POTENTIALS AND CONSTRAINTS OF ORGANIC TOMATO FARMING

A Case Study of Pithuwa VDC-2 Chitwan District, Nepal

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The Central Department of Rural Development,
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DECLARATION

I hereby declare that the thesis entitle POTENTIALS AND CONSTRAINTS OF ORGANIC TOMATO FARMING: A CASE STUDY OF PITHUWA VDC-2, CHITWAN DISTRICT NEPAL submitted to the Central Department of Rural Development, Tribhuvan University, is entirely my original work prepared under the guidance and supervision of my supervisor. I have made due acknowledgements to all ideas and information borrowed from different sources in the course of preparing this thesis. The results of this thesis have not been presented or submitted anywhere else for the award of any degree or for any other purposes. I assure that no part of the content of this thesis has been published in any form before.

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(2071-11-30)

RECOMMENDATION LETTER

The thesis entitled **POTENTIALS AND CONSTRAINTS OF ORGANIC TOMATO FARMING: A CASE STUDY OF PITHUWA VDC-2, CHITWAN DISTRICT NEPAL** has been prepared by **Sujata Thapa Magar** under my guidance and supervision. I hereby forward this thesis to the evaluation committee for final evaluation and approval.

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Prof. Dr. Uma Kant Silwal

Supervisor

Date: 2015-3-31

(2071-12-17)

APPROVAL LETTER

The thesis entitled **POTENTIALS AND CONSTRAINTS OF ORGANIC TOMATO FARMING: A CASE STUDY OF PITHUWA VDC-2, CHITWAN DISTRICT NEPAL** submitted by **Sujata Thapa Magar** in partial fulfillment of the requirements for the Master's Degree (M.A.) in Rural Development has been approved by the evaluation committee.

Evaluation Committee

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Date: 2015-3-14 **Sujata Thapa Magar**

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Abstract

Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycle and social biological activity. It is used on minimal use of off-farm inputs and enhances ecological harmony. Organic tomatoes are produced using pest management and fertilization methods that do not include synthetic compounds.

Nepal is one of the most beautiful countries in the world with lofty snowcapped mountains and scenic, peaceful settings. Nepal having three geographical variations tomato is best suited in Tarai, in low and mid hills; it is becoming increasingly attractive for cash generation in the high hills too. Organic tomato farming is highly followed by Nepalese where Chitwan District consists large numbers of farmers that are following organic tomato farming as cash crops. Chitwan district that falls under the central region lies in Narayani zone of Nepal. The district has many places like Bhandara, Chainpur, Pithuwa, Kshetrapur, Torikhet which are practicing an organic farming culture.

The general objective of the study was to explore organic tomato farming potentiality and challenge in Pithuwa village of Chitwan district whereas specific objectives were to assess the level of awareness among the farmers about organic tomato farming, to identity the problems faced by tomato growers and to explore potentiality of organic farming.

This study has been carried out mostly on the basis of exploratory research design, also descriptive method of research design is used in order to describe the findings during the study. Qualitative and quantitative data have been collected for the study using both primary and secondary sources. Of the total households, 15 households farmers were selected from those who have adopted organic tomato farming, 24 households were consumers of organic tomato farming and 11 households were from different sectors, all together 50 respondents were selected. To collect data, household survey, key informant interview, observation, method have been used and different computer program, simple statistics tools like table, graphs, have been used for data analysis and descriptive methods has been used for qualitative data.

After the research different findings were obtain, after research it was found that among respondents 58% were married and 42% were found unmarried.39 respondents were found following Hinduism and 11 respondents were found following Buddhism, 8 respondents were found illiterate, 30 were literate and remaining 12 respondents had education level above SLC. It was found that Brahmin community had dominated the study area. It was found that 34 respondents were from Brahmin community, 4 respondents were from Pariyar, 6 respondents were from Magar and 6 from Tamang caste. It was also found that 12 respondents were below the age of 30, 25 were of between age group of 31 to 60 and 13 respondents were above 61. It was also found that 31 respondents were female and 19 were male. It was also found that 3 respondents' purpose of tomato production were self-consumption, 5 respondents' motive were commercial production and 7 respondents were having both purposes.

Study area has huge potentiality to be one of the finest places for organic farming as the very district has a fertile soil which is key factor for crop production. Different attractions like, the environment, the plain land, availability of transportation and information technology and labors has added more value for organic tomato farming.

A major challenge to develop this area as agriculture hub is lack of sufficient irrigation, lack of technical knowledge and assistance, problems of diseases and insects and lack of training for farmers that has hindered to product the finest organic tomatoes.

I believe that this thesis will contribute in some level for the promotion of the study area as organic tomato farming area, and helps to determine this area as a place having high potentiality of it. This study might be useful for the exposure of Pithuwa VDC area and hope that this thesis will contribute to increase the number of farmers towards organic farming system in study area.

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ABBREVIATIONS/ACRONYMS

ADB	=	Asian Development Bank
CBS	=	Central Bureau of Statistics
FAO	=	Food and Agriculture Organization
GDP	=	Gross Domestic Production
GOI	=	Government of India
HHS	=	House Holds
NARC	=	National Agricultural Research Council
NGO	=	Non-Governmental Organization
NPC	=	National Planning Commission
NRB	=	Nepal Rastra Bank
SLC	=	School Leaving Certificate
VDC	=	Village Development Committee

CHAPTER – I

INTRODUCTION

1.1 Background of the Study

Nepal being an agricultural country most of the people depend on agriculture. Main source of food, income even employment is agriculture. The agriculture has large number share on gross domestic production (GDP). It provides food stuff and raw material to agro based industries. It helps to increase national income through various ways such as production of food grains, commercial fruit farming, livestock and poultry farming etc. It also provides employment and semi skill manpower either directly or indirectly.

Government past efforts to increase agricultural productivity and productivity were fundamentally guided towards promoting intensive use of green revolution based technologies and off- farm agricultural inputs such as fertilizer pesticides and improve verities/breeds and planting materials (*Pokharel*, 2012).

Average use of chemical fertilizers and pesticides in Nepal (G.C. and Katawal, 2011) is still very low (32kg/ha and 142gm/ha/year respectively). But unbalanced and over use of pesticides in some crop and production pockets particularly in commercial vegetables grown for urban market has been a major concern at present with increased awareness about harmful effect of pesticides on human environment health an organized movement towards organic agriculture was initiated from date 1980s by nongovernment organization (Adhikari and Shrestha 2011). At present several governments organization NGOs farmer and entrepreneurs are involved in promotion of organic agriculture in Nepal. The market of organic agriculture product is increasing over the years in Nepal. At present it is assumed that organic products worth of at least 7 million us $ are sold per annum in Nepal and demand along with number of farmers involved in organic production are continuously ever increasing (Newa, 2011).

"Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycle and social biological activity. It is used on

minimal use of off-farm inputs and enhances ecological harmony" (National organization standard board).

Various local organic practiced by institution and farmer in organic farming sector. Organic tomato farming is also one of the major commercial vegetable crops in Nepal. The earliest tomato were little sour berries that grew on low bushes in dry sunny places in the Andes mountain in south America beginning about 350 million years ago. The word "Tomato" comes from the Spanish "Tomate". Tomatoes were first used as food by Mexicans. There are hundreds of tomato varieties from marble-sized grape or cherry tomatoes, to juicy salad tomatoes, meaty paste tomatoes, and huge, sweet, beefsteak tomatoes. Their colors range from deep crimson to orange, yellow, green, purple, and chocolate.

The tomato is consumed in diverse ways including raw an ingredient in many dishes, sausages, salad and drinks. Nepal is small and landlocked country but it has diverse climate, so Nepal has huge potentiality of different farming. Tarai region is best suited for tomato farming including low and mid hills. But nowadays it is becoming increasingly attractive for cash generation in the high hills also. Nepal has fertile soil which is suitable for organic tomato farming. Most of the area is covered by villages. All the villages have tradition of growing animal. The wastages (animal dung) are the best organic fertilizer for organic farming which will be easily available because of animal farming. This helps in healthy and testy crop cultivation. Most of the farmers are illiterate in Nepal so they do not have new technology of farming but due to long term experience of farming they have indigenous knowledge and technology about organic tomato farming. For example "Gaut" is spread over the crop which acts as pesticides. Organic farming needs to be carefully handled so it requires more people which are easily available because so many people are unemployed in Nepal. This helps in income growth and decrease the rate of foreign employment. We need to promote this type of farming, Nowadays health has become main concern for the people. Thus people are attracted towards organic tomato farming and its product.

That is why organic tomato has large demand in Nepali market. This type of farming helps in increase of income, self-employment, and healthy life, tasty and natural foods. So let all the sectors, including individual private and government think about utilization and promotion of organic tomato farming. Be the first to start it. Different

type of threats are coming in organic tomato farming .One obvious threat factor is competition from other countries with similar advantages especially India. As Indian government provides subsidy to the farmers and they could produce some quality product in less cost and it is likely that such products could produce Nepali market. Despite the flaws and due problems, organic farming is growing in a very speedy manner these days.

It is believed, in conclusion, that Nepalese farmers are more committed for the organic farming compared to other South Asian countries. But nowadays particularly youth are distracting from the agriculture field. They think once they have some academic degree, it's not good to work in agriculture field and playing with mud plough etc. is not feasible option and move out of the village in search of employment. Due to lack of standard guidelines and lack of clear vision of government is one of the serious drawbacks for the slow development of organic tomato farming in Nepal

Nepalese political situation is also one of the major threats in putting debar to the organic movement. Relentless government, lack of policies, weak governance system etc. are exacerbating problem, no guarantee on the price of organic products is another threats to the organic tomato growers. Until and unless farmers are assured with the handsome price of the organic products farmers will not be motivated more and asking them to go through organic production remain another threat. India is mainly an agricultural country, where agriculture contributes to about 14.6 percent in gross domestic product (GDP) and support over 58 percent of nation's population for livelihood (GOI, 2010). The recent economic and trade liberalization are exerting heavy pressure on India's land resource partitioning in sectors such as forestry, agriculture, pasture lands, human settlements and industries. Thus, the coupled effect of meeting food demand under limited arable area and toxin-free agricultural produce have become an important forcing factor for countries like ours to explore possibilities for opting 'conventional agriculture', the dominant farming approach promoted by most government and agribusiness groups throughout the world or 'organic agriculture' a holistic production management system which is supportive to environment, health and sustainability. Organic farming system emphasis on the use of organic matter for enhancing soil properties, minimizing food chain associated

health hazards and attaining closed nutrient cycles, the key factors for sustainable agriculture (Cardelli et al., 2004).

1.2 Statement of the Problem

Agriculture is very important for developing countries like Nepal. Most of the people depend in agriculture occupation, which has large impact on economic level of country. The diverse climatic condition of Nepal has huge potentiality of different types of farming. Almost all the districts have practiced different type of farming among which Chitwan district is suitable for it due to its plain land infrastructure, access of water etc. Pithuwa which is one of the biggest VDC of chitwan district has practiced organic tomato farming due to all these facilities. Organic tomato farming is easy in this VDC because of its easy transportation, information technology, due to large number of labor available in village, fertile land and also indigenous knowledge of local people.

Although having such potentiality of organic tomato farming in this VDC it is difficult to find the farmers who have awareness about organic tomato farming. Farmers have many problems which are neither identified by government nor by local people. In this VDC potentiality of organic tomato farming is not uptimumly explored. So this research has been conducted in micro level to understand the prospects and probability of organic tomato farming in Pithuwa VDC.

1.3 Objectives of the Study

The general objectives of the study are to explore organic tomato farming potentiality and challenge in Pithuwa village of Chitwan district. The specific objectives are.

1. To assess the level of awareness among the farmers about organic tomato farming.
2. To identify the problems faced by tomato growers.
3. To explore potentiality of organic farming.

1.4 Importance of the Study

It is necessary to diversify agriculture in Nepal. There is a need to bring considerable cultivated land under cash crop. Organic tomato farming in Nepal played the vital role to introduce Chitwan district. Organic tomato production has contributed a lot to the local farmers in improving their socio- economic life. This study focuses on the condition of the organic tomato farmers who are facing numerous problems like lack of technical knowledge lack of irrigation, lack of proper fertilizer pesticides etc. In this study production of tomato in Chitwan district has been analyzed. If the government does not have proper knowledge about the tomato production, it cannot develop good plan, policy or program relating to it.

This research is based on field survey. This report assist student on the corresponding field related study and research. It is expected that the information generated from this research will be useful for policy makers, planners, administrators and implementers as well.

1.5 Limitation of the Study

This present study is based on and limited to the people of Pithuwa village of Chitwan district. The study is very specific like that of case studies. So the conclusion drawn from the study might not be conclusive. The conclusion might not be generalized for the whole. But the interferences might be valid to some extent to those areas, which have similar geographical area, socio-economic and environmental settings.

1.6 Organization of the Study

The study has been divided into seven chapters. The first chapter presents the introduction, statement of the problem, objectives, significance and limitation. The second chapter is related to the review of related literature. The third chapter presents about the methodology adopted while collecting data. Likewise, fourth chapter deals about the analysis and interpretation of the data. The fifth chapter analyses the impacts of organic tomato farming based on primary data. Sixth chapter is related to the problems and prospects of tomato farming and seventh chapter is the conclusion part of the study. It contains the summary, findings and suggestions.

CHAPTER – II
LITERATURE REVIEW

Literature review is essential to conduct any research work so for this study review of different literature has been done under two different sections the conceptual and review of empirical studies.

For this study different available books journal previous research work report acts articles, published, unpublished and documents related to the subject are reviewed.

The concept of organic farming is based on a holistic view point. Nature is more than just the separate individual elements into which it can be split. Principles and ideas of farming are found in the science of ecology, the interrelationship of living organism and their environments. Organic farming largely excludes synthetic inputs pesticides herbicides and fertilizers and focuses on sufficient biological processes such as composting and other measure to maintaining soil fertility, natural pest control diversifying crops and livestock. Organic agriculture gives priority to long term ecological health, such as biodiversity and soil quality, contrasting with conventional farming, which concentrates on short term profit gains. (Trewavas, 2001)

Organic agriculture is one of the approaches to sustainable agriculture development practice today which is ecologically safe economically viable and socially acceptable. As been widely accepted, it is a holistic production management system that emphasizes on the use of management practices accomplished by using agronomic, biological and mechanical methods in preference to off- farm inputs and as opposed to using synthetic materials to fulfill any specific function within the system. Of which, the soil is of central importance, and the primary goal is to optimized the health and productivity of interdependent communities of soil life, plants, animals and human being. Prohibiting the use of genetically modified organism, it avoids or largely excludes the use of chemical pesticides, herbicides, fertilizers, growth regulator, hormones and antibiotics. In several ways, the system can help to promote and enhance healthier agro- ecosystems including biodiversity, biological cycles and soil biological activity. In reality, organic farming is a content system approach based on the perception that tomorrow's ecology is more important than today's economy. (Scialabba, 1999)

Growth of organic agriculture requires producers' and consumers' awareness, availability of sound infrastructures and consumers' willingness to pay for the organic products. Nepal, being a developing country, definitely majority of the consumers is not well off. However, a large chunk of consumers are clustered in and around urban areas of the country and they could pay for the organic products provided quality is assured. Market potentials are mainly determined by consumer expectations of the product attributes, which are attached to the product such as quality, price, certification, quality also consumers' awareness of health, food safety, environmental, and technology issues related to food products as well as the industrialization of agriculture and globalization, have been identified as diversification factors of food consumption. There is the need to investigate wider prospective of organic farming through producer' and consumer view point. (Ramesh et al, 2005)

Organic farming is the technique which calls for extension of knowledge vis–a-vis skills among the end users. Unfortunately government extension service remains quite rudimentary in the study area despite its peri- urban location. As a matter of fact many farmers have only vague ideas about organic farming and its advantages as against the traditional and modern farming methods. Albeit many have been involved in organic production, their way of managing organic farm may not justify organic standards. Similarly majority of the consumers replied that they had heard of organic vegetables and known the significance of it, however, most of them lack of knowledge about their availability. This finding is in concordance with that of (Sharma, 2005) who reported that 63% of the respondents knew about organic products while 375 of the respondents did not. This indicates that awareness programs about organic products could be an effective way of promoting among consumers

Agriculture is one of the major contributing sectors in Nepalese economy that shares 36% in the GDP at 1984/85 constant price (MOAC, 2007) and provides employments to two-third of the economically active population (MOAC, 2006). The government, through the past development plans, has made significant efforts to increase agricultural production and productivity. However, the efforts have not yielded results to desired levels due mainly to difficult topography, poor infrastructural development and high level of farm poverty (NPC, 2007). Nepalese agriculture is predominantly characterized by traditional knowledge based subsistence type with low productivity.

The agricultural systems in the mountain comprise 2/3rd of the nation's geographical area and largely integrate crops livestock to traditional knowledge and locally available resources. With very low productivity, the systems are largely organic by default for maintaining soil fertility and production. Most of the farmers in the high mountain and majority of the in the middle mountain do not use chemical inputs in their farming. The use of agro- chemical such as fertilizers and pesticides is becoming important only to the commercial agriculture pockets recently being developed in the accessible areas. With introduction of improved agronomic and composting practices, bio- fertilizers and bio-pesticides, there is greater possibility of converting the systems to organic types with little effort. Farmers in the terai are producing crops in combination of both indigenous and conventional knowledge system. Organic farming with low productivity is adopted in few areas. In Nepal use of pesticides and fertilizers is wide spread in commercial production areas due to conventional agriculture based market and infrastructure development. Pesticides and fertilizers consumption is increasing ai faster rate with intensification of farming business regardless of their detrimental effects on human and environmental health. Indiscriminate use of the agro-chemicals has , in consequence, initiated several problems such as pest' resistance to pesticides and resurgence due to elimination of their natural enemies, environmental pollution, toxic residues in food and feed materials, depletion of soil fertility, disruption of ecosystem, animal and human health hazards and other economic losses. This forces to think alternative strategies towards sustainable agriculture development and preserving eco- system. (Pant, 2006)

Tomato (Lycopersiconesculentum Mill.) is one of the most important vegetable crops grown from subsistence to commercial scale in Nepal. Tomato can be grown in winter, spring and rainy seasons. The crop is grow in winter in the Tarai and inner-Tarai and can be grown in two seasons, spring and rainy in the low and middle hills of Nepal. Tomato was used to be grown only in the rainy season in the hills at subsistence level. However the introduction of improved exotic verities makes it possible to grown the crops in the spring seasons as well- Both spring and rainy seasons tomatoes are a major source of income to the vegetable grower of the hills, since they get an off season market price. Total area and production of this crop in Nepal is 10,530 ha and 72,657 t, respectively with an average productivity of 6.9 t ha-

1 (Shrestha and Ghimire 1996), which is very low as compare to the experiment yield of tomato in the country.

Tomato has acquired the status of world most popular vegetable crop due to its wider adaptability to various agro climatic conditions. At present tomatoes rank third net to potato and sweet potato in terms of global vegetable production (FAO, 2002).

There are several factors limiting tomato productivity among which tomato yellow leaf curl virus has been identified as one of the most important biotic constrains for rainy season tomato cultivation in Nepal. Both spring and rainy season tomatoes are found infected with yellow leaf curl virus and a high incidence of the disease was observed during the rainy season in the western hills of Nepal. The popular tomato variety, NCL 1 for the rainy season is highly susceptible to TYLCV. Since this variety covers majority of tomato growing areas during rainy season in the western hills, large losses due to the disease have been experienced by the farmers every year. The presence of the disease in the western hills was for the first time, suspected in 1992 in CL 1131(now NCL 1) a popular rainy season tomato variety at Kudule, Baglung. However, the authentic confirmation of the disease was done only in 1994. The incidence of the disease was just 1 to 2% at the third and the fourth picking in 1992 and hence, it was consider as a disease of very low profile at that time. The subsequent annual monitoring of the disease in commercial tomato growing areas of the western hills revealed an increased incidence and severity associated with significant yield losses up to 95% because of an early appearance of the disease right from pre-flowering stage. Since then the disease has been considered in high profile at Agriculture Research Station, Lumle. Extensive monitoring of the disease have been carried out to find out the incidence of the disease, associated yield losses and to assess the need for research on TYCLV management. This paper presents the results of the field monitoring and laboratory analysis work on TYLCV in the western hills during the rainy seasons from 1995 to 1997 (PPD,1995).

Consumption of organic food products is the best remedy to prevent the numerous health hazards, caused by conventionally produced foods, the global market has experienced exceptionally high growth in organic foods in the United States Europe and small (Piyasiri and Ariwardana,2002). However, in developing countries, the growth of organic sector is quite slow and faces tremendous challenges. Nepal's

organic agricultural production has a relatively short history. Adaptation of organic farming is quite slow, market for organic products is not well developed and no market statistics are available in Nepal (Bhatta et al 2008)

There have been some signs of changes in agriculture sector of Nepal in the past few years. Some youths are going abroad in lack of opportunities for income and jobs while others are trying to reap benefits from the opportunities in the country. Increasing involvement of the youths in commercial farming of vegetables must be mentioned while talking about those making efforts to capitalize on such opportunities. Land used for vegetable farming increased by 1,355 hectares to 246,392 hectares in the fiscal year 2069/70 with production rising by 2,868 tons to 33,000 tons, according to the Vegetable Development Directorate under the Department of Agriculture. Attraction of youths toward both seasonal and non-seasonal vegetables is rising now while the market is also expanding. Youths are now starting commercial farming of green vegetables by bringing in new technologies and methods. Commercial vegetable farming is growing in the rural areas of Kathmandu and surrounding Kavre and Dhading. Vegetables produced have also got the market and the farmers are also earning well. This trend is rising even outside Kathmandu Valley. Farmers in a few districts are even earning hundreds of thousands through riverbed farming.

But the middlemen still dominate vegetable market which means the farmers are not getting the right price for their products. The farmers, who have failed to establish direct relation with the market, are being cheated. Import of green vegetables is rising every year even though the government report is showing an increase in the area of land used for vegetable farming. Vegetables worth Rs 5.32 billion have been imported in the first 10 months of the current fiscal year, according to the Nepal Rastra Bank (NRB). Data shows that domestic production is meeting just 60 percent of the total demand for vegetables. This shows that proper inter-relation among production, consumption and market has not been established. Domestic production can meet the demand if the products were to get proper access to the market, farmers are provided better seeds, fertilizers and skills, and access to agricultural loans is increased. This can also help improve the income level of farmers.

There is a sort of revolution in production of tomato in recent times. While tomato has been produced in Kavre, Sarlahi, Dhanusha, Mahottari, Makwanpur, Surkhet and other districts, it is now commercially produced even in Kathmandu Valley. Attraction for farmers toward tomato is increasing as Sirjana and Samjhana strains developed by agricultural scientist Dr. Kedar Budhathoki while at the Nepal Agricultural Research Council (NARC) can be cultivated in tunnels, and can provide yield across the year. Tomato farming has also brought about a massive change in the financial state of farmers. The number of farmers doing tomato farming by leasing other's land has increased now after Budhathoki showed that up to 22 kilograms of tomatoes can be produced in a single plant inside plastic tunnels. Over 10,000 families are estimated to be involved in tunnel farming of non-seasonal vegetables in the Valley. Farmers state that tomato production has doubled in comparison to the last year when it had fallen. Over-production obviously has affected the market price. But the farmers have dumped around seven tons of tomatoes on the road protesting lack of fair price. They demand that they be allowed to export tomato. We should not take the demand to be allowed to export when production is more than domestic demand otherwise. The government must address the demand of farmers to remove the quarantine hassles while exporting to India. Farmers should also seriously think about the suggestion of government officials that they should pick raw tomatoes and send to the market to ensure adequate time to allow export before they rot. Establishment of industries to produce tomato sauce, tomato juice and other products can also solve the current problem (www.karobardaily.com).

Tomato in different countries

Etymology

The word "tomato" comes from the Spanish *tomate*, which in turn comes from the Nahuatlword *tomatotl* /aːˈtomatl it first appeared in print in 1595. A member of the deadly nightshade family, tomatoes were erroneously thought to be poisonous (although the leaves are) by Europeans who were suspicious of their bright, shiny fruit. Native versions were small, like cherry tomatoes, and most likely yellow rather than red. The tomato is native to western South America and Central America.

Mesoamerica

Aztecs and other peoples in Mesoamericaused the fruit in their cooking. The exact date of domestication is unknown: by 500 BC, it was already being cultivated in southern Mexico and probably other areas. *The Pueblo people are thought to have believed that those who witnessed the ingestion of tomato seeds were blessed with powers of divination*. The large, lumpy variety of tomato, a mutation from a smoother, smaller fruit, originated in Mesoamerica, and may be the direct ancestor of some modern cultivated tomatoes.

Spanish distribution

Spanish conquistador Hernán Cortés may have been the first to transfer the small yellow tomato to Europe after he captured the Aztec city of Tenochtitlan, now Mexico City, in 1521, although Christopher Columbus, a Genoese working for the Spanish monarchy, may have taken them back as early as 1493. The earliest discussion of the tomato in European literature appeared in an herbal written in 1544 by Pietro Andrea Mattioli, an Italian physician and botanist, who suggested that a new type of egg plant had been brought to Italy that was blood red or golden color when mature and could be divided into segments and eaten like an eggplant—that is, cooked and seasoned with salt, black pepper, and oil. However it wasn't until ten years later that tomatoes were named in print by Mattioli as *pomid'oro*, or "golden apple".

After the Spanish colonization of the Americas, the Spanish distributed the tomato throughout their colonies in the Caribbean. They also took it to the Philippines, from where it spread to Southeast Asia and then the entire Asian continent. The Spanish also brought the tomato to Europe. It grew easily in Mediterranean climates, and cultivation began in the 1540s. It was probably eaten shortly after it was introduced, and was certainly being used as food by the early 17th century in Spain. The earliest discovered cookbook with tomato recipes was published in Naples in 1692, though the author had apparently obtained these recipes from Spanish sources. In certain areas of Italy, such as Florence, however, the fruit was used solely as a tabletop decoration before it was incorporated into the local cuisine in the late 17th or early 18th century.

Italy

The recorded history of tomatoes in Italy dates back to 31 October 1548 when the house steward of Cosimo de' Medici, the grand duke of Tuscany, wrote to the Medici private secretary informing him that the basket of tomatoes sent from the grand duke's Florentine estate at Torre del Gallo "had arrived safely." Tomatoes were grown mainly as ornamentals early on after their arrival in Italy. For example, the Florentine aristocrat Giovanvettorio Soderini wrote how they "were to be sought only for their beauty" and were grown only in gardens or flower beds. The tomato's ability to mutate and create new and different varieties helped contribute to its success and spread throughout Italy. However, even in areas where the climate supported growing tomatoes, their proximity of growing to the ground suggested low status. They were not adopted as a staple of the peasant population because they were not as filling as other fruits already available. Additionally, both toxic and inedible varieties discouraged many people from attempting to consume or prepare them.

Unique varieties were developed over the next several hundred years for uses such as dried tomatoes, sauce tomatoes, pizza tomatoes, and tomatoes for long term storage. These varieties are usually known for their place of origin as much as by a variety name. For example, Pomodorinodel Piennolo del Vesuvio is the "hanging tomato of Vesuvius". Five different varieties have traditionally been used to make these "hanging" tomatoes. They are Fiaschella, Lampadina, Patanara, Principe Borghese, and Re Umberto. Other tomatoes that originated in Italy include San Marzano, Borgo Cellano, Christopher Columbus, Costoluto Genovese, and Italian Pear. These tomatoes are characterized by relatively intense flavor compared to varieties typically grown elsewhere.

Varieties of tomato

There are around 7,500 tomato varieties grown for various purposes. Heirloom tomatoes are becoming increasingly popular, particularly among home gardeners and organic producers, since they tend to produce more interesting and flavorful crops at the cost of disease resistance and productivity. In 1973, Israeli scientists developed the world's first long shelf-life commercial tomato varieties.

Hybrid plants remain common, since they tend to be heavier producers, and sometimes combine unusual characteristics of heirloom tomatoes with the ruggedness of conventional commercial tomatoes.

Tomato varieties are roughly divided into several categories, based mostly on shape and size.

- "Slicing" or "globe" tomatoes are the usual tomatoes of commerce, used for a wide variety of processing and fresh eating.
- Beefsteak tomatoes are large tomatoes often used for sandwiches and similar applications. Their kidney-bean shape, thinner skin, and shorter shelf life make commercial use impractical.
- Oxheart tomatoes can range in size up to beefsteaks, and are shaped like large strawberries.
- Plum tomatoes, or paste tomatoes (including pear tomatoes), are bred with a higher solids content for use in tomato sauce and paste, and are usually oblong.
- Pear tomatoes are pear-shaped, and are based upon the San Marzano types for a richer gourmet paste.
- Cherry tomatoes are small and round, often sweet tomatoes generally eaten whole in salads.

- Grape tomatoes, a more recent introduction, are smaller and oblong, a variation on plum tomatoes, and used in salads.

- Campari tomatoes are also sweet and noted for their juiciness, low acidity, and lack of mealtimes. They are bigger than cherry tomatoes, but are smaller than plum tomatoes.

http://www.flavourfresh.com/historyoftomatoes.htm.

Research and Field Experience in Tomato Fertility

In a California study, soils well prepared with cover crops (legumes or legume-grass mixtures, grown during the winter preceding all other cash crops) and composted poultry manure showed no yield response over four years of replication as compared to conventionally based two-year rotation (tomato and wheat) and four-year rotation (tomato, safflower, corn, bean).Yields averaged 70 to 80 t/ha across the treatments. However, greater inputs were needed in the organic treatments, such as higher levels of irrigation because of greater infiltration rates, whereas the conventionally managed soils had poor infiltration rates. The total nitrogen inputs were also greater, applying twice the amount of nitrogen (N) to the organic as the conventional system in the last two years of treatment. High N input suggested N immobilization or insufficient decay by the microbial community. Many studies have shown that providing N via cover crops and/or composts can provide adequate fertility; however, this study demonstrates that total N inputs cannot rely on cover crops and/or composts alone. (Clark et al., 1999)

In an Iowa study, two natural soil amendment/fertilizer products were used in an organic tomato production trial as a comparison to tomato plants that received no soil amendment. Chilean nitrate, also known as sodium nitrate, was applied at a rate of 40 pounds N/acre acre plus composted manure at 160 pounds N/acre. Cinagro™ was used as the other treatment at the application rate of 200 pounds N/acre. Results of the amendments were much the same: the tomato plants treated with the fertilizers were taller and had more leaves than the unfertilized soil. Flower, fruit number, and yield were numerically greater in the fertilized plots as compared to the untreated soil. No differences were statistically shown between the two amendments. (Delate et al., 2008)

In a two-year Ohio study, fall-applied organic composted cannery waste (40% tomato processing byproducts, 20% duck manure, 20% municipal yard waste, and 20% reed canary grass straw) at a total of 26 t/ha in 1996 and 35 t/ha in 1997 produced 33% higher yields of ripe tomatoes than the no amended conventional plots that were receiving supplemental nutrient fertilizers. In addition, the composted cannery waste incorporated into organic tomato plots reduced the incidence of anthracnose root rot when disease was severe in the conventional plots. The organic plots also seemed to have better water retention than the conventional plots during two unusually dry months of the year when they received no supplemental irrigation. (Abbasi et al., 2002)

In a long-term field experiment set up in North Carolina, three tomato subplots were amended each May with synthetic fertilizers (for the conventional method), cotton-gin trash, and animal manure (poultry and swine manure) at a rate of 67 kg N/ha. A fourth subplot consisted of rye/vetch green manure at a rate of 45 kg N/ha. Results showed that microbial biomass and microbial activity were generally higher in organically, rather than conventionally, managed soils with cotton-gin trash being the most effective, followed by animal manure, rye/vetch, and the synthetic soil. Likewise, the highest extractable carbon (C) and N levels occurred in plots amended with cotton-gin trash, followed by animal manure, rye/vetch, with the conventional plot showing the least amount of extract-able C and N. Cotton-gin trash, animal manure, and rye/vetch treatments increased soil moisture by 25% to 58%, 11% to 13%, and 8% to 12%, respectively, compared to the synthetic fertilizer treatment. In addition, data showed that mulching the plots enhanced the soil microbial biomass N and potential N supply by 45% compared to the amended organic plots not mulched. (Tu et al., 2005)

Nepal produces veggies worth Rs 45 billion annually: Report

KATHMANDU, FEB 15 - Nepal produces vegetables worth Rs 45 billion annually, according to Nepal Vegetable Crops Survey 2009-10. And, Rs 9 billion is invested in vegetable farming every year. The report says that around 70 percent of Nepal's total household is involved in vegetable farming.

The first of its kind survey reveals interesting facts about vegetable farming in the country—description of vegetable holders, total area for vegetable cultivation, expenditure on vegetable farming, total production and uses of vegetables, and farmers' access to agricultural services.

The survey carried out by the Central Bureau of Statistics (CBS) with assistance from the Asian Development Bank says that vegetables are cultivated in 232,295 hectares of land in the country.

Tarai is the major vegetable growing area with an annual production of 1,437,921 tons, followed by hilly region with 1,261,041 tons. As per the survey, total annual production of vegetables in Nepal is 2.82 million tons. Of the total output, 39 percent (1.10 million tons) is used for household consumption and 61 percent (1.71 million tons) for sale. However, of the total vegetable farmers, only 18 percent are engaged in commercial farming.

In terms of cultivation area, production and value, cauliflower is the number one vegetable crop. A total of 404,580 tons of cauliflower is produced in 33,172 hectares of land in the country. According to the survey, cauliflower worth Rs 6.5 billion is produced annually in Nepal. Other major vegetable crops in terms of production are tomato (317,657 tons), cabbage (302,067 tons), pumpkin (166,424 tons) and radish (164,076 tons).

According to the survey, cauliflower, tomato and cabbage are the major money-spinners among vegetable crops. It says most commonly sold vegetables are cauliflower (339,273 tons), tomato (283,999 tons) and cabbage (269,294 tons). "As

cauliflower, tomato and cabbage can be cultivated throughout the year, it is natural that they are the top three vegetables," said agro-expert Tulasi Gautam.

Although the Tarai region produces and sells more vegetables, vegetables grown in hilly region have better value. According to the survey, vegetables produced in hills in a year are valued at Rs 21.79 billion, whereas Tarai products are valued at Rs 21 billion. "The reason behind the difference in value is vegetables in hills are produced during rainy reason when prices are relatively higher," said Gautam. In terms of value, cauliflower tops the chart. It is followed by tomato, cabbage, asparagus bean, cucumber and broad leaf mustard (Rs 2 billion each).

A majority of vegetable farmers in the country are self-financed with only five percent taking loan for vegetable farming. Around 55 percent of the farmers rely on informal sectors for loans.

Among those taking loans, only 24.3 percent take loans from banks. Relatives and friends are the largest sources of loan for the farmers. "Farmers are still relying on traditional loans with high interest rates. This means they are not earning up to their potential," said Puskhar Bajracharya, a member of the National Planning Commission (NPC). "There is a need for expanding banking services in rural areas to encourage farmers."

Interestingly, 15.1 percent of farmers have taken loans from co-operatives. It shows that agriculture cooperatives and agriculture and fruits cooperatives are emerging as major sources of financing.

A total of Rs 9 billion is invested in vegetable farming in the country annually. The largest portion of the amount (Rs 2.3 billion; 26 percent) is invested for purchasing organic fertilizers followed by purchase/production of seeds (22 percent) and land preparation (16 percent). The rental cost of land is the highest in Tarai, according to the survey.

There are 55 vegetable crop groups identified in the survey. Vegetable farming is slowly emerging as the major source of income for farmers with 12 percent of them saying that income from vegetable farming is sufficient for a year. According to the survey, on an average, five months' expenditure can be maintained by the income

form vegetable farming. The survey revealed that almost half of the vegetable farmers (48 percent) use pesticides (insecticides or fungicides). The use of pesticides was observed most prominently (72 percent) in the Eastern and Central Tarai.

According to the survey, organic vegetable farming is still in its nascent stage in the country. Of the total vegetable farmers, only eight percent use organic pesticides, while 92 percent use chemical pesticides. Uttam Narayan Malla, director general, CBS, said the survey will be of a great help for planners, policy makers and researchers for the development of vegetable crops.

Top five vegetable products

Vegetable Production in tonnes

Cauliflower 404,580

Tomato 317,657

Cabbage 302,067

Pumpkin 166,424

Radish 164,076

www.ekantipur.com

There exists good opportunities for organic tomato farming in the urban and peri-urban areas of the country as most the affluent consumers have been agglomerated around cities and cites are the popular destination for the tourists. Some specialized markets have started selling organic products. There is immense scope for the organic products to be delivered to India and other countries provided quality standards have been maintained.

Growing awareness among the educated circle and increasing purchasing power goods provide the ramification towards organic tomato farming development. Organic tomato farming requires more labor input than traditional modern farming methods. Thus, Nepal which has very large amount of labor unemployment and under employment will find organic farming an attraction. Moreover the problem of

periodical unemployment will also get mitigated because of the diversification of the crops their different planting and harvesting schedule resulting in the requirement of the relatively high labor input ecotourism in increasingly becoming popular and organic farms could turn into favorite spots. Protection of the ecosystem, flora, fauna and increased bio-diversity and the resulting benefits to all human and living things are great advantages of organic farming which are yet to be properly accounted for.

CHAPTER-III

RESEARCH METHODOLOGY

Research methodology is an essential part of the thesis paper which forms the framework for obtaining all necessary inputs of the study. In the present study the methodology includes research design, nature and sources of data, sampling procedure, data collection techniques and tools, data processing, analyzing methods and presentation.

3.1 Research Design

This study was carried out mostly on the basis of exploratory research design as because the study was done focusing on constraint and potentiality of organic farming in the study area. The study had tried to explore and cover all aspects of organic farming and its role for the rural development in the study area.

Besides, the study had made an attempt to describe the thing related to organic tomato farming such as history of organic farming; potentiality and constraint of this farming and awareness among the farmer and consumer about this farming have been described. Thus, this study can be categorized as both descriptive and exploratory.

3.2 Rational of the Selection of the Study Area

Organic tomato farming has higher potentiality in the village Pithuwa of Chitwan, district. This district is located at mid development region has suitable climate for agriculture. Its fertile and plain land, access of transportation helps the farmer to cultivate and market its product. This is why this district has large area covered by farming but Pithuwa VDC highly practiced organic tomato farming. It is located nearby headquarter Bharatpur,Chitwan district so it was accessible to conduct research. Different types of ethnic caste live in this village. Among which called higher caste (Brahaman,Chettri, Newaretc.) are literate so they are attracted towards organic product due to its advantages. On the other hand Janjatis and Dalits are not aware of it. I choose this area to find out their thinking and to aware janjati and Dalit

about organic tomato farming and how its lifts life standards because of high cost of organic products.

3.3 Nature and Sources of Data

Socio economic data are collected for the study. The collected data are both qualitative and quantitative. Both primary and secondary data sources are used to describe and analyze the study area. The primary data have been collected through structured questionnaire. Interview and direct apparition also have been applied to collect primary data, whereas secondary data has been collected from different published and no published written documents from individuals, experts and organization related to the tomato farming sector. Data collected are both in qualitative and quantitative nature as needed. Qualitative data like observation and interview were collected and Quantitative data like number of consumer, farmer related data social status data etc. also have been collected.

3.4 Sampling procedure

The universe of the study was the people of the Pithuwa VDC-2 of chitwan district, household having organic tomato farming and other informative local people chosen according to quota sampling as well as random sampling was also applied in order to take household survey.

Among 381 households in Pithuwa village, for sampling procedure15 households having organic tomato farming was chosen randomly among 50 households. Another 24 households having consumers of organic tomato, 11 households engaged in different sectors have been selected for the study.

3.5 Data Collection Tools and Techniques

To collect primary data, the structured questionnaire, semi or unstructured interview and observation methods has been applied.

3.5.1 Interview Survey

To generate accurate and realistic data structured questionnaire was prepared to be asked to fill up by local people, where as those respondents who are unable to fill up the questionnaire, the question were asked to the respondents and answer were filled up to collect the required information.

3.5.2 Key Informant Interview

The primary data was also collected from the key informants using the semi or unstructured questionnaire interview method on the basis of prepared checklist. The interview was taken as cross checking for data obtained from questionnaire. The information was collected from farmers, consumers, and labor involve in organic tomato farming.

3.6 Method of Data Analysis

The data are analyzed in two ways; descriptive and analytical. Descriptive analysis consists of concrete description about the growers and their farm product regarding available sources of data. It further presents the input to output feedback of the cultivation to identify the problems of the growers. In the analytical method, the study presents an execution weather the tomato cultivation is increasing or decreasing. It deals with comparative analysis about the cultivation to fulfill the above mentioned objectives

CHAPTER- IV

OVEVIEW OF THE STUDY AREA

4.1 General background of the study area

The Chitwan District is one of 75 Districts of Nepal and is located in the southwestern part of Narayani Zone with Bharatpur the fifth largest city of Nepal, as its district headquarters. It covers an area of 2,218 km^2 (856 sq. mi), and in 2011 had a population of 579,984 (279,087 male and 300,897 female) people. Bharatpur is a commercial and service Centre of central south Nepal and merger destination for higher education, health care and transportation of the region.

The district takes its name from the Chitwan Valley one of Nepal's Inner Tarai valleys between the Mahabharat and Siwalik ranges, both considered foothills of the Himalayas.

Bharatpur is located on the banks of the Narayani River, and is the main town with numerous shopping zones where people come from all over the district and neighboring districts.

Now there are about 40 Village Development Committees, each of which has nine wards or villages and one sub-Metropolitan city, Bharatpur. The Ratnanagar, Khairhani and Chitrawan municipalities have more than nine wards or urban areas.

Chitwan is one of the few remaining undisturbed vestiges of the Tarai region, which formerly extended over the foothills of Nepal.

Pithuwa isthe most developed village development commit in chitwan District in the Narayani Zone of southernNepal.According to 2011 Nepal census survey it had a population of 12,579 (5696 male& 6883 female) people living in 2,898 individual households . Pithuwa is located West to the Kayer river, East and North to Ratnanagar Municipality and South to Jutpani VDC. Most people of this VDC are immigrants of Gorkha and Dhading districts. At present the VDC has no elected representatives and is run by secretary appointed by Central Government. It lies in constituency region no. 2 along with RatnanagarMunicipality & JutpaniVDC. The

total population living here are the more emigrated from the hills, especially from Gorkha and Dhading districts. Here are also some indigenous communities, various ethnic group which co-relate their individual values and cultures like Tharus and Darais. Jana Jagriti Higher Secondary School one of the High School of the VDC which is the sole provider of higher education and periphery since about 5 decades. It is one of the most beautiful places of the Eastern Chitwan. It is close to the famous tourist place such as Saurah& Chitwan National Park.

Electricity

Electricity is very important for human life, in this VDC easily available of electricity.

Communications

Pithuwa is connected with GSM, CDMA connection by Nepal Telecom and Spice Nepal. Land lanes are common in this VDC. Almost each VDC is provided with land line or CDMA phone. CDMA and GSM mobile phones are common in many villages and towns due to easily available.

Internet

Pithuwa is connected with ADSL which is much faster as compared to dial up. Recenty, Wi-Fi has been made available by Broadlink in this VDC. Pithuwa has print Medias like Chitwan post, etc to name a few. At present Chitwan has above twelve stations like kalika FM Synergy FM etc.

Languages

Chitwan district have people from different caste, bahun, chettri, newar, gurung, magar. Major languages used in this district are Nepali, gurung, and magar newar and different type of language speak here.

Transportation

Road transportation is one of the easiest and accessible ways to reach Chitwan,Which is available like that airways also available in chitwan.

4.1.1 Population of Age Group of Study Area

This data indicates that economically active and non-active population of Pithuwa. In the context of Nepal, 60.7 percent people are economically active (15-59 Age).

Table 4.1: Population of Age Group

Age Group	Pithuwa	
	Population	Percent
0-14	3542	28.2
15-59	7639	60.7
60 above	1398	11.1
Total	12579	100

Source: CBS-2014

4.1.2 Distribution of Population by Caste

Pithuwais a VDC in Chitwan district among 5 districts in the Narayani zone of Nepal. According to CBS (2011) this VDC have 2989 household, with total population of 12579 in which male are and 5855 female are 6828

Table 4.2: Population Distribution by Caste

Caste	Total	Male	Female
Cheetri	2431	1103	1328
Brahman-hill	5131	2328	2809
Magar	614	265	349
Tamang	856	388	468
Kumal	124	60	64
Newar	895	418	477
Kami	651	285	366
Rai	24	10	14
Gurung	848	386	462
Damai/Dholi	373	373	215
Sarki	268	123	145
Gharti/Bhujel	156	72	84
Chepangpraja	25	11	14
Others	66	33	33
Total	12472	5855	6828

Source: CBS 2014

From the given table it can be determined that this VDC is mainly dominated by Brahman community as followed by Cheetri, Newar, Tamang, Gurung, kami, Magar respectively

4.1.3 Ward- wise population distribution

On the basis of CBS 2011 report following graphical figure is presented about the total households and population of Pithuwa VDC 2 area. Following graph shows the total number of households, total population of the study area, total number of male population and total number of female population.

Table No.4.3: Ward-Wise Population Distribution

Ward	Household	Population		
		Total	Male	Female
1	434	1807	792	1015
2	381	1686	750	936
3	468	2063	929	1134
4	78	312	133	179
5	307	1343	620	723
6	129	565	283	282
7	487	2100	952	1148
8	336	1525	699	826
9	278	1178	538	640
Total	2,898	12,579	5,696	6,883

Source: CBS, 2011

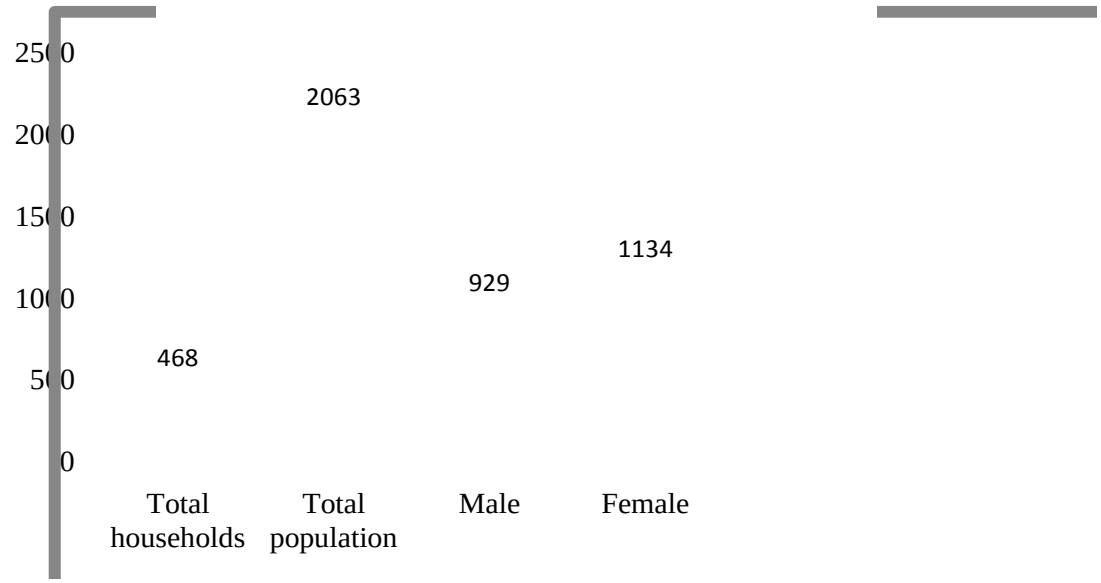
Above table illustrates the total population of the PithuwaVDC in accordance to ward presented by CBS. From the above table it can be learned that ward-7 has highest population having 2100 people where as ward-4 have 312 people

Basically study was conducted in the Pithuwa VDC area is mainly dominated by Brahman community. Dalits households can be found in the study area. The study area has been starting tomto farming since 2008/09 tomato grow but real speed of tomato grow in this area took off since 2011/012.

4.1.4 Total households of Pithuwa VDC 2

From the above figure, presented on the basis of CBS report it can be studied that Pithuwa 2.area have female population more than the male population

Figure No.4.1: Total Household and Population of Pithuwa VDC 2



Source: CBS, 2011

. Above chart is prepared in accordance to the data presented by CBS, which were total household number 468, total number of population 2063 in which male population 929, female population 1134.

Most of the people of this area have engaged themselves in the agriculture sector, beside that people are in different other sectors like animal husbandry, army service, involved in different official jobs.

4.1.5 Literacy Status of Pithuwa VDC

This data reveals that literate people are more than illiterate. In PithuwaVDC there is 22.62 percent people were cannot read. The people who can read and write were reported Pithuwa are 75.12 and 2.19 percent people who can read only in this VDC.

Table No.4.4: Literacy status of Pithuwa VDC

Description	No.	Percent	Male	Percent	Female	Percent
Can't Read	2668	22.6	743	14.1	1925	29.6
Can Read Only	259	2.2	125	2.4	134	2.1
Read and Write	8860	75.1	4417	83.1	4443	68.3
Not Stated	6	0.1	3	0.1	3	0.0
Total	11793	100	5288	100	6505	100

Source: CBS-2011

Above data shows that literacy rate of male is greater than female, in which male were 83.52 percent and female were 68.301 percent

CHAPTER V

ANALYSIS AND INTERPRETATION OF SURVEY DATA

5.1 Socio-Demographic Characteristics

The study was carried out in order to learn the potentiality and constraints of organic tomato farming in Pithuwa 2 area. So in this chapter those data which are acquired from the field study in terms of collecting primary data are analyzed and interpreted. Tabulation of the data and in some cases graphical presentation is done for the clear interpretation of the data.

In this section socio-demographic characteristics of the sample population are interpreted. Generally sample populations are tabulated on the basis of their social and demographic characteristics.

5.1.1 Population Structure

Population is the major component of any research. During the study some people are selected as sample population, such sampled population sketches our real report. The sample population composition of this study has been presented under the table;

Table 5.1: Sample Population Structure of the Study Area

Streams	No. of Respondents	Percentage
Respondents having tomato farming	15	30
Respondents consumers of organic tomato farming	24	48
Respondents involved in different sectors	11	22
Total	50	100

Source: Field survey, 2014

Table presented above shows the sampled population for the study, which shows that respondents from household having tomato farming and consumer of tomato farming 15 and 24 respectively and respondents from different sectors are 11.

5.1.2 Gender of Respondents

Gender is the range of physical, biological, mental and behavioral characteristics pertaining to, and differentiating between, masculinity and femininity. Depending on the context, the term may refer to biological sex (i.e. the state of being male, female or intersex), sex-based social structures (including gender roles and other social roles), or gender identity.

During the study, respondents were both male and female, questionnaire were asked to respondents randomly without pre mind-set whether to ask for male or female. So the findings of the respondent's gender are presented in following table.

Table No.5.2: Gender of the Respondents

Gender	No. of respondents	Percentage
Male	19	38
Female	31	62
Total	50	100

Source: Field survey, 2014

From the above table it can be understood that among the total respondents 19 were male and 31 were female who were chosen as sample for collecting information to fulfill the primary data needed for the study. From the above table it is known that female respondents are more than male.

5.1.3 Marital Status of the Respondents

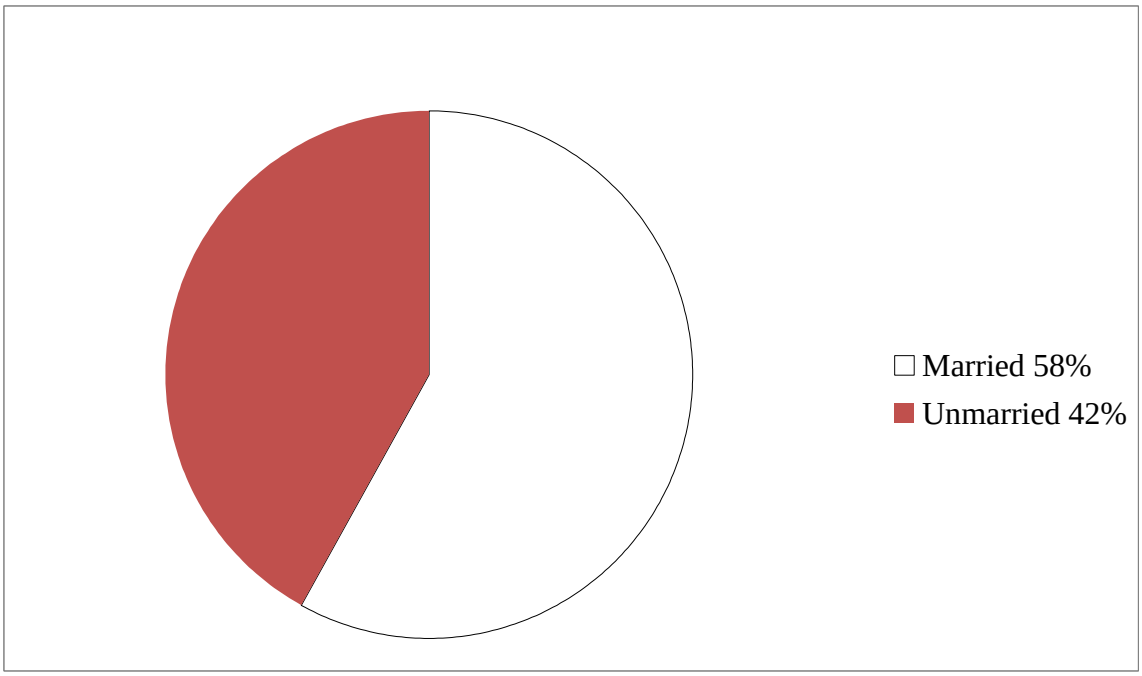
Marriage (also called matrimony or wedlock) is a socially or ritually recognized union or legal contract between spouses that establishes rights and obligations between them, between them and their children, and between them and their in-laws.

The definition of marriage varies according to different cultures, but it is principally an institution in which interpersonal relationships, usually intimate and sexual, are acknowledged. In some cultures, marriage is recommended or considered to be

compulsory before pursuing any sexual activity. When defined broadly, marriage is considered a cultural universal.

Marital status of the respondents is categorized in two types i.e. married and un-married. In which it was found out that 21 respondents among the total sample was found unmarried and remaining 29 were married.

Figure No.5. 1: Marital Status of the Respondents



Source: Field Survey, 2014

In above figure small quarter shows the unmarried portion of the respondent i.e. 42% and bigger quarter represent the married respondent i.e. 58% of the total sampled population.

5.1.4 Religion of the Respondents

A religion is an organized collection of beliefs, cultural systems, and world views that relate humanity to an order of existence. Many religions may have organized behaviors, clergy, a definition of what constitutes adherence or membership, holy places, and scriptures.

The practice of a religion may also include rituals, sermons, commemoration or veneration of a deity, gods or goddesses, sacrifices, festivals, feasts, trance, initiations, funerary services, matrimonial services, meditation, prayer, music, art, dance, public service or other aspects of human culture. Religions may also contain mythology. The word religion is sometimes used interchangeably with faith, belief system or sometimes set of duties.

Generally study area is dominated by Brahman community who follows Hinduism whereas Gurung Tamang who was chosen as sample follows Buddhism.

Table No. 5.3: Religion of the Respondents

Religious background	Number of the respondents	Percentage
Hinduism	39	78
Buddhism	11	22
Total	50	100

Source: Field Survey, 2014

According to presented figure 11 respondents who belong to Mangolian family i.e 22% of respondents follow Buddhism and remaining 39 out of 50 i.e. 78% are follower of Hinduism.

5.1.5 Age wise Distribution of the Respondents

During the study sample were chosen from the various age backgrounds, so the sampled respondents are separated here below in four different categories i.e. below 30, 31-45, 46-60 and above 61which is presented in tabulated form.

Table No.5.4: Age wise Distribution of the Respondents

Age-group	No. of Respondents	Percentage
Below 30	12	26
31-45	16	32
46-60	9	18
Above-61	13	24
Total	50	100

Source: Field Survey, 2014

Above table explains that from the total respondent age below 30 were 12, age group 31-45 were 16, age group 46-60 were 9 and age group above 61were 13 respondents. From the sampled population it can be determined that mid-aged people and old people are more than the young and enthusiastic population aged below 30.

5.1.6 Caste wise Distribution of Respondents

Caste is a form of social stratification characterized by endogamy, hereditary transmission of a lifestyle which often includes an occupation, ritual status in a hierarchy and customary social interaction and exclusion based on cultural notions of purity and pollution Pithuwa area is mostly dominated by Brahman community, so most of the respondents were from Brahman community, whereas some respondents were from Tamang community or Dalit community too. Beside few sampled population belongs to Magar community. So following table is presented to see the caste distribution of the respondents.

Table No.5.5: Caste wise Distribution of the Respondents

Caste	No. of the respondents	Percentage
Brahman	34	68
Tamang	6	12
Pariyar	4	8
Magar	6	12
Total	50	100

Source: Field Survey, 2014

As illustrated in given table it can be learned that 34 respondents from the sample population were from Brahman community, 6from Tamang,4 from Pariyar and Magar 6 from each.

From the above figure it can be studied that 30 people among 50 were involved in agriculture or farming, 9 people were from teaching background,4 from private job holder and animal husbandry were 7 from each.

5.1.7 Education Status of the Respondents

Education in its general sense is a form of learning in which the knowledge, skills, and habits of a group of people are transferred from one generation to the next through teaching, training, or research. Education frequently takes place under the guidance of others, but may also be autodidactic. Any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational. Education is commonly divided into stages such as preschool, primary school, secondary school and then college, university or apprenticeship.

Education is the key to any success. It is the cornerstone of the development also. Higher the level of the education means better will be the opportunities. The education level of the local respondents has been listed on the following table;

Table No. 5.6: Education Status of the Respondent

Levels	No. of Respondents	Percentage
Illiterate	8	16
Literate	30	60
Above SLC	12	24
Total	50	100

Source: Field Survey, 2014

From the above tabulated data it can be learned that 60% of respondents were literate, whereas 16% couldn't read and write, remaining 24% have passed SLC and few were University students.

5.2 Level of awareness among farmers about organic tomato faming

During the study sample farmers were chosen from different educational background like educated and uneducated. So in this sample of level of awareness we categorized it in to five levels. i.e. healthy, high nutritional value etc.

TableNo.5.7: Level of awareness among farmers about organic tomato farming.

Description	No. of respondents	Percentage
Healthy	5	33.3
High nutritional value	2	13.3
Free from chemical pesticides and fertilizers	4	26.7
Animal friendly techniques	2	13.3
I don't know	2	13.3
Total	15	100.0

Source: Field survey 2014

Above table explains that 33.3% farmers said organic tomato is healthy,13.3% went in favor of high nutritional value, whereas 26.7% thinks it is free from chemical pesticides and fertilizer,13.3% said this type of farming is animal friendly and the same percentage have no idea about this type of farming. Thus, this table clearly shows farmers are more awareness about organic tomato.

5.2.1 Main Purpose of the Organic Tomato Cultivation

Most of the households of Pithuwa have started organic Tomato faming from the commercial point of view. Out of the total fifty sampled households, sixty percent households are engaged in the organic tomato cultivation from the commercial purpose and forty percent households have been practicing the organic Tomato farming for commercial and self-consumption purpose. Somebody was found in the Tomato cultivation for just consumption purpose.

Table No.5.8: Main Purpose of the Organic Tomato Cultivation

S.N	Description	Households	Percentage
1	Self-Consumption Only	3	20.0
2	Commercial Production	5	33.3
3	Both(Consume/Commercial)	7	46.7
	Total	15	100.0

Source: Field survey 2014

According to this table Main purpose of the organic tomato farming is self-consumption was found 20%, commercial production was found 33.333% both found 46.666%.

5.2.2 Production during the Last Three Year (in kg)

Table No. 5.9: Production during the Last Three Years

Production Kg/HHs	Year 2068	Year 2069	Year 2070
0-50	2	3	2
50-100	3	3	7
100-150	4	6	3
150-above	3	3	3
Total	12	15	15

Source: Field Survey-2014

Out of sampled households 3 households did not produce organic tomato during year 2068. The data shows the increasing trend in organic tomato production. The number of farmers producing 50-100 kg organic tomato is increasing from two households in 2069 to three households in 2070.

5.2.3 Income from Organic tomato Rs/ Year

The data below shows that, there were total twelve households in 2068 who earned from organic tomato. Out of thirty five households only one household earned more than sixteen thousand. Similarly, out of fifty households only two households earned more than Rs. sixteen thousand in 2069 and four households earned more than Rs. sixteen thousand in 2070. This data shows that earning from organic tomato farming is increasing every year.

Table No.5.10: Income from Organic tomato

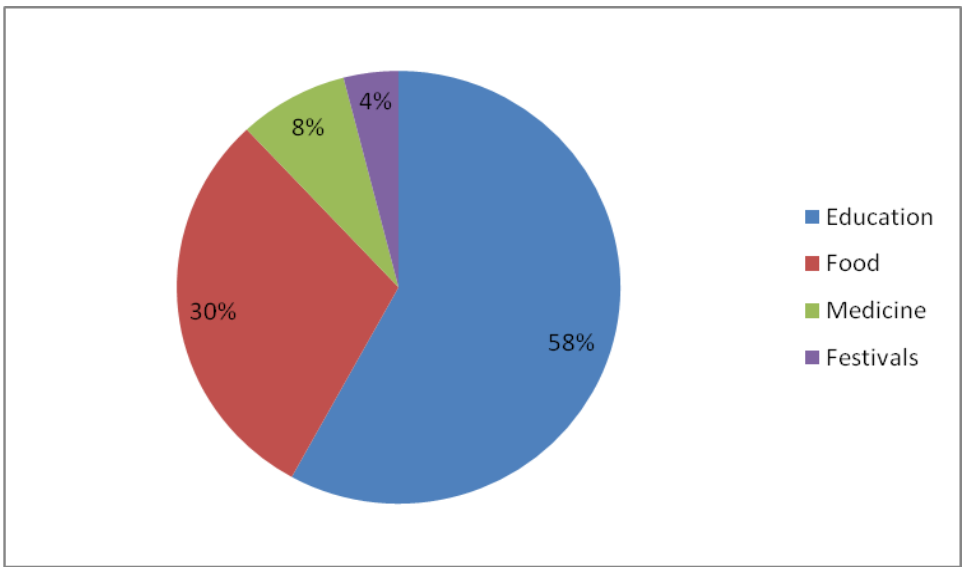
Income R.s /Year	2068	2069	2070
0-4000	2	5	3
4000-8000	2	3	2
8000-12000	4	2	3
12000-16000	3	3	3
16000-above	1	2	4

Source: Field Survey, 2014

5.2.4 Pattern of Expenditure in Sampled Households (based on 1st priority)

The people of Pithuwa VDC have spent their income in education, food, medicine, festivals and religious occasions. But the priority of their spending seems varied. Farmers in the study area have given different priorities to different expenditure headings. Some people have given priority to food, some people have given priority spending in religious occasions, ceremonies and festivals, those which do not have problem in food catering activities, have spent their income in the ceremonies, festivals and the education, but those which have some problem to cater food spent in food grains.

Figure No. 5.2: Pattern of Spending



Source: Field Survey-2014

According to this figure peoples are spend 58% their money for education, 30% for food, 8% for medicine and 4%for festivals.

5.2.5 Comparative Benefit from Organic Tomato Farming:

Majority of sampled households believe that they are getting comparative benefit from organic tomato, whereas, few farmers believe that cereal and food grain production is more beneficial than organic Tomato. The table below shows the farmer's view in this regard.

Table No.5.11: Comparative Benefit from Organic Tomato Farming

S. N	Description	Households	Percentage
1	From Cereal Crops	7	46.7
2	From Organic tomato	8	53.3
	Total	15	100.0

Source: Field Survey-2014

5.2.6 Influence of Organic Tomato in Economic Condition

Out of sampled households eighteen percent households have feel good influence on economic condition, eighty-two percent households have feel general and nobody have felt that the organic tomato farming did not contribute any more to improve economic condition.

Table No.5.12: Influence of Organic Tomato in Economic Condition

S. N	Description	Households	Percentage
1	Good	6	40
2	General	9	60
3	No	0	0
	Total	15	100

Source: Field Survey-2014

5.3 Potential of organic farming

5.3.1 Land Holding Size:

Because of the system of division of property in Nepal, land is getting divided in smaller and smaller units. Thus the land holding capacity is also decreasing generation after generation. The following table shows the state of the total ownership

of land of the fifty sampled households. It shows that an average household owns lands between 10-20 kattha.

Table No 5.13: Land Holding Size

S.N	Land Description (kattha)	Households	Percentage
1	0-10	14	28
2	10-20	23	46
3	20-30	5	10
4	30+	8	16
	Total	50	100

Source: Field Survey-2014

5.3.2 Cultivated Land for Food Grains and Other Crops

Out of total cultivated land 24 percent House Holds (HHs) have 0-10 Kattha land, 46 percent HHs have 10-20 Kattha land, 12 percent HHs have 20-30 Kattha land and 18 Percent HHs have 30 above Kattha land.

Table No 5.14: Cultivated Land for Food Grains and Other Crops

S. N	Cultivation land (in kattha)	Households	Percentage
1	0-10	12	24
2	10-20	23	46
3	20-30	6	12
4	30+	9	18
	Total	50	100

Source: Field Survey-2014

5.3.3 Consumers taste about organic product

When we start any kind of business first of all we can know about consumer awareness about this business which is we are going to start. The table below sows that most of the consumers taste about organic product.

Table No.5.15: Consumers taste about organic tomato

Description	Households	Percentage
Health for me and my family	6	25.0
Taste good	8	33.3
Fresh	6	25.0
Saving resources for next generations	3	12.5
It has fashion	1	4.2
I don't know	0	0
Total	24	100.0

Source: Field Survey-2014

The data revels that 25% households says that organic tomato is health for me and my family like that 33.3% households says that taste is good, 25% households says that fresh, 12.5% households says that saving resource for next generations , 4.2% says that it has fashion, and nobody says that I don't know.

5.3.4 Family size of the Respondents

Members of the immediate family may include a spouse, parent, brother and sister, and son and daughter. Members of the extended family may include grandparent, aunt, uncle, cousin, nephew and niece, or sibling-in-law.

Family sizes of the sampled population were determined from the sample respondents who were representing household having tomato farming households consumers any other sector. So the following table shows the family size of the respondents:

Table No.5.16: Family size of the Respondents

Family member	No. of respondents	Percentage
Below 3	15	30
3-5	25	50
Above 5	10	20
Total	50	100

Source: Field Survey, 2014

So from the above table it can be determined that family having 3-5 members were of 25 respondents, whereas family whose members were less than 3 were 15respondents, and 10 respondents were from the family whose members were more than 5.

5.3.5 Farmers engaged in farming

Of the total households there is at least one person involved in farming in eighteen percent households, at least two persons involved in sixty-six percent households and three or more people involved in sixteen percent households.

Table No.4.17: Members engaged in farming

S.N	Person/ HHs	Number of Households	Percentage
1	1	9	18
2	2	33	66
3	3+	8	16
	Total	50	100

Source: Field Survey-2014

5.3.6 Major Occupation of the Respondents

Most of the people of the study area were involved in agriculture beside some of them are found to be engaged in different other sector as well. From the sampled population they were distributed in following tables on the basis of their involvement in different occupation.

Table No.5.18: Major Occupation of the Respondents

Occupation	No. of the respondents	Percentage
Farming	30	60

Teacher	6	12
Private job holder	4	8
Animal husbandry	10	20
Total	50	100

Source: Field Survey, 2014

5.3.7 Main Sources of Income

Nepal is an agriculture country. Most of the people of Nepal are farmer. Agriculture is the main occupation for the Nepalese. Banana mustard is their major cash crops. They sell their product in the market of Tandi and Narayanghat. Rice is the main cereal crop in Pithuwa.so 80% peoples main source of income is Agriculture and 20% people main source of income is Agricultre + Service.

Table No.5.19: Main Sources of Income

S.N	Income source	Households	Percentage
1	Agriculture	40	80
2	Agriculture + Service	10	20
	Total	50	100

Source: Field Survey-2014

5.3.8 Irrigation System

Irrigation is most important for farming. In the study area, there was not enough irrigation facility five years ago. In Pithuwa there are no households having *plastic ponds*, there are 13 households in Pituwa facilitated by *plastic ponds* for irrigation.

Table No.5.20: Irrigation System

S. N	Description	Households	
		Before Five Year	At Present
1	Pipe	2	16
2	*Plastic Pokhari*	0	13

3	Rain Water	48	21
	Total	50	50

Source: Field Survey-2014

Five years back, for irrigation purpose out of sampled households four percent farmers had piped water, no-one had plastic ponds and ninety-six percent farmers were depend on rain water for irrigation. But now thirty-two percent farmers have piped water for irrigation, twenty-six percent farmers have plastic ponds and forty-two percent farmers are still depending on rain water for irrigation.

5.3.9 Sources of Organic Plants

The easy availability of plants has also helped in extending the organic cultivation. Due to the easy access of plants has helped the people of Pithuwa to be motivated to organic cultivation. About eighty-four percent farmers get plants from local nursery.

Table No 5.21: Source of Organic Plants

S.N	Sources	Households	
		Before 5 year	At present
1	Out of Districts	13	0
2	Local nursery	37	42
3	Own nursery	0	8
	Total	50	50

Source: Field Survey-2014

5.3.10 Access of transportation

Transportation is very important for farming. In the study area, there was enough road and vehicle facility for transportation.

Table No.5.22 Access of transportation

S. N	Description	Households	Percentage
1	Access of road	50	100
2	Not access of road	0	0
	Total	50	100

Source: Field survey2014

According to this table all sample households said access of road in their place. So this place is very suitable for farming.

5.3.11 Facility of information technology

Information technology give information for farmer about organic farming.so it makes easy their farming.

Table No.5.23

Facility of information technology

S. N	Description	Households	Percentage
1	Use	50	100
2	Not use	0	0
	Total	50	100

Source: Field survey2014

This table shows that every households get facility of any kind of information technology.

5.4 Problem of farmers in tomato farming

5.4.1 Lack of Training in the Organic tomato Farming

Regarding th5 training availability 26.7 percent have got opportunity of training related to the Tomato farming while 73.3 percent farmers have not got any opportunity of training. According to the farmers, they have been given training such as about soil management, nursery management etc.

Table No. 5.24 Lack of Training in the Organic tomato Farming

S.N	Description	Households	Percentage
1	Trained	4	26.7
2	Untrained	11	73.3
	Total	15	100.0

Source: Field Survey-2014

5.4.2 Satisfaction status from Selling Price

Out of sampled households forty percent households seem satisfied with selling price of organic tomato, whereas sixty percent households are not-satisfied with selling price of organic tomato.

Table 5.25 Satisfaction status from Selling Price

S. N	Description	Households	Percentage
1	Satisfied	6	40
2	Not-satisfied	9	60
	Total	15	100

Source: Field Survey-2014

5.4.3 Not application of Modern Techniques in farming

Modern technique is essential part for farming, especially in organic tomato farming. But only few farmers use modern techniques, so they are worried about their farming system.

Table No.5.26: Application of Modern Technique in Tomato Production:

S. N	Description	Households	Percentage
1	Applied	6	40
2	Not-applied	9	60
	Total	15	100

Source: Field Survey- 2014

The table shows that 40% household applied modern techniques in their farming and 60% households said that not applied. So we conclude that lack of modern techniques in their farming

5.4.4 Causes of Not Application of Modern Techniques

The role of modern techniques and tools are significance in organic Tomato. Modern tools and techniques help producing quality tomato and also reduce the number of labors. But, as discussed earlier very few people are using it's mainly because people have very few knowledge about it and machine are not available easily. Of the total 15 households only one household has modern equipment, Remaining 14 households lacking such equipment. The main reason behind the lack of such modern machines is lack of knowledge about such equipment. Other reasons are as follows:

Table No.5.27: Causes of Not-application of Modern Techniques

S. N	Description	Households	Percentage
1	Lack of Knowledge	4	28.6
2	Unavailability of Instruments	6	42.8
3	Too Risky	4	28.6
	Total	14	100.0

Source: Field Survey-2014

5.4.5 Main Insects and Disease in Organic Tomato Plantation

Most of the farmers in the study area could not identify the name of disease but they can say the symptoms seen in their farm. On the basis of symptoms, various kinds of diseases were reported.

Table No.5.28:

Main Insects and Disease in tomato Plantation

S. N	Description	Households	Percentage
1	*Bot oilaune roga*	3	20.0
2	*Fal kuhine raj harneroga*	4	26.7
3	G*abaro*	6	40.0
4	No any disease	2	13.3
	Total	15	100.0

Source: Field Survey-2014

Of the selected households main disease in tomato farming seems "Gabaro". Forty percent farmers are suffering from it. 26.7 percent are affected by *falkuhinene ra jharneroga*, twenty percent are affected by *Bot oilaune roga* and 13.3 percent haven't seen any kind of problem.

5.4.6 Problems of Seasonal Disease

The table below reveals that the tomato farming is affected by disease during fruiting season. About sixty of farmers were suffering at this stage of cultivation. Very few farmers were suffering before flowering.

Table No.5.29: Problems of Seasonal Disease

S. N	Description	Households	Percentage
1	Before Flowering	2	13.3
2	Flowering Period	4	26.7
3	Fruiting	6	40.0
4	Not any time	3	20.0
	Total	15	100.0

Source: Field Survey-2014

5.4.7 Methods of Prevention of Disease

This data reveals that sixty percent households have been using indigenous methods. Very few (13.3percent) households have been used modern methods, whereas thirty three percent households did not use any method to prevent from disease.

Table No.5.30: Methods of Prevention of Disease

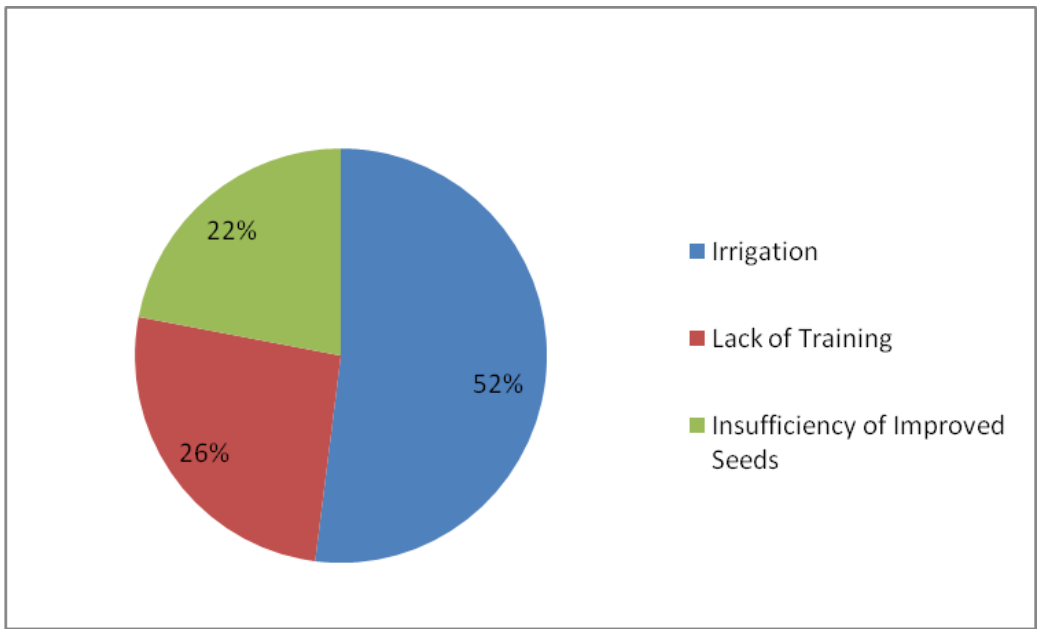
S. N	Methods	Households	Percentage
1	Indigenous	8	53.3
2	Modern	2	13.3
3	Not any methods	5	33.3
	Total	15	100.0

Source: Field Survey-2014

5.4.8 Problems of Organic tomato Production

This chart below reveals the fact that irrigation is the major problem in Tomato production. Fifty-two percent households have irrigation problems. Twenty-six percent do not have tomato related training and twenty-two percent have not sufficient improved seeds.

Figure No.5.3: Problems in Organic Tomato Production



Source: Field Survey-2014

5.5 PROBLEMS AND PROSPECTS

5.5.1 Problems

To find the problems connected with tomato growers is also one of the objectives of this study. All the respondents were asked to explain about the problems in Tomato

production based on their experience. Different respondents mentioned different problems facing by them. The problems are categorized into two groups as general problems and problems of disease and insect pest as described below.

5.5.2General Problems

Organic tomato farming has been a new experience for traditional and ignorant farmers. On the one hand, most farmers have no knowledge about farming and on the other hand, government and other agencies have not been able to provide effective service to tomato farming.

It is obvious that irrigation is very important. The majority of farmers have established tomato farm without irrigation facility. Lack of irrigation facility was seen as the main problem in tomato farming. Most of the farmers have not any irrigation facility on their farm. Very few area of Pithuwa were facilitated with plastic ponds and some people of pithuwa were facilitated with piped water supply and they have also managed water for irrigation and drinking purpose, but there are still some people who have lot of difficulties relating to irrigation facilities in organic Tomato cultivation. Lack of knowledge and training (tomato cycle training) was seen as the major problems in tomato farming. The majority of farmers have not proper knowledge and training. Such training must be provided by the government or tomato related agencies. Due to the scarcity of technical knowledge, most of the cropping patterns are traditional in nature. Land preparation and layout, nursery establishment, use of fertilizer or compost and pesticide etc. are the areas that farmers should be trained and consulted. Therefore, training is necessary in the study area as well as district level in order to make them familiar with tomato technology. Though there are some institutions to provide training to tomato farmers, but it is not sufficient to impart tomato cycle and leadership trainings.

5.5.3Problems of Disease and Insect Pests

Due to the lack of technical know-how and technical assistance, tomato growers are facing so many problems of disease and insect pests. The problem of insect pests was the main reason of low productivity and low quality of tomato. The main problem of insect pest was (*Gabaro*) which was reported by forty percent households. The next

serious disease was '*Fal kuhine ra Jharne Roga*'. About twenty-six percent households were facing this problem. The problem of *'Bota Oilaune Roga*' was reported by sixteen percent of the total sampled households.

This is also serious problems for tomato farming. Almost all farmers are being discouraged from tomato farming due to the helplessness in controlling most harmful diseases and insects. About eighty-two percent farmers were suffered from insects and disease in the survey area. Farmers cannot afford sufficient amount for the cultivation and pest control. Due to the problem of collateral they couldn't lend money from banks and financial institutions. It needs good amount of capital for introducing scientific methods, fertilizers, skilled labors, transportation etc. The service provided by ADB/N is not sufficient to meet the requirement.

5.5.4Prospects

Generally, all the prospects have some problems. Similarly, tomato farming also has some problems as mentioned above. However it has bright prospects in the study area as well as mid Tarai region of eastern part of Nepal. Commercially, it is more profitable than other cultivation of traditional cereal crops. Topographically and climatically, the study area is suitable for tomato production. At the same time there is not serious problem in transportation facility also. Though very few tomato growers reported the problem of transportation, it was very small numbers. So, it has better economic prospects for the cultivation of tomato farming. Thus if all the farmers of the study area grow the tomato plant instead of other prevailing traditional crops like maize, millet etc., they can certainly receive better income. Better income helps them to improve their economic status by improving educational status, health status, social status etc.

The production of tomato has not only given the better income for tomato growers, it has also created additional employment opportunities for people at various levels such as orchard operations, transport media, storage and processing factory, technical personnel etc. This would also be helpful to check the out migration as many people migrate either permanently or temporary in search of employment opportunities. The

prevailing situation of disguised unemployment can also be removed to some extent by growing tomato farming.

By growing tomato plant, the environmental balance can also be maintained by checking the, soil erosion, drought, floods which the problem are facing by Tarai well as other regions of the country.

CHAPTER VI

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Summary of the Study

In the Tarai region of Eastern part of Nepal including the study area, where the climatic condition is favorable, the tomato farming could be a major source of cash income. Unfortunately, the tomato growers have not been able to gain reasonable returns from the production process. Thus this study has made attempts to evaluate the profitability of tomato production compared to the prevailing pattern of food grain like paddy, maize, wheat, millet.

Tomato production has become one of the most important alternative ways of earning in Pithuwa, where many farmers have been attracted towards Tomato cultivation.

Introduction of "Organic Tomato" have been discussed in Chapter I. It gives brief sketch of tomato farming in Nepal. The objectives of this study are to assess the level of awareness among the farmer about organic tomato, to identify the problems face by tomato grower and to explore potentiality in organic tomato farming.

In this study, data has been collected from the structured questionnaire, unstructured interview and observation. The research design in this research was exploratory as well as descriptive. The primary as well as secondary data were used in this study. Fifty households were taken as a purposive sampling from Pithuwa VDC. Data was collected in the basis of participant observation during the field visit.

No land less people were found in the study area but inequality in distribution was found in the study area. Most of the plants of tomato were found yet to be productive and many of them were just starting to bear tomato beans.

Thus, if farmers invest some amount at the initial stage of farming, it gives regular return for long period.

The tomato growers reported about many other problems connected with farming such as lack of knowledge and training, lack of technical support, lack of leadership

development training, problems of insect and disease, financial problems etc. In order to minimize this problem of farming people express need of good government policy and some of the farmers expressed the need for tomato farming insurance.

6.2 Conclusion

Nepal is small and landlocked country but it has a diverse climate, so Nepal has huge potentiality of different types of farming. Chitwan is a district of Nepal which has the huge number of attractive rural areas having high potentiality of organic farming. Pithuwa VDC-2 is one of the villages that have huge potentiality of farming development, so the study is conducted in order to find the potentiality and constraint of organic tomato farming in the study area, to assess the level of awareness among the farmers about organic tomato farming, to identify the problems of tomato growers, to explore potentiality of organic tomato faming. From the previously mentioned finding, it can be concluded that Pithuwa VDC has huge potentiality of organic tomato farming. This area is geographically and climatically suitable for tomato farming, at the same time there is no problems of transportation facility, in this area most of the people have tradition of animal husbandry. The wastages (animal dung) are the best organic fertilizer for organic farming which will be easily available. This farming is easy in this village because different types of facilities are available like information technology, availability of large numbers of labor, fertile land and indigenous knowledge etc.

This area has a different challenge which stands as hindrance in the pace of organic farming development in this area. Lack of sufficient irrigation facility was seen as the main problem in organic farming most of the farmers were dependent on rain water. The majority of farmers have not proper knowledge and technical assistance; tomato growers had been facing so many problems of disease and insect pests, no reasonable price of products. This is also serious problems for organic tomato farming. They are not getting proper support from state sector.

Despite having many challenges this place has more potentiality for developing this area as organic farming sector. This area has great future to be developed as organic

tomato farming place in near future if the challenges and constraints are mitigated in the proper way.

6.3 Suggestions

Eastern Tarai of Nepal is considered as suitable area for tomato, which is one of the most important cash crops. Its development would help increase farmers income to a great extent. . Based on the findings and conclusion, following suggestions have been made:

- The government should take some action for the irrigation facility to all the parts of land.
- The modern machines should be distributed in low price to the farmers to ensure the organic compost for the maintenance of quality production.
- One of the most important things is that farmers should be given the confidence that the produced tomato can be sold at reasonable price at reasonable time.
- After studying different aspects, it is concluded that we can develop and expand the tomato plantation area and launch package program in selected area to make organic farming more reliable and trustworthy.
- In Nepal, organic tomato is a cash crop that's why technical knowledge is lacking over here. To make technical manpower efficient, there should be a provision of abroad training to related personals.
- The district level and village level tomato production group should be supported by giving them technical, economic, physical and other helps. They are the real organization of field workers.
- The way of tomato production, marketing management and way of taking, should be advertised through newspapers, pamphlet, slide, radio, T.V. etc.

- To give continuity to the referred work and to develop work in systematic way, tomato planting project is needed. Provision of soil testing should be made available.

- In order to generate the healthy and qualitative samplings, a well-managed nursery should be established.

- The government should establish an organization that involves in research and development in tomato plantation and farming. This institution would fully be responsible for studying climate, soil quality, samplings quality etc. The other aspects of research would be the preparation of compost manure; protection of the plants, irrigation etc. This institution would work in co-ordination with Nepal Agriculture Research Council (NARC) and Agriculture Department etc.

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QUESTIONNAIRES

Questionnaires for households having organic tomato farming

1. Personal Introduction

   Name……..

   Age……..

   Sex……

   Family members…….

2. What is your educational status?

   a) Educated b) Literate c) Illiterate

3. Since when did you start organic tomato farming?

   …….

4. What is your major income source?

   a) Business and organic tomato farming.

   b) Animal husbandry and tomato farming.

   c) Job holder and tomato farming.

   d) Others.

5. How did you know about organic tomato farming?

   ……

6. How many members are engaged in organic tomato cultivation from your family?

   ……

7. Have you got training about organic tomato cultivation?

   a) Yes b) No

8. If yes, from which organization?

   …….

9. How would you describe organic tomato?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't agree
Healthy						
High nutritional value						
Tomatoes are grown in harmony with nature						
Free from chemical pesticides and fertilizers						
Produced with environmentally						
Animal friendly techniques						

10. Do you think government bodies have been helping to develop organic tomato farming?

    a) Yes b) no c) don't know

11. Do you suggest other household to start organic tomato farming?

    a) Yes b) no

12. What types of problems did you face in this farming?

    ……

    ……

13. How did you manage financed for organic tomato farming?

    ……

14. If you have got loan from bank which bank offered the loan?

S.N.	Name of the bank	Loan Rs.	Interest rate	Date of return	Date off no return	Remarks
a)	ADB/N					
b)	Commercial bank					
c)	Nepal bank					
d)	Co-operative					

e)	Others					

15. Did you felt difficulty to get loan?

    a) Yes b) no

16. What kind of difficulty did you face?

    a) High interest rate

    b) Lengthy process

    c) Far from access

    d) Others

17. Are you satisfied from selling rate?

    a) Yes b) no

18. What are the main diseases of organic tomato?

    a) invade of insects b) unknown disease c) method of preventing

19. What kind of irrigation system do you apply?

    a) pipe b) rain water

    c) boring d) others

20. Is your economic status increased due to this farming?

    a) Yes b) no

21. Is it possible to reduce unemployment problem?

    a) Yes b) no

22. From which cultivation do you get better benefits from the same area of land?

    a) From the cereal crop

    b) From organic tomato

23. In your opinion who is the responsible person to develop your area as organic agriculture?

    ……

    ……

24. What efforts are made from this side?

    ……

25. What kinds of role does it play in decrease of environment pollution?

    ……

26. At last if you have any other information that I forgot to ask please?

    ……

(Thank you for your precious time)

QUESTIONNAIRES FOR CONSUMERS AND OTHER SECTOR PEOPLE

1. Personal introduction.

   Name……..

   Age…….

   Sex……

   Occupation……

   Family members……

2. What is your educational status?

   a) educated b) illiterate c) literate

3. What is your occupation?

   a) business b) job holder

   c) farming d) others

4. Have you started to consuming organic tomato?

   a) yes b) No

5. Approximately when did you start buying organic tomato?

   a) more than 5 years b) 1-3 years

   c) Last year d) last 6 months

6. Who is generally responsible in your house for the organic tomato shopping?

   a) yourself b) other person

   c)yourself and another person together

7. I buy organic tomato because……

	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	Don't know
Health for me and my family						
Taste good						
Fresh						
High quality						
saving resources for next generations						
It has positive image						
It is fashion to consume						

8. What kinds of differences did you find between organic and inorganic tomato?

……

9. Did you find organic tomato expensive than inorganic tomato?

a) yes b) no

10. If yes, then why do you buy organic tomato?

……

11. Do you want to start growing organic tomato in your house?

a) yes b) no c) don't know

12. Do you think your area has potentiality for organic tomato farming?

a) yes b) no

13. How has organic tomato positively affected in your health?

……

14. Is organic tomato easily accessible in your area?

a) yes b) no

15. What kind of role can you play to promote organic tomato farming?

……

16. Have you ever suggested others to buy organic tomato?

a) yes b) no

17. Where did you get the information about consumption of organic tomato?

a) Media b) NGO c) Friends & relatives

d) Others

18) If organic tomato is not available for a while, you prefer inorganic tomato or stop consuming it?

……

19) Do you feel confident about purity of organic tomatoes while buying?

a) yes b) no c) doubtful

20) Is the supply of organic tomato adequate for the consumer?

a) yes b) no c) do not know

21) Do you have any other opinion than what I asked?

……

(Thank you for your valuable time)