, in the study area was found to be more popular among young vegetable growers with 11-20 years of farming experience. They were found to have high Cosmo-politeness, innovativeness, management ability, scientific orientation, economic motivation and risk-taking ability.

The organic vegetable growers have shown medium to high information seeking behavior when comes to collecting information regarding organic farming. The study also concludes that organic vegetable farmers of the study area were found to seek information regarding organic vegetable farming more from friends, neighbors, relatives and progressive farmers. Thus, social contacts were considered as the major sources of information for the

organic vegetable growers. It was told that they rely more on television, newspaper and online searching among various mass media channels for gathering knowledge and skill regarding organic vegetable cultivation. They often take part in group discussion, result demonstration and method demonstration to get more exposure, practical experience and discuss with fellow farmers.

The study has witnessed a highly favorable attitude towards organic vegetable farming however, a medium level of adoption was found among the organic vegetable growers. It has been seen that higher education has contributed to better perception about organic vegetable farming. They have found to possess a good knowledge about organic manures and crop residues management among other package of practices.

The socio- psychological variables were found to have a positive and significant association and have more influence on attitude, perception and adoption of vegetable growers, towards organic vegetable farming. The plant protection and economic constraints were found to be the major constraints among all constraints towards full organic vegetable farming.

### **Recommendation**

The study has come up with the recommendation to organize more awareness programmes by different government departments and institutions. Appropriate and strong extension service for skill and capacity building has to be made available to the vegetable growers. Above all, motivational training through extension personnel would promote organic farming in future.

The study further recommends to promote research, provide supporting published materials and technical training to vegetable growers as well as extension functionaries, on organic vegetable farming in participatory mode for the progress of organic vegetable farming in the study area.

Higher attitude towards organic vegetable farming but medium adoption level was found among the respondents hence, the study recommends to develop a model organic farm and provide the exposure of the same, to the organic vegetable growers in order to build the required confidence in them to shift from conventional vegetable farming to organic vegetable farming. To address the high cost of production, it is suggested to start input center run by societies and co-operatives to provide cheap and timely organic inputs. This will also create employment opportunities in the study area. Respondents had also mentioned poor infrastructure as a hindrance in adopting organic vegetable farming thus, cold storage and

transport facilities should be made available to the vegetable growers and this may be done with government initiative or other non-governmental organization or in PPP mode.

Economic and marketing constraint were found to be the major constraints and hence, credit and subsidy facilities to be extended by different public and private credit institution as well other stakeholders of agriculture. Developing domestic markets, special markets and linkages between producer and consumers along with enhancing linkages in supply chain may prove beneficial in providing a favorable market to the organic vegetable growers.

Finally, the study recommends that the process of conversion from conventional to organic must be gradual “Towards organic” instead of immediate organic approach.

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## APPENDIX: BATTERY OF SCHEDULES

**Id No..... Department of Agricultural Extension**

**UBKV, Pundibari , Cooch Behar, West Bengal, INDIA**

Survey Questionnaire for Ph. D thesis on A study on attitude, perception and adoption of organic farming by vegetable growers in selected districts of North Bengal

**Household hold survey schedule (to be collected from individual farmer only)**

Sr.No. \_\_\_\_\_ Date of Interview \_\_\_\_\_

**Name of the Farmer**

Father's Name \_\_\_\_\_

Village \_\_\_\_\_ Block \_\_\_\_\_ District \_\_\_\_\_

**Personal and Socio-economic Profile:**

**1. Age**\_\_ (Years)

**2. Education**

(i) Illiterate (0) (ii) Primary(1) (iii) Middle (2) (iv) Secondary (3) (v) Senior Secondary(4) (vi) Graduate(5) (vii) Post Graduate and above (6)

**3. Land holding**

(i) No land(0) (ii) Up to 2.5 acres (1) (iii) 2.6- 5 acres (2) (iv) 5.1-10 acres (3) (v) >10 acres(4)

**4. Livestock** (No. of animals) -----

**5. Religion**.....

**6. Caste**.....

**7. Economic class** -APL/BPL

**8. Cosmo politeness:**

**a) Visit to towns / cities** (i) Yes (2) No (1)

**b) Frequency of visit** (i) Often (3) (ii) Occasionally (2) (iii) Rarely (1)

**c) Purpose of visit** (i) Agricultural (3) (ii) Non-agricultural (1) (iii) Both (2)

**9. Occupation:**

Primary-1) wage labour,2) Agriculture,3)Business,4)Service,5)Others Secondary-1)wage labour,2)Agriculture,3)Business,4)Service,5)Others

**10. Family:**

**(a) Type:** (i) Nuclear/ single (1) (ii) Joint (2)

**(b) Size:** (i) Small (upto 4 members) (1) (ii) Medium (5-6 members) (2) (iii) Large (above

6 members) (3)

**11. Social Participation:**

(i) Member of no organization (0) (ii) Member of one organization (1) (iii) Member of more than one organization (2) (iv) Office holder (3)

**12. Family members involved in agriculture (in No.s).....**

**13. Farm Experience (in years) .....**

**14. Mass media exposure**

Radio	Do you listen to radio?	Daily(3) / Often (2) / Sometimes (1)
Television	Do you watch T.V programs?	Daily(3) / Often (2) / Sometimes (1)
Newspaper	Do you read newspaper?	Daily(3) / Often (2) / Sometimes (1)
Farm magazine	Do you read farm magazines?	Daily(3) / Often (2) / Sometimes (1)
Kisan call Centre	Do you call Kisan call centre for queries?	Daily(3) / Often (2) / Sometimes (1)
Online searching	Do you search online for your problem?	Daily(3) / Often (2) / Sometimes (1)

**15. Innovativeness (Indicate whether you agree or disagree with the following statements)**

Sr. No.	Statement	Agree (1)	Disagree (0)
1.	I feel restless until I try a new idea, I have heard about		
2.	I am cautious about trying a new practice		
3.	Often organic farm practices are not successful, however if they are promising, I would surely like to adopt them		
4.	I discuss about organic farming information with fellow farmers before trial		

**16. Management orientation (Indicate whether you agree or disagree with the following statements)**

Sr. No	Statement	Response	
		Agree (1)	Disagree (0)
	<b>A) Planning</b>		
1.	One should think in advance the crop to be grown		
2.	Prior decision about the variety of crop and time of sowing		
3.	The amount of fertilizer and pesticides for raising crop should		

	be assessed before cultivation		
4.	Cost involved in raising crops must be calculated.		
	<b>B) Production</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	Timely planning of crop ensures a good yield		
2.	One should use organic fertilizers judiciously		
3.	Seed rate should be given as per recommended dose		
4.	Effective weed control is possible mainly by manual weeding		
	<b>C) Marketing</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	Market news is very useful to farmers		
2.	A farmer can get good price by grading his produce		
3.	A farmer can get better price for organically produce vegetables		
4.	One should grow those organic crops which has a demand in market		

**17. Scientific orientation (Indicate whether you agree or disagree with the following statements)**

<b>Sr. No.</b>	<b>Statement</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	Improved methods of farming gives better result to a farmer than old method		
2.	The way the forefathers farmed should be modified scientifically		
3.	Even a farmer with lot of experience should use new method of farming		
4.	Though it takes time for a farmer to learn new method in farming, it is worth the effort.		

**18. Economic Motivation (Indicate whether you agree or disagree with the following statements)**

<b>Sr. No.</b>	<b>Statement</b>	<b>Agree (1)</b>	<b>Disagree (0)</b>
1.	All I want from my farm is to make a reasonable profit		
2.	I would like invest in organic farming if it ensures higher profits		

3.	I have no hesitation to borrow money to run the organic farming properly		
4.	Even though organic farming is costly practice, I follow it		
5.	It is OK to spend extra money, purchase inputs, transport conveyance to grow organically.		

**19. Risk preference (Indicate whether you agree or disagree with the following statements)**

Sr. No.	Statement	Agree (1)	Disagree (0)
1.	One should try organic farming practices in own farm instead of advocating to others.		
2.	Adopting organic farming involves risk but it is worth doing.		
3.	A farmer who is willing to take greater risk than the average farmer usually does better financially.		
4.	Progress not possible without risk.		

**20. Information seeking behavior**

Sr. No.	Information source	Frequency of utilization		
		Always (2)	Sometimes (1)	Never (0)
1.	Friend/Neighbor/Relative			
2.	Progressive Farmer			
3.	Other Farmers of the village			
4.	Assistant Director of Agriculture (ADA)			
5.	Agricultural Scientist (College/KVK)			
6.	Company Representative/NGOs			

**21. Exposure to Training**

Sr. No	Training attended on Organic Farming	Year	Organized by
1			
2			
3			

## 22. Extension Participation

Sr. No.	Extension activity	Extent of Participation		
		Regularly (2)	Occasionally (1)	Never (0)
1.	Group Discussion/Meeting			
2.	Result Demonstration			
3.	Method Demonstration			
4.	Field Visit			
5.	KisanDiwas			
6.	Field Day			
7.	Tour			
8.	Kisan Mela			
9.	Campaign			

## 23. Knowledge schedule

A.	Concept of organic farming	Full Knowledge (2)	Partial Knowledge (1)	No Knowledge (0)
1	Organic is a way forward to sustainable agriculture			
2	Organic vegetable/food is eco-friendly.			
3	Organic vegetable farming mitigates the hazardous effects of chemicals			
B.	Knowledge of organic manures and crop residues	Full Knowledge (2)	Partial Knowledge (1)	No Knowledge (0)
1	Proper time and quantity of FYM required.			
2	Right method of FYM application.			
3	Accurate method / procedure of FYM preparation.			
4	Organic/solid waste management.			
5	Crop to be selected for green manuring and the sowing time.			
6	Stage at which green crop to be incorporated in field.			

<b>C.</b>	<b>Knowledge of bio fertilizers</b>		<b>Yes (1)</b>	<b>No (0)</b>
1	Bio fertilizers by name.			
2	Effect on yield			
3	Cheaper than conventional practices			
4	Useful for all types of soils			
5	Reduction in consumption of chemical fertilizers			
6	Pollution free practice			
7	Decrease the insect pest & disease infestation.			
8	Improve soil fertility.			
9	Remain in the soil for a longer period and it has good effect on next crop also			
10	Become useless after its expiry date.			
11	Recommended time of application of bio fertilizers.			
<b>D.</b>	<b>Knowledge of vermicompost</b>	<b>Full Knowledge (2)</b>	<b>Partial Knowledge (1)</b>	<b>No Knowledge (0)</b>
<b>1</b>	Vermicompost and its benefit.			
<b>2</b>	Proper method of preparation.			
<b>3</b>	Vermi-wash			
<b>E.</b>	<b>Knowledge of weed management</b>		<b>Yes (1)</b>	<b>No (0)</b>
1	Crop rotation and shallow ploughing			
2	Polythene sheet use			
3	Closer planting of seedlings			
4	Mechanical method of weeding			
5	Bio-herbicide weed control			
<b>F.</b>	<b>Knowledge of pest management</b>		<b>Yes (1)</b>	<b>No (0)</b>
1	Benefit of summer ploughing			
2	Crop debris free bed, stubble incorporation and weed free bunds			
3	Seed rate/proper spacing/adjusting transplanting time have effect on pest/disease population			
4	Crop residue management			
5	Ploughing immediately after harvesting removes egg masses/ larvae			
6	Resistant varieties			
7	Flooding and draining water 3-4 days removes/control larvae			

8	Sticky traps			
9	Bio agents			
10	Bio pesticides (plant extracts)			
11	Crop rotation			
12	Elimination of weeds			
13	Installing fishtail palm/wild saccharum attracts predatory birds			
14	Traditional methods for proper storage			
15	Collection and destruction of eggs, larv ae			

#### 24. Perception dimensions regarding organic farming

Sl No	Dimensions	High	Medium	Low
1	Simplicity			
2	Profitability			
3	Efficiency			
4	Sustainability			
5	Input availability			
6	Flexibility			

#### 25. Attitude towards organic farming in vegetable

Sl.No.	Statement	Response categories				
		SA	A	N	D	SD
1.	Organic farming threatens productivity. So, it should not be adopted (-).					
2.	We should be more careful for nature than immediate higher productivity.					
3.	Healthy rural communities are essential to make the organic farming practice a success.					
4.	Farmers should use primarily synthetic fertilizers and pesticides in order to maintain adequate levels of production.					
5.	Promoting organic farming leads to starvation of mass number of people.					
6.	We should promote organic farming to protect the future generation.					
7.	Chemical based farming is a major cause of					

	ecological problems and must be greatly modified to become ecologically sound.					
8.	We should first feed our present population, then think about future generation by organic agriculture.					
9.	Soil and water are basic factors of production and should be exploited for larger production without thinking anything.					
10.	Successful farming must stand in harmony with nature.					
11.	Organic farming always leads to low productivity.					
12.	It is impossible to make our country food sufficient with organic farming.					
13.	Organic farming is not profitable.					
14.	Organic farming leads to sustainability.					
15.	I think organic farming is more costly than chemical farming.					
16.	Price of organic produce is always high. So, it should always be encouraged.					
17.	It is easy to arrange chemical inputs than organic inputs.					
18.	We should think about quick results than to wait for ecologically sound agriculture.					

\*SA-Strongly agree; A-Agree; SDA-Strongly disagree agree; DA-Disagree; UD-Undecided

## 26. Adoption Schedule:

**Mention the period since you opted for organic farming**

(a) more than three years (b)two to three years (c) one to two years (d) less than one year

A.	Use of organic manures and crop residues	Full Adoption (2)	Partial Adoption (1)	No Adoption (0)
1	Application of FYM or compost in any crop, Quantity of FYM/compost applied per ton/acre			
2	Application time and method of FYM/compost use			
3	Method of FYM preparation			
4	Crop residue incorporation in the soil			
5	Organic/ solid waste management			
6	Adoption of green manure crop selected and sowing time			
7	Stage of incorporating green manure crop in your field			

<b>B.</b>	<b>Use of bio fertilizers</b>	<b>Full Adoption (2)</b>	<b>Partial Adoption (1)</b>	<b>No Adoption (0)</b>
1	Bio fertilizers applied in vegetable crop			
2	Reduces chemical fertilizers use			
3	Seed treated with bio fertilizer for vigour growth/disease control			
4	Seedlings dipped in biofertilizer solution			
5	Dose of biofertilizer used			
6	Biofertilizers purchased from authorized source			
<b>D.</b>	<b>Vermicompost</b>	<b>Full Adoption (2)</b>	<b>Partial Adoption (1)</b>	<b>No Adoption (0)</b>
1	Vermicompost application			
2	Vermicompost preparation method			
3	Application of Vermiwash			
<b>E.</b>	<b>Weed management measures</b>	<b>Full Adoption (2)</b>	<b>Partial Adoption (1)</b>	<b>No Adoption (0)</b>
1	Practiced crop rotation and shallow ploughing for weed control			
2	Spread of polythene sheet in nursery			
3	Transplanted two seedlings per hill for closer spacing to control weed population			
4	Employed labour for manual weeding			
5	Used bio-herbicide for weed control			
<b>F.</b>	<b>Pest management</b>	<b>Full Adoption (2)</b>	<b>Partial Adoption (1)</b>	<b>No Adoption (0)</b>
1	Practiced summer ploughing			
2	Clean seed bed/buds from crop debris and stubbles incorporated			
3	Maintained proper spacing to check pest/disease population			
4	Crop residue managed properly to check major pest and disease			
5	Ploughed field after harvest			
6	Sown resistant varieties for pest/disease control			
7	Flooding and draining fields controls larvae			
8	Installed light traps /pheromone traps to kill adult pests			
9	Bio agents / predators adopted for pests control			
10	Bio pesticides like BT and plant			

	extracts used			
11	Follow crop rotation for pests controls			
12	Weeds removed to control pests/ diseases			
13	Installing fishtail palm/ wild saccharum for predatory birds			
14	Adopted indigenous / traditional methods for proper storage			
15	Collected and destroyed eggs larvae and pupae of crop pests			

## 27. Constraints schedule

### A. Technological/ Production constraints in organic farming

Sr. No.	Constraints	Very serious 3	Serious 2	Not so serious 1
1	Problem about human labour			
2	Low production of organic Vegetable			
3	Lack of knowledge of recommended package of practices on organicvegetable growing			
4	Lack of knowledge about organic plant protection management			
5	Organic farming is a slow Process			
6	Lack of proper trainings by Govt. Personnel /NGOs/ research institutes			
7	Unavailability of organic Inputs			
8	Lack of knowledge about organic weed management			
9	Lack of knowledge about crop residue management			
10	Limited amount of information and research available			
11	Lack of capital			
12	Predominance of the inorganic farmers in the Locality			
13	Knowledge about seed variety, seed rate seed treatment & right time of Sowing			
14	Proper irrigation facilities			
15	Lack of technical know how to get organic vegetable certified from authorized Agencies			

### B. Economic constraints in organic farming

Sr. No.	Constraints	Very serious 3	Serious 2	Not so serious 1
1	Less premium prices			
2	Lack of subsidy/incentives			
3	No minimum support price (MSP)			
4	Lack of bulk local demand			
5	Lack/Poor cooperative societies at local level			
6	Farmers have no access for direct exports of organic vegetable			

**C. Manures and bio fertilizers constraints:**

<b>Sr. No.</b>	<b>Constraints</b>	<b>Very serious 3</b>	<b>Serious 2</b>	<b>Not so serious 1</b>
1	Inadequacy of required manures & bio fertilizers			
2	Long process of organic manure preparation			
3	Costly manures and bio fertilizers			
4	Knowledge about type and recommended doses			
5	Supply agencies at long distance			

**D. Plant protection constraints**

<b>Sr. No.</b>	<b>Constraints</b>	<b>Very serious 3</b>	<b>Serious 2</b>	<b>Not so serious 1</b>
1	Inclination towards chemical pesticides			
2	Lack of Knowledge about bio-pesticides, application time, method and proper dose			
3	Unavailability of biopesticides			
4	Lack of supply centre			
5	Difficult method of biopesticides production/preparation			
6	Lack of skilled labour			

**E. Marketing constraints**

<b>Sr. No.</b>	<b>Constraints</b>	<b>Very serious 3</b>	<b>Serious 2</b>	<b>Not so serious 1</b>
1	Lack of agencies to purchase			
2	Dependence/ interference of middleman for disposal			
3	Lack of marketing news			
4	Poor communication channels			
5	Purchase agencies at longdistance			
6	Lack of storage facilities			
7	More transportation charges			

#### F. Constraints related to transfer of technology

Sr. No.	Constraints	Very serious 3	Serious 2	Not so serious 1
1	Lack of timely and appropriate transfer of organic vegetable farming practices by extension organization /Agri.Deptt./ private agencies.			
2	Lack of coordination between various service, supply and marketing agencies/organic promoting organizations.			
3	Lack of dedicated and competent extension personnel for organic vegetable promotion			
4	Lack of published information regarding various practices of organic vegetable farming			

#### G. Others constraints

Sr. No.	Constraints	Very serious 3	Serious 2	Not so serious 1
1	Lack of proper guidance and training on organic vegetable practices			
2	Irregular visit of agriculture officers			
3	Lack of risk ability			
4	Lack of testing facilities (soil and water)			







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## Entire Document

Chapter-I INTRODUCTION Introduction

68%

**MATCHING BLOCK 1/15**

W

<https://www.britannica.com/topic/organic-farming>

The concepts of organic agriculture was developed during early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner and others. They believed that the use of manures, cover crops, crop rotation, and biological pest control result in better farming system.

Howard had worked in India as an agricultural researcher and gained much inspiration from the traditional agriculture system, he has also advocated for their adoption in the West.

63%

**MATCHING BLOCK 2/15**

W

<https://www.britannica.com/topic/organic-farming>

Such practices further were promoted by various advocates like J.I. Rodale and his son Robert during 1940s and onward. He has published "Organic Gardening and Farming" magazine and a few text books on organic farming. The demand for organic food had improved in the 1960s due to the publication of " Silent Spring" by Rachel Carson, which had documented the environmental damage

issues. However, the population of the world was increasing and providing food for the world had become difficult. India is the second most populous country in the world. With this increasing population, the cultivable land resource is shrinking by each day. To meet the food, fuel, fibre, fodder and other needs of the increasing population, the productivity of land and soil need to be improved. Green Revolution occurred through use of modern agriculture technologies like use of synthetic chemicals like fertilizers and pesticides, adoption of high-yielding and nutrient responsive varieties of crops, greater use of irrigation sources etc. Which has undoubtedly increased the production and labor efficiency and made our country self-sufficient in food production. But indiscriminate and excess use of chemicals during that period has questioned sustainability of agriculture in the long run and concerns have been raised regarding its adverse effects on soil health and environment.

The concept of organic farming (IFOAM) International Federation of Organic Agriculture Movements, an international organization, established in 1972, for organic farming defines the goal of

organic farming:

"

100%

**MATCHING BLOCK 4/15**

W

[https://en.wikipedia.org/wiki/Organic\\_farming](https://en.wikipedia.org/wiki/Organic_farming)

Organic agriculture is a production system, that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved...{(

Conserve-energy-future.com)

81%

**MATCHING BLOCK 3/15**

W

<https://www.britannica.com/topic/organic-farming>

Modern organic farming was developed as a result of environmental harm caused by the use of chemical pesticides and fertilizers in conventional

farming and it has numerous ecological benefits .The process involves the use of organic inputs, avoiding synthetic substances to maintain soil health and ecological balance thus minimizing pollution and wastage. In other words, organic farming is a method that involves growing and nurturing crops without using synthetic fertilizers and pesticides. No

genetically modified organisms(GMO) are permitted. It relies on ecologically balanced principles like crop rotation, green manuring, organic waste, biological pest control. Organic farming uses pesticides and fertilizers if they are natural and avoids the use of petrochemical fertilizers and pesticides. Some Statistics as per Statista 2022

Agriculture contributes 18% to India's GDP and employment to approximately 2/3rd of the total population. It ranks 9th in organic agricultural land and 1st in number of organic producers. Total area under certification process is 4339184.93 (2020-21) ha. According to union ministry of Agriculture and farmers welfare, 2% of cultivable net sown area (140.1 million ha) is under organic farming. India has produced 3496800.34 MT of certified organic product during 2020-21 and volume of the export was 888179.68 MT in 2020-21. Export realization was Rs.707849.52 lakhs during 2020-21. Production of vegetables was 176.2 million metric tonnes. India was the 2nd largest vegetable producer after China and could contribute 14% of total world vegetable production. Madhya Pradesh has the largest area under organic farming. Sikkim has converted the entire cultivable area under organic certification. Sikkim became India's first "100 per cent organic" state in January 2016. Presently, total farming in Sikkim is carrying out without the use of synthetic fertilizers and pesticides. It could provide access to safer food choices and making agriculture a more environment-friendly activity. Even the state of Sikkim is now the world's first 100 per cent organic state. It has won the prestigious Future Policy Gold Award from the UN Food and Agriculture (FAO), after beating 51 nominations from across the world. The need for organic farming Now a days, its normal to hear about extinct species and this should be a matter of concern. In the last century, approximately 75 percent of the agricultural crop diversity has been wiped out. inclination towards one form of farming can be a reason for future disaster. A classic example is of a potato. There were number of varieties available in the market. But today, only one species of potato dominates. This is a dangerous situation because if pests knock out the remaining species of potato, available today, we won't have potatoes anymore. This is why we need organic farming methods that produces disease and pest-resistant crops to ensure a sustainable future.

Organic foods do not contain chemicals. This is because organic farmers don't use chemicals in food-growing process like conventional farmers. Organic farmers use natural farming techniques that won't harm human and the environment. These food product keep away dangerous diseases like cancer and diabetes .Studies revealed that a large section of the population consume toxic substances used in conventional agriculture and fallen prey to diseases like cancer. As organic farming avoids these toxins, it reduces the sickness and diseases caused by them.

For any product to get certified as organic food, it must undergo quality checks and the creation process undergoes rigorous investigation. The same rule applies to international markets also. This is a great thing for consumers as they are getting true organic foods. These quality checks weed out the quacks who want to get benefited from the organic food label. There is a misconception that organic foods are expensive. The truth is they actually are cheaper because they don't require expensive pesticides, insecticides, weedicides etc.

The quality of food also depends on its taste. Organic food tastes better than conventionally grown food. The sugar content in organically grown food provides them better taste. Organic plants also have greater metabolic and structural integrity in cellular structure than conventional crops. This makes the storage of organic food possible for a longer period.

Organic farming appears to be one of the best options for sustainability. As a result, there great is a interest in organic farming globally to hold sustainability of natural resources and environment along with better taste and nutritional availability in the food. During the last two decades, 'Organic Agriculture' has been established as a dynamic 'Alternate Farming System'.

## Organic vegetable cultivation in India

Vegetables are important constituents of Indian diet. They are rich in carbohydrate, proteins, vitamins, minerals, antioxidants, fibre, etc. They are consumed for nutrition, vigor, therapeutic values and prevention of diseases. The consumers are now, concerned about the vegetables they eat. Both the international and domestic consumers have become cautious regarding issues like residues of poisonous chemicals in vegetables and their associated health and environmental issues. This has therefore made us think about alternate form of agriculture to produce chemical free food. Organic agriculture is one that supports the environment and restricts the use of synthetic inputs.

India with its varied agro-climatic zones is suitable to grow a wide variety of vegetables. It is the second largest vegetable producer country after China, with production level of 176.2 million metric tonnes of vegetables, accounting for 14% of the total worlds' vegetable production. India with its varied climate and soil, has a great potential for organic vegetable production. The wide product base, huge volume of production throughout the year, strategic geographic location, high demand, climatic condition and availability of labor at relatively low cost makes India an apt place for organic vegetable production.

However, the vegetable sector suffers through 25 % of post-harvest losses and only 5 % of it are either processed or exported. With an increase in population there is tremendous pressure on the agriculture sector to feed the entire population with decreasing land share. There is a constant battle between the quantity and quality of the food that can be produced from a given land. If one of them can be taken up as the objective the other one has to be forsaken. However, it would have been better if both of them could be achieved together. Indians have become more diet conscious and health conscious. Their income levels have increased and they have become interested in quality of the produce rather than the quantity of the food. Vegetables are one such commodity which are consumed on a daily basis. Its price fluctuates with their visual appeal i.e. freshness, color and odor etc. Cultivation practices followed to grow vegetables also effect the prices, people are happy to pay higher prices for the organically grown vegetables. The growing awareness among the masses about organic farming has raised its demand. Organic vegetables are gaining momentum across the world and emerged as an attractive source of income generation. Organic products are being preferred in developed countries and in urban centers of India. There is a great demand for organic food in both domestic and international market. Which is growing around 20-25 % annually, thus the area under organic vegetable farming in has been increasing consistently.

## Organic Farming in West Bengal

Bengal agriculture department, food processing industries, and horticulture departments have started organic farming activities across the state. The increasing demand for organic vegetables, especially among urban people, has convinced the state government to formulate organic farming policy. The food processing industries and horticulture departments have asked the rural agricultural farms to initiate organic farming and have assured them of technical promotional and marketing assistant. The department would supply greenhouses and pack houses as well as organic fertilizers. It will also provide transport to ferry those farm products to the market places. The department is also taking organic farming at their own farms. The agriculture department, has set a target to prepare 32 organic villages across the Bengal — especially in the districts of North and South 24 Parganas, Howrah and Hooghly. It has set up 120 clusters, 50 acres of each. Around 194 farmhouses under the department are also growing organic vegetables. Apart from this, the department under Swanirbhar Krishi Prakalpa is also collaborating with private agencies on organic farming (The Economic Times, E-paper).

Advantages of Organic Farming: 1. It creates higher level of resistance to pests and diseases. 3. This farming process supports soil health and pollinators. 4. There is no chance of genetically modified foods with organic farms. 5. The working environment for organic farmers is healthier and safe. 6. Organic farmers can often produce their own fertilizers at their own farming location. 7. It can be implemented in any geographic location or season. Constraints in organic farming 1. There is no subsidy offered for most organic farmers. 2. It requires more work to produce that are ready for sale. 3. Organic farmers must be knowledgeable about localized growing systems. 4. There are unique marketing challenges for organic produce. 5. Organic farms and foods has to go through a rigorous certification process. 6. It usually is difficult to be competitive with organic farming. 9. Organic crop generally spoils fast.

1.1 The problem Statement Cooch Behar and Alipurduar districts have more than 20-30% of farmers, growing vegetables as summer and winter crops. Organic farming is taken in some of the part of the districts still majority of the farmers are still growing with conventional method. Organic vegetable farmers though have adopted some of the aspects of organic farming still many aspects of organic farming are not yet fully adopted. There is a lack of knowledge and adoption among farmers regarding vegetable organic farming. Thus, sustainability of agriculture and health of the people including our farmers is at stake.

1.2 Objectives of the study 1. To assess the socio-economic characteristics of vegetable growers in the selected districts of North Bengal. 2. To find out different sources of information from where vegetable growers access information related to organic farming. 3. To study farmers' attitude, perception and adoption of organic farming in the selected districts of North Bengal. 4. To elicit out the various factors which are responsible for attitude, perception and adoption of organic farming in selected districts of North Bengal. 5. To suggest a policy framework to improve the organic farming scenario in the selected district.

1.3 Limitations of the study: • Only 200 vegetable growers were taken, 100 from Coochbehar district and 100 from Alipurduar district hence, the result might not be generalized for entire district.

- Farmers were taken purposively hence; chances of homogeneity might exist.
- Regarding knowledge analysis only package of practices regarding production aspects considered.
- Due to covid situation, along with physical interview data was collected over

## 1.4 Scope of the study:

- Similar study can be done with the same farmers in respect of other crops they cultivate organically.
- Similar study can be done in other geographical area with different set of farmers.
- The similar study can be done for nonadopters (organic farming) also.
- Can spread the importance of organic farming.

Chapter II REVIEW OF LITERATURE Review of Literature An intensive study of the available literature is important in gaining an idea and understanding of the area of research. The reviews were collected according to the specific objectives of the research. Though, there are number of studies, conducted in the past regarding adoption, knowledge, technological gap and constraints in organic farming as a whole but still a lot to be studied about vegetable organic farming. Hence, some of the related literatures were studied and reviews were written. The literature reviewed related to the present study under is presented with the following headings.

### 2.1 Socio-economic characteristics of vegetable growers

#### 2.2 Sources of information from where vegetable growers access information related to organic farming.

2.3 Farmers' attitude, perception and adoption of organic farming  
2.4 Factors which are responsible for attitude, perception and adoption of organic farming  
2.5 Policy framework to improve the organic farming scenario t. 2.1 Socio- economic characteristics of organic growers Bimala (2000) found that majority of her respondents had small land holdings. The study also said that about 10 percent and 15 percent of the respondents possessed large and medium land holding respectively. The study was conducted in some villages of Haryana. Ranganatha et.al. (2001) carried out a study in some selected villages of Srirangapatna, a taluk of Mandya district. They found that education, mass media, extension participation, scientific orientation, innovation proneness of the small farmers had a positive and significant relationship with their adoption of organic farming.

Manay and Farzana (2000) did a study in Kammansandra village of Bangalore and found that most of the families (87.8%) had small or medium land holding, less than five acres of area. Only 6.1 per cent of the respondents had more than five acres of area.

Ramesh and Santha (2003) had informed that in Pudukottai district of Tamil Nadu most of the organic farmers had medium size farm and had less cropping intensity. Majority of the farmers has shown medium level of category when they were classified against the variables farming experience, livestock possession, farm power, social participation, mass media exposure, extension agency contacts and information seeking behavior.

Wakle et al. (2003) did a study in western and central Maharashtra and said that majority of the rural farm women (70.50 %) had low socio- economic status followed with medium (28.10 %) and high (1.40 %) level of socio- economic status.

Ramesh et.al. (2007) found that in selected study area of Madhya Pradesh, more number of large and medium farmers were involved in organic cultivation compared to small farmers.

Sanghi (2007) did a study in Andhra Pradesh and said, organic cultivation is an intensive process, limited basically to resource-rich farmers. The study also stated that export market depends on external support systems for price, certification and market intelligence and thus, there is little scope of coverage and social relevance pr organic farming.

Sharma et.al. (2008) did a study in Bhabbhar region of Uttaranchal and found that most of the farmers were marginal farmers followed by small (22.62%). 13.12 % were Semi medium and 3.16 % were medium farmers. None of them was found to be large farmer.

Ranjan et al. (2011) reported that in Jalpaiguri district of West Bengal, average size of the land holdings for the selected respondents, under organic cultivation is from 0.32 ha - 0.84 ha in areas under NGOs' and 0.47 ha to 0.86 ha in Government areas. The overall average size of the organic farm was 0.60 ha.

Binod Chettri (2015) carried out a study on organic farming in Sikkim and revealed that there are observable changes in socio-economic profile of the farmers after adopting organic farming. With the increasing demand and supply of organic product, a better living standard, better health, infrastructural development and better cohesion among the farmers were observed within the village or community. When considered the group -based growers, majority of the groups were dominated by farm women, which ensures the empowerment the women.

Brockington, et al. (2016) carried out a study in south Indian village and stated that adoption rates were found to be very high among households, belong to upper wealth classes, where farm size was large and major proportion of individuals derived their primary occupation from cultivation. Low level of adoption was found among households belong to 'poor' and 'very poor' economic status.

Mazhar (2016) found that majority (60%) of the farmers in UP, India, were found to have low socio-economic status followed by 24.7 per cent farmers having medium socio-economic status and rest 15.3 per cent of respondents had high socio - economic status.

Poyyamoli and Padmavathy (2011) found that majority of the organic farmers in Bahor village of Puducherry, India, were of middle aged, had educational qualification from primary to collegiate level, possessed small sized farm, possessed high level of livestock, shown medium level of social participation, innovativeness and high level of economic motivation, information seeking behavior, scientific orientation and risk orientation. They had also mentioned that majority of the organic farmers believed that progress is impossible without risk.

### 2.2 Sources of information from where growers access information related to organic farming.

Agwu et al. (2008) said that majority of the farmers in Enugu state, Nigeria will get benefitted from the radio broadcast regarding organic technologies. Cacek et al. (2009) did a study in Central and Northern states of America and stated that organic farming is capable of competing economically with conventional farming when importance is given to proper approaches during conversion. Information needs of organic farmers must be studied and the delivery systems should be tailored to meet those required needs. Zossou, et al. (2009) found that tools like video learning i.e Farmer-to-Farmer video to be more effective in transferring information on the technology characteristics rather than conventional training tools like Workshop, training, various integrated rural development approach, etc. The video and workshop could reach 74 and 22 percent of women respectively in the villages of Central Benin where interventions took place. Nwachukwu (2010) shows that majority of the respondents (82.6%) in Imo state, Nigeria, had possession of radio sets and 64.3% of the respondents have asserted that radio is a useful source of information for organic agricultural technologies. It was concluded that majority would get benefitted from radio broadcasting. Sarker and Itohara (2010) conducted a study to find out the factors affecting the adoption of organic agriculture in Peshawar of Pakistan. The study concluded that organic farming not only increases the farmers' income but also protect environment by reduced use of toxic chemicals and fertilizers. The study suggested that government agencies as well as extension and research institutions must play a vital role in strengthening the awareness and advantages of organic farming. Poyyamoli and Padmavathy (2011) found that majority of the organic farmers in Bahor village of Puducherry, India, were of middle aged, had educational qualification from primary to collegiate level, possessed small sized farm, had livestock, shown medium level of social participation, high information seeking behaviour, innovativeness, economic motivation and scientific/ risk orientation. They had also mentioned that majority of the organic farmers had high risk orientation. Baker (2012) did a study in India and found that 44.2 percent of the farmers belong to middle age group. 100 percent of the farmers reported to watch TV programs, followed by 98.30 percent of the farmers who read newspaper, 96.70 percent of the farmers listen to radio, 83.33 percent of the farmers follow kissan call centre, 70.80 percent of the farmers read magazines, 29.20 percent of the farmers attended workshop/ training on organic farming whereas, only 19.20 percent of the farmers search online to search information related to organic cultivation. Benabise and Banciles (2012) found that television/radio and reading materials were the least popular sources of information in Cagayan valley, Athens, regarding the environmental and economic impact of organic farming. Mahapatra (2012) said that there is a need for assessing the lack of information among agricultural stakeholders in Odisha to assess their information need. Extension professionals must develop liasioning and empowering the farmers with improved technologies and farming practices. In modern digital era, farmers with information accessing ability, are not only limited to TV, radio and newspaper but inclined towards searching and releasing information through means of network (He, 2012). Rezvanfer et al. (2012) revealed that the majority of the Iranian farmers used communication channels and sources of information at low and medium level. Adebayo and Oladelf (2013) did a study in Southwest Nigeria and indicated that extension agents, neighbors, progressive framers, various farmers' organization and family members are the chief sources of information. Results show that respondents' information seeking behavior is informal. Therefore, information on organic farming should make use of these channels of information more frequently in combination to other available sources of information. Fallys (2013) carried out a study in Central region in Malawai and found medium level of radio use among the farmers. Farmers were found to prefer print media more while accessing information. Farmers' use of various communication channels does not necessarily indicate that farmer prefer that channel however, in the absence of the preferred channel, other channels available to them would be used. Manige et al (2013) stated that database of farmers in Gulbarg district of Karnataka and the internet-based application system, enabled the dissemination of need and demand-oriented information to the farmers in the form of text massages. This mobile SMS service was found to be encouraging. Farmers could find it very easy to follow. Kumar et al. (2014) did a study in Madhya Pradesh and revealed that organic farmers had better interest,

high inspiration, better education, high mass media exposure and faith in organic farming. Well educated farmers collect information regarding organic farming and importance of organic produce from different information sources like mass media (television, radio, newsletters and extension literature) as well as through consulting agricultural experts. Sasidharan (2015) carried out a study in Kasaragod district of Kerala and revealed that organic farmers were consulting various sources information to for awareness and knowledge regarding various aspects of organic production system. Government policies initiated organic farming in the study area had caused a sudden change in farming system. Cluster members, extension officers, trainings and exposure visits were the major sources along with online information source. Mittal and Mehar (2016) presented the combinations of information sources used by farmers in the study area in India. 9.5 per cent of the farmers are using single source of information and depend on other farmers for various information. One-third of the farmers were using combinations of 2-3 sources of information, whereas 21.6 per cent of the farmers were using upto four sources of information. The result also showed that socio-economic attributes of farmers like age, farm size and level of education were positively and significantly related to farmer's use of sources of information regarding agriculture.

### 2.3 Attitude, perception and adoption of organic farming among organic vegetable growers

Butler (1919) found that the main reasons for adopting the organic cultivation by the farmers in India, were soil health, plant growth, quality food, low cost and simpler technology, healthy environment, healthy life and consumer awareness about their health. Vine and Bateman (1981) and Wernick and Lockeretz (1977) found that farmers included in study conducted in England and Wales mainly adopted organic farming because of problems in inorganic farming. The difficulties faced by farmers in conventional farming included soil health and animal health problems. Svensson (1991) and Vogtmann et al (1993) did a study in West Germany found that farmers mainly shifted to organic cultivation to secure better prices for their farm produce. Codex Alimentarius Commission (FAO, 2001) stated that "organic agriculture is a holistic production management system that has reduced the use of synthetic fertilizers and pesticides. Avoids genetically modified organisms and minimizes pollution of air, soil, water as well as optimizes the health and productivity of interdependent communities. Midmore et al (2001) conducted a study in England, revealed that organic farmers mainly made their decisions to shift based on their perceptions about the financial viability of the organic production and concern regarding environment. However, many conventional farmers perceived larger financial risks associated with organic farming due to unavailability of special markets for organic products. Pugliese (2001) did a study in Italy and found that the spreading of organic farming methods and initiatives for sustainable rural development are in crucial stage in many places. It was suggested that organic farming can effectively contribute to sustainable rural development. Tress (2001) identified Danish farmers' motivations for organic conversion and desires to improve animal health, provision of quality products to consumers and better work environment defy the production practices of conventional agriculture. Howlett. et. al. (2002) carried out a study in Ireland and analyzed the views of farmers with regard to their perceptions about organic conversion process and their intention for conversion. The two motives for conversion were identified as producers' attitudes toward finances and environment. When the farmers were asked about the benefits of organic farming, their view was "better prices," and, "greater income." Nakro (2003) did a study in Nagaland and found that young farmers had more faith on organic paddy cultivation and age of the respondents were negatively but significantly correlated with adoption of organic farming. Lauwere et al (2004) did a study and the study found that economic motives to be the least important among all categories of motives for organic conversion of farmers. Idealistic motives for conversion were cited most frequently by the farmers. Idealistic motives included farmers' interest for better personal and family health, sustainable farming and relationships with consumers. Technical motives were mentioned as the second most important motive towards conversion. Furthermore, institutional motives, concern for a positive image and social acceptance, were cited as third most frequently mentioned motive by the Dutch farmers. Bhattacharyya and Chakraborty (2005) did a study in India and suggested that the combination of organic and inorganic is definitely the best option as on today till the existing dietary system is changed. Rapid population growth may be considered as the main reason for the food and nutritional security. Authors suggested neither conventional nor organic farming can face this challenge. Darnhofer et al (2005) carried out research in Austria and found that product sector characteristics were important considerations in farmers' conversion to organic agriculture. The researcher showed that farmers without livestock and farmers that engage in sugar beet production were less likely to convert to organic farm management. The study explained the importance of these considerations by alluding to governmental policies associated with sugar beet production and livestock market factors. Canavari et.al. (2008) did a study in Emilia-Romagna region, revealed that ethnocentrism could explain neither the present status of the farmers (organic vs. conventional) nor their future intentions regarding the adoption of agricultural methods of production. However, the absence of local origin is significantly affecting the choice of conventional farmers towards organic farming. Kallas et.al., (2009) carried out a study in vineyard holdings in the Spanish region of Catalonia and analyzed the decision to adopt organic farming practices among farmers. They used Duration Analysis (DA) to find the reason of adoption of organic farming. It has been found that farmers who are not risk averse are more inclined to adopt organic farming. Results have identified the policy changes relevant in motivating adoption of organic farming practices.

Charyulu and Subho (2010) found that in India organic farming practices are being practiced successfully in diverse climates, like in the rain fed, mountainous and hills of the country. The area under organic cultivation increased substantially during 2005 and 2006 and is presently more than 500,000 hectares. Constance and Choi (2010) did a study in United States and said that more than forty percent of the producers had some interest in organic production. They found a significant difference among the three groups regarding the structural and attitudinal characteristics related to organic farming adoption. For the conventional producers, increase in revenue was the main facilitator for adoption of organic farming. The high level of uncertainty regarding organic production, marketing and certification were the main constraints. They had concluded that increased institutional support could facilitate organic adoption. Hall (2010) found a positive attitude of farmers toward using non-organic farming and a negative attitude toward using organic farming was observed. The barriers in adopting organic farming were reduced yields, more pest and disease, increased workload, higher weed infestations etc. This negative image of organic farming practices may have negative affect Ohio grain farmers' perception and attitude toward organic farming practices. Jayavardhana and Sherief conducted (2010) a study and found that education, information seeking behavior innovativeness, risk orientation, self-confidence, market perception, knowledge, awareness, and attitude towards organic farming showed significant correlation with adoption. However, age, experience, livestock possession, training received negative and non-significant correlation with adoption of organic farming among the coconut-based farmers. Assis and mohd (2011) conducted a study in Kundasang, Sabah, Malaysia to find out the knowledge, perception, attitude and practices of organic vegetable growers. They found that the knowledge of the respondents on organic farming especially regarding the use of chemical pesticides, herbicides and fertilizers, need to be improved. They still are dependent on the conventional practices to control pests and diseases. Pornpratansombat et al. (2011) carried out a study in North-Eastern Thailand and found the influencing factors towards organic farming for organic farmers are demand for healthy products, human and animal health. They have also reported that organic food improves the longevity and the organic farming mitigate harmful effect of chemicals. Benabise and Banciles (2012) observed that organic compost was the top organic fertilizer that the farmers of Cagayan valley, Athens, were aware of and adopted. Bio-organic plant supplement made from fruit extracts and beneficial micro-organisms increase crop yields by as much as 30 per cent while reducing the use of chemical fertilizer by 50 per cent in the initial cropping. But, vermi based fertilizers was gaining slow popularity and awareness. Pandey and Singh (2012) found that the growth of organic farming is relatively slower. There are number of constraints small farmers face in adopting organic farming. The non-availability of sufficient organic input, bio fertilizers and market for organic produce are the main constraints of organic farming in India. Prashanth and Reddy (2012) did a study in Karimnagar district of Andhra Pradesh and said that training could enhance the capacity of the farmers to understanding level and hence a positive and significant relationship was observed between the extent of adoption of organic practices and the training attended. They did not find any significant relationship between age and the extent of adoption of organic farming practices. Devdas and Helen (2013) made an attempt to study attitude of farmers towards organic vegetable cultivation in India. Majority of the organic growers (86.67 percent) had shown favorable attitude towards organic farming. More than 80 per cent of the conventional farmers had shown favorable attitude towards organic farming. Above 90 per cent of the both, organic and conventional farmers, believed that use of organic farming practices is essential for improved quality of vegetables. Almost cent per cent of the conventional farmers have reduced the use of chemical fertilizer and had increased the application of organic manures. Sukla et al. (2013) studied the current status of organic farming in India. They found that such farming can contribute to food security by improving nutritional intake, supporting livelihoods and enhancing biodiversity. It would also reduce vulnerability to climate change. They have concluded that, organic farming could sustain on an average 30 percent higher biodiversity compared to conventional farming. Nenna (2014) studied the adoption level organic farming technologies. The organic farming adoption index of 0.45 implies that the farmers had 45 per cent adoption for all the organic farming technologies in the study area. The low adoption could also be due to the paucity of technical information on organic farming practices. Panda (2014) did a study in Mohanpur block, West Tripura and found that lesser adopted technologies are biological pest control and soil testing. Borthakur et al. (2015) did a study in Assam state and concluded that majority of the farmers had not adopted bio-fertilizer. Low adoption is due to the lack of knowledge of bio fertilizers. Regarding seed rate, they were practicing conventional system. Traditional mindset of the farmers made them follow accurate seed rates. Ramesh and Divya (2015) conducted a study in Coimbatore and found that there was a significant relation between education, qualification and organic food products. There was no relation between monthly income and level of price for organic food products. Majority of respondents, preferred quality of the product over other parameters. Consumer information was the main barrier in increasing the market share of organic products. Ullah, et. al. (2015) did a study in Peshawar-Pakistan and found that farmers' perception about the adoption of organic cultivation plays an influential role in adopting or non-adopting organic cultivation. Adoption of organic cultivation has a positive and significant impact on the life of farmer. Hence, the farmers should be motivated and be aware of the advantages of organic cultivation through extension and research intuitions both to increase income and change their attitude and

perception about improved technique of the farming. Adoption of organic cultivation is essential for farmers and thus comprehensive policy and strategies should be made for awareness of farmers. 2.4 Factors which are responsible for attitude, perception and adoption of organic farming. Laureiro et. al. (2001) carried out a study in Zurich, Switzerland and found that higher the concern about the environment more would be the likelihood towards organic food. MacDonald (2004) found that 95 per cent of the farmers from Europe and North America said their agricultural income raised after converting to organic agriculture, most of them were

70%

**MATCHING BLOCK 5/15**

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[https://www.iima.ac.in/c/document\\_library/10Or ...](https://www.iima.ac.in/c/document_library/10Or...)

attributing this to the reduced cost of production and higher prices. They found organic cotton farming more profitable compared conventional.

Hattam and Holloway (2005) did a study in Mexico and said that alternative sources of income have a positive effect to aid adoption, also cultivation of other crops positively influenced the decision of organic farmers. They rely more on family labor. Membership of social organization increases the likelihood of conversion to organic farming. Lea and Worsley (2005) did a study in Australia and found that compared to the conventional food products, organic foods are perceived as healthier. Lopez and Requena (2005) did a study in Spanish olive orchard and found that the organic farm productivity tends to be lower than that of the conventional growers because organic growers were less experienced as cultivators. None of the socio personal characteristics like, age, sex, marital status, amount of formal education etc. were found to be significantly associated with the adoption of organic farming. Narayan (2005) presented the relevance and constraints of organic farming in India. As per the finding India is lagging far behind in adoption of organic farming. Only achievement seems to be the laying down of the NSOP and approval of 4 accreditation agencies. The study suggested that substantial financial assistance by government is necessary to promote organic agriculture. Marketing system for the organic produce is a vital factor to promote domestic sales. Ramesh et.al. (2005) stated in the article "Organic farming: Its relevance to the Indian context" that increase in consciousness about conservation of environment and health issues associated with agro- chemicals and consumer choice to safe food are the factors that lead to growing interest in organic agriculture. The scope of organic agriculture in developing countries is increasing because it needs less financial input and pay more importance to rural and human resources. Organic farming does not need costly investments in inputs rather organic agricultural policies improve local food security. Lower input costs and favorable price can offset reduced yield and make organic farming profitable than conventional farming. Stobbelaar. et. al. (2007) conducted a survey among pupils of Dutch said that organic farming is an established method of sustainable agriculture. Most of the techniques in organic farming, like inter cropping, mulching, raising animals etc are the same to various traditional farming system. Chakrabarti (2010) found that price and limited availability of input were the most critical barriers in progress of organic farming in India. Takagi (2010) conducted a study in West Java and Bali and result showed various factors associated with awareness of organic farming like location, gender, educational level, exposure to the pilot farms, information sources but they didn't show any statistically significant relationships between awareness and attitude toward the practices. Devi, et. al. (2014) revealed from Kasargod, India that educational level, farming experience; returns from farming and extension of technical support received by the farmers were the major factors that influenced the decision making with regard to adoption of bio-agents. Xie et. al. (2015) did a study in China and stated that premium prices and unavailability of input were the main barrier in increasing the market share of organic product. 2.5 Policy framework to improve the organic farming scenario Mahale (2002) said the Indian standards are based on the IFOAM basic standards and the seal "India Organic" has been established. In October 2001, the export of organic produce was brought under government regulation but not domestic market and import. Balachandran (2004) said organic farming in Kerala facing a stiff challenge from different angle. The fundamental requirement is to spread awareness in the society regarding the ill effects of modern agriculture and the positive angle of organic agriculture. It was suggested that the government and other institutional agencies must support development of model organic farm in the state where farmers would learn the techniques. However, immediate transition to organic farming is not advisable, even phased reversion may cause temporary financial risk, which may be avoided if there is support from authorities. Guthman (2004) carried out a study in California and stated that the role of regulations in supporting and controlling the organic farming is considered as beneficial by some, while others have shown concerns that this is leading to a system of institutionalization or 'conventionalization' of organic sector. Darnhofer, et al. (2005) did a study in Austria and found that farmers were willing to take risk, foregoing some of the income." Also, said that these growers were likely to convert once "technological uncertainties have been taken care off" and once the market for organic products is available. Lopez and Requena (2005) did a study in Spanish olive orchard and suggested that some strategies could be easily taken by public institutions to encourage the adoption of organic olive cultivation, like promotion of training and education offering courses,

conferences, etc. Expansion and creation of specialized public and private organizations responsible for diffusion of environment friendly agricultural practices; funding for training; incorporation of young people; development of training programs regarding agricultural management and business administration. Halberg, Alroe, Knudsen & Kristensen (2006) did a study in Italy and stated that the scope of higher income has encouraged developing countries to participate in global organic market. Usually, they deal in fair trade through consolidation with different importing countries. Smallholder farmers in developing countries may face numerous difficulties towards adequate financing, management skills, consistency in workforce, cooperation and partnership, cultural differences etc. Padel et.al. (2007) did a study in Europe and argued that organic farming is value-based however, not all of these values of organic farming are covered by minimum regulatory standards. There is concern that in a growing anonymous and globalized market these might be neglected. Dabbert et. al., (2008) carried out a study in New York and stated that as the basis of the current certification system was developed decades ago, and organic farming being in its early stage, the level of international trade being low, innovative and efficient certification process needs to be developed without making compromise in the certification quality. Kilcher, Eisenring, & Menon (2008) found that the domestic organic market is growing rapidly at a rate of 30–40% annually. India Organic Trade Fair, annually organized by the International Competence Centre for Organic Farming (ICCOA) had helped in large for developing local organic market. Organic produces can also be found in retail shops which devote separate place for organic products, producer owned stores, informal haats, online stores etc. Stolze Matthias and Nicolas Lampkin (2009) concluded that organic farming has become the focus of attention for policy-makers, consumers and farmers in Europe and state institutions are involved in regulating and supporting the organic sector. The study pointed out a varied and complex policy measure that could be developed and implemented to support the organic sector. However, the study stated that balancing societal and consumer goals and balancing institutional and private stakeholders' interests in the organic sector create challenges for policy making. Kaur (2010) found that organic agriculture is very much needed in India. But the major constraint felt in the development of organic farming in India is the failure of the policy makers to take a concrete decision to promote organic agriculture. Reddy (2010) argued that organic agriculture concept has been neglected in the agricultural Policy and there are less government assistance for the development of organic agriculture in the country compared to the conventional agriculture where assistant in the form of subsidies and extension services are available. He said that proper encouragement may develop organic farming in India. According to Agricultural and Processed Food Products Export Development Authority (APEDA, 2011), The government is promoting organic sector with financial assistance to organic farmers. Government's organic friendly policy has also motivated the private sectors to get involved in farming, certification process, processing, retailing system, exporting and bringing in new innovation. Namdev et al. (2011) conducted a study in Jabalpur district of Madhya Pradesh and suggested that strong and appropriate attempt to be made by the extension personnel to motivate the conventional farmers to adopt improved production practices. Different inputs like manure and bio-fertilizer must be made available through societies or distribution centers at village to ensure supply of timely and quality inputs to the farmers. Ozkan and Ceylan (2011) did a study in Turkey and recommended for strengthening the organic market for producers and both domestic and foreign consumers. These recommendations are expected to contribute to the progress of organic farming as well as production and consumption of organic produce, leading to higher demand and returns. Rana (2011) reported that the system of farming in hill areas of India is organic in nature by default and they offer vast prospects of commercialization. The government has identified organic farming as one of the most important areas for development of agriculture and has implemented number of programmes for development of organic farming. Organic cluster project on 1200 ha at the cost of 26.7 million rupees (US \$490,000) has been initiated. Subrahmanyeswari and Chander (2011) have carried out a study to find the possibility of using organic farming as a tool for promoting gender equality in India. The authors have asked around 200 respondents in Uttarakhand and they found that the state government has been encouraging women's participation formally. They have also suggested the need for further studies to compare conventional and organic systems on gender basis. Pandey & Singh (2012) stated that Ministry of Commerce launched the National Organic Programme in 2000 in response of the detrimental impacts of Green Revolution in India. Organic industries are entirely export oriented wherein farmers are choosing organic because of economic benefit rather than sustainability. Archana (2013) argued that for promoting organic agriculture government interference is very much needed in Indian Agricultural sector specifically in organic farming. Provision of subsidies and knowledge of the adverse effects of inorganic agriculture may encourage organic agriculture. Meena, et. al. (2013) did a study in India and suggested measures for promotion of Organic farming: (i) promoting appropriate and strong extension services (ii) establishing strong linkage between producer and consumers (iii) Reducing cost of certification (iv) Making organic inputs available to small farmers (v) Developing domestic market (vi) Provision of subsidies and credit facilities (vii) Improving infrastructural facilities (viii) improving linkages in the supply chain (ix) Promoting research on organic agricultural (x) Provision of training regarding organic agriculture. Sirohi (2015) recommended to develop 'potential zones' and be named as 'Special organic farming system zone' like that of 'Organic Spice' zone in the state of Kerala or like tuber and special root crops in North Eastern

Hilly region and also promoting these zones as Agro-eco tourism centres. Planning needs to be done for establishing organic inputs production units. Integrated organic farming system, 'Model Organic Farm' can also be promoted in every district for quick adoption of organic farming.

CHAPTER-III MATERIALS AND METHODS Materials and Methods Research is a systematic and intensive process of carrying out a scientific method of analysis. As per Creswell (2008) "Research is a process of steps, used to collect and analyze information, to increase our understanding of a topic or issue". The scientific study of a problem requires that a researcher must follow appropriate methods and procedures in to reach reliable, unbiased and objective inferences. Whereas, methodology is the study, description, explanation as well as justification of methods. This chapter deals with various procedures, designed to plan, before conducting the enquiry and the method employed specifically according to the objectives and set for making decisions to evaluate and to draw inference. The present study is A study on attitude, perception and adoption of organic farming by vegetable growers in selected districts of North Bengal delineated to find out the attitude, perception and adoption of organic vegetable farming among vegetable grower in North Bengal. The entire chapter has been made under the following sub-themes

- 3.1 Conceptual framework and design of the study
- 3.2 Selection of study area and respondents
- 3.3 Data collection tool, method and description of the schedule
- 3.4 Selection as well as measurements of variables
- 3.5 Data processing, tabulation and procedure of analysis
- 3.6 Statistical methods used
- 3.1 Conceptual framework and design of the study

Organic farming system in India is not a new thing and it is being followed from ancient times.

77%

**MATCHING BLOCK 6/15**

W

<http://www.ouat.nic.in/sites/default/files/fin ...>

It is a method of farming which is primarily aimed at cultivating the land and raising crops in such a way so as to keep the soil healthy by use of

various organic wastes like crop, animal and farm wastes, aquatic wastes etc and other organic matter along with many beneficial microbes such as bio-fertilizers. It releases nutrients to crops for increased sustainability in production and for an eco-friendly pollution free environment. According to the definition of

89%

**MATCHING BLOCK 9/15**

W

<http://www.ouat.nic.in/sites/default/files/fin ...>

United States Department of Agriculture (USDA), "Organic farming is a system which avoids or largely excludes the use of synthetic inputs such as fertilizers, pesticides, hormones etc and to the maximum extent

of

73%

**MATCHING BLOCK 7/15**

W

<http://www.ouat.nic.in/sites/default/files/fin ...>

feasible rely upon crop rotations, crop residues, manures, organic wastes and biological system of nutrient mobilization and plant protection".

FAO said that "

Organic agriculture is a unique production system to promote

and enhance agro-ecosystem, including biodiversity, biological cycles and soil biological activity and this is achieved by using on-farm agronomic, biological

as well as mechanical methods in the exclusion of all synthetic off-farm inputs”.

### 3.2. Selection of study area and respondents

#### 3.2.1 Sampling Frame:

The study was carried out through a structured interview schedule. The interview undertook organic vegetable growers for assessing their socio- economic characteristics, factors influencing their information seeking behaviour, attitude towards organic vegetables growing, perception regarding organic farming in case of vegetables, adoption of organic vegetable farming and finding out constraints faced by them.

**3.2.2 Selection of Study Units** The study was conducted in Cooch Behar district and Alipurduar district of West Bengal, India. The districts were taken purposively due to convenience of the researcher and availability of vegetable growers as well presence of organic farming practices in vegetable cultivation. Coochbehar-I, Coochbehar-II, Dinhata-II blocks were purposively and these were selected from Coochbehar district. Whereas, Kumargram and Alipurduar-II blocks were purposively selected from Alipurduar district. Total 16 villages were selected randomly, from the selected five blocks. The villages are as follows

- Dhangdhinghuri village from Coochbehar-II block.
- Charaker Kuthi, Dawaguri, Dewanhat, Hourgiri, Talliguri, Ghughumari villages from Coochbehar-I block.
- Batasur Kuthi and Durganagar villages from Dinhata-II block.
- Telipara, Daldali, Kamakhyaguri, Khoardanga, Gochimari villages from Kumargram block.
- Joshodanga and Parokata villages from Alipurduar-II block.

Fig. 3.1 Sampling frame 3.2.3 Selection of organic vegetable growers for the study from selected districts

Total 200 respondents were taken for the study. 100 respondents from CoochBehar district and 100 respondents from Alipurduar district.

#### 3.2.4 Description of Study Areas (Cooch Behar district and Alipurduar district) 3.2.4.1 The District- Cooch Behar

##### Geography

The district is located between 25°57'40" and 26°32'20" North latitude. Between 88°04'40" and 89°05'35" East longitude. It has 3,38,700 ha geographical area. The district is located in the northeast of the state and surrounded by the district Jalpaiguri and Alipurduar in the north, Dhubri and Kokrajhar district of Assam are in the east and Bangladesh in the west and south. The district forms part of the Himalayan Terai zone of West Bengal. Total reporting area is 331565 ha, forest area is 4256 ha, area under non-agriculture use is 69431 ha, barren and uncultivated land is 263 ha, pasture and grazing land is 8 ha, land under miscellaneous trees and groves is 5800 ha, cultivable waste land is 286 ha, fellow land other than current fallow is 55 ha, current fallow land is 855 ha, and net area sown area is 250611 ha.

**Climate** Annual Rainfall is 3200 to 3300 mm, agro-climatic region is eastern Himalayan region -2. The district experiences high level of humidity and abundant rainfall. The temperature is rarely ever excessive. The flora here are palms, bamboo, creepers, ferns, aquatic plants, fungi, timber, orchid, grass, vegetable, fruit etc.

**Topography** Cooch Behar is a flat region with a southeastern slope through which the main river of the district flow. Most of the highland areas are in Sitalkuchi region and most of the low-lying lands are in Dinhata region. The rivers in the district generally flow from northwest to southeast. Six rivers in the district are Teesta, Jaldhaka, Torsha, Kaljani, Raidak, Gadadhar and Ghargharia.

**Fig 3.2 Position and map of Cooch Behar district**  
**Economy** The economy of the district is solely dependents on agriculture. The inland marketing of the agricultural produce supports the economy of Cooch Behar. However, in supplement to the agriculture-based economy, some measures have been taken to ensure growth in the industrial sector. As the district is agrarian, the agro-based industries are the first priority. **Demographics** According to 2011 census, Cooch Behar district has a population of 2,822,780. Population density is 833 inhabitants per square kilometer (2,160/sq mi) and the population growth rate over the decade 2001–2011 was 13.86 per cent. Cooch Behar has a sex ratio of 942 females

per 1000 males. Literacy rate is 75.49 per cent. As per the census report of 2001, cultivator's male no is 2,77,339, female no is 1,15,222 and total is 2,85,426.

Agricultural Scenario Cropping intensity is 204 per cent, total irrigated area is 130416 ha, agro-climatic zones are Terai, Teesta and Alluvial. No. of agricultural sub-divisions are 4, no. of agril. blocks are 11 (Tufanganj block consisting of Tufanganj-I & II Panchayet Samiti), no. of small farmers are 50748 nos, no. of marginal farmers are 249437 nos. 85-90 per cent of the total population depends on agriculture and allied. In spite of the obstacles like poor soil status, acidic nature of soil, lack of irrigation facilities, the adoption of improved varieties and inclusion of high yielding varieties and hybrid varieties through on-going schemes like ATMA, NFSM, RKVY etc. The production and productivity of different crops are increasing, keeping pace with the increasing demand. No. of regulated markets are 6, no. of haats is 253, no. of cold storages is 12 (capacity of 16, 11, 423.05 qt), no. of input dealers is 1500, no. of farming families is 3, 27, 127, consumption of fertilizers is 52000 m.t, nitrogenous fertilizers is 30.2 ('000mt), phosphatic fertilizers is 12.2 ('000mt), potash fertilizers is 9.6 ('000 m.t).

### 3.2.4.1.1 Cooch Behar-I block

The block Cooch Behar-I consists of 15 nos of Gram Panchayats (GPs) and 149 villages. The total geographical area of the area is 362.42 sq. km. Net cultivable area is 23,899ha. The main sources of irrigation are river lift irrigation (7), deep tube well (10), shallow tube well (1107) etc. The soil is sandy loam and the climate is modestly dry with moderate rainfall. The total population is 258564 (male is 146298 and female is 138266). Among this population, the total no. of Schedule Caste (SC) and Schedule Tribe (ST) population is 96082 and 886 respectively. The sex ratio is 945:1000 and the child sex ratio are 954:1000. Percentage of child population is 15.60%. The literacy rate (excluding upto 6 year's population) of the block is 67.98%. Total no. of literates is 163,277 (males are 95,668 and females are 67,609). 18,185 people are agricultural labor.

Fig 3.3 Map of Cooch Behar-I block 3.2.4.1.2 Cooch Behar-II block The block Cooch Behar-II has of 13 Gram Panchayats (GPs) in its area of operation. The geographical area of the block is 362.36 sq. km. Net cultivable area is 24,011 ha. Agricultural land is 18,789 ha. Total irrigated area is 9811 ha. The main sources of irrigation are river lift irrigation (10), shallow tube well (718) and deep tube well (7). Soil is sandy loam and the climate is modestly dry with moderate rainfall. The total population of the block is 2,98,163 (males are 1,54,011 and females are 1,44,152). Among the population, the total no. of Schedule Caste (SC) and Schedule Tribe (ST) population is 1,19,479 and 2,904 respectively. The sex ratio is 936:1000 and the child sex ratio are 960:1000. The percentage of child population is 14.49%. The literacy rate (beyond 0-6 year's population) of the block is 74.56%. Total no. of literates [s 1,90,093 (males are 1,09,694 and females are 80,399). Among this 20,221 no people are associated with agricultural labour. No. of Below Poverty Line (BPL) families of this block is 31,226.

### Fig 3.4 Map of Cooch Behar Block-II

3.2.4.1.3 Dinahata-II block The block Dinahata-II has of 12 Gram Panchayats (GPs) in its area of operation. The total geographical area of the block is 103.30 sq. km. Net cultivable area is 18626 ha. Main sources of irrigation are river lift irrigation (18), shallow tube well (1290), deep tube well (8). Total population of the block is 205391 (males are 104443 and females are 100948). The population consists of, total no. of Schedule Caste 82324 and Schedule Tribe population is 843, respectively. The sex ratio is 967:1000 and the child sex ratio are 983:1000. The percentage of child population is 15.10%. The literacy rate (beyond 0-6 year's population) of the block is 66.57%. Total no. of literates is 116,080 (males are 67,841 and females are 48,239). Total no. of agricultural labourers is 19,830.

### Fig 3.5 Map of Dinahata-II block 3.2.4.2 Alipurduar district

Alipurduar district, carved out from Jalpaiguri as on 25th June, 2014 as 20th district in the state of West Bengal, India. It consists of Alipurduar municipality and six community development blocks viz. Madarihata, Birpara, Alipurduar-I, Alipurduar-II, Falakata, Kalchini and Kumargram. There are 66 nos pf gram panchayats and nine no of census towns. The district has its headquarters at Alipurduar. It consists of mainly rural population. More than 80 percent of the population belong to SC/ST community. It's the hometown of various ethnic tribes like Rajbanshi, Santhals, Madasia, Rabha, Metch, Bodo, Toto & Oraons. Geography Alipurduar shares the western part of Jalpaiguri District & eastern part of Assam State and is close to international borders with Bhutan in the North & South. It coordinates between 26029 N & 89034 E to 26.480 N 89.570 E. It has geographical areas measuring 3383 km<sup>2</sup> (1306 sq mile) and population of the district is almost 17.00 lakh.

Fig. 3.6 Map of Alipurduar District Climate According to the classification, Alipurduar district falls under Terai and Teesta alluvial zone. It has six blocks. Alipurduar District has a humid tropical climate, average air temp. 24.10 C and annual

rainfall is 3160 mm to 3500 mm, temperature is 100 C to 320 C with relative humidity of 82 percent. The soil in the district is subjected to the following natural and man-made disasters due to the topography, drainage system, soil texture, agro-climatic conditions, land use and existing cropping sequences/ practices etc. Topography Topography of the land is cut across by rivers, streams and hills, tea gardens and forests. Major rivers are Torsa, Raidak, Kaljani, Sankosh and Gadadhar. It has undulated land slope causes runoff in the catchments of watersheds, mainly in the northern part of the district. Flash floods are causing sand deposition in inundated areas of the river and rivulets. Poor capacity of soil in this area, to retain adequate moisture and nutrients in the post monsoon period resulting in soil reaction, ranging from medium to highly acidic.

Economy There is huge possibility of development of Tourism as Industries in the Tea Gardens, Dense Evergreen Forest with Wild Lifes and Hills with flowing river. Jaldapara sanctuary, Buxa Tiger Reserve, Buxa Fort, are there in this district. Besides agriculture, people of this district, earn their livelihood from tourism, fishing, making of wood and cane-based furniture. Demographics As per 2011 census, Alipurduar has a population of 15, 01, 983 out of which 7, 70, 905 are males and 7, 31, 078 are females. Sex ratio is 948 per 1000. Literacy rate for the adult population is 89.16 per cent and population density is 539 per Sq. Km. Agricultural Scenario Soil is sandy loamy and loose textural class, prone to soil erosion, having less water holding capacity. Soil is deficient in organic matter and permeable to water and nutrient leaching. Tea is one of the main resources of income in this district. Tea plantation and processing are the only Industry, covering 52,566.4 Ha of land. The famous "Duars Tea" is also produced here. Most of the people of the district, depends on agriculture and grow Rice, Jute, Potato etc. 3.2.4.2.1 Kumargram block Rural areas under Kumargram block have 11 no of gram panchayats viz. Chengamari, Khoardanga-I, New land Kumargram Sankos, Turturi khanda, Kamakhyaguri-I, Khoardanga-II, Valka Barabisa-I, Kamakhyaguri-II, Kumargram, Raidak, Valka Barabisa-II. Urban area under the block consists of one town namely Uttar Kamakhyaguri. Kumargram police station serves the block. Headquarters of the block is in Kumargram. Barobisha / Barabisa is a fast developing business and cultural hub. Which is located on the National Highway 31 C, towards Assam. It's 8 km away from Bengal-Assam border.

Fig. 3.7 Map of Kumargram block

#### 3.2.4.2.2 Alipurduar II Block

The Alipurduar II Community Development block is located in the south-central part of the district. The Chiklajhord River flows through the eastern boundary of the community development block. It has hilly terrain which is the part of the sub-Himalayan range.

The Alipurduar II block is bounded by the Kalchini and Kumargram CD blocks in the north, Kumargram CD block in the east, Tufanganj I and Tufanganj II CD blocks are in Cooch Behar district, in the south and Alipurduar I CD block is in the east.

Alipurduar II CD block has an area of 318.92 sq km. It has 1 panchayat samity, 11 gram panchayats, 161 nos of nos of gram sansads (village councils), 79 nos of mouzas, 78 nos of inhabited villages and 2 census towns. Samuktala police station serves the block. Headquarter of this CD block is at Jashodanga.

Gram Panchayats of Alipurduar II block/ panchayat samiti are: Bhatibari, Chaporerpar I, Chaporerpar II, Kohinoor, Parokata, Mahakalguri, Majherdabri, Shamuktala, Tatpara I, Tatpara II and Turturi.

Fig. 3.8 Map of Alipurduar-II block

3.2 Data collection tools and description of the interview schedule The present study has considered qualitative as well as quantitative data, collected both from primary as well as secondary sources. The primary data were collected personal interview method with structured interview schedule.

3.3.1 Pilot Study Due to pandemic situation, pilot study could not be conducted. Primary data could not be collected and many data were collected from secondary information sources like Panchayat office, ADA office etc. 3.3.2 Construction of schedule after pre-testing Schedule is defined as a device having set of questions, asked and filled by the interviewer physically to another person. It aims to explore new information for testing an assumption. In the present study, the interview schedule was prepared for collection of information, keeping in mind the major objectives and variables of the present study. The draft schedule was pre-tested with 25 non-sample respondents from each district before presenting to the actual respondents. On the basis of analysis of the data and suggestions made by the respondents, the schedule was rechecked and modified with appropriate contents. Pre-testing helped in ensuring the validity of the content under local conditions. The schedule consisted of both open and close ended questions. 3.3.3 Field Data Collection The data were

collected during March 2020 to August 2021 with the help of the structured interview schedule constructed for the study. The data were then collected through personal interview method. The schedule was presented and explained to respondents in local language and the responses were recorded in English. The physical interview was carried out by the researcher herself. 3.3 Selection and measurements of variables A variable can be defined as something which can be observed and that is of such a nature that each observation can be defined into one and only one of a number which are of mutually exclusive classes (Kerlinger, 1978). Research evidences indicate that perception, attitude and adoption of organic farming are influenced by the antecedent factors. Considering the suitability of the variables to the present research, twenty-four independent variables and three dependent variables were identified for investigation. A detailed account of all the variables with their measurement procedures are explained below. The variables for the study were selected on the basis of the review of literature, consultation with experts and from past studies conducted in the similar subjects. The variables, which were found to have importance with the present investigation, were then included in the study. The instruments are used to measure the variables together with their detailed procedure is presented here. 3.4.1 Measurement of independent variables The independent variables (which had a direct or indirect bearing on the dependent variables) namely age, education, land holding, livestock possession, information seeking behavior, mass media exposure, exposure to training, extension participation, innovativeness, management orientation, scientific orientation, cosmo-politeness, socio-economic status, economic motivation and risk preference were taken in the investigation. The operational definitions of these variables and their measurement techniques have been described below.

Sr. No Independent variable(s) Instruments used with partial modification(s) 1. Age

Scale developed by Trivedi (1963) used with required modification 2. Caste Scale developed by Trivedi (1963) used with required modification 3. Education

Scale developed by Trivedi (1963) used with required modification 4. Religion

Scale developed by Hanglem (2017) used with required modification 5. Economic class Scale developed by Hanglem (2017) used with required modification 6. Land holding Scale developed by Trivedi (1963) used with required modification 7. Livestock possession Schedule developed for the study 8. Primary occupation Scale developed by Trivedi (1963) used with required modification 9. Secondary occupation Scale developed by Trivedi (1963) used with required modification 10. Family type Scale developed by Trivedi (1963) used with required modification 11. Family size Scale developed by Trivedi (1963) used with required modification 12. Social Participation Scale developed by Trivedi (1963) used with required modification 13. Farm Experience Scale developed by Sreedaya (2000) used with required modification

14. Family members involved in agriculture Schedule developed for the study

15. Information seeking behavior Scale developed by Singh (2002) used with required modification 16. Mass media exposure

Scale developed by Bhatti (1985) used with required modification 17. Exposure to training Scale developed by Desai et al (1977) used with required modification. 18. Extension participation Scale developed by Kalaivani (1992) used with required modification 19. Innovativeness

Scale developed by Moulik (1965) used with required modification 20. Management orientation

Scale developed by Samantha (1977) used with required modification. 21. Scientific orientation

Scale developed by Supe (1969) used with required modification. 22. Cosmo-politeness

Scale developed by Sekar (1979) used with required modification. 23. Economic motivation

Scale developed by Moulik (1965) used with required modification. 24. Risk preference

Scale developed by Supe (1969) used with required modification.

3.4.1.1 Socio personal Variables Age It refers to chronological age of the respondents at the time of interview. On the basis of their age, the respondents were placed under young (> 35 years), middle (35-50 years) and old age group (<50 years). It was measured by using the scale developed by Trivedi (1963). The scoring was done as mentioned below

Categories

Age group

Score

Young

Young (>35 years)

1

Middle age

Middle age (35-50 years)

2

Old

Old (< 50 years)

3

Caste The scale consisted of details of caste like General, Schedule Caste, Schedule Tribe and OBC. It was a categorical variable and 1,2,3 and 4 score were assigned to indicate the category. It was measured using the scale developed by Trivedi (1963) with required modification.

Caste Category

Score

General

1

Scheduled Caste

2

Scheduled Tribe

3

OBC

4

Education It refers to the years of formal education of farmers starting from illiterate to post graduation and above level of education. It was measured by the SES scale, developed by Trivedi (1963) for this purpose with slight modification. The scores were assigned like (i) Illiterate (0) (ii) Primary (1) (iii) Up to middle (2) (iv) Up to secondary (3) (v) Up to senior secondary (4) (vi) Graduate (5) (vii) Post Graduate and above (6).

Education Level Score Illiterate 0 Up to primary 1 Up to middle 2 Up to secondary 3 Up to senior secondary 4 Graduate 5 Post Graduate and above 6

Religion The variable consists of different religions like Hindu, Muslim, Christian and Others. It was also a categorical variable and 1,2,3 and 4 score/ scale value was assigned. It was measured by using the scale developed by Hanglem (2017) for this purpose with slight modification.

Religion Score Hindu 1 Muslim 2 Christian 3 Others 4

Economic class The variable comprises of BPL (Below Poverty Level) and APL (Above Poverty Line). It was also a categorical variable, 1 and 2 score/ scale value was assigned. It was measured by the scale developed by Hanglem (2017) for this purpose with slight modification.

Economic class Score

BPL

1

APL

2

Land holding Land holding refers to the cultivated land, in terms of acres, possessed by the respondents. The farmers were categorized into three groups on the basis of their land holding i.e. marginal farmers (Upto 2.5 acre), small farmers (2.6 to 5 acres), semi-medium farmers (5.1 to 10 acres) and medium farmers (< 10 acres). It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

Farmers' type

Land Holding(acres)

Score

Marginal

Upto 2.5

1

Small

2.6-5

2

Semi-medium

5.1-10

3

Medium

<10

4

Livestock possession Livestock possession was operationalized as the no of livestock possessed by the respondents such as cattle, buffalo, sheep and poultry. Livestock possession is the number of animals owned by the respondents. One number was assigned to each animal above the age of 1 year. Organic farming incorporates the concept that man and farm animals are parts of a ecological system (Gera 2010). Thus, respondents were divided into low, medium and high categories of livestock possession with the help of equidistance method of classification.

Primary Occupation

The variable comprises of categories like wage labor, crop farming, business, service and Others. It was also a categorical variable and scores like 1,2,3,4 and 5 were assigned. It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

Primary Occupation Score Wage labor 1 Crop farming 2 Business 3 Service 4 Others 5

Secondary occupation The variable comprises of categories like wage labor, crop farming, business, service and Others. It was also a categorical variable and scores like 1,2,3,4 and 5 was assigned. It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

Secondary Occupation Score Wage labor 1 Crop farming 2 Business 3 Service 4 Others 5

Family type The scale included option of nuclear or single and joint family. It was a categorical variable and 1 and 2 scores, were assigned. It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification.

Family type

Score

Nuclear/single

1

Joint

2

Family Size The scale consists of categories like Small (upto 4 members), Medium (5-6 members) and Large (above 6 members) family size. It was aslo a categorical variable and scores like 1,2 and 3 were assigned. It was measured by the scale developed by Trivedi (1963) for this purpose.

Family Size

Members (No.)

Score

Small

Upto 4

1

Medium

5-6

2

Large

Above 6

3

Social Participation: The scale consists of details about the participation of respondents in any social organization and recorded as member of no organization, member of one organization, member of more than one organization and office holder of any organization. It was a categorical variable and score like 0,1,2 and 3 were assigned. It was measured by the scale developed by Trivedi (1963) for this purpose with slight modification. Social Participation Score Member of no organization 0 Member of one organization 1 Member of more than one organization 2 Office holder of any organisation 3

Farm Experience The respondents were divided on the basis of their farm experience and classified into four categories (upto 10 years, 11-20 years, . It was measured by the scale developed by Sreedaya (2000) for this purpose with slight modification.

Family members involved in crop farming

The respondents were divided on the basis their number of family members, involved in crop farming.

Information Seeking Behavior

According to Rogers and Shoemaker (1971) communication behavior is the extent to which an individual is seeking information and advices. The information seeking behavior indicates the activities performed for collection of scientific and technical information regarding organic vegetable farming practices. A score of 2 was assigned for always, 1 for sometimes and 0 for never. The respondents were classified into low, medium and high level of categories. Further the six different information sources were ranked on the basis of total weighted score and weighted mean score to find out the importance of these six sources of information. The scale developed by Singh (2002) was used with required modification.

Sr.

No. Information source Frequency of utilization

Always (2) Sometimes (1) Never (0) 1. Friend/Neighbor/Relative 2. Progressive Farmer 3. Other Farmers of the village 4. Assistant Director of Agriculture (ADA) 5. Agricultural Scientist (University/KVK) 6. Company Representative/NGOs

Mass media exposure It refers to the frequency of exposure to different mass media viz., radio, television, newspaper, farm magazine etc by the respondents to gain knowledge about organic vegetable farming. Different mass media sources were listed and respondents were asked to respond on how often they use these mass media sources. A score of 3, 2 and 1 was assigned to daily, often and sometimes response and the scores thus obtained by the respondents, for all the questions, in the schedule, were summed up to arrive at their final mass media exposure scores. The respondents were categorized in low, moderate and high level of categories. The level of mass media exposure was arrived based on the rank secured through weighted mean score. The was scale developed by Bhatti (1985) with required modification is used for this purpose.

## Mass Media Source Frequency

### Radio

Daily (3) / Often (2) / Sometimes (1)

### Television

Daily (3) / Often (2) / Sometimes (1)

### Newspaper

Daily (3) / Often (2) / Sometimes (1)

### Farm magazine

Daily (3) / Often (2) / Sometimes (1)

### Kisan call Centre

Daily (3) / Often (2) / Sometimes (1)

### Online searching

Daily(3) / Often (2) / Sometimes (1)

Training attended Prashanth and Reddy (2012) stated that the trainings attended by a farmer contributes in his knowledge, skills and develops comprehensive abilities to acquire, process, understand and apply the information in appropriate situation. Training attended was operationalized as the number of trainings attended by respondents in last 5 years. The respondents were classified into three groups (0-2 no of training, 3-4 no of training and 5-6 no of training) depending on the number of trainings they have attended. The scale developed by Desai et al (1977) and used with required modification.

## Extension participation

It indicates the extent of participation of the organic vegetable farmers in different extension activities like group discussion, meeting, result demonstration, method demonstration, field day, field visit, kisan diwas, kisan mela and campaign. The frequency of participation was scored as 2, 1 and 0 for regularly, occasionally and never respectively. The equidistance method of classification was used to categorize the respondents into low, medium and high level of categories. The different extension activities were than ranked based on weighted mean score. The scale of Kalaivani (1992) was used with required.

### Sr. No.

### Extension activity

### Extent of Participation

Regularly (2)

Occasionally

(1)

Never

(0)

1.

Group Discussion/Meeting

2. Result Demonstration

3. Method Demonstration

4. Field Visit

5. Kisan Diwas

6. Field Day

7. Tour

8. Kisan Mela

9. Campaign

**Innovativeness** The characteristic of innovativeness is an important determinant in acceptance of the innovations, is an established fact. Innovativeness means the degree of individual interest and desire to seek changes in farming practices and to introduce such changes into their own field when it would be practicable and feasible. The four statements of scale developed by Moulik (1965) were taken with required modification. The innovativeness scale has two options for each statement i.e agree and disagree. The statements were given a score of 1 for agreeing and 0 for disagreeing.

Sr. No. Statement Agree (1) Disagree (0) 1. I feel restless until I try a new idea, I have heard about 2. I am cautious about trying a new practice 3. Often organic farm practices are not successful, however if they are promising, I would surely like to adopt them 4. I discuss about organic farming information with fellow farmers before trial

**Management orientation** It is the degree to which a respondent is oriented towards organic and scientific farm management consisting of planning, production and marketing functions. 12 statements were taken from scale developed by Samantha (1977) and used with required modification, four statements each for planning, production and marketing aspects. The management orientation scale has two responses for each statement i.e agree and disagree. The statements were score 1 for agreeing and 0 for disagreeing. Further, these four statements from each aspect were ranked on the basis of their total weighted score and weighed mean score.

Sr. No

Statement Response

A) Planning Agree (1) Disagree (0) 1. One should think in advance the crop to be grown 2. Prior decision about the variety of crop and time of sowing 3. The amount of fertilizer and pesticides for raising crop should be assessed before cultivation 4. Cost involved in raising crops must be calculated.

B) Production Agree (1) Disagree (0) 1. Timely planning of crop ensures a good yield 2. One should use organic fertilizers judiciously 3. Seed rate should be given as per recommended dose 4. Effective weed control is possible mainly by manual weeding

C) Marketing Agree (1) Disagree (0) 1. Market news is very useful to farmers 2. A farmer can get good price by grading his produce 3. A farmer can get better price for organically produce vegetables 4. One should grow those organic crops which has a demand in market

**Scientific orientation** The variable scientific orientation means the degree to which a respondent was oriented with scientific methods in organic vegetable farming. This scale consisted of four statements with two responses. The responses were taken on 2-point continuum i.e 1 for agree and 0 for disagree. The scale was developed by Supe (1969) and was used with required modification and finally ranked based on weighted mean score.

Sr.

No. Statement Agree (1) Disagree (0) 1. Improved methods of farming gives better result to a farmer than old method 2. The way the forefathers farmed should be modified scientifically 3. Even a farmer with lot of experience should use new method of farming 4. Though it takes time for a farmer to learn new method in farming, it is worth the effort.

Cosmo-politeness Cosmo-politeness is the tendency to have contacts outside one own environment, with the belief that all needs of an individual cannot be satisfied within the community. This variable was measured with the scale developed by Sekar (1979), and used with slight modifications. Based on the total score of the individual respondent, they were categorise into low, medium and high categories using equidistance method.

## Economic motivation

Refers to the degree to which a farmer desire to increase his income and maximizes his profit from agriculture. The statements were taken from the scale of Moulik (1965) with slight modification, and scored on the basis of the degree of economic motivation. The responses were obtained on 2-point continuum i.e 1 for agree and 0 for disagree. The respondents were than categories into low and high categories, each statement was ranked on the basis of their weighted mean score.

Sr.

No. Statement Agree (1) Disagree (0) 1. All I want from my farm is to make a reasonable profit 2. I would like invest in organic farming if it ensures higher profits 3. I have no hesitation to borrow money to run the organic farming properly 4. Even though organic farming is costly practice, I follow it 5. It is OK to spend extra money, purchase inputs, transport conveyance to grow organically.

Risk preference Risk preference is defined as the degree to which respondents were oriented towards risk and uncertainty and ready to face the problems in organic vegetable farming. The statements taken from the scale of Supe (1969) with required modification, the responses were obtained on 2-point continuum i.e 1 for agree and 0 for disagree. The respondents were than divided into low and high categories and different statements were ranked based on their weighted mean score.

Sr.

No. Statement Agree (1) Disagree (0) 1. One should try organic farming practices in own farm instead of advocating to others. 2. Adopting organic farming involves risk but it is worth doing. 3. A farmer who is willing to take greater risk than the average farmer usually does better financially. 4. Progress not possible without risk.

## 3.4.2 Dependent variables 3.4.2.1 Knowledge level of organic vegetable farming practices

Knowledge generally means familiarity gained by past experience. According to English and English (1961), it refers to a body of understood information, possessed by an individual /culture. Bloom et al. (1956) considered knowledge as that behavior and test situation which emphasized the remembering by recognition or by recall of ideas, materials phenomenon. It has been further said that knowledge is that personal information which is in line with the established facts. In this study, knowledge has been taken as the amount of understood information possessed by the respondents about organic vegetable farming practices. To measure the knowledge level of respondents, statements of the scale, developed by Bhatia (2015) were used with slight modification.

86%

**MATCHING BLOCK 10/15**

W

[https://www.researchgate.net/publication/23776 ...](https://www.researchgate.net/publication/23776...)

Farmers were asked to reply questions regarding the concept of organic farming, use of organic manures and crop residues,

knowledge of bio fertilizers, knowledge of vermicompost, weed management and pest management. The respondents were questioned for assessing their level of knowledge like full knowledge, partial knowledge and no knowledge and assigned the score of 2, 1 and 0, respectively. But in some cases they were asked whether they have any knowledge regarding a particular practice of organic vegetable farming and their responses were recorded as 'yes' or 'no' and assigned as 1 and 0 respectively. The scores thus obtained for various questions were summarised. The different practices were than ranked on the basis of score obtained.

## 3.4.2.2 Measurement of "Evaluation of perception"

Evaluation perception is the meaningful sensation of the respondent regarding the worth, efficiency, or value of organic farming practices in terms of various dimensions like simplicity, profitability, efficiency, flexibility, input availability and sustainability, based on their experience with the practice. The six dimensions were taken from the scale developed by Patel. C. Dhirubhai (2005) with slight modification. The respondents were asked to give responses for each dimension of

organic farming practices. Scores of 0,1 and 2 were given to the responses for low medium and high respectively. The evaluation perception for each of these dimensions was arrived by adding the scores. 3.4.2.3 Attitude towards organic farming Attitude refers to a tendency to respond, positively or negatively, towards any idea. The scale consisted of 18 statements and taken from the scale developed by Hanglem (2017), used with slight modification. The responses were rated on five-point continuum starting from 'strongly agree' to 'strongly disagree' with (+)2 to (-)2 scores. The statements were than selected following the Likert scale developed procedure. The alpha-coefficient for the sale was 0.76.

### 3.4.2.4 Adoption

50%

**MATCHING BLOCK 15/15**

**W** <http://www.saulibrary.edu.bd/daatj/public/inde ...>

of organic farming According to Rogers and Shoemaker (1971), decision to make full use of new or improved ideas as the best

course available. A well-structured interview schedule was prepared on the basis of organic vegetable farming practices, recommended by International Federation of Organic Agriculture Movement (IFOAM) , Germany. To measure the extent of adoption, the farmers were asked to reply about the use of each recommendation on three-point continuum i.e full adoption, partial adoption and no adoption and score of 2, 1 and 0 were assigned, respectively. The obtained scores were then summed up respondent wise and component wise. On the basis of weighted mean score, orrganic farming practices were ranked.

3.4.2.5 Constraints faced by farmers in adoption of organic vegetable farming Constraints are 'confinement', the act to determine or 'confine action', 'bound' and 'faltered condition', restriction of liberty or free action. A list of possible constraints perceived by the respondents was prepared after consulting various literature after detailed discussion with scientists and extension personnel. Statements were taken with slight modification from the scale developed by Bhatia (2015). Constraints were than divided into seven groups, i.e. technological constraints, economical constraints, manures and bio fertilizers constraints, pest management constraints, marketing constraints, transfer of technology constraints and other constraints. The respondents were asked to mention the constraints faced by them in organic vegetable farming cultivation. Frequencies of the constraints were measured with three-point scale i.e 'very serious', 'serious' and 'not so serious' with score of 3, 2 and 1, respectively. The frequency in each category was multiplied with score assigned to that category and the scores were then added up and divided by total number of respondents to get the weighted mean score of each constraint. Score for all the constraints were then worked out and rank order was assigned to all the constraints.

3.5 Data processing, tabulation and presentation of data The filled-up structured interview schedules were systematically recorded on master table made on excel sheet and frequency tables were made meticulously. The data were then analyzed keeping the objectives of the study in mind.

3.6 Statistical Methods Used The statistical methods in this study include frequency, percentage, mean, Pearson's coefficient of correlation, one way ANOVA, F-test, Z- test and stepwise regression.

#### 3.6.1 Mean

The arithmetic mean is the average, which is most easily computed and understood, for it is calculated as the sum of the items divided by the number of items. The symbol for the mean is  $\bar{X}$  (read as X bar). The formula for the mean of a series of numbers is as follows

$\bar{X} = \frac{\sum X}{N}$  Where, x- represents items to be averaged and

N- represents the number of items.

3.6.2 Percentage Percentage is used for making simple comparisons. For calculating percentages, the frequency of the particular cell was divided by the total number of respondents in that particular category and multiplied by 100. Percentage was calculated upto two places after the decimal points.

Percentage=  $\frac{\text{Frequency}}{N} \times 100$

Where, N - represents the number of respondents

#### 3.6.3 Mean score

It was obtained by adding the weight of all the respondents or statements then dividing by the total number of respondents.

$\bar{X} = \frac{\sum X_i}{n}$  Where,

$\bar{X}$  = Arithmetic mean  $\Sigma$  = Summation

$X_i$  = Each individual score

$n$  = Total number of respondents

### 3.6.4 Frequency

Frequency is the statistical measure to represent the number of respondents in a particular category.

### 3.6.5 Total weighted score and weighted mean score

The assigned scores were multiplied with the frequencies of each statement and summed up to arrive at total weighted score and this total weighted score was divided by total number of respondents i.e. 200 to find out weighted mean score. This procedure has been followed for ranking of all independent variables and ranking different constraint statements.

3.6.6 Equidistance method The equidistance method of classification was used to categorize the respondents into different level of categories. 3.6.7 Pearson's coefficient of correlation (simple correlation) It is most widely used method of measuring the degree of relationship between two variables. This coefficient assumes the following:

(a) that there is linear relationship between the two variables.

(b) that the two variables are casually related which means that one on the variable is independent and the other one is dependent

(c) a large number of independent causes are operating in both variables so as to produce a normal distribution.

Pearson's coefficient of correlation can be worked out thus

$$r = \frac{N\sum XY - \sum X(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

Where,  $r$  = coefficient of correlation

$X$  and  $Y$  = original scores in variable  $X$  and  $Y$

$N$  = Number of paired scores

$\sum XY$  = each  $X$  multiplied by its corresponding  $Y$ , then summed

$\sum X$  = sum of  $X$  scores

$\sum X^2$  = each  $X$  squared, then summed

$(\sum X)^2$  = sum of  $X$  scores, squared

$\sum Y$  = sum of  $Y$  scores

$\sum Y^2$  = each  $Y$  squared, then summed

$(\sum Y)^2$  = sum of  $Y$  scores, squared

Pearson's coefficient of correlation ' $r$ ' lies between  $\pm 1$ . Positive values of ' $r$ ' indicate positive correlation between the two variables i.e. changes in both variables take place in the same direction, whereas negative valued of ' $r$ ' indicate negative correlation i.e. changes in the two variables taking place in the opposite directions. A zero value of ' $r$ ' indicates that there is no association between the two variables. When  $r = (+) 1$ , it indicates perfect positive correlation and when it is  $(-) 1$ , it indicates perfect negative correlation, meaning thereby that variations in independent variable ( $X$ ) explain 100% of the variations in the dependent variable ( $Y$ ). We can also say that for a unit change in independent variable, if there happens to be a constant change in the dependent variable in the same direction, then correlation will be termed as perfect positive. But if such change occurs in the opposite direction, the correlation will be termed as perfect negative. The value of ' $r$ ' nearer to  $+1$  or  $-1$  indicates high degree of correlation between the two variables.

### 3.6.8 One-way ANOVA:

To test significant difference between the means of independent categorical variables.

### 3.5.1.9 F test

Purpose

Perform a two sample F test to determine whether the two standard deviation are equal.

Description

The hypothesis test is:

$$H_0: \sigma_1 = \sigma_2$$

$$H_a: \sigma > \sigma_2$$

Test Statistic:

$$F = S_1^2 / S_2^2$$

where S1 and S2 are the sample standard deviations

Significance level: Typically set to .05

Critical Region:

$F > f_{(1-\alpha/2)}(v_1, v_2)$  and  $F < f_{(\alpha/2)}(v_1, v_2)$  where the critical region is determined from the F distribution function with (N1-1) and (N2-1) degrees of freedom and a significance level of 0.05.

Conclusion: Reject null hypothesis if T in critical region

### 3.6.10 Z Test Definition

A z test is conducted on a population that follows a normal distribution with independent data points and has a sample size that is greater than or equal to 30. It is used to check whether the means of two populations are equal to each other when the population variance is known. The null hypothesis of a z test can be rejected if the z test statistic is statistically significant when compared with the critical value.

Z Test Formula The z test formula compares the z statistic with the z critical value to test whether there is a difference in the means of two populations. In hypothesis testing, the z critical value divides the distribution graph into the acceptance and the rejection regions. If the test statistic falls in the rejection region then the null hypothesis can be rejected otherwise it cannot be rejected. The z test formula to set up the required hypothesis tests for a one sample and a two-sample z test are given below.

One-Sample Z Test

A one-sample z test is used to check if there is a difference between the sample mean and the population mean when the population standard deviation is known. The formula for the z test statistic is given as follows:

$$z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$$

$\bar{x}$  is the sample mean,  $\mu$  is the population mean,  $\sigma$  is the population standard deviation and n is the sample size.

The algorithm to set a one sample z test based on the z test statistic is given as follows:

Left Tailed Test:

$$\text{Null Hypothesis: } H_0: \mu = \mu_0$$

Alternate Hypothesis:  $H_1: \mu > \mu_0$  Decision Criteria: If the z statistic > z critical value then reject the null hypothesis.

$$\text{Right Tailed Test: Null Hypothesis: } H_0: \mu = \mu_0$$

$$\text{Alternate Hypothesis: } H_1: \mu < \mu_0$$

Decision Criteria: If the z statistic < z critical value then reject the null hypothesis.

Two Tailed Test:

Null Hypothesis:  $H_0 : \mu = \mu_0$

Alternate Hypothesis:  $H_1 : \mu \neq \mu_0$

Decision Criteria: If the z statistic < z critical value then reject the null hypothesis.

## Two Sample Z Test

A two sample z test is used to check if there is a difference between the means of two samples. The z test statistic formula is given as follows:

$Z = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}}$   $(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)$  are the sample mean, population mean and population variance respectively for the first sample.  $\bar{x}_2$ ,  $\mu_2$ ,  $\sigma_2^2$  are the sample mean, population mean and population variance respectively for the second sample.

The two-sample z test can be set up in the same way as the one-sample test. However, this test will be used to compare the means of the two samples. For example, the null hypothesis is given as  $H_0 : \mu_1 = \mu_2$ .

## 3.6.11 Stepwise Regression:

Often, theory and experience give only general direction as to which of a pool of candidate variables (including transformed variables) should be included in the regression model. The actual set of predictor variables used in the final regression model must be determined by analysis of the data. Determining this subset is called the variable selection problem.

Finding this subset of regressor (independent) variables involves two opposing objectives. First, we want the regression model to be as complete and realistic as possible. We want every regressor that is even remotely related to the dependent variable to be included. Second, we want to include as few variables as possible because each irrelevant regressor decreases the precision of the estimated coefficients and predicted values. Also, the presence of extra variables increases the complexity of data collection and model maintenance. The goal of variable selection becomes one of parsimony: achieve a balance between simplicity (as few regressors as possible) and fit (as many regressors as needed).

Stepwise-Selection Stepwise regression is a combination of the forward and backward selection techniques. It was very popular at one time, but the Multivariate Variable Selection procedure described in a later chapter will always do at least as well and usually better. Stepwise regression is a modification of the forward selection so that after each step in which a variable was added, all candidate variables in the model are checked to see if their significance has been reduced below the specified tolerance level. If a nonsignificant variable is found, it is removed from the model. Stepwise regression requires two significance levels: one for adding variables and one for removing variables. The cutoff probability for adding variables should be less than the cutoff probability for removing variables so that the procedure does not get into an infinite loop.

## Assumptions and Limitations

The same assumptions and qualifications apply here as applied to multiple regression. Note that outliers can have a large impact on these stepping procedures, so you must make some attempt to remove outliers from consideration before applying these methods to your data. The greatest limitation with these procedures is one of sample size. A good rule of thumb is that you have at least five observations for each variable in the candidate pool. If you have 50 variables, you should have 250 observations. With less data per variable, these search procedures may fit the randomness that is inherent in most datasets and spurious models will be obtained. This point is critical. To see what can happen when sample sizes are too small, generate a set of random numbers for 20 variables with 30 observations. Run any of these procedures and see what a magnificent value of R-Squared is obtained, even though its theoretical value is zero.

## Analysis of data

The data were finally, analysed with the application of statistical softwares like SPSS (statistical package for social science) analysis tool pack and MS Office Excel. The data were interpreted in the according to the objectives of the study.

CHAPTER IV RESULT AND DISCUSSION Result and discussion This chapter consists of the objective wise findings of the present study. In the backdrop of objectives of the study, data was collected from the respondents and was organized, tabulated and analysed scientifically. The entire finding is presented in a systematic manner under the following subheading: 4.1 Assessment of Socio-economic characteristics of vegetable growers in the selected districts of North Bengal. 4.2 Sources of information from where vegetable growers access information related to vegetable organic

farming. 4.3 Attitude, perception and adoption of organic farming among organic vegetable growers in the selected districts of North Bengal. 4.4 Factors influencing attitude, perception and adoption of organic vegetable farming in the selected districts of North Bengal. 4.5 Policy framework to improve the organic farming scenario in the selected districts. 4.1 Assessment of Socio-economic characteristics of vegetable growers in the selected districts of North Bengal. Along with detailed Socio-economic characteristics, the study has also analysed the Socio personal characteristics of the organic vegetable growers and presented here before Socio economic characteristics.

4.1.1 Analysis of Socio- personal characteristics Table 4.1 Distribution of respondents according to their Socio- personal characteristics. n=200 Variable Category Frequency Percentage

Age	Frequency	Percentage
Upto 35	20	10.0
36-50	124	62.0
> 50	56	28.0
Education	Frequency	Percentage
Illiterate	0	0.0
Primary	11	5.5
Middle	63	31.5
Secondary	78	39.0
Senior Secondary	22	11.0
Graduate	24	12.0
Post Graduate	2	1.0
Religion	Frequency	Percentage
Hindu	186	93.0
Muslim	14	7.0
Caste	Frequency	Percentage
General	54	27.0
SC	118	59.0
ST	2	1.0
OBC	Frequency	Percentage
Low(0-2)	93	46.3
Moderate(3-4)	95	47.3
High(5-7)	12	6.0

The table shows that majority of the organic vegetable growers i.e 62 % were belonged to the middle aged group i.e.36-50 years . It has also been found that majority of the respondents (39%) had secondary level of education i.e upto class 10 followed by middle level education (31.5%) i.e upto class 8. None of them were found to be illiterate.Out of the total 200 respondents, most of the respondents (93.0%) were hindu by religion. Majority of the respondents were from Scheduled Caste category i.e.59 % of the total respondents. 47.3 % out of 200 respondents had shown moderate level of mass media exposure whereas, 46.3% had low extend of mass media exposure.

4.1.2 Analysis of Socio- economic characteristics Table 4.2 Distribution of respondents on the basis of their land holding n=200

Variable	Category	Frequency	Percentage
Land holding	Marginal (upto 2.5 acre)	35	17.5
	Small (2.6 to 5 acres)	155	77.5
	Medium (5.1 to 10 acres)	8	4.0
	Large (< 10 acres)	2	1.0

Total 200 100.0 The table shows that majority (77.5%) of the respondents are small farmers having 2.6-5 acres of land holding followed by 17.5% of marginal farmers with less than or equal to 2.5 acres of land.Hence, it can be said from the data that almost all the organic vegetable growers had small land holding.

Table 4.3 Distribution of respondents on the basis of their possession of livestock n=200 Variable Category Frequency Percentage

No. of livestock	1-6	166	83.0
	7-12	30	15.0

<12 4 2.0

Total 200 100.0

Possession of livestock in rural area is a sign of wealth and economic status of the people. It has been found and presented in the table that 83.0 % of the respondents had 1-6 nos of livestock in their possession followed by 15 % of the sample, who had 7-12 livestock in their possession. It was found that they mainly reared cow and goat.

Table 4.4. Distribution of respondents on the basis of their Economic Class n=200 Variable Category Frequency Percentage Economic class BPL 98 49.0

APL 102 51.0

Total 200 100.0

Economic class is basically a classification to indicate the economic status of the people. People of rural area are generally categorised into APL i.e above poverty level and BPL i.e below poverty level. It has been found that out of 200 respondents 102 i.e 51% belonged to APL category and the rest were from BPL category. Which indicated that the sample taken for study had almost equal number of population from both APL and BPL category.

Table 4.5 Distribution of respondents on the basis of their Primary Occupation n=200 Variable Category Frequency Percentage Primary occupation

Wage Labor 2 1.0

Crop Farming 128 64.0

Business 46 23.0

Service 24 12.0

Total 200 100.0

An occupation is called primary occupation when maximum income comes from that. It has been found that 64 percent of the sample taken, had farming as their primary occupation. Besides farming it has been seen that 23 percent organic vegetable growers were also engaged in some or other type of business. 12 percent of the sample were found to had service as their primary occupation.

Table 4.6 Distribution of respondents on the basis of their Secondary Occupation n=200 Variable Category Frequency Percent Secondary occupation

Wage Labor 4 2.0

Crop Farming 143 71.5

Business 28 14.0

Service 21 10.5

Others 4 2.0

Total 200 100.0

The table shows that the organic vegetable growers were associated with some or other secondary occupation like wage labor, crop farming, business, service and some other odd jobs. It can be seen from the above table that majority of the respondents (71.5 percent) were associated with farming as their secondary occupation, followed by 14 percent and 10.5 percent of the sample who were involved in some kind of business and services respectively.

Table 4.7 Distribution of respondents on the basis of their Family Type n=200 Variable Category Frequency Percent Family type

Nuclear 93 46.5

Joint 107 53.5

Total 200 100.0

With modernization in society, family structure has undergone huge changes. Due to the shift from joint family to nuclear family, the number of family members got reduced and hence the availability of family labor has declined. The same could also be seen in the study area also. The table shows that 46.5% of the total respondents had nuclear family and rest 53.5 % of the respondents had joint family. Thus, it can be concluded that the shift from joint to nuclear family is near to 50%.

Table 4. 8 Distribution of respondents on the basis of their Family Size n=200 Variable Category Frequency Percent

Family size	Frequency	Percent
Small(upto 4)	93	46.5
Medium(5-6)	80	40.0
Large(<6)	27	13.5
Total	200	100.0

Family size refers to the number of family members in a household. Due to the nuclear nature of the family the number of members also got reduced presently. It has been found that 46.5 % of the respondents had small family size consisting of upto 4 members. However, 40 % of the respondents had 5-6 nos of family members. Thus, it can be said that the size of the family has reduced in the study area also.

Table 4.9 Distribution of respondents on the basis of their extent of Family members involved in farming. n=200

Variable Category	Frequency	Percent
Extent of family members involved		
0-2	179	89.5
3-4	21	10.5
Total	200	100.0

In farm families, other members of the family like women also work as family labour. It has been found in the study area that 89.5 % of the respondents had involvement of upto 2 family members in their farm.

4.1.3 Analysis of Socio-psychological characteristics In order to understand the perception, attitude, adoption as well as various problems of rural people, Socio- psychological analysis need to be done and hence, some of the Socio- psychological variables were taken and analysed. The findings are as follows. Table 4.10 Distribution of respondents on the basis of their Socio- psychological characteristics. n=200

Variable Category	Frequency	Percentage
Extent of Cosmo- politeness		
Low(0-2)	0	0
Medium(3-5)	51	25.5
High(6-8)	149	74.5
Level of innovativeness		
Low(0-2)	82	41.0
High(3-4)	118	59.0
Extent of management orientation		
Low(0-4)	55	27.5
Medium(5-8)	58	29.0
High(9-12)	87	43.5
Extent of scientific orientation		
Low(0-2)	22	11.0
High(3-4)	178	89.0
Extent of economic motivation		
Low(0-2)	19	9.5
High(3-4)	181	90.5
Extent of risk preference		
Low(0-2)	36	18.0

High(3-4) 164 82.0 Extent of information seeking behavior

Low(0-4) 6 3.0

Medium(5-8) 94 47.0

High(9-12) 100 50.0 Extent of extension participation

Low(0-6) 98 49.0

Medium(7-12) 102 51.0

High(13-18) 0 0 Extent of training attended

0-2 181 90.5

3-4 16 8.0

<4 3 1.5 Social participation

Member of no organization 69 34.5

Member of one organization 103 51.5

Member of more than one organization 26 13.0

Office holder 2 1.0 Farm experience

Upto 10 years 35 17.5

11-20 years 97 48.5

21-30 years 55 27.5

<30 years 13 6.5

The table shows the distribution of respondents on the basis of their Socio- psychological characteristics. It has been found that the majority of the respondents (74.5%) had high Cosmo-politeness. 59% of the population were found to had high innovativeness. Majority were found to had high management orientation (43.5%),89% of the respondents had high scientific orientation.High economic motivation and risk preference were found in 90.5% and 82% of the respondents respectively. High extent of information seeking behaviour and medium level of extension participation were found in 50% and 51% of the respondents respectively. Most of the respondents (90.5%) had attended upto 2 numbers of training and are member of one organization (51.5%).48.5% of the respondents were found to had 11-20 years of farm experience.Thus, it can be concluded that the sample, selected randomly, had mainly young farmers with high extend of Socio- psychological parameters and good amount of farm experience.

4.2 Sources of information from where vegetable growers access information related to organic vegetable farming. Table 4.11 Sources of information as per their preference to farmers regarding access of information n=200

Sr.No	Information Source	Utilisation frequency	Total weighted score	Weighted mean score	Rank
1	Friend/ Neighbor/ Relative	140 (70)	58 (29)	2 (1)	338 1.69
2	Progressive Farmer	126 (63)	72 (36)	2 (1)	324 1.62
3	Other Farmer of the village	111 (55.5)	79 (39.5)	10 (5)	301 1.505
4	Agricultural Development Officer	113 (56.5)	77 (38.5)	10 (5)	303 1.515
5	Agricultural Scientist (University/KVK)	43 (21.5)	112 (56)	45 (22.5)	198 0.99
6	Company Representative/NGOs	46 (23)	136 (68)	18 (9)	228 1.14

The table shows that majority of the farmers prefer friends/neighbour/relative and other progressive farmers, when it comes to seeking information regarding cultivation of organic vegetables and thus they ranked 1st and 2nd respectively. Respondents had also mentioned about frequently meeting ADA to get updated information in respect of organic farming practices.However, it was found that there was lack of communication between respondents and various Agricultural scientists of University and KVK.Thus, the gap between researchers and farmer needs to be reduced in order to diffuse improved package of practices regarding organic vegetable farming. Table 4.12 Mass media exposure of organic vegetable growers n= 200

Sr.No	Information Source	Utilisation frequency	Total weighted score	Weighted mean score	Rank
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Always (%) Sometimes (%) Never (%) 1 Radio 1 (0.5) 1 (0.5) 198 (98.5) 3 0.015 V 2 Television 70 (34.8) 70 (34.8) 60 (29.9) 210 1.05 I 3 Newspaper 54 (26.9) 90 (44.8) 56 (27.9) 198 0.99 II 5 Farm magazine 23 (11.4) 49 (24.4) 128 (63.7) 95 0.475 III 6 Kisan call Centre 12 (6) 32 (15.9) 156 (77.6) 56 0.28 IV 7 Online searching 62 (30.8) 74 (36.8) 64 (31.8) 198 0.99 II

The table reveals that majority of the organic vegetable growers had preferred television followed by newspaper and internet searching to get updated information as well as skill regarding various improved organic vegetable cultivation. It has been found that radio was preferred the least among all mass media channels this shows that radio is not much popular now a days among the farmers. Kisan call centre was also not much preferred, might be due to the hesitation they feel, in making calls or due to the fact that they are more comfortable with TV programmes and internet searching.

Table 4.13 Extension participation of organic vegetable farmers n=200 Sr. No. Extension Activity Extent of participation Total weighted score Weighted mean score Rank

Regularly (%) Occasionally (%) Never (%) 1 Group Discussion/ Meeting 127 (63.5) 73 (36.5) 0 (0) 327 1.635 I 2 Result Demonstration 82 (41) 91 (45.5) 27 (13.5) 255 1.275 III 3 Method Demonstration 113 (56.5) 59 (29.5) 28 (14) 285 1.425 II 4 Field Visit 56 (28) 85 (42.5) 59 (29.5) 197 0.985 IV 5 Kisan Diwas 2 (1) 5 (2.5) 193 (96.5) 9 0.045 IX 6 Field Day 22 (11) 76 (38) 102 (51) 120 0.6 V 7 Tour 2 (1) 72 (36) 126 (63) 76 0.38 VII 8 Kisan Mela 6 (3) 66 (33) 128 (64) 78 0.39 VI 9 Campaign 0 (0) 14 (7) 186 (93) 14 0.07 VIII

The table shows that respondents in the study area finds meetings and group discussions more effective in making decision regarding adoption of improved package of practices of organic vegetable farming. They had also informed that had learned a lot from method demonstrations and result demonstrations and rely more when they see themselves. It improves their confidence, clear their doubt and provide them opportunity to discuss with other fellow farmers. Therefore, group discussion/meetings, method demonstration and result demonstration ranked I, II and III respectively. Table 4.14 Innovativeness of organic vegetable farmers n=200 Sr. No. Statements Innovativeness weighted score Weighted mean score Rank

Agree (%) Disagree (%) 1 I feel restless until I try a new idea, I have heard about 100 (55) 90 (45) 100 0.5 II 2 I am cautious about trying a new practice 99 (49.5) 101 (50.5) 99 0.495 III 3 Often organic farm practices are not successful, however if they are promising, I would surely like to adopt them 153 (76.5) 47 (23.5) 153 0.765 I 4 I discuss about organic farming information with fellow farmers before trial 153 (76.5) 47 (23.5) 153 0.765 I

The table shows that respondents are interested to adopt a improved package of practice if it is promising and they like to verify those information with their fellow farmers before finally trying those on farm.

Table 4.15 Management orientation of organic vegetable growers n=200 Sr. No. Statement Management orientation Weighted score Weighted mean score Rank order

Agree (%) Disagree (%)

Planning One should think in advance the crop to be grown 139 (69.5) 61 (30.5) 139 0.69 I

Prior decision about the variety of crop and time of sowing 125 (62.5) 75 (37.5) 125 0.62 II

The amount of fertilizer and pesticides for raising crop should be assessed before cultivation 88 (44) 112 (56) 88 0.44 IV

Cost involved in raising crops must be calculated. 93 (46.5) 107 (53.5) 93 0.46 III

Production Timely planning of crop ensures a good yield 153 (76.5) 47 (23.5) 153 0.76 I

One should use organic fertilizers judiciously 101 (50.5) 99 (49.5) 101 0.50 IV

Seed rate should be given as per recommended dose 104 (52) 96 (48) 104 0.52 III

Effective weed control is possible mainly by manual weeding 133 (66.5) 67 (33.5) 133 0.66 II

Marketing Market news is very useful to farmers 147 (73.5) 53 (26.5) 147 0.73 II

A farmer can get good price by grading his produce 86 (43) 114 (57) 86 0.43 IV

A farmer can get better price for organically produce vegetables 114 (57) 86 (43) 114 0.57 III

One should grow those organic crops which has a demand in market 168 (84) 32 (16) 168 0.84 I

The table shows the management orientation of the organic vegetable cultivation in term of planning ,production and marketing. It has been found that in respect of planning of the organic vegetable cultivation, respondents felt that deciding crop, variety and time of sowing before hand is very important.They had also informed that regarding production management timely planning of crops to be grown and manual weeding is more effective. They were of view that growing crops as per market demand is essential thus market information play a big role in taking decision. Table 4.16 Scientific orientation of organic vegetable farmers n=200 Sr. No. Statement Scientific orientation Weighted score Weighted mean score Rank

Agree (%) Disagree (%) 1 Improved methods of farming gives better result to a farmer than old method 188 (94) 12 (6) 188 0.94 I 2 The way the forefathers farmed should be modified scientifically 184 (92) 16 (8) 184 0.92 II 3 Even a farmer with lot of experience should use new method of farming 180 (90) 20 (10) 180 0.9 III 4 Though it takes time for a farmer to learn new method in farming, it is worth the effort. 166 (83) 34 (17) 166 0.83 IV

The table shows the scientific orientation of respondents towards organic vegetable farming.It has been found that they agreed more with the fact that improved package of practices as well as scientific methods of cultivation are better than conventional cultivation practices.Hence, the conventional approach of cultivation should be modified in light of scientific and improved one. Table 4.17 Economic motivation of organic vegetable farmers n=200 Sr. No. Statement Economic orientation Weighted score Weighted mean score Rank

Agree (%) Disagree (%) 1 All I want from my farm is to make a reasonable profit 194 (97) 6 (3) 194 9.7 I 2 I would like invest in organic farming if it ensures higher profits 168 (84) 32 (16) 168 8.4 II 3 I have no hesitation to borrow money to run the organic farming properly 107 (53.5) 93 (46.5) 107 5.35 V 4 Even though organic farming is costly practice, I follow it 157 (78.5) 43 (21.5) 157 7.85 III 5 It is OK to spend extra money, purchase inputs, transport conveyance to grow organically. 142 (71) 58 (29) 142 7.1 IV

The table shows the economic motivation of organic vegetable growers.It has been found that all they want from organic vegetable farming is reasonable profit and they are ready to invest if organically cultivated produce provides them more profit. Table 4.18 Risk preference of organic vegetable farmers n=200 Sr. No. Statement Risk Preference Weighted score Weighted mean score Rank

Agree (%) Disagree (%) 1 One should try organic farming practices in own farm instead of advocating to others. 176 (88) 24 (12) 176 0.88 II 2 Adopting organic farming involves risk but it is worth doing. 164 (82) 36 (18) 164 0.82 III 3 A farmer who is willing to take greater risk than the average farmer usually does better financially. 131 (65.5) 69 (34.5) 131 0.655 IV 4 Progress not possible without risk. 178 (89) 22 (11) 178 0.89 I

The table shows the risk preferences of organic vegetable growers in the study area. It has been found that majority of the farmers are agreed with the fact that progress is not possible without taking risk and instead of advocating to others it should be practiced on own farm.This findings are might be due to the fact that majority of the respondents were young and had experience of 11-20years. 4.3 Attitude, Perception and Adoption of organic vegetable farming among organic vegetable growers in the selected districts of North Bengal. Knowledge can affect a person's perception in many ways.It helps an individual to recognize and interpret ideas and events.It is capable in creating perceptual difference among people of a category.It can lead to enrichment of perception and hence, before analysing the perception of the respondents, their knowledge about organic vegetable cultivation was assessed and presented below. 4.3.1 Knowledge of vegetable growers towards regarding vegetable cultivation

Table 4.19 Knowledge of respondents regarding the concept of organic vegetable farming. n=200

A.Concept of vegetable organic farming Full Knowledge(%)

Partial Knowledge

(%)

No Knowledge

(%)

Organic is a way forward to sustainable agriculture

52

45.5

2.5

Organic vegetable/food is

Eco-friendly.

51.5

42.5

6.5

Organic vegetable farming mitigates the hazardous effects of chemicals

48.5

44

7.5

The table shows that regarding concept of organic vegetable farming. In order to know their knowledge about different production aspect of organic farming, pre existing scale was used with suitable modification and questions were asked to judge their level of understanding of the subject.it has been found that majority of the respondents are fully knowledgeable about the fact that organic farming can ensure sustainable agriculture and the produce is eco friendly.

Table 4.20 Knowledge of respondents regarding manures and crop residue management n=200

B. Knowledge of organic manures and crop residues Full Knowledge

(%)

Partial Knowledge

(%)

No Knowledge

(%)

Proper time and quantity of FYM required.

85.5

13.5

1

Right method of FYM application.

82.5

16.5

1

Accurate method /procedure of FYM preparation.

78.5

19.5

2

Organic/solid waste management.

58

37

5

Crop to be selected for green manuring and the sowing time.

42.5

42.5

15

Stage at which green crop to be incorporated in field.

40.5

33.5

26

The table shows that a good percentage of respondents are fully knowledgeable about the time, quantity and right method of farm yard manures (FYM) application. Majority of the respondents are having full knowledge of accurate method and procedure of farm yard manure preparation.

Table 4.21 Knowledge of respondents regarding Bio fertilizers n=200

C.knowledge of bio fertilizers Percentage

(%)

Bio fertilizers by name.

57.5

Effect on yield

46

Cheaper than conventional practices

39.5

Useful for all types of soils

50

Reduction in consumption of chemical fertilizers

40.5

Pollution free practice

40.5

Decrease the insect pest & disease infestation.

42.5

Improve soil fertility.

51

Remain in the soil for a longer period and it has good effect on next crop also.

44

Become useless after its expiry date.

45

Recommended time of application of bio fertilizers.

47.5

Table shows that majority (above 50%) of the respondents are having knowledge about various bio fertilizers. They know them by name and the fact that they are useful for all type of soils. However, less percentage of respondents (39.5%) are knowledgeable about the fact that they are cheaper than conventional practices.

Table 4.22 Knowledge of the respondents regarding Vermicompost n=200

D. knowledge of vermicompost Full knowledge

(%)

Partial knowledge

(%)

No Knowledge

(%)

Vermicompost and its benefit.

29.5

49.5

21

Proper method of preparation.

24.5

41.5

34

Vermi-wash

20.5

17

62.5

The table shows that respondents don't have proper knowledge about benefits and preparation of vermicompost. Even less number of respondents are knowledgeable about vermi-wash. Less percentage of people possess full knowledge, more percentage of people have partial knowledge and many of them don't have any knowledge about benefit, preparation or about vermi-wash. Table 4.23 Knowledge of the respondents regarding Weed Management n=200

E. knowledge of weed management Percentage

(%)

Crop rotation and shallow ploughing

92

Polythene sheet use

46.5

Closer planting of seedlings

29.5

Mechanical method of weeding

59.5	Bio-herbicide weed control
4	
It has been found that 92% of the respondents have knowledge about practice of crop rotation and shallow ploughing. 59.5% of the organic vegetable growers have knowledge about mechanical method of weeding. This must be due to the fact that majority of the respondents were young and experienced (11-20 years)	
Table 4.24 Knowledge of the respondents regarding Pest Management n=200	
F. knowledge of pest management Percentage (%)	
Benefit of summer ploughing	
12	
Crop debris free bed, stubble incorporation and weed free bunds	
63.5	
Seed rate/proper spacing/adjusting transplanting time have effect on pest/disease population	
58	
Crop residue management	
79.5	
Ploughing immediately after harvesting removes egg masses/ larvae	
22.5	
Resistant varieties	
1	
Flooding and draining water 3-4 days removes/control larvae	
6.5	
Sticky traps	
61	
Bio agents	
62.5	
Bio pesticides (plant extracts)	
63.5	
Crop rotation	
94.5	
Elimination of weeds	
11	
Installing fishtail palm/wild saccharum attracts predatory birds	
3	
Traditional methods for proper storage	

33.5

Collection and destruction of eggs, larvae

7.5

It is clear from the table that majority (more than 50%) of the respondents had knowledge about various aspects of pest management like maintaining crop debris free bed, weed free bunds, crop rotation, crop residue management, sticky traps, bio agents, bio pesticides, spacing and planting time. Whereas, very small percentage of people had knowledge about resistant varieties, installing fishtail palm, collection and destruction of eggs larvae etc.

Fig.4.1 Knowledge of the respondents regarding various aspects 4.3.2 Farmers' perception towards organic vegetable farming. Perception refers to an organized process through which an individual interprets a situation or an idea and draw subjective and personal conclusion or inferences which help them to take certain action or behave in a particular manner .Thus perception about organic farming leads to further attitude towards it.The researcher has therefore attempted to analyse the perception dimensions regarding various attributes of organic vegetable farming and presented as below. Table 4.25 Perception dimension wise distribution of organic vegetable growers' n=200 Sr. No Characteristics Perception Dimension Total weighted score Weighted mean score Rank

High (%)	Medium (%)	Low (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
108 (54)	82 (41)	10 (5)	298	1.49	III	2	Simplicity																		
99 (49.5)	66 (33)	35 (17.5)	264	1.32	IV	3	Profitability																		
119 (59.5)	75 (37.5)	6 (3)	313	1.565	II	4	Sustainability																		
139 (69.5)	55 (27.5)	6 (3)	333	1.665	I	5	Input availability																		
28 (14)	137 (68.5)	35 (17.5)	193	0.965	V	6	Flexibility																		
39 (19.5)	104 (52)	57 (28.5)	182	0.91	VI																				

The table presents the distribution of respondents on the basis on their perception dimensions towards organic vegetable cultivation.It has been found that they have a clear perception about the sustainability and efficiency dimensions of organic vegetable cultivation. 4.3.3 Farmers' attitude towards organic vegetable farming. Attitude refers to how we see a situation as well as behave towards it.It can be defined as a learned predisposition in a consistently unfavorable or favorable manner towards a object or a situation. Hence, the attitude of the organic vegetable growers,taken as respondents was analyzed and presented below.

Table 4.26 Distribution of respondents according to their level of Attitude n=200 Sl.No Particulars No. of Respondent

Frequency (F)	Percentage (%)	1	2	3
10	5	Less favorable (Up to 30)		
8	4	Moderately favorable (31 to 60)		
182	91	Highly favorable (< 60)		

The table shows the attitude level of respondents towards organic vegetable farming.It has been found that the majority of the organic vegetable growers (91%) have highly favorable attitude towards organic vegetable.Thus it can be concluded that vegetable growers of the study area had better attitude towards organic vegetable cultivation.It is assume that a favorable attitude help to take a positive action towards an idea or situation. So, further to see the effect of attitude of the organic vegetable growers, on their act or behaviour , the adoption level of the respondents were studied.the findings of the same are presented below.

4.3.4 Adoption of organic vegetable farming among the vegetable growers. Table 4.27 Distribution of respondents according to their level of adoption n=200 Sr. No. Adoption level No of farmers Percentage of farmers

Adoption level	No of farmers	Percentage of farmers
1 Low ( upto 24)	55	27.5
2 Medium (25-48)	126	63
3 High (More than 48)	19	9.5

It has been found that majority of the respondents have shown medium level of adoption towards organic vegetable farming though they have highly favourable attitude towards organic vegetable farming.This indicates their lack of confidence in adopting the technology.

4.3.4.1 Adoption of various package of practices for production of organic vegetable.

Table 4.28 Adoption of various package of practices for production of organic vegetable. n= 200 Sr .No. Organic farming aspects Adoption level Score range Frequency Percentage Weighted Mean score Rank

Adoption level	Score range	Frequency	Percentage	Weighted Mean score	Rank
1					

83%

**MATCHING BLOCK 11/15**

W

[https://www.researchgate.net/publication/23776 ...](https://www.researchgate.net/publication/23776...)

Use of organic manures and crop residues Low 0-4 11 5.5 0.66 I Medium 5 – 10 143 71.5 High 11 – 14 46 23 2 Use of Bio fertilizer Low 0 – 3 117 58.5 0.35 III Medium 4 – 8 24 12 High 9 – 12 59 29.5 3

Vermicompost Low 0 – 1 143 71.5 0.26 IV

75%

**MATCHING BLOCK 12/15**

W

[https://www.researchgate.net/publication/23776 ...](https://www.researchgate.net/publication/23776...)

Medium 2 -4 18 9 High 5 – 6 39 19.5 4 Weed management Low 0 – 3 93 46.5 0.38 II Medium 4 – 8 107 53.5 High 9 – 12 0 0 5 Pest management Low 0 -9 84 42 0.35 III Medium 10 – 20 113 56.5 High 21-30 3 1.5

The table shows the adoption level of various package of practices for production of organic vegetables. It can be concluded from the table that use of organic manure and crop residue management has been adopted more than any other aspect of organic farming practices and hence, it ranked 1st followed by weed management which has ranked 2nd. A detailed study has been done to find out the adoption level of specific practices for various aspect of organic farming.

Table 4.29 Adoption level of organic vegetable growers with respect to organic manures and crop residues n=200 Sr.No. Organic farming practices Adoption level Total weighted score Weighted mean score Rank

Sr.No.	Organic farming practices	Adoption level	Total weighted score	Weighted mean score	Rank
1	Application of FYM or compost in any crop, Quantity of FYM/compost applied per ton/acre	135 (67.5) 63 (31.5) 2 (1)	333 1.66	I	1
2	Application time and method of FYM/compost use	131 (65.5) 67 (33.5) 8 (4)	329 1.64	II	3
3	Method of FYM preparation	125 (62.5) 67 (33.5) 8 (4)	317 1.58	III	4
4	Crop residue incorporation in the soil	113 (56.5) 74 (37) 13 (6.5)	300 1.5	IV	5
5	Organic/ solid waste management	103 (51.5) 82 (41) 15 (7.5)	288 1.44	V	6
6	Adoption of green manure crop selected and sowing time	48 (24) 50 (25) 102 (51)	146 0.73	VI	7
7	Stage of incorporating green manure crop in your field	44 (22) 48 (24) 108 (54)	136 0.68	VII	

The above table shows that the selected organic vegetable growers have adopted FYM in recommended quantity. They are following proper time and method of application regarding use of FYM. But in case of adoption of green manure they still are lacking behind. Table 4.30 Adoption level of organic vegetable growers with respect to bio fertilizers n=200 LINK Excel.Sheet.12 "C:\Users\Shrabantika Ghosh\Desktop\Shrabantika\_excel1\_.xlsx" Sheet5!R11C1:R18C8 \a \f 5 \h \\* MERGEFORMAT Sr.No. Organic farming practices Adoption level Total weighted score Weighted mean score Rank

Sr.No.	Organic farming practices	Adoption level	Total weighted score	Weighted mean score	Rank
1	Bio fertilizers applied in vegetable crop	65 (32.5) 22 (11) 113 (56.5)	152 0.76	I	2
2	Reduces chemical fertilizers use	51 (25.5) 32 (16) 117 (58.5)	134 0.67	IV	3
3	Seed treated with bio fertilizer for vigour growth/disease control	57 (28.5) 28 (14) 115 (57.5)	142 0.71	III	4
4	Seedlings dipped in biofertilizer solution	57 (28.5) 28 (14) 115 (57.5)	142 0.71	III	5
5	Dose of biofertilizer used	61 (30.5) 28 (14) 111 (55.5)	150 0.75	II	6
6	Biofertilizers purchased from authorized source	59 (29.5) 32 (16) 109 (54.5)	150 0.75	II	

The table shows that the organic vegetable growers have adopted the use of bio-fertilizer in organic vegetable cultivation as well as they have also adopted the recommended dose for those bio fertilizers, They are also purchasing the same from authorized sources. Table 4.31 Adoption level of organic vegetable growers with respect to use of vermi -compost n=200 Sr.No. Organic farming practices Adoption level Total weighted score Weighted mean score Rank

Sr.No.	Organic farming practices	Adoption level	Total weighted score	Weighted mean score	Rank
1	Vermicompost application	43 (21.5) 28 (14) 129 (64.5)	114 0.57	I	2
2	Vermicompost preparation method	43 (21.5) 20 (10) 137 (68.5)	106 0.53	II	3
3	Application of Vermiwash	39 (19.5) 20 (10) 141 (70.5)	98 0.49	III	

The above table reveals that many of the organic framers have adopted the use of vermicompost in vegetable cultivation. They have also learned and started preparation of vermicompost. Few of them have also adopted application of vermiwash but still many of them have not yet adopted Vermicompost use in vegetable farming. The reason might be the lack of knowledge, as it has been found that 62.5 percent respondents have shown no knowledge about vermicompost. The reason might also be the unavailability of the input. Table 4.32 Adoption level of organic vegetable growers with respect to weed management n=200 Sr.No. Organic farming practices Adoption level Total weighted score Weighted mean score Rank

Full (%) Partial (%) No (%) 1 Practiced crop rotation and shallow ploughing for weed control 139 (69.5) 53 (26.5) 8 (4) 331 1.65 I 2 Spread of polythene sheet in nursery 54 (27) 39 (19.5) 107 (53.5) 147 0.73 III 3 Transplanted two seedlings per hill for closer spacing to control weed population 0 (0) 37 (18.5) 163 (81.5) 37 0.18 IV 4 Employed labour for manual weeding 80 (40) 85 (42.5) 35 (17.5) 245 1.22 II 5 Used bio-herbicide for weed control 0 (0) 8 (4) 192 (96) 8 0.04 V

The table shows that regarding weed management, respondents have adopted practicing of crop rotation, shallow ploughing as well as manual weeding more than other weed management practices. However, use of bio herbicide is still negligible. The practice of closer spacing to avoid weed population and spreading of polythene sheet in nursery is still not popular among organic vegetable farmers. Table 4.33 Adoption level of organic vegetable growers with respect to pest management n=200

Sr.No.	Organic farming practices	Adoption level	Total weighted score	Weighted mean score	Rank
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Full (%)	Partial (%)	No (%)	1 Practiced summer ploughing	6 (3)	0 (0)	194 (97)	12	0.06	XIII						
debris and stubbles incorporated	69 (34.5)	58 (29)	73 (36.5)	196	0.98	VI	3	Maintained proper spacing to check pest/disease population	49 (24.5)						
51 (25.5)	100 (50)	149	0.745	VIII	4	Crop residue managed properly to check major pest and disease	79 (39.5)	82 (41)	39 (19.5)						
240	1.2	III	5	Ploughed field after harvest	72 (36)	88 (44)	40 (20)	232	1.16	IV					
6	Sown resistant varieties for pest/disease control	5 (2.5)	4 (2)	191 (95.5)	14	0.07	XII	7	Flooding and draining fields controls larvae	2 (1)	15 (7.5)	183 (91.5)	19	0.095	XI
8	Installed light traps / pheromone traps to kill adult pests	77 (38.5)	48 (24)	75 (37.5)	144	0.72	IX	9	Bio agents / predators adopted for pests control	84 (42)	23 (11.5)	93 (46.5)	191	0.955	VII
10	Bio pesticides like BT and plant extracts used	90 (45)	33 (16.5)	77 (38.5)	213	1.065	V	11	Follow crop rotation for pests controls	140 (70)	49 (24.5)	11 (5.5)	329	1.645	I
12	Weeds removed to control pests/ diseases	92 (46)	87 (43.5)	21 (10.5)	271	1.355	II	13	Installing fishtail palm/ wild saccharum for predatory birds	0 (0)	2 (1)	198 (99)	2	0.01	XIV
14	Adopted indigenous / traditional methods for proper storage	6 (3)	19 (9.5)	175 (87.5)	31	0.155	X	15	Collected and destroyed eggs larvae and pupae of crop pests	5 (2.5)	4 (2)	191 (95.5)	14	0.07	XII

The table shows that respondents of the study area have adopted crop rotation, weed removal and crop residue management as pest management techniques more, compared to other available techniques of pest management. However, many other techniques are still to get popularity like installing fishtail palm, collecting and destroying eggs larvae and pupae, flooding and draining fields and practicing summer ploughing etc.

4.3.5 Relation between various Socio personal, Socio economic, Socio psychological variables with Perception, Attitude and Adoption of the organic vegetable growers. Table 4.34 Co-efficient of correlation between various Socio- personal, Socio economic and Socio- psychological variables with Perception, Attitude and Adoption of of organic vegetable farming. N=200

Independent variables	Perception	Attitude	Adoption
Family members involved	-0.04	-0.10	0.10
Training	0.14**	0.04	0.38**
Farm Experience	-0.12	0.09	0.15*
Innovativeness	0.46**	0.86**	0.38**
Management orientation	0.71**	0.51**	0.52**
Scientific orientation	0.47**	0.43**	0.35**
Economic Motivation	0.21**	0.15*	0.07
Risk preference	0.53**	0.45**	0.30**
Extension participation	0.49**	0.28**	0.59**
Social participation	0.14*	0.06	0.29**
Information seeking behavior	0.23**	0.36**	0.47**

(\*\*0.01% level of significance \*0.05% level of significance)

The table shows that the variables like training, innovativeness, management orientation, scientific orientation, economic motivation, risk preference, extension participation, social participation and information seeking behavior are positively and significantly associated with the dependent variable perception. Further the table reveals that innovativeness, management orientation, scientific orientation, economic motivation, risk preference, extension participation and information seeking behavior are positively and significantly associated with the attitude of the organic vegetable growers. The table also shows that training, farm experience, innovativeness, management orientation, scientific orientation, risk preference, extension participation, social participation and information seeking behavior are positively and significantly associated with adoption of the organic vegetable growers. Thus, it can be concluded that socio- psychological attributes had contributes a lot in framing the perception, attitude and adoption of organic vegetable cultivation among the vegetable growers of the selected study area. In order to see if socio personal and socio economic variable had any impact on the dependent variables (perception, attitude and adoption) one way ANOVA and F test was carried out and the findings are as follows.

Table 4.35 Influence of different socio- personal, socio- economic and socio- psychological variables on perception, attitude and adoption of organic vegetable farming. n=200

Variable	Perception	Attitude	Adoption
Education	2.85*	0.92NS	0.96NS
Livestock possession	0.89NS	4.97**	3.04*
Age	1.41NS	1.34NS	1.52NS
Land Holding(Farmers' type)	2.43NS	1.00NS	0.03NS
Caste	7.64**	8.78**	5.02**
Primary occupation	6.12**	2.09NS	5.78**
Secondary occupation	3.86**	4.63**	4.35**
Family size	0.13NS	0.06NS	8.19**
Religion	5.25*	4.69*	0.00NS
Cosmo- politeness	26.67**	13.10**	24.95**

(\*\*0.01% level of significance \*0.05% level of significance) One way

ANOVA was done to see if the socio personal, socio economic and socio psychological variables (categorical variables here, irrespective of the number of categories) have any influence on dependent variables namely Perception, Attitude and Adoption. It has been found that education has a significant influence on perception. Livestock possession was found to be significant with attitude and adoption however, age and land holding were found to be not significant with any of the selected dependent variable. Whereas, caste, Cosmo politeness and secondary occupation were seen as significant with all the dependent variables. Primary occupation and family size were significant with adoption of vegetable organic farming, primary occupation was also found significant with perception. Religion is found to be significant with perception and attitude of the respondents towards organic vegetable farming. In order to see if there is any significant difference between the categories of the categorical variable towards perception, attitude and adoption of organic vegetable farming exists, F test and z test were carried out with the help of SPSS. F test was done for variables having more than two categories (education, family type, caste, primary occupation, secondary occupation and family size) and z test was done for variables having upto two categories namely religion, Cosmo politeness, economic class and family type. The results are presented as follows. Table 4.36 Multiple Comparison Test using Duncan method; Education with Perception n=200 Education category Perception (Mean) Primary 9.36a Middle 7.61a Secondary 7.43a Senior Secondary 8.90a Graduate 8.33a Post graduate 12.00b F value 2.85\*\* (\*\*=0.01% level of significance \*=0.05% level of significance) (Categories with mean, bearing same symbol like a and b have no significant difference among them in perception towards organic vegetable farming) It has been found that there is no significant difference among the education categories like primary, middle, secondary, senior secondary and graduate in perception towards organic vegetable farming. But there is a significant difference in the perception of respondents with Post Graduation, towards vegetable farming, when compared to respondents of other above-mentioned category. This can be explained with the fact that higher education always yields better perception. Table 4.37 Multiple Comparison Test using Duncan method ;Farmers type with perception n=200 Farmers type Perception (Mean) Marginal Farmers (Up to 2.5 acres) 7.74b Small (2.6 to 5 acres) 7.97b Medium (5.1 to 10 acres) 8.75b Large (< 10 acres) 3.00a F value 2.43\* (\*\*=0.01% level of significance \*=0.05% level of significance) (Categories with mean, bearing same symbol like a and b, have no significant difference among them in perception towards organic vegetable farming) It has been found that there is no significant difference among the categories of farmers' type like marginal, small, and medium in perception towards organic vegetable farming. But there is a significant difference in perception of large farmers towards vegetable farming, when compared to respondents of other above-mentioned category. This can be explained with the fact that farmers with more area under cultivation are inclined towards diversified cropping and thus they find it difficult to follow organic farming in all crops, might be because the study area has lack of input availability as well as the inputs are costlier.

Table 4.38 Multiple Comparison Test using Duncan method; Caste with Perception, and Attitude n=200 Caste category Perception (Mean) Attitude (Mean) General 7.90b 68.25b SC 8.37b 74.91b ST 10.00b 80.50b OBC 5.69a 62.73a F value 7.64\*\* 8.76\*\* (\*\*=0.01% level of significance \*=0.05% level of significance) (Categories with mean, bearing same symbol like a and b, have no significant difference among them in perception towards organic vegetable farming) This table shows that there is no significant difference in the perception and attitude of the respondents belong to categories like general caste, SC, ST towards organic vegetable farming. However the category, OBC has shown a significant difference in perception and attitude when compared to other categories towards organic vegetable farming. Perception and attitude mean of OBC category has comparatively shown less extent of perception and less favourable attitude towards organic vegetable farming, when compared to the respondents of other category like general, SC and ST. Table 4.39 Multiple Comparison Test using Duncan method; Primary occupations with Perception n=200 Primary Occupations Perception (Mean) Wage labor 5.00a Crop farming 7.49b Business 8.21b Service 9.83b F value 6.12\*\* (\*\*=0.01% level of significance \*=0.05% level of significance) (Categories with mean, bearing same symbol like a and b, have no significant difference among them in perception towards organic vegetable farming) The table shows that there is no significant difference in the perception of the respondents belong to different categories, based on primary occupation, like crop farming, business and service towards organic vegetable farming. However, the perception of the wage labor towards organic vegetable farming is different that other categories of respondent belong to above mentioned categories. The perception mean of wage labor is comparatively less. It can be explained with the fact that the wage labor are not much concern about the hazardous effect of chemicals on the soil because they are not the owner of the land as well as they are only bothered about their wages. Table 4.40 Multiple Comparison Test using Duncan method; Secondary occupation with adoption n=200

Secondary Occupation Adoption (mean) Wage labor 24.00b Crop farming 27.72b Business 35.82b Service 33.85b Others 19.00a F value 4.35\*\*

(\*\*0.01% level of significance \*0.05% level of significance) (Categories with mean, bearing same symbol like a and b, have no significant difference among them in adoption of organic vegetable farming) The table shows that the respondents with secondary occupation like wage labor, crop farming, business and service have no significant difference in their adoption towards organic vegetable farming. However, the respondents with other occupation as secondary occupation have shown significant difference in their adoption towards organic vegetable farming when compared to all other respondents with different categories of secondary occupation. The adoption mean shows that the respondents with other occupation as secondary occupation have shown less adoption level when compared to other above-mentioned categories with different secondary occupation.

Table 4.41 Multiple Comparison Test using Duncan method; Family size with Adoption n=200 Family Size Adoption (mean) Small (Upto 4 members) 26.80a Medium (5-6 members) 29.30a Large (Above 6 members) 37.00b F value 8.19\*\* (\*\*0.01% level of significance \*0.05% level of significance) (Categories with mean, bearing same symbol like a and b, have no significant difference among them in perception towards organic vegetable farming) The table shows the respondents of the categories, small and medium family size, have shown no significant difference in their adoption towards organic vegetable farming. However, the farmers with large family size have shown significant difference in adoption of organic vegetable farming when compared to respondents with either small or medium family size. The adoption mean of category with large family indicates that they have better adoption level for organic vegetable farming compared to the respondents having various other family size. Four of the independent variables have upto two categories only and thus z test was done to analyse the difference between the categories towards their perception, attitude and adoption. The results are as follows.

Table 4.42 Z test of perception scores for different socio- economic variables n=200 Variables Category Mean z Probability Religion Hindu 8.03 2.29\* 0.02

Muslim 6.28 Cosmo-politeness Medium 6.33 4.96\*\* 0.00

High 8.45 Economic class APL 8.18 -1.40 0.16

BPL 7.63 Family type Nuclear 7.80 -0.41

0.67

Joint 7.91 (\*\*=0.01% level of significance \*=0.05% level of significance) The table shows that there is a significant difference in perception towards organic vegetable farming, between the respondents of Hindu and Muslim community. A significant difference has been also found between the high cosmo polite respondents and medium cosmo polite respondents in perception towards organic vegetable farming. Table 4.43 Z test of attitude scores for different socio- economic variables n=200 Variables Category Mean z Probability Religion Hindu 72.14 2.16\* 0.03

Muslim 64.28 Cosmo-politeness Medium 65.98 -3.62\*\* 0.00

High 73.51 Economic class APL 72.46 -0.95 0.34

BPL 70.68 Family type Nuclear 71.41 -0.10 0.91

Joint 71.61 (\*\*0.01% level of significance \*0.05% level of significance) The table shows that there is a significant difference in attitude towards organic vegetable farming, between the respondents of Hindu and Muslim community. A significant difference has been also found between the high Cosmo polite respondents and medium Cosmo polite respondents in attitude towards organic vegetable farming. Table 4.44 Z test of adoption scores for different socio- economic variables n=200 Variables Category Mean z Probability Religion Hindu 29.19 0.05 0.95

Muslim 29.00 Cosmo politeness Medium 22.37 -4.99\*\* 0.00

High 31.51 Economic class APL 30.70 -0.18 0.06

BPL 27.59 Family type Nuclear 26.80 -3.06\*\* 0.00

Joint 31.80 (\*\*0.01% level of significance \*0.05% level of significance) A significant difference has been also found between the high Cosmo polite respondents and medium Cosmo polite respondents in adoption towards organic vegetable farming. 4.4 Factors which are responsible for attitude, perception and adoption of organic farming in selected districts of North Bengal. Above tables have shown that there is a significance association between various socio personal, socio economic and socio psychological variables with the perception, attitude and adoption of organic vegetable

cultivation among the selected vegetable growers. To find out the major factors that had framed the perception, attitude and adoption among the selected vegetable growers step wise regression was done and the findings are as follows.

Table 4.45 Stepwise regression between Perception and selected socio personal, socio economic and socio psychological variables n=200 Model Equation R Square value Adj. R square value 8. Perception=3.15+0.28X1\*\* -0.45X2\*\*+0.22X3\*\* - (0.88) 0.07X4\*\*+0.48X5\*\*+0.66X6\* -0.53X7\* +0.11X8\* 0.63 0.62 (\*\*0.01% level of significance \*0.05% level of significance)

X1 =Management orientation, X2=Caste, X3=Extension participation, X4=Farm experience X5=Risk preference, X6=Cosmo-politeness, X7=Social participation, X8=Mass media exposure The above table of stepwise regression shows that variables like Management Orientation, Caste, Extension Participation, Farm Experience, Risk Preference, Cosmo-Politenss, Social Participation, Mass Media Exposure are the most significant factors that had contributed towards the perception of the respondents. Together these eight independent variables could explain 63% of variability in the dependent variable perception. This indicates that there were many other variables which had contributed in the perception of the respondents but not considered in the study.

Table 4.46 Stepwise regression between Attitude and selected socio- personal, socio- economic and socio- psychological variables n=200 Model Equation R Square value Adj. R square value 9. Attitude=38.38 +17.39X1\*\*+0.70X2\*\* - 0.70X3\*\*+ (3.27) 2.02X4\*\* -1.77X5\*\* -6.46X6\*\*+3.13X7\*\* - 0.36X8\* -1.51X9 0.81 0.81 (\*\*0.01% level of significance \*0.05% level of significance) X1 =Innovativeness, X2=Mass media exposure, X3=Management orientation, X4=Scientific orientation, X5=Economic motivation, X6=Religion, X7=Social participation, X8=Extension participation, X9 =Primary occupation The above table of stepwise regression shows that independent variables like Innovativeness, Mass media exposure, Management orientation, Scientific orientation, Economic motivation, Religion, Social participation, Extension participation and Primary occupation are the most significant factors contributed towards the dependent variable attitude of the respondents. Together these nine variables had explained 81% of the variability in dependent variable attitude. This indicates there were few more factors that had contributed to the attitude of the respondents

Table 4.47 Stepwise regression between Adoption and selected socio- personal, socio- economic and socio- psychological variables n=200 Model Equation R Square value Adj. R square value 5. Adoption=3.28+1.37X1\*\*+1.30X2\*\*2.25X3\*\*+1.07 (3.48) X4\*\*+1.48X5\* 0.56 0.53 (\*\*0.01% level of significance \*0.05% level of significance) X1= Extension participation, X2=Mass media exposure, X3 =Caste, X4=Information seeking behavior, X5=Scientific orientation The above table of stepwise regression shows that Extension Participation, Mass Media Exposure, Caste, Information Seeking Behavior, Scientific Orientation were found to be the most significant factors contributing to adoption of organic vegetable cultivation among the selected respondents. Together the five independent variables could explain 56% of the variability in the dependent variable Adoption. There must be many other variables that had contributed towards adoption of organic vegetable cultivation among vegetable growers of the selected area.

Table 4.47 Stepwise regression between Adoption and selected socio- personal, socio- economic and socio- psychological variables n=200 Model Equation R Square value Adj. R square value 5. Adoption=3.28+1.37X1\*\*+1.30X2\*\*2.25X3\*\*+1.07 (3.48) X4\*\*+1.48X5\*

0.56 0.53 (\*\*0.01% level of significance \*0.05% level of significance) X1= Extension participation, X2=Mass media exposure, X3 =Caste, X4=Information seeking behavior, X5=Scientific orientation The above table of stepwise regression shows that Extension Participation, Mass Media Exposure, Caste, Information Seeking Behavior, Scientific Orientation were found to be the most significant factors contributing to adoption of organic vegetable cultivation among the selected respondents. Together the five independent variables could explain 56% of the variability in the dependent variable Adoption. There must be many other variables that had contributed towards adoption of organic vegetable cultivation among vegetable growers of the selected area.

#### 4.5 Policy framework to improve the organic farming scenario in the selected districts.

In order to frame a policy frame work for improving the adoption of organic vegetable framing in the selected area, it was essential to find out the various constraints hindering the full adoption of vegetable organic vegetable in the selected area.

Different types of constraints were analysed and finally specific constraints were identified to construct the policy framework for the selected study area.The constraint analysis result is presented below.

Table 4.48 Types of constraints faced by the organic vegetable growers in the study area. n=200

Type of Constraints Percent (%) Rank

Technological Constraints 65.15 III Economic Constraints 70.69 II Manure and bio fertilizer Constraints 53.86 VII Plant Protection Constraints 75.38 I Marketing Constraints 63.40 V Constraints related to Transfer of Technology 63.91 IV Other Constraints 58.33 VI

It has been found that the major constraints organic vegetable farmers faced in the study area were plant protection constraint and economic constraint.The reason might be the lack of knowledge about various available plant protection measures and costly organic inputs. The specific constraints under each type of constraint were also identified for generating suggestions and presented below. Table 4.49 Different constraints related to technological and production aspects of organic vegetable cultivation. n=200 Sr. No. Constraints Constraint frequency Total weighted score Weighted mean score Rank

Very serious (%) Serious (%) Not so serious (%) 1 Problem about human labour 84 (42) 100 (50) 15 (7.5) 467 2.33 III 2 Low production of organic vegetable 14 (7) 68 (34) 118 (59) 296 1.48 XIV 3 Lack of knowledge of recommended package of

practices on organic vegetable growing 35 (17.5) 67 (33.5) 98 (49) 337 1.68 XII 4 Lack of knowledge about organic plant protection management 37 (18.5) 82 (41) 81 (40.5) 356 1.78 X 5 Organic farming is a slow process 39 (19.5) 116 (58) 45 (22.5) 394 1.97 VI 6 Lack of proper trainings by Govt. Personnel /NGOs/ research institutes 45 (22.5) 75 (37.5) 80 (40) 365 1.82 VII 7 Unavailability of organic inputs 26 (13) 103 (51.5) 71 (35.5) 355 1.77 XI 8 Lack of knowledge about organic weed management 51 (25.5) 92 (46) 57 (28.5) 394 1.97 VI 9 Lack of knowledge about crop residue management 48 (24) 64 (32) 88 (44) 360 1.80 IX 10 Limited amount of information and research available 123 (61.5) 58 (29) 19 (9.5) 504 2.52 II 11 Lack of capital 69 (34.5) 99 (49.5) 32 (16) 437 2.18 IV 12 Predominance of the inorganic farmers in the locality 124 (62) 66 (33) 10 (5) 514 2.57 I 13 Knowledge about seed variety, seed rate seed treatment & right time of sowing 17 (8.5) 69 (34.5) 114 (57) 303 1.51 XIII 14 Proper irrigation facilities 28 (14) 108 (54) 64 (32) 364 1.82 VIII 15 Lack of technical know how to get organic vegetable certified from authorized agencies 67 (33.5) 83 (41.5) 50 (25) 417 2.08 V

Out of the fifteen specific constraints given as options to the respondents, predominance of the inorganic farmers in the study area, limited amount of information and research outcome and availability of labor were mentioned as the major constraints in adopting inorganic vegetable cultivation in the study area. It has been found that many farmers in the study area were involved in inorganic vegetable cultivation and hence they found to follow organic cultivation difficult in the adjacent fields. The lack of information about improved practices and research outcomes were also said as constraints this might be due to the lack of interaction /association with universities and scientist. Shortage of labour for organic farming was also seen as constraint, this might be due to the migration of the labour to neighbouring states for odd jobs.

Table 4.50 Different constraints related to economic aspects of organic vegetable cultivation. n =200 Sr. No. Constraints Constraint frequency Total weighted score Weighted mean score Rank

Very serious (%) Serious (%) Not so serious (%)

Sr. No.	Constraints	Constraint frequency	Total weighted score	Weighted mean score	Rank
1	Less premium prices	85 (42.5)	85 (42.5)	30 (15)	455 2.27 III
2	Lack of subsidy/ incentives	89 (44.5)	80 (40)	31 (15.5)	458 2.29 II
3	No minimum support price (MSP)	101 (50.5)	89 (44.5)	10 (5)	491 2.45 I
4	Lack of bulk local demand	73 (36.5)	53 (26.5)	74 (37)	399 1.99 V
5	Lack/Poor cooperative societies at local level	64 (32)	84 (42)	52 (26)	412 2.06 IV
6	Farmers have no access for direct exports of organic vegetable	34 (17)	60 (30)	106 (53)	328 1.64 VI

It has been found that unavailability of any MSP (Minimum Support Price) for organic vegetable was identified as the major constraint followed by lack of subsidies and incentives by government. Along with these, less premium price was also quoted as a major constraint towards adoption of organic vegetable cultivation in the study area. Thus, economic constraint was mentioned as the biggest constraint among all.

Table 4.51 Different constraints related to manures and bio fertilizers use for organic vegetable cultivation. n =200 Sr. No. Constraints Constraint frequency Total weighted score Weighted mean score Rank

Very serious (%) Serious (%) Not so serious (%)

Sr. No.	Constraints	Constraint frequency	Total weighted score	Weighted mean score	Rank
1	Inadequacy of required manures & bio fertilizers	11 (5.5)	73 (36.5)	116 (58)	295 1.47 V
2	Long process of organic manure preparation	25 (12.5)	99 (49.5)	76 (38)	349 1.74 II
3	Costly manures and bio fertilizers	41 (20.5)	72 (36)	87 (43.5)	354 1.77 I
4	Knowledge about type and recommended doses	22 (11)	55 (27.5)	123 (61.5)	299 1.49 IV
5	Supply agencies at long distance	35 (17.5)	48 (24)	117 (58.5)	318 1.59 III

The table shows various constraints in respect of manures and bio fertilizer in adopting organic vegetable farming. It has been found that Cost of manures and fertilizers was the main constraint followed by time consuming manure preparation and less availability of supply agencies in the vicinity. It might be due to the non -availability of inputs in the locality. Table 4.52 Different constraints related to pest management aspects of organic vegetable cultivation. n =200 Sr. No. Constraints Constraint frequency Total weighted score Weighted mean score Rank

Very serious (%) Serious (%) Not so serious (%)

Sr. No.	Constraints	Constraint frequency	Total weighted score	Weighted mean score	Rank
1	Inclination towards chemical pesticides	153 (76.5)	22 (11)	25 (12.5)	528 2.64 I
2	Lack of Knowledge about bio-pesticides, application time, method and proper dose	71 (35.5)	59 (29.5)	70 (35)	401 2.00 VI
3	Unavailability of biopesticides	67 (33.5)	95 (47.5)	38 (19)	429 2.14 V
4	Lack of supply centre	96 (48)	54 (27)	50 (25)	446 2.23 III
5	Difficult method of biopesticides production/preparation	88 (44)	61 (30.5)	51 (25.5)	437 2.18 IV
6	Lack of skilled labour	95 (47.5)	79 (39.5)	26 (13)	469 2.34 II

The table shows that in case of pest management the major constraints were the inclination towards chemical pesticides due to the fact that they are readily available in the local market. Few more constraints identified as major by the

respondents were lack of skilled labour in the locality and lack of supply centre for input in the study area. This might be the reason that many of the farmers of the study area were still involved in conventional vegetable cultivation.

Table 4.53 Different constraints related to marketing aspects of organic vegetable cultivation. n =200 Sr. No. Constraints Constraint frequency Total weighted score Weighted mean score Rank

	Very serious (%)	Serious (%)	Not so serious (%)										
1 Lack of agencies to purchase	36 (18)	82 (41)	82 (41)	354	1.77	VI	2 Dependence/ interference of middleman for disposal	58 (29)	60 (30)	82 (41)	376	1.88	IV
3 Lack of marketing news	50 (25)	53 (26.5)	97 (48.5)	353	1.76	VII	4 Poor communication channels	34 (17)	95 (47.5)	71 (35.5)	363	1.81	V
5 Purchase agencies at long distance	44 (22)	99 (49.5)	57 (28.5)	413	2.06	III	6 Lack of storage facilities	46 (23)	125 (62.5)	29 (14.5)	417	2.08	I
7 More transportation charges	71 (35.5)	73 (36.5)	56 (28)	415	2.07	II							

The table show that regarding marketing facilities the respondents have cited lack of storage facilities, high transportation charges as well less unavailability of purchase agencies in the locality as the major issues. However, these problems are common in rural Bengal and need to be addressed as a whole. Table 4.54 Different constraints related to transfer of technology aspect of organic vegetable cultivation. n =200 Sr. No. Constraints Constraint frequency Total weighted score Weighted mean score Rank

	Very serious (%)	Serious (%)	Not so serious (%)			
1 Lack of timely and appropriate transfer of organic vegetable farming practices by extension organization /Agri. Deptt./ private agencies.	44 (22)	46 (23)	110 (55)	334	1.67	IV
2 Lack of coordination between various service, supply and marketing agencies/organic promoting organizations.	53 (26.5)	94 (47)	53 (26.5)	400	2.00	II
3 Lack of dedicated and competent extension personnel for organic vegetable promotion	41 (20.5)	98 (49)	61 (30.5)	380	1.90	III
4 Lack of published information regarding various practices of organic vegetable farming	59 (29.5)	102 (51)	39 (19.5)	420	2.10	I

Effective transfer of technology is the most important aspect for adoption of any improved technology. It has been found that lack of published information regarding various practices of organic vegetable farming, Lack of coordination between various service, supply and marketing agencies/organic promoting organizations and lack of dedicated and competent extension personnel for organic vegetable promotion were the most faced constraints as mentioned by the respondents of the study area. This shows an overall lack of information and knowledge about the technology among farmers as well as extension functionaries.

Table 4.55 Different other constraints in organic vegetable cultivation n=200 Sr. No. Constraints Constraint frequency Total weighted score Weighted mean score Rank

	Very serious (%)	Serious (%)	Not so serious (%)			
1 Lack of proper guidance and training on organic vegetable practices	29 (14.5)	49 (24.5)	122 (61)	307	1.53	III
2 Irregular visit of agriculture officers	33 (16.5)	47 (23.5)	120 (60)	313	1.56	II
3 Lack of risk ability	98 (49)	90 (45)	12 (6)	486	2.43	I
4 Lack of testing facilities (soil and water)	22 (11)	52 (26)	126 (63)	296	1.48	IV

Along with all major type of constraints few others constraints were also studied and found that lack of risk ability among the vegetable growers was a serious constraint in adoption of organic vegetable cultivation over conventional method of cultivation. Respondent had also mentioned about less interaction with agriculture officers, as a constraint. This indicated that there is a lack of confidence among the vegetable growers due to insufficient required guidance and motivation to shift from conventional to organic vegetable cultivation. Policy framework for improvement of the organic farming scenario in the study area

Fig4.2 Policy framework for improvement of organic farming scenario in study area In light of various constraints and other factors, influencing the attitude and adoption of the organic vegetable cultivation in the study area, a policy framework has been framed. The figure is self explanatory. It indicates that promoting research and providing research output in the form of technical training as well as publishes material to the vegetable grower can overcome their lack of knowledge in the concern field of organic farming. Along with that developing a model organic farm or village to provide them the required exposure, might improve their confidence level. The same can be supported with various motivational and skill orientated training by competent extension personnel, to make them more competent in practicing the technology. A strong linkage between farmers and extension personnel might help in the overall development of the knowledge, perception, attitude and adoption of the organic vegetable farming, among the farmers of the study area.

However, economic constraint was found to be the biggest constraint hence, credit facilities along with provision of subsidy may motivate the farmers further to shift to organic cultivation from conventional practice. All these initiatives may be taken by government, NGOs' and other stake holders of agriculture. However, mere development and motivation of farmers might not result positively and hence input centres run by local youth or societies might prove helpful to provide cost effective and locally available inputs. Some other infrastructural constraints as mentioned by the respondents of the area advocates the availability of cold storage and transport facilities in the vicinity, as vegetables are most perishable agricultural produce. Marketing constraint was also mentioned as a major constraint in adopting organic vegetable farming hence development of domestic markets along with organic markets and special markets would be helpful for farmer to get premium price for their produce. These are few of the interventions, if taken, might lead to an improved and better environment for farmers and accelerate them towards organic vegetable cultivation.

## CHAPTER V

### SUMMARY AND CONCLUSION

68%

**MATCHING BLOCK 13/15**

W

<https://www.britannica.com/topic/organic-farming>

The concepts of organic agriculture was developed during early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner and others. They believed that the use of manures, cover crops, crop rotation, and biological pest control result in better farming system.

Green Revolution occurred through use of modern agriculture technologies like use of synthetic chemicals like fertilizers and pesticides, adoption of high-yielding and nutrient responsive varieties of crops, greater use of irrigation sources etc. Which has undoubtedly increased the production and labour efficiency and made our country self-sufficient in food production. But indiscriminate and excess use of chemicals during that period has questioned sustainability of agriculture in the long run and concerns have been raised regarding its adverse effects on soil health and environment.

The population of the world is increasing and providing food for the world had become difficult. India is the second most populous country in the world. With this increasing population, the cultivable land resource is shrinking by each day. To meet the food, fuel, fibre, fodder and other needs of the increasing population, the productivity of land and soil need to be improved. (IFOAM) International Federation of Organic Agriculture Movements, an international organization, established in 1972, for organic farming defines the goal of

organic farming:"

100%

**MATCHING BLOCK 14/15**

W

[https://en.wikipedia.org/wiki/Organic\\_farming](https://en.wikipedia.org/wiki/Organic_farming)

Organic agriculture is a production system, that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved...(  
Conserve-energy-future.com)

Organic farming appears to be one of the best options for sustainability. As a result, there great is a interest in organic farming globally to hold sustainability of natural resources and environment along with better taste and nutritional availability in the food. During the last two decades, 'Organic Agriculture' has been established as a dynamic 'Alternate Farming System'. However, the vegetable sector suffers through 25 % of post-harvest losses and only 5 % of it are either processed or exported. With an increase in population there is tremendous pressure on the agriculture sector to feed the entire population with decreasing land share. There is a constant battle between the quantity and quality of the food that can be produced from a given land. Indians have become more diet conscious and health conscious. Their income levels has increased and they have become interested in quality of the produce rather than the quantity of the food. Vegetables are one such commodity which are consumed on a daily basis. Its price fluctuates with their visual appeal i.e. freshness, colour and odour etc. Cultivation practices followed to grow vegetables also effect the prices, people are happy to pay higher prices for the organically grown vegetables. The growing awareness among the masses about organic farming has raised its demand. Organic vegetables are gaining momentum across the world and emerged as an attractive source of income generation. Organic products are being preferred in developed countries and in urban centers of India. There is a

great demand for organic food in both domestic and international market. Which is growing around 20-25 % annually, thus the area under organic vegetable farming in has been increasing consistently.

Cooch Behar and Alipurduar district have more than 20-30% of farmers, growing vegetables as summer and winter crops. Organic farming is taken in some of the part of the districts still majority of the farmers are still growing with conventional method. Organic vegetable farmers though have adopted some of the aspects of organic farming still many aspects of organic farming is not yet fully adopted. There is a lack of knowledge and adoption among farmers regarding vegetable organic farming. Thus, sustainability of agriculture and health of the people including our farmers is at stake.

In this back drop, the study was carried out to see the attitude, perception and adoption of vegetable growers towards organic vegetable farming in North Bengal with the following objectives.

Objectives of the study 6. To assess the socio-economic characteristics of vegetable growers in the selected districts of North Bengal. 7. To find out different sources of information from where vegetable growers access information related to organic farming. 8. To study farmers' attitude, perception and adoption of organic farming in the selected districts of North Bengal. 9. To elicit out the various factors which are responsible for attitude, perception and adoption of organic farming in selected districts of North Bengal. 10. To suggest a policy framework to improve the organic farming scenario in the selected district.

Major limitation of the study Only 200 vegetable growers were taken, 100 from Coochbehar district and 100 from Alipurduar district hence, the result might not be generalized for the entire population of North Bengal.

Future scope of the study

- Similar study can be done with the same farmers in respect of other crops they cultivate organically.
- Similar study can be done in other geographical area with different set of farmers.
- Similar study can be done for non adopters (organic farming) also.

Some review of literature

Stobbelaar. et. al. (2007) said that organic farming is an established methods of sustainable agriculture. Most of the techniques in organic farming, like inter cropping, mulching, raising animals etc are the same to various traditional farming system.

Takagi (2010) Result showed various factors associated with awareness of organic farming like location, gender, educational level, exposure to the pilot farms, information sources but they didn't show any statistically significant relationships between awareness and attitude toward the practices. Pandey & Singh (2012) stated that Ministry of Commerce launched the National Organic Programme in 2000 in response of the detrimental impacts of Green Revolution. Organic industries are entirely export oriented wherein farmers are choosing organic because of economic benefit rather than sustainability.

Meena, et. al. (2013) suggested measures for promotion of Organic farming: (i) promoting appropriate and strong extension services (ii) establishing strong linkage between producer and consumers (iii) Reducing cost of certification (iv) Making organic inputs available to small farmers (v) Developing domestic market (vi) Provision of subsidies and credit facilities (vii) Improving infrastructural facilities (viii) improving linkages in the supply chain (ix) Promoting research on organic agricultural (x) Provision of training regarding organic agriculture.

Methodology The study was conducted in Cooch Behar district and Alipurduar districts of West Bengal, India. The districts were taken purposively, due to convenience of the researcher and availability of vegetable growers as well presence of organic farming practices in vegetable cultivation. Coochbehar-I, Coochbehar-II, Dinhata-II blocks were taken purposively and these were selected from Coochbehar district. Whereas, Kumargram and Alipurduar-II blocks were purposively selected from Alipurduar district. The villages and total 200 respondents (Organic vegetable growers) were taken randomly.

Due to pandemic situation, pilot study could not be conducted. Secondary data were collected from secondary information sources like Panchayat office, ADA office etc. A interview schedule was prepared for collection of information, keeping in mind the major objectives and variables of the present study. 200 organic farmers having grown at least one organic vegetable in last one year were taken as respondents. The data were collected during March 2020 to August 2021 with the help of the structured interview schedule constructed for the study through personal interview method.

The data was recorded with personal interview method physically but due to pandemic situation some of the respondents were contacted over phone. Various socio- personal, socio- economic and socio- psychological variables were taken as independent variables. Perception, attitude and adoption were selected as dependent variable. Statistical tools like frequency, percentage, mean, coefficient of correlation, t test, z test, step wise regression etc were taken to analysis the data. SPSS (Statistical Package for the Social Science) was used to do the statistical analysis.

**Conclusion** The study concludes that organic vegetable farming, in the study area was found to be more popular among young vegetable growers with 11-20 years of farming experience. They were found to have high Cosmo-politeness, innovativeness, management ability, scientific orientation, economic motivation and risk-taking ability. The organic vegetable growers have shown medium to high information seeking behavior when comes to collecting information regarding organic farming. The study also concludes that organic vegetable farmers of the study area were found to seek information regarding organic vegetable farming more from friends, neighbors, relatives and progressive farmers. Thus social contacts were considered as the sources of information for the organic vegetable growers. It was told that they rely more on television, newspaper and online searching among various mass media channels for gathering knowledge and skill regarding organic vegetable cultivation. They often take part in group discussion, result demonstration and method demonstration to get more exposure, practical experience and discuss with fellow farmers. The study has witnessed a highly favorable attitude towards organic vegetable farming however, a medium level of adoption was found among the organic vegetable growers. It has been seen that higher education has contributed to better perception about organic vegetable farming. They have found to possess a good knowledge about organic manures and crop residues management among other package of practices. The socio- psychological variables were found to have a positive and significant association and have more influence on attitude, perception and adoption of vegetable growers, towards organic vegetable farming. The plant protection and economic constraints were found to be the major constraints among all constraints towards full organic vegetable farming.

**Recommendation** The study has come up with the recommendation to organize more awareness programmes by different government departments and institutions. Appropriate and strong extension service for skill and capacity building has to be made available to the vegetable growers. Above all, motivational training through extension personnel would promote organic farming in future. The study further recommends to promote research, provide supporting published materials and technical training to vegetable growers as well as extension functionaries, on organic vegetable farming in participatory mode for the progress of organic vegetable farming in the study area. Higher attitude towards organic vegetable farming but medium adoption level was found among the respondents hence, the study recommends to develop a model organic farm and provide the exposure of the same, to the organic vegetable growers in order to build the required confidence in them to shift from conventional vegetable farming to organic vegetable farming. To address the high cost of production, it is suggested to start input center run by societies and co-operatives to provide cheap and timely organic inputs. This will also create employment opportunities in the study area. Respondents had also mentioned poor infrastructure as a hindrance in adopting organic vegetable framing thus, cold storage and transport facilities should be made available to the vegetable growers and this may be done with government initiative or other non-governmental organization or in PPP mode. Economic and marketing constraint were found to be the major constraints and hence, credit and subsidy facilities to be extended by different public and private credit institution as well other stakeholders of agriculture. Developing domestic markets, special markets and linkages between producer and consumers along with enhancing linkages in supply chain may prove beneficial in providing a favorable market to the organic vegetable growers. Finally, the study recommends that the process of conversion from conventional to organic must be gradual "Towards organic" instead of immediate organic approach.

2

OpcFile.Embedded.dat

## Hit and source - focused comparison, Side by Side

**Submitted text** As student entered the text in the submitted document.  
**Matching text** As the text appears in the source.

1/15	SUBMITTED TEXT	41 WORDS	68% MATCHING TEXT	41 WORDS
	<p>The concepts of organic agriculture was developed during early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner and others. They believed that the use of manures, cover crops, crop rotation, and biological pest control result in better farming system.</p>		<p>The concepts of organic agriculture were developed in the early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner and others who believed that the use of animal manures (often made into compost), cover crops, crop rotation, and biologically based pest controls resulted in a better farming system.</p>	
	<p><b>W</b> <a href="https://www.britannica.com/topic/organic-farming">https://www.britannica.com/topic/organic-farming</a></p>			

2/15	SUBMITTED TEXT	64 WORDS	63% MATCHING TEXT	64 WORDS
	<p>Such practices further were promoted by various advocates like J.I. Rodale and his son Robert during 1940s and onward. He has published "Organic Gardening and Farming" magazine and a few text books on organic farming. The demand for organic food had improved in the 1960s due to the publication of " Silent Spring" by Rachel Carson, which had documented the environmental damage</p>		<p>Such practices were further promoted by various advocates—such as J.I. Rodale and his son Robert, in the 1940s and onward, who published Organic Gardening and Farming magazine and a number of texts on organic farming. The demand for organic food was stimulated in the 1960s by the publication of Silent Spring, by Rachel Carson, which documented the extent of environmental damage</p>	
	<p><b>W</b> <a href="https://www.britannica.com/topic/organic-farming">https://www.britannica.com/topic/organic-farming</a></p>			

4/15	SUBMITTED TEXT	61 WORDS	100% MATCHING TEXT	61 WORDS
	<p>Organic agriculture is a production system, that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved...(</p>		<p>Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved... —</p>	
	<p><b>W</b> <a href="https://en.wikipedia.org/wiki/Organic_farming">https://en.wikipedia.org/wiki/Organic_farming</a></p>			

<b>3/15</b>	<b>SUBMITTED TEXT</b>	23 WORDS	<b>81% MATCHING TEXT</b>	23 WORDS
<p>Modern organic farming was developed as a result of environmental harm caused by the use of chemical pesticides and fertilizers in conventional</p>		<p>Modern organic farming was developed as a response to the environmental harm caused by the use of chemical pesticides and synthetic fertilizers in conventional</p>		
<p><b>W</b> <a href="https://www.britannica.com/topic/organic-farming">https://www.britannica.com/topic/organic-farming</a></p>				

<b>5/15</b>	<b>SUBMITTED TEXT</b>	25 WORDS	<b>70% MATCHING TEXT</b>	25 WORDS
<p>attributing this to the reduced cost of production and higher prices. They found organic cotton farming more profitable compared conventional.</p>		<p>attributing this largely to the reduced cost of production and higher unit output prices (MacDonald, 2004). In conclusion, studies found organic cotton farming more profitable than conventional.</p>		
<p><b>W</b> <a href="https://www.iima.ac.in/c/document_library/10OrganicInputProductionbdc6.pdf?uuid=c954a68f-6973-443...">https://www.iima.ac.in/c/document_library/10OrganicInputProductionbdc6.pdf?uuid=c954a68f-6973-443 ...</a></p>				

<b>6/15</b>	<b>SUBMITTED TEXT</b>	32 WORDS	<b>77% MATCHING TEXT</b>	32 WORDS
<p>It is a method of farming which is primarily aimed at cultivating the land and raising crops in such a way so as to keep the soil healthy by use of</p>		<p>It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of</p>		
<p><b>W</b> <a href="http://www.ouat.nic.in/sites/default/files/final_inner_pages_souvenir_ofsa_2017.pdf">http://www.ouat.nic.in/sites/default/files/final_inner_pages_souvenir_ofsa_2017.pdf</a></p>				

<b>9/15</b>	<b>SUBMITTED TEXT</b>	33 WORDS	<b>89% MATCHING TEXT</b>	33 WORDS
<p>United States Department of Agriculture (USDA), "Organic farming is a system which avoids or largely excludes the use of synthetic inputs such as fertilizers, pesticides, hormones etc and to the maximum extent</p>		<p>United States Department of Agriculture (USDA) study team organic farming – "organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc) and to the maximum extent</p>		
<p><b>W</b> <a href="http://www.ouat.nic.in/sites/default/files/final_inner_pages_souvenir_ofsa_2017.pdf">http://www.ouat.nic.in/sites/default/files/final_inner_pages_souvenir_ofsa_2017.pdf</a></p>				

<b>7/15</b>	<b>SUBMITTED TEXT</b>	19 WORDS	<b>73% MATCHING TEXT</b>	19 WORDS
<p>feasible rely upon crop rotations, crop residues, manures, organic wastes and biological system of nutrient mobilization and plant protection".</p>		<p>feasible rely upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection". "</p>		
<p><b>W</b> <a href="http://www.ouat.nic.in/sites/default/files/final_inner_pages_souvenir_ofsa_2017.pdf">http://www.ouat.nic.in/sites/default/files/final_inner_pages_souvenir_ofsa_2017.pdf</a></p>				

<b>8/15</b>	<b>SUBMITTED TEXT</b>	21 WORDS	<b>84% MATCHING TEXT</b>	21 WORDS
<p>and enhance agro-ecosystem, including biodiversity, biological cycles and soil biological activity and this is achieved by using on-farm agronomic, biological</p>		<p>and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity, and this is accomplished by using on-farm agronomic, biological</p>		
<p><b>W</b> <a href="http://www.ouat.nic.in/sites/default/files/final_inner_pages_souvenir_ofsa_2017.pdf">http://www.ouat.nic.in/sites/default/files/final_inner_pages_souvenir_ofsa_2017.pdf</a></p>				

<b>10/15</b>	<b>SUBMITTED TEXT</b>	20 WORDS	<b>86% MATCHING TEXT</b>	20 WORDS
<p>Farmers were asked to reply questions regarding the concept of organic farming, use of organic manures and crop residues,</p>		<p>farmers they were asked to reply different questions about the concept of organic farming, use of organic manures and crop residues,</p>		
<p><b>W</b> <a href="https://www.researchgate.net/publication/237762666_Knowledge_Level_about_Organic_Farming_in_Haryana">https://www.researchgate.net/publication/237762666_Knowledge_Level_about_Organic_Farming_in_Haryana</a></p>				

<b>15/15</b>	<b>SUBMITTED TEXT</b>	28 WORDS	<b>50% MATCHING TEXT</b>	28 WORDS
<p>of organic farming According to Rogers and Shoemaker (1971), decision to make full use of new or improved ideas as the best</p>		<p>of organic farming practices. According to Rogers (1995) "Adoption is a decision to make full use of an innovation as the best</p>		
<p><b>W</b> <a href="http://www.saulibrary.edu.bd/daatj/public/index.php/getDownload/Done%2010-03799%20k_11.pdf">http://www.saulibrary.edu.bd/daatj/public/index.php/getDownload/Done%2010-03799%20k_11.pdf</a></p>				

<b>11/15</b>	<b>SUBMITTED TEXT</b>	464 WORDS	<b>83% MATCHING TEXT</b>	464 WORDS
<p>Use of organic manures and crop residues Low 0-4 11 5.5 0.66 I Medium 5 – 10 143 71.5 High 11 – 14 46 23 2 Use of Bio fertilizer Low 0 – 3 117 58.5 0.35 III Medium 4 – 8 24 12 High 9 – 12 59 29.5 3</p>		<p>Use of organic Low 0-4 8 10.00 9.64 75.89 II manures and crop Medium 5-10 4 5.00 residues High 11-14 68 85.00 5. Vermicompost Low 0-1 16 20.00 3.87 60.41 V Medium 2-4 24 30.00 High 5-6 40 50.00 6. Use of Bio-fertilizer Low 0-3 8 10.00 7.95 72.91 III Medium 4-8 12 15.00 High 9-12 60 75.00 52</p>		
<p><b>W</b> <a href="https://www.researchgate.net/publication/237762666_Knowledge_Level_about_Organic_Farming_in_Haryana">https://www.researchgate.net/publication/237762666_Knowledge_Level_about_Organic_Farming_in_Haryana</a></p>				

<b>12/15</b>	<b>SUBMITTED TEXT</b>	606 WORDS	<b>75% MATCHING TEXT</b>	606 WORDS
<p>Medium 2 -4 18 9 High 5 – 6 39 19.5 4 Weed management Low 0 – 3 93 46.5 0.38 II Medium 4 – 8 107 53.5 High 9 – 12 0 0 5 Pest management Low 0 -9 84 42 0.35 III Medium 10 – 20 113 56.5 High 21-30 3 1.5</p>		<p>Medium 3-5 - - High 6-8 72 90.00 2. Weed Management Low 0-3 12 15.00 7.35 65.62 IV Medium 4-8 24 30.00 High 9-12 44 55.00 3. Pest-Management Low 0-9 15 18.75 16.31 54.37 VI Medium 10-20 33 41.25 High 21-30 32 40.00 4.</p>		
<p><b>W</b> <a href="https://www.researchgate.net/publication/237762666_Knowledge_Level_about_Organic_Farming_in_Haryana">https://www.researchgate.net/publication/237762666_Knowledge_Level_about_Organic_Farming_in_Haryana</a></p>				

13/15	SUBMITTED TEXT	41 WORDS	68% MATCHING TEXT	41 WORDS
	<p>The concepts of organic agriculture was developed during early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner and others. They believed that the use of manures, cover crops, crop rotation, and biological pest control result in better farming system.</p>			<p>The concepts of organic agriculture were developed in the early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner and others who believed that the use of animal manures (often made into compost), cover crops, crop rotation, and biologically based pest controls resulted in a better farming system.</p>
	<p><b>W</b> <a href="https://www.britannica.com/topic/organic-farming">https://www.britannica.com/topic/organic-farming</a></p>			

14/15	SUBMITTED TEXT	61 WORDS	100% MATCHING TEXT	61 WORDS
	<p>Organic agriculture is a production system, that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved...(</p>			<p>Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved... —</p>
	<p><b>W</b> <a href="https://en.wikipedia.org/wiki/Organic_farming">https://en.wikipedia.org/wiki/Organic_farming</a></p>			