CHAPTER-I

INTRODUCTION

1.1 Background

Nepal is predominantly an agriculture country in engaged in the sector. Agriculture sector engages around 66% of the total population in Nepal. It contributes one-third of the nation's GDP with significant contribution to national economy. It creates a diverse array of jobs and employment from farming to small scale enterprises. Nepal is vulnerable to food insecurity and recurring natural disasters like floods, drought, landslides, earthquake, diseases and pest outbreaks. The agriculture sector in the country is still dominated by subsistence farming resulting in low productivity of agricultural commodities. Cash crop farming, which is considered a branch of agriculture, has been increasing over the year because of in brighter prospects in the foreign market. The cash crops such as jute, cardamom, tobacco, etc have already been introduced in our country Nepal. These crops have played a crucial role in the foreign trade of Nepal but areca nut. On the other hand, is one of the recently introduced cash crops in our country, which is particularly cultivated in the eastern terai part of Nepal. Therefore, areca nut is accepted as a major cash crop and an exportable crop of eastern south of Nepal. According to Prime Minister Agriculture Modernization Project of Government of Nepal, Jhapa is the Betel nut Zone area.

Jhapa is an inner terai district in province no. 1 of south - eastern Nepal. Jhapa observes moderate climate complexion as it lies in the indo-Gangetic plain and churia low hills. Seasonal monsoon is well distributed across the district with annual rainfall is about 2000 mm and maximum temperature is recorded 42^0 C in summer and 10^0 C in winter. Geographically it covers the area of 1606 square kilometers and ranges from the elevation of 701 m. to 3639 m. According to Food and Agriculture Organization (FAO 2021) , the total area covered by areca nut in Nepal is 3918 hectare and total production is 14390 tons. Eastern region of Nepal is the leading area for the areca nut production which contributes 99.68% of total production. Among this Jhapa district lies in the top most rank on the basis of production. The total area under areca nut cultivation is 2660 hectare and total production is 9773 tons. Out of total production of areca nut, 68 % of production is from Jhapa district (MoAD, 2021) revealing the great opportunity of improving live hood of farmers. Betel nuts rank eighth among culinary nuts by worldwide production

(1,033,691 tones). In Nepal the total production area of areca nut is 3918 hectare and the production from the total area is 14390 metric tons (FAO, 2021). Mostly it is cultivated in eastern part is 14328 metric tons which is 99.57 % of the total cultivation. Commercially It is cultivated in Jhapa, Morang, Sunsari and out of total production topmost production comes from Jhapa.

Areca nuts are small in size and are round to oblong in shape. The fleshy other husk is coarse and matures from green to yellow – orange and may also contain patches of red. Within the husk, there are layer of fibrous pale yellow strands surrounding a hard light brown seed or not, which is the dried endosperm. (Staples and Bevacqua,2006). Areca nut is a tropical crop. It is mostly confined to 28^0 North and south. It is grown at and altitude of 1000 MASL. Required range of temperature for areca nut cultivation is between 14^0 to 36^0 and is adversely affected by temperatures below 10^0 and above 40^0C (Dhakal, 2021). Generally lateritic soil, red loam soil and alluvial soil is regarded good for its cultivation (Bhat and Sujatha, 2009). Soil should be deep and well drained (soil depth should fall below 1 m), which should be slightly acidic soil to neutral soil (Ramappa, 2021). Areca nut is grown under different agro climatic conditions, it is very sensitive to extreme climatic conditions. In general areca nut is mainly grown in low altitudes. Major areca nut growing area is in plains, since at higher elevations the winter temperature would be too extreme for the crop. Through the evaluation of indigenous accessions, the variety mohitnagar (from West Bengal) with highest yield potential has been released during 1991 (Ananda, 2020).The areca nut which is correctly called as betel nut is seed of Areca catechu fruit having size of about the plum stone (Arjungi, 1976). Betel nuts are generally hard kernel and are oval in shape and brown in color. Betel nuts are the core constituent of a variety of raw and purified products. Betel nut constitutes various chemicals such as tannins, alkaloids, fatty acids, flavonoids, triterpenoids, chrysophonic, physcione and other chemicals (Salehi et al., 2020). Alkaloid is one of the major and most active constituent toxic component of the betel nut, whereas, tannins is another majorconstituent which make the betel nut astringent and bitter (X. Chen, He, & Deng, 2021). It is used most commonly within the Indian sub-continent (India, Nepal, Pakistan, and Bangladesh), but is also prevalent in Taiwan and Southeast Asia which includes Indonesia, Thailand, Philippines, Cambodia, Loas, Guam, Malaysia among others, the Pacific rim and southern China. Data shows that, the largest betel nut production countries in the world includes India, Bangladesh, and Malasiya (X. Chen et

al., 2021). It is known by name Supari in India and Nepal, Daka in Papua and Guan in Thailand (Winstock, 2011). The nut is a hard brown oval kernel, about the size of a plum stone. Besides consumptions of nut in different forms, its husk can be used as raw material for insulating wool and paper manufacturing. So, its husk is also the reason of the cultivation of the areca palm. It grows in much of the tropical part of the Pacific Southeast and South Asia and regions of east Africa. In south countries, it is often wrapped inside betel leaves (paan) or with tobacco (betel quid) for their consumption, the composition of which varies in different populations and countries. It's consumption as addictive substances in the world is very high ranking the 4th after nicotine, ethanol and caffeine, and is consumed by approximately 10% of the world's population. The consumption of betel nut is free and people starts its chewing at the very young age (Apurva Garg, 2014). Medical use of betel nut is very limited but many scientific research shows that it has various health hazards. Medical researches proved that the regular consumptions of betel nut may causes systemic illnesses, cancers, and various other diseases. It consumption is also related to toxicities and drug interactions. But, the greater hazard linked to its consumption is and malignancy and sub mucous fibrosis (Winstock, 2012)

Areca nut and the plant as a whole is used widely in India and South Asia as: a masticator for chewing purposes, vegetable, medicine, stimulant, timber, fuel food, clothing, wrapping, lubricant, tannin and so forth. The nut is chewed with the betel leaf as it has a stimulating effect. (Wikipedidea)

1.2 Statement of the Problem

Areca nut is one of the major exportable cash crop which plays a crucial role in the economic prosperity of Buddhashanti rural municipality although areca nut cultivation is rapidly expanding over the rear, producer are facing problems such as marketing facility transformation, traditional cultivated system, loan facility, loan modern techniques technician, insecticide and low production of areca plant and damage and depth of areca plant etc. So it has become imperative to identify the problems and prospect sociable it areca nut cultivation. On the other hand the ore helming presence of the so called areca nut buyer (middle man) is pairing avoidable to areca nut buyer. As to these reasons areca nut producer are always deprived areca nut bean such types of price fluctuation is caused by the absences of factories, price fluctuation is directly influenced by the foreign market, demand by overseas the areca nut production production is motivated by increased in

market price. Generally, the areca nut farmer faced following problems in areca nut farming.

- Water and irrigation difficulties in areca nut farming.
- Traditional technology is used in areca nut farming.
- There is no facility about areca nut farming loan.
- Areca nut growers are monotonous due to the prize ups and downs fluctuation.
- Lack of laboratory for testing the soil quality and organism.
- There is not any agriculture co-operative which deals with farmers.
- Production of seeds, harvesting and farming system.
- Problems of diseases in areca nut.
- Pests causing major crop loss.
- Lack of labor saving appliances.
- Stability in production of areca nut.
- Lack of competitive market of areca nut.
- Low prices of areca nut.
- Techniques of traditional areca nut farming.

Areca nut didn't play good role in study area due to above problems in areca nut farming. The problems of role of areca nut in study area are given below.

- Production of areca nut is getting low due to lack of irrigation.
- Livelihoods of farmers didn't run smoothly due to low income from areca nut farming..
- Productions of materials of areca nut don't produce due to lack of knowledge.

1.3 Objectives of the Study

Research objectives describe concisely what the research is trying to achieve. They summarize the accomplishments a researcher wishes to achieve through the project and provides direction to the study. The General Objectives of this study are to find out the areca nut farming system and socio economic impact of Buddhashanti Rural Municipality- 7 Dharagola Jhapa. The specific objectives of this study are given below:

1. To examine the problems of farmers for areca nut farming in the study area.

2. To state the social environmental benefits of the areca nut production and cultivation in rural area.
3. To find out the economic role of areca nut production on rural economy in the study area.

1.4 Significance of the Study

The significance of a study is its importance. It refers to the contributions to and impact of the study on a study area. The significance also signals who benefits from the research findings and how. The composition of Buddhashanti Rural Municipality ward no. 7 Dharagola explains 80 % are farmers. This case study is necessary since researches are found many problems in areca nut farming and it has not been studied yet by anyone. People are farming the areca nut crops by applying their only traditional system. No any advanced and transformed agricultural methods have been adopted by them.

The researcher thought that this is a must to carry out the study on areca nut farming since areca nut has become one of the main case crops farming in Buddhashanti Rural Municipality ward no. 7 Dharagola. The researcher has studied the all-round farming systems which are prevail of Buddhashanti-7 Dharagola of Jhapa district and thought out of Nepal. The researcher has found out that farmers has been getting good benefits on their economic development from the good production of areca nut.

So, this research will be useful for the other project plan of Buddhashanti Rural Municipality ward no. 7 Dharagola development in future with respect to agro based policy. This research study can help the student and civil servants of Buddhashanti to formulate very essential policy of Rural Municipality programmed and plan. Similarly, this research useful for the planner, policy maker of rural municipality, government sector or co-operatives.

1.5 Limitation of the Study

The limitations of a study are its flaws or shortcomings which could be the result of unavailability of resources, small sample size, flawed methodology, etc. No study is completely flawless or inclusive of all possible aspects. Any kinds of research works has been done in certain area of limitation determines it's nature, needs, situation and area of study. This study has some limitations which are as follows.

1. The research has been conducted in role of areca nut farming on Buddhashanti Rural Municipality-7, Dharagola, Jhapa district.

2. The result has been applicable only for the study area.
3. The research has been related with agriculture sector where included areca nut farming.
4. There has been primary data and secondary data for the research work.
5. This study has been found out economic condition of farmers located on Buddhashanti Rural Municipality ward no. 7 Dharagola.
6. Field visit, questionnaire and data collection has been the main methods to this study.

1.6 Organization of the Study

Generally, a component of the organization of the study is to spotlight the organizational "sign posts" to look for in the chapters that follow. Specially, a component of the organization of the study is to briefly establish how each chapter is constructed to achieve research objectives.

This study has been organized in five chapters. The first chapter has deal with introduction and general background of the study. The second chapter has explained about the review of the related literatures. The third chapter has explained research methodology. The forth chapter has described their study area and interpretation and analysis of the data. The last chapter has described about the summery, conclusion and recommendation.

CHAPTER-II

LITERATURE REVIEW

2.1 Review of the Related Literature

Agriculture is the backbone of Nepalese economy. The importance of agriculture in the economic development is very high. The agriculture sector in Nepal contributes approximately 33 percentage of the GDP and employees an estimated 78 percentage of the total labor force. Therefore, agriculture plays a very important role in Nepalese economy. GDP from agriculture in Nepal is expanded to reach 660700.00 NPR Million by the end of 2022, according to Trading Economic Global macro models and expectations. In the current Fiscal year 2078/79, the total value added of the agriculture is estimated to increase by 2.3 percentages. The contribution of agriculture to the total value added of FY 2078/79 has been 23.8 percent.

Case crops are grown for direct sale in the market, rather than for family consumption or to feed livestock. Coffee, cocoa, tea, sugarcane, cotton, and spices are some examples of case crops. Food crops such as rice, wheat, and corn are also grown as case crops to meet the global food demand. A case crop or profit crop is an agricultural crop which is grown to sell for profit. It is typically purchased by parties separate from a farm. Areca nut is a tropical crop which grows from West Indies to the East Coast of Africa, and Bangladesh, China, Sri Lanka and Malaya. The practice of chewing the areca nut is attributed to Vietnam and Malaysia. It was from Southeast Asia that the crop spread to Asia and India where it is cultivated as a case crop. (Wikipedia)

The largest producer of areca nut in the world is India. In 2017, world production of areca nut was 1.3 million tones, with India providing 54% of the total. As other leading producers, Bangladesh, Myanmar, Indonesia and Taiwan combined contributed 38% of the world total. Nepal shares 1.2% in the world areca nut production yielding 14,225 metric tons from 3905 hectares. Some report also reported that the area of production in Asia is 958574 hectares with total production of 1213950 metric tons, the average productivity being 1.26 metric tons per hectare. (Source: https://actascientific.com Oct 28, 2021)

It is conjectured that ancient Indian literatures provide information on betel nut and its mastication. The Indian Ayurveda texts also refer to the areca nuts as traditional medicine. It is used in India is also noted from the pre-Vedic period and was described by

the word taamboola in ancient Indian civilization. It is extensively used in Hindu religious rites of birth, marriage, nuptials and is also offered to guests as a mark of hospitality. It is offered to gods in venerations in the form of taamboola, which consists of one areca nut placed over two betel leaves. Areca nut is extensively used as masticator in south and Southeast Asian counties, chewed with or without betel leaves.

Agriculture is the production of food or other materials by farming, both by planting crops and keeping animals. It provides food for people and animals as well as raw materials for industries. Animals are reared for milk, meat, fur, wool etc to be used as raw materials by the industries. Some modernized agriculture has highly specialized on very few or sometimes a single crop. Types of crops cultivated and species of animals reared and their products depends on climate, a fertility of soil, a technology used etc. application of the improved irrigation system, seeds, and fertilizers, trained, modern tools etc can help to grow the products.

2.2 Importance of Agriculture

Nepal is an agricultural country but hardly 20% of the total land is under cultivation and farming must provide food for the population. The population is increasing by nearly 2% every year (that's nearly 5,00,000 people) but the land which can be cultivated remains the same, even occupied growingly by settlement and industries.

Agriculture is very important economic activity in Nepal. It is a non-alternative occupation for the mass of unskilled people. Nepal's varied climate and soil type can be suitable for growing diverse crop types and animal species. Agriculture supports nearly 40% of the national economy. It provides raw materials for many industries. Generally, important role of agriculture are given below:

- All humans depend on agriculture for food
- Urban industrial societies depend on the base of food surplus generated by farmers and herders
- Without agriculture there could be no cities, universities, factories, or offices
- Today agriculture remains the most important economic activity in the world
- Agriculture employs 45 percentage of the working population (only 2% in US)

- In some parts of Asia and Africa, over 88% of the labor force is engaged in agriculture. (https//kulabs.com, agriculture-2)

2.3 Introduction of Areca Nut Crop

It is a monoecious palm and its inflorescence is a spadix produced in the leaf axil and is completely enclosed in a sealed boat shaped spathe. The spadix is having a main rachis divided subsequently into secondary and tertiary rachis. Female flowers are confined to tertiary and distal end of the secondary rachis, while male flowers are produced on filiform branches arising below and beyond the female flowers. Both female and male flowers are sessile, with two whorls of perianth. The fruit is a monolocular, one seeded berry and it consists of a fibrous outer husk, enclosing a single seed. It is a cross pollinated crop and fruit set normally varies form 12.0 to 40.0 percent and the time taken from full bloom to maturity of the fruit ranges from 35 to 47 weeks.

Areca catechu is a species of palm which grows in much of the tropical Pacific, Asia and parts of East Africa. The palm believed to have originated in the Philippines but is widespread in cultivation an is considered naturalized in southern China, Taiwan, India, Bangadesh, the Maldives, Shri Lanka, Cambodia, Laos, Thailand, Vietnam, Malaysia, Indonesia, New Guinea, many of the islands in the Pacificic Ocean and also in the West Indies.

2.3.1 Botanical Classification of Areca Nut

Kingdom	plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Monocots
Clade	Commelinids
Order	Arecales
Family	Arecaceae
Genus	Areca
Species	catechu

Source: www.wikipeaia.org

Common names in English include areca palm, areca nut palm, betel palm, betel nut palm, Indian nut, Pinang palm and catechu. In English this palm is called the betel

tree because its fruit, the areca nut, is often chewed along with the betel leaf, a leaf from a vine of the family Piperaceae.

2.3.2 Growth

Areca catechu is a medium-sized palm tree, growing straight to 20 m (66 ft) tall, with a trunk 10-15 cm (4-6 in) in diameter. The leaves are 1.5-2 m (4.9-6.6 ft) long, pinnate, with numerous, crowded leaflets.

2.3.3 Characteristics

Areca catechu is grown for its commercially important seed crop, the areca nut .The areca nut is important in the Austronesian civilization, especially in the modern day Indonesia and Malaysia. Actually, there are numerous city and areal names in Indonesia and Malaysia using the words pinang, jambi or jambe (areca in Javanese, Sundanese, Balinese, and Old Malay) for example the cities of Tanjung Pinang, Pangkal Pinang in Indonesia, the Indonesian province of Jambi and Penang Island (Pulau Pinang) off the west coast of Peninsular Malaysia, Fua Mulaku in the Maldives. Guwahati in Assam, and coastal areas of Kerala and Karnataka in India, are also some of the places named after a local name for areca nut.

2.3.4 Chemical Composition

The seed contains alkaloids such as arecaidine and arecoline, which, when chewed, are intoxicating and slightly addictive. Areca palms are grown in Bangladesh, India, Indonesia, Malaysia, Taiwan and many other Asian countries for their seeds.The seed also contains condensed tannins (procyanidins) called arecatannins which are carcinogenic.

2.3.5 Uses

The areca nut is also popular for chewing throughout some Asian countries, such as China, Bangladesh, Taiwan, Vietnam, the Philippines, Malaysia, Maldives, Myanmar, and India and the Pacific Islands, notably Papua New Guinea, where it is very popular. Chewing areca nut is quite popular among working classes in Taiwan. The nut itself can be addictive and has direct link to oral cancers. Chewing areca nut is a cause of oral sub mucous fibrosis, a premalignant lesion which frequently progresses to mouth cancer. Areca nuts in Taiwan will usually contain artificial additives such as limestone powder. The extract of Areca catechu may be addictive.

The areca palm is also used as an interior landscaping species. It is often used in large indoor areas such as malls and hotels. It will not fruit or reach full size if grown in this way. Indoors, it is a slow growing, low water, high light plant that is sensitive to spider mites and occasionally maybugs. In India the dry, fallen leaves are collected and hot-pressed into disposable palm leaf plates and bowls.

2.4 Problem Associated with Production

2.4.1 Cost of Cultivation

In Today's environment to start areca cultivation one should have patience, commitment, perseverance, team of labors and ability to invest lakhs of rupees. Preparation of land layout for planting, fencing, digging and opening of drains, digging of pits for areca planting, cost of areca seeds, fertilizers, irrigation materials and expense of plant protection measures, mulching and shading expenses, crop operations, cleaning of drains, application of fresh soil and management of intercrops are the major components of cost involved in the cultivation of areca nut. Now a days areca cultivation by buying plain land calls for substantial investment.

2.4.2 Pests Causing Major Crop Loss

Areca nut cultivation in the study area is subject to disturbance by several insects and non- insects. These insects could infest all parts of the areca palm from the root to areca fruits. The major pests causing considerable crop loss to the farmers will comprise of Mites, Spindle bugs, Caterpillars and Root grubbers. These pests are either seasonal or persistent with the crop. Non insect pests cause fall of Inflorescence and leaves. Apart from this, other minor Nursery pests, trunk feeders, Leaf feeders and tender nut feeders are considered to be faltering chunk in the course of production.

2.4.3 Diseases

Areca nut palm in the District is reported to be affected by a number of diseases during different stages of its growth and development. 'Around 20 types of diseases causing varying degrees of damages to the tree have been discovered and identified in India'. However, in UK District the following major nine types of diseases are reported to be responsible for the downfall in the process of production activity.

- Yellow leaf diseases (YLD) or 'Chandiroga'.
- Inflorescence death and batten flaking.
- Flower or bud decompose.
- The spring or 'Hirimundige'.
-Sun scorch or Stem breaking.

- Nut splitting (front and back).
- Inflorescence death and batten flaking.
- Flower or buds decompose.
- Sun scorch or Stem breaking.
- Nut splitting (front and back).
- Fungal infection.

2.4.4 Water and Irrigation Difficulties

Nepal is wealthy in river. Still, in recent years farmers are facing water problem here and there due to lack of channelized water supply system and erratic rain effect. Moreover, reduced level of ground water has added fuel to the burning issues. Though there are many ponds, lakes, water reservoirs in the high land area, they are with full of mud, due to improper maintenance, negative attitude shown by authorities concerned or organized body of farmers and individual farmers to clean up the water sources for its utilization. Farmers need to invest lakhs of rupees to irrigate land.

2.4.5 Effects of Deforestation and Dwindling of Green Forests

Geographically, Nepal is spread over an area of 1,47,181 km^2 (Including Lipulekh, Kalapani and Limpiyadhura, area of Nepal is 1,47,516 km^2), out of which 44 percent is forest land and only 17 percentage is available for cultivation. But today so called green and gleaming compact of dense forest depicts the dwining scene due to power projects and other projects in the name of development. Finally this deforestation effect has made deep impact on areca farming. It could be seen from the attack of wild animals and birds, crowd in the areca garden, reduction in water supply, increased temperature, decreasing rain etc. , besides this providing grebe green leaf manure has become costly for the farmers, it has badly damaged the yield.

2.4.6 Lack of Labour Saving Appliances

Till today, areca cultivation has maintained its unique nature of labor intensive system. Problems of labor have created the urgent need and necessity of labor saving appliances. However, these are not available to the desired extent, which has posed problems overproduction.

2.4.7 Stability in Production:

Quantum of yield differs from place to place in the District. On the contrary, yield rate is not stable due to climate variations, rain, diseases and pests. So that growers will have to face the situation of instability in the production. This trend will have impinging impact on the socio- economic development of the growers.

2.4.8 Difficulty in Growing Intercrops

Over the period of decades, Nepal has maintained its traditional popularity in producing intercrops like Pepper, Cardamom, Banana, Betel vine, and coconut. But, since fifteen years it became difficult to grow these intercrops due to various diseases, erratic rate behavior, disturbance caused by the animals, birds attack etc. Therefore, failure of inter crops have accelerated the problems of areca gardeners having the adverse effect over yield on the one hand and threatening economic life on the other.

2.4.9 Crop Management and Protection

Unlike other agricultural crops areca is to be maintained properly to enjoy the benefits of better yielding. It has to be protected at all the stages before, during and after the harvest from the natural calamities, pest and other diseases, animals, labor, technical, theft etc., Hence thought to be hard to grow and maintain.

2.5 Health Benefits of Areca Nut

The areca nut (Areca catechu L) is an important commercial crop cultivated through tropical India, East Africa, Far East Asia, and South Pacific. India is the major producer and consumer of areca nut in the world. Areca nut production in India is the largest in the world, as per FAO statistics for 2021, accounting for 49.74 % of its world output, and is exported to many countries. It is estimated that nearly ten million people depend on areca nut industry for their livelihood in India. The fruits of areca nut are used in traditional herbal medicine. The nut has a characteristic astringent and slightly bitter taste. The nut may be used fresh or it may be dried and cured before use, by sun-drying, baking or roasting. Since time immemorial, areca nut is being used for chewing or mastication throughout the world, especially in Indian sub-continent and other parts of Southeast Asia as it is believed to have lots of medicinal properties. In India, the use of areca nut has been noticed as early as 1300 BC as cited by Sisu Mayana in 'Anjana Chaitra and the practice of its chewing from 650 BC as mentioned by Magha in 'Shishupala Vadha'. In other countries such as Vietnam, the antiquity of areca nut even goes back to Bronze Age.

2.5.1 Biochemical Composition

The biochemical constituents in areca nut have been recently recognized as functionally active molecules, possessing antioxidant, antidiabetic, antiallergic and other useful properties, as well as exert protective effects against cardiovascular and other diseases. The chemical composition of marketed areca nuts depends on the maturity of the nut since processed areca nuts are made from both green and ripe nuts. The major

constituents are polyphenols, fat, polysaccharides, fibre and protein. Alkaloid is present as a minor but significant constituent. Polyphenols, which are the major components, constitute about 20 percent of the dried areca nut. Some of the major polyphenols are (+) catechin, epicatechin, (+) leucocyanidin.

The areca nut has been shown to contain four alkaloids [arecoline (7.5 mg/g weight), arecaidine (1.5 mg/g weight), guvacoline (2.0 mg/g weight) and guvacine (2.9 mg/g weight)]. Arecoline is the most important alkaloid and it is an oily liquid that is soluble in water, alcohols, and ether. Arecoline is the primary active ingredient responsible for the central nervous system effects of the areca nut. The overall pattern of chemical composition of the nut reveals that at tender stages, the total water extractives containing mainly polyphenols. Polysaccharides, fibre, fat and alkaloids are formed rapidly in the middle stages. The hardening of the nut coincides with the drop in moisture content and formation of polysaccharides. All the major chemical constituents of areca nut, including arecoline decrease significantly while drying and storing with husk as whole nuts compared to fresh mature nuts and also while roasting, soaking and boiling. (anantkumarhegde.com)

2.5.2 Health Benefits

Since time immemorial, areca nut is being used for chewing as it is believed to have lots of medicinal properties. It has an important place in the ancient Indian system of medicine such as Ayurveda, Unani and Homeopathy. WHO has listed out as many as 25 different beneficial effects of areca nut on man kind. Chewing areca nut sweetens the breath, removes bad taste from the mouth, strengthens the gums and checks perspiration. It has potent antioxidant, anti-inflammatory and analgesic, antiulcer, hypolipidemic, antidiabetic and neuroprotective properties. It is also traditionally used in a number of ailments for its laxative, digestive, carminative, antiulser, antidiarrhoeal, anthelmintic, antimalarial, antihypertension, diuretic, prohealing, antibacterial, hypoglycaemic, antiheartburn properties.

2.5.2.1 Hypoglycemic Activity

Arecoline has hypoglycemic effect at low doses (0.05 -0.25 mg per kg body weight) in an animal model of diabetes. Subcutaneous administration of an alkaloid fraction to alloxanized rabbits showed a significant hypoglycemic effect lasting for 4-6 hours. Areca nut extract also has potent -a glucosidase inhibitors and would be effective in suppression of elevation in blood glucose after oral administration of maltose to rats.

2.5.2.2 Parasympathetic Action

Arecoline produces both the muscarinic and nicotinic actions of acetylcholine. As a result, bradycardia, hypotension, increase in intestinal tone, salivation and sweating are produced. Arecoline increases the tone and rhythm of the smooth muscles of alimentary canal. At presynaptic sites, arecoline appears to be useful for liberation and maintenance of neurotransmitter.

2.5.2.3 Cardiovascular Activity

All crude extracts of areca nut in different solvents - water, alcohol, acetic acid and calcium hydroxide were found to cause capillary constriction. Cardiovascular effect of arecoline is mediated through the cholinergic system. It is effective by both subcutaneous and intravenous routes. Cardiac depression is brought about through vagal stimulation.

2.5.2.4 Vascular-relaxation

Arecoline found to have relaxed the human umbilical artery and vein rings in a concentration dependent manner; the higher the concentration of arecoline, the greater the relaxation of the rings and that relaxation was decreased after the endothelium removed or pre-treated with nitric oxide synthase inhibitor. Arecoline increased the GMP levels of human umbilical arteries and veins in a dose-dependent way.

2.5.2.5 Urine and Electrolyte Secretion

Arecoline hydrochloride (1.25 3.0 mg/kg subcutaneously) produced marked natriuresis and chlorouresis in hydrated dogs. This action is purely muscarinic. It has some direct effect on renal haemodynamics, as it affects the effective renal plasma flow. Arecoline increased Na, K and osmolity of urine without increasing the urine volume.

2.5.2.6 Ocular Effects

Miotic effect of arecoline has been known for a long time. This effect is muscarinic in nature. It accelerates the regeneration of rhodopsin, a visual purple, by activation of the functional components other than the outer segments of the rod cells.

2.5.2.7 Antihelminthic Activity

Areca nut decoction (1 in 10 dilutions) as well as arecoline and its salts have been found to be effective in taenia infections. Arecoline is reported to be useful in infections like fasciolopsian cestode, ascariasis, heterales and Rallietina sp. Areca is used in veterinary practice as a vermifuge for tapeworm and roundworm in dogs.

2.5.2.8 Antimicrobial Activity

Polyphenols present in the areca nut inhibited the growth of Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Vibro cholerae and Salmonella typhistrains. E.coli and Pseudomonas strains were inhibited larger extent than other bacterial strains and are comparable with antibiotic gentamycin. Monomer catechol, epicatechol and condensed tannins or proanthocyanidins present in areca nut, collectively might be responsible for its antimicrobial activity.

2.5.2.9 Wound Healing Profile

Arecoline and polyphenol of arecanut and the combined formulation enhanced the breaking strength in the incision wound model. This suggests that areca nut could be used to enhance the healing of burn wounds, leg ulcers and skin graft surgery.

2.5.2.10 Antiulcer Activities of Areca Nut

Areca nut at the dose of 250 mg/kg body weight prevent the formation ethanol induced gastric mucosal MDA, NO and there by possess antiulcerative activities. This protective action of areca nut on ethanol induced gastricmucosal injury may be attributed to its antioxidant effect.

2.5.2.11 Prevention of Erythrocyte Haemolysis

Ethanolic extract of areca nut inhibited H_2O_2-induced erythrocyte haemolysis in both old and young rats.

2.5.2.12 Antioxidant

Ethanolic extract from areca nut showed potent anti-oxidative, free radical scavenging, and anti-hyaluronidase activity. Anti-oxidative effect of the extract was lower than butylated hydroxytoluene, but similar to tocopherol and higher than ascorbic acid.

2.5.2.13 Anti-inflammatory/Anti-Melanogenisis

Topical application of areca nut extract inhibits hyaluronidase activity in vivo on delayed hypersensitivity and croton-oil induced ear edema in mice. Skin whitening effect of areca nut extract showed through inhibitory activity on mushroom tyrosinase activity and melanin synthesis in B16 melanoma cells. Thus it is clear that areca nut extract is effective as anti-inflammatory/ anti-melanogenesis agent and can be used as a new agent for cosmetics.

2.5.2.14 Skin Aging and Cosmetics

The anti-aging effects of areca nut on the skin were investigated both in- vitro and in- vivo. Areca nut extract showed an increase in collagen synthesis, improvement in skin hydration, the skin elasticity, and skin wrinkles and suggested that areca nut extract can

be used as a new anti-aging component for cosmetics. Areca nut phenolics reported to have inhibitory activity on elastase and hyaluronidase enzymes present in the skin tissues and thus it has anti-ageing effect.

2.5.2.15 Hypolipideamic

Areca nut extracts found to exhibit a strong inhibitory activity on cholesterol absorption in high-cholesterol-fed rats. The supplementation of the arecanut extract significantly lowered the absorption of triglyceride and the plasma lipid concentration.

2.5.2.16 Antihypertension

Areca nut fraction reported to have potent in vitro inhibitory activity on angiotensin-converting enzyme (ACE). Oral administration of areca nut fraction spontaneous hypertensive rats (SHR) produced a lasting, dose-related antihypertensive effect, and the responses obtained with doses of 100 and 200 mg/kg were comparable to those of captopril at doses of 30 and 100 mg / kg

2.5.2.17 Antidepressant

Antidepressant activity of areca nut ethanolic extract was evaluated in rodents using the forced swimming and tail suspension tests. The ethanol extract (4-80 mg/kg) caused a significant reduction in the immobility time without effecting spontaneous motor activity. Areca nut dichloromethane fraction from nut has a suppressive effect on withdrawal signs in morphine dependent mice.

2.5.2.18 Anti-allergic

Areca nut reported to have most potent inhibitor of antigen- induced degranulation in mast cells, and thus areca nut may be useful for the treatment of various immediate and delayed allergic diseases.

2.5.2.19 Anticonvulsant Activity

Arecaidine and guvacine, constituents of the nut of areca nut exhibit anticonvulsant activity by inhibiting the uptake of GABA and a-alanine.

2.5.2.20 Platelet Aggregation Inhibitory Activity

Areca nut crude extract inhibited platelet aggregation induced by arachidonic acid, adenosine phosphate, platelet activating factor and epinephrine and Ca+ ionophore.

2.5.2.21 Prevention of Dental Cavities

Areca nut used in toothpaste to prevent cavities. Laboratory studies suggest that betel nut may have antibacterial effects, which may reduce the development of cavities. It is considered to strengthen the gum, sweeten breath. The areca nut reduced to charcoal and powered, forms excellent dentifrices.

2.5.2.22 Proteasome Inhibitors

The proteasome hydrolyze various cell cycle regulators, transcription factors and antigenic proteins, it is a promising target for the development of drug for the treatment of a range of pathologies such as cancer, inflammation, immune diseases and others). Arecoline is reported to be a inhibitor of 26S proteasome, a multicatalytic protease complex that plays an essential role in intracellular protein degradation.

2.5.2.23 Antimalarial Activity

Methaol extract of arecanut and its sub-fractions were evaluated for ant- malarial activities by using the SYBR-green method, and the butanol fraction of the extract showed anti-malarial activity against Plasmodium falciparum with an IC_{50} value of 18 micro g/ml.

2.5.2.24 Psychiatric Disorders and Alzheimer's Diseases Treatment

Arecoline present in areca nut has been used to treat both depression and schizophrenia. Arecoline has been used to treat patients with Alzheimer's prehensile dementia.

2.5.2.25 Areca nut and Cancer

Though areca nut has got all these beneficial properties, several researchers highlighted that areca nut chewing might cause cancer. But the adverse effects reported in association with areca nut chewing might be due to several other factors such as small sample size, the role of other ingredients used in the preparation of betel quid, the quality of areca nuts (including contaminations and adulterations) used for making different preparations of chewing products.

Areca nut was found to arrest the growth and multiplication of several human cancer cells such as MCP-7 breast cancer cells, SGC-7901 gastric cancer cells and SMMC-7721 liver cancer cells in dose dependant manner. Certain studies carried out on both normal as well as immune suppressed laboratory mice confirmed that the extracts of areca nut and betel quid without tobacco were not carcinogenic. It also reported that both ripped and unripeed sundried areca nut was found safe and did not induce any tumor in mice at 1 g/kg bw/day.

In a study conducted on the etiological factors in oral squalors cell carcinoma it was reported that 85% of cheek carcinoma patients were chewing betel quid with tobacco as against 12.5% in the control group. In another study it was found that the relative risk due to pan chewing without tobacco was found to be non-significant with both males and females whereas it was significantly more with pan chewing with tobacco. It also proved

that the incidence of oral sub mucous fibrosis was directly related to chewing of kharra, gutkha or tobacco but not to areca nut.

The antioxidant activity of areca nut might play active role in repairing DNA damage in cancer cells. While investigating the effect of aqueous and various organic extracts from different parts of areca nut on oxidative DNA damage in human hepatocarcinoma HepG2 cells it was noticed that the methanol extract of eight month old areca nut husk showed a dose dependent inhibition DNA damage while other solvent extracts did not.

In a recent study at the Winship Cancer Institute of Emory University, Atlanta, USA, the arecoline hydrobromide, the major active principle of areca nut was found to arrest the growth of cancer cells. It was reported that the arecoline hydrobromide inhibited the activity of the enzyme ACAT1 (acetyl-COA acetyltransferase) which lead to attenuation of cancer cell proliferation and tumor growth in mice.

Areca nut seed possess therapeutic effect on various disease conditions. Beneficial health effects of areca nut may attract great attention for human health improvement. Studies conducted on certain rodents such as albino rats, mice and hamsters have confirmed that the areca nut was safe to these animals at a normal dose of 1.5 to 5 g/kg body weight per day. This comes to 90 to 300 g of areca nut for 60 kg body weight per day. Areca nut and its chewing products caused problems in experimental animals only in higher doses. All these reports confirm that areca nut in its pure form is not dangerous but has got a plethora of medicinal properties including curing ulcers, wounds and even cancer. Most of its folklore medicinal properties are now validated by scientific evidences.

Detailed studies on the nature of active principle(s) responsible for all these properties and clinical trials on them are warranted to utilize such plant products effectively and profitably as these palms are available in plenty in most of the South and Southeast Asian Countries. (anantkumarhegde.com)

2.6 Side Effect of Areca Nut

Areca nut occasionally is permissible but do not let it become an addiction. Regular chewing of this nut can increase heart rate, blood pressure and can interfere with the cognitive functions of the brain leading to lack of focus and memory. Various research publications suggest that continuous chewing of betel nut is one of the primary reasons behind oral cancer, colon cancer, hyperlipidaemia and irregular heartbeats.

There is no safe level of drug use. Use of any drug always carries some risk. It's important to be careful when taking any type of drug.

Betel nut affects everyone differently, based on:

- Size, weight and health
- Whether the person is used to taking it
- Whether other drugs are taken around the same time
- The amount taken
- The strength of the drug (varies from batch to batch)
- The effects of betel nut are not fully understood and further research is needed.

However, people who have used the drug have reported the following effects:

- Relaxed, feeling happy
- Feeling alert
- Fast heart rate and palpitations
- High blood pressure
- Red face and feeling warm
- Sweating

Studies regarding areca nut cessation should be given proper attention as areca nut contains many chemicals which are harmful to the human body. As a result of various reasons including cultural beliefs, social misconceptions, lack of policies, and lack of research, many people are unaware of the possible harmful effects of areca nut. In addition, only few studies with regard to areca nut cessation can be found in the lit- erasure. The findings of the limited studies that have been conducted reveal the fact that behavior controlling interventions are more effective in areca nut cessation. Some areca nut chewers have reported relapses after cessation due to withdrawal sump- toms, peer pressure, and behavioral factors. Lack of awareness, socio-cultural influence, and issues of accessibility can be identified and issues of accessibility can be identified as the main reasons for failures of cessation programs. Making cessation programs easily accessible, increasing awareness, involving family in sessions, making learning ma- terial available in local languages, including pictures of patients with oral cancer, having an ex-chewer as an advisor, giving financial support, and increasing social sup- port are some of the things recommended by previous studies on cessation to improve future cessation programs. (Bhat, 2018)

2.7 The Top Areca Nut Producing Countries

Based on a comparison of 11 countries in 2021, India ranked the highest in areca nut production with 1,563 kt followed by Bangladesh and Myanmar. On the other end of the scale was Maldives with 0.013 kt, Malaysia with 0.039 kt and Kenya with 0.113 kt.

Total areca nut production reached 2,435 kt in 2021 in the World according to Faostat. This is 9.16 % more than in the previous year and 50.2 % more than 10 years ago.

Historically, total areca nut production reached an all-time high of 2,435 kt in 2021 and an all-time low of 185 kt in 1966. The average annual growth amounted to 4.13% since 1961.

The top ranked country, India, accounted for 64.2 % of areca nut production in the world. The top 3 countries hold a 87.0% share while the ten largest countries some 96.1% in 2021. (https:/www.helgilibrary.com)

CHAPTER-III

RESEARCH METHODOLOGY

This chapter deals with the set and method, employed in the field to accomplish the research objectives. It contains rationale of the study area, research design, and sample design. Sampling procedure, nature, source of data, data collection procedure, questionnaire construction tools and instruments, data analysis and interpretation procedure along with the conclusions and recommendations .

The research methodology has been designed to study the real problems of professional areca nut farmers and socio-economic impact at areca nut farm. So, this research study has considered that the finding has been very useful for other professional areca nut farmers to be more benefited.

The researcher has designed this study on the basis of descriptive as well as exploratory research design. Descriptive information about the research area and exploratory research design has been used for collecting information about respondent's view and ideas about the farmers and their problems.

Methodology was the most important part of research work. Reliable and relevant study can be made passable only by applying scientific method, hence the main propose of this chapter is to present the frame work for their research design, different procedure has been used for complete this study. They are as follows:

3.1 Selection of the Study Area

Buddhashanti is based on agriculture. It is in Jhapa district. People are based on agriculture before longtime of this village. In Buddhashanti-7 total household and total population are 597 and 2300 respectively. In Buddhashanti rural municipality east side Mechinagar, west Arjundhara, north side Ilam district and south side Mechinagar are located. Paddy, Maize, wheat areca nut, barley etc are main farms of this village, here are all type of farms depend on rainfall (monsoon). This place is very producted place but production has been decreasing day by day because of climate change. The economic condition of this area is getting low and any one researcher did not research in this area. That's why, Buddhashanti Rural Municipality ward no. 7 Dharagola selected for the study area. In this study area, there were total 90 households and 80 households had areca nut farming. Among them 25% i.e. 20 households has been selected for the study.

3.2 Research Design

This study has been based on descriptive as well as exploratory research designs. Descriptive information about the research area Buddhashanti Rural Municipality ward no.-7 Dharagola exploratory research design has been used for collecting information about respondents view and ideas about farmers and their farm.

3.3 Nature and Sources of Data

Study has been used two types of data collections. The primary data has been collected from interview survey. Secondary data has been also studied acquired from different reports, published and unpublished documents, related to environment and related websites.

3.4 Universe and Sampling Procedures

There are 90 households in Buddhashanti Rural Municipality ward no-7 Dharagola or study area and 80 households has been areca nut farming. Among them 25% i.e. 20 household has been selected for the study.

3.5 Data Collection Tools and Techniques

This study follows such a kind of tools and techniques for the data collection

a. Questionnaire: – Questionnaire has been prepared to collect the realistic and accurate data form household's survey.

b. Interview: – Interview method has been effective for the data collection where was asking related questions with the subject.

c. Observation:– Each household selected in sampling has been visited and observed. The data has been recorded while observing the hose hold.

d. Focus group Discussion and Check List has been used of their design for the data collection.

3.6 Data Presentation and Analysis

The data and information collected by various tools and techniques has been analyzed using various statistical methods according to the need and nature of data manly tables, chards and diagrams has been used as required.

CHAPTER – IV

DATA PRESENTATION AND ANALYSIS

4.1 Description of the Study Area

Buddhashantia Rural Municipality out of seven Rural Municipalities located in Jhapa District of Koshi Province of Nepal. There are 15 Local Governments in Jhapa distict, in which 8 are Municipalities and 7 are Rural Municipalities .The Buddhashanti Rural Municipality is divided into total 7 wards and the headquarter of this newly formed Rural Municipality is situated in Budhabare and the study area is ward no. 7 Dharagola where Areca nut farming were done in medium level. The socio-economic and political status of peoples of the study area is medium. (RM office profile)

4.2 Age Group of the Respondents

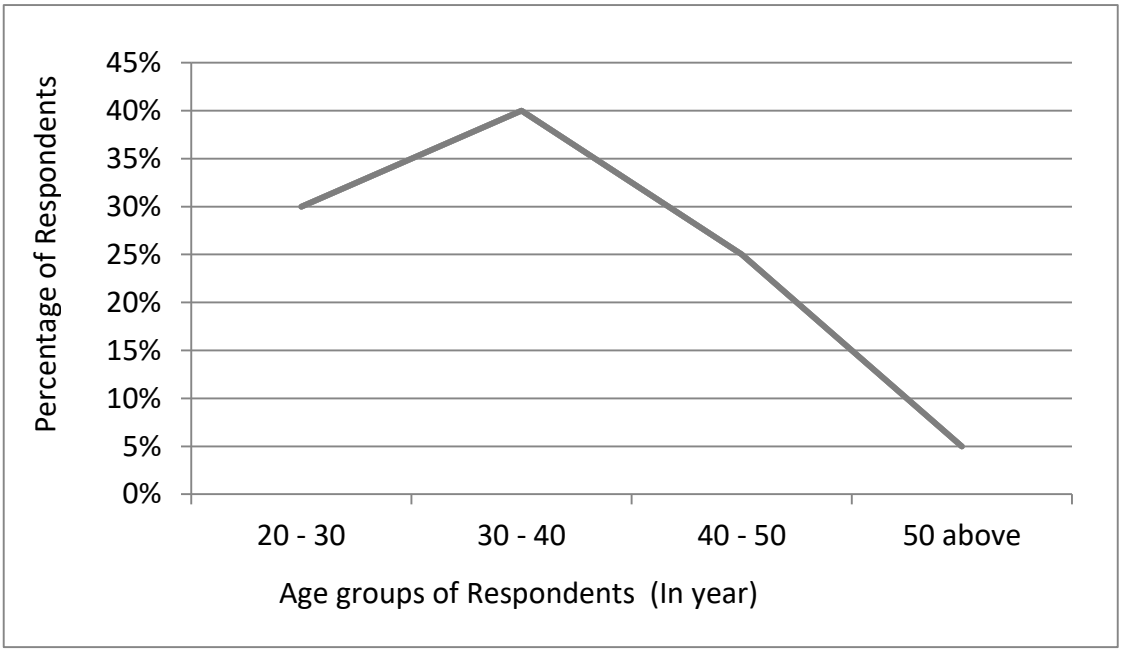
The respondents were divided in to four groups. The questions were asked to the respondents aging above 15 years which is shown below.

Table No. 4.1 Age Group of the Respondents

S.N.	Age group	Number of Respondents	Percentage
1	20-30	6	$\frac{6}{20} \times 100\% = 30\%$
2	30-40	8	$\frac{8}{20} \times 100\% = 40\%$
3	40-50	5	$\frac{5}{20} \times 100\% = 25\%$
4	50 above	1	$\frac{1}{20} \times 100\% = 5\%$
	Total	20	100%

Source: Field Survey, 2023

Figure No. 4.1 Age Group of the Respondents



The table No. 4.1 shows that, the higher portion 40% respondents are from age group 30-40 and 30 %are from 20-30. Similarly, from age groups 40-50 and above 50 are 25% and 5% respectively. It shows that young people are involves in areca nut farming.

4.3 Composition of Respondents

Heterogeneity and multiplicity is the figure of the study area, various castes like Brahmin, Chhetri, Gurung, Rai, Limbu Magar and Dalit are in existence in the villagers.

Table No. 4.2 Caste Composition of Respondents

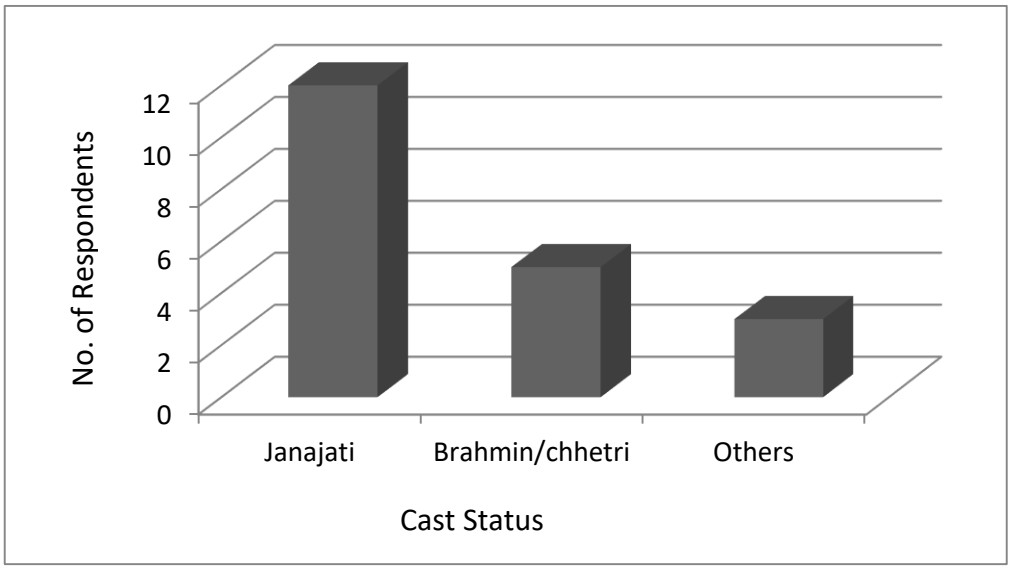
S.N.	Caste	Number of Respondents	Percentage
1	Janajati	12	$\frac{12}{20} \times 100\% = 60\%$
2	Brahmin/Chhetri	5	$\frac{5}{20} \times 100\% = 25\%$
3	Others	3	$\frac{3}{20} \times 100\% = 15\%$
	Total	20	100%

Sources: Field survey 2023

The table No. 4.2 reflects that the Janajati are 60 percent, Brahmin/Chhetri are 25 percent and others caste are 15 percent in the study area. In context of Nepal, the populations of janajati are lower than the population of Brahmin/Chherti but in this study

area, the population of janajati is higher than population of Brahmin/Chherti. Rai, Limbu, Tamang are caste of janajati are live in this study area. Above data can show in bar graph as below.

Figure No. 4.2 Caste Status of the Study Area



4.4 Religion Practice in the Study Area

The dominant Religion in Nepal is Hindu, about 80% Nepalese people practice Hinduism and only around 20 % and people practice Buddhism Christian kirat and others. In this study area, respondents only practice Kirat, Hinduism, Christian and Buddhism. The respondent's ratio according to relation has presented in following table:

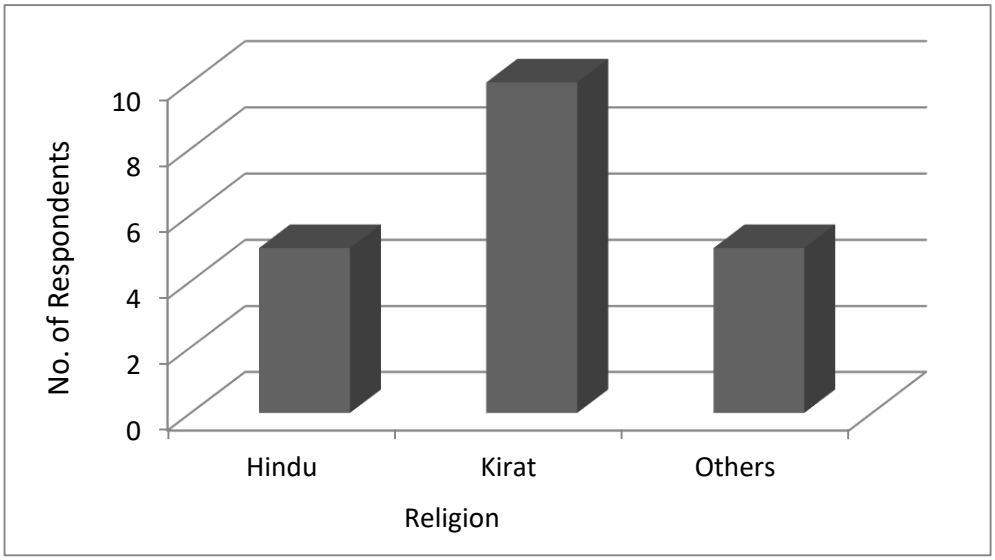
Table No. 4.3 Religion Practiced by the Respondents

S.N.	Religion	Number of Respondents	Percentage
1	Hindu	5	$\frac{5}{20} \times 100\% = 25\%$
2	Karat	10	$\frac{10}{20} \times 100\% = 50\%$
3	Others	5	$\frac{5}{20} \times 100\% = 25\%$
	Total	20	100%

Source: Field Survey 2023

The table No. 4.3 the religion practiced by the respondents are very clear in a total Kirat are 50 percent, hindus are about 25 percent and the remaining others are about 25 percent in the study area. Janajati like Rai, Limbu, Tamang etc. are live in this study so their own religion Kirat is more than others. It can represent as following bar graph.

Figure No. 4.3 Religion Practiced by the Respondents.



4.5 Main Income Sources of Households

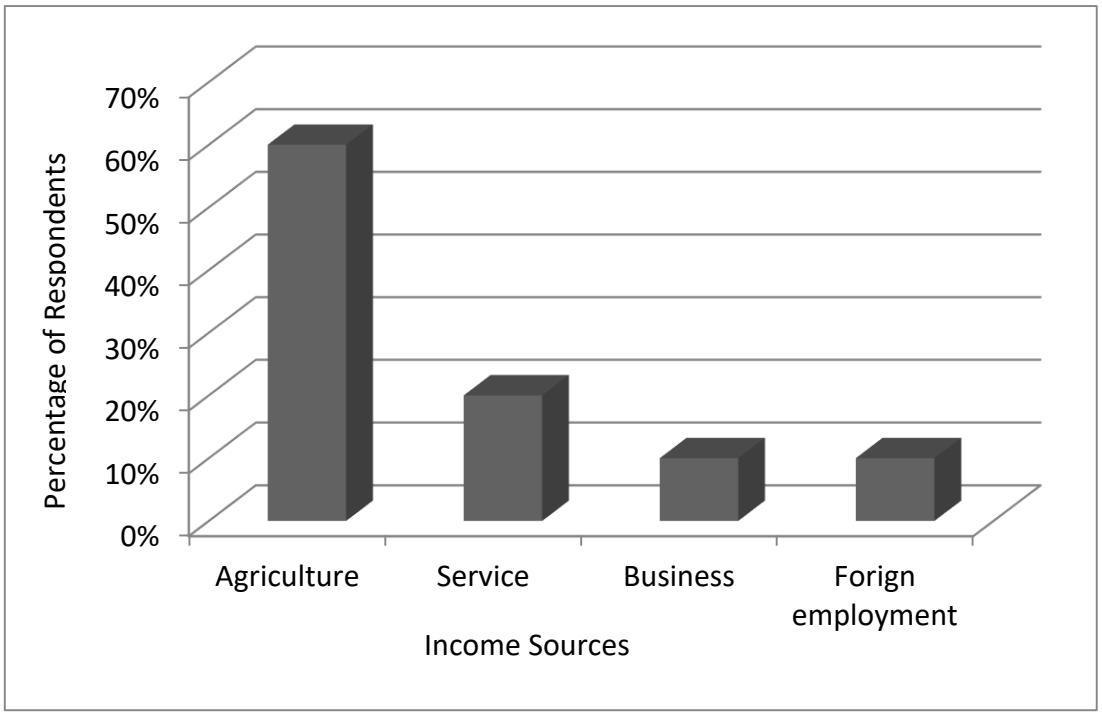
Agriculture, service, self-oriented business, Foreign Employments are the main income sources of the survey households. The frequency and the percentage of survey households has presented in the table No. 4.4 some of the households are depending on foreign employment.

Table No. 4.4 Main Income Sources of Households

S.N.	Income Sources	Number of Respondents	Percentages
1	Agriculture	12	$\frac{12}{20} \times 100\% = 60\%$
2	Services	4	$\frac{4}{20} \times 100\% = 20\%$
3	Business	2	$\frac{2}{20} \times 100\%$ =10%
4	Foreign employment	2	$\frac{2}{20} \times 100\% = 10\%$
	Total	20	100%

Source: Field Survey, 2023

Figure No. 4.4 Main Income Sources of Households



The table No. 4.4 and bar graph demonstrates that the main income source is agriculture is 60 percent, service is 20 percent, business is 10 percent and foreign employment is 10 percent. It clearly show that the percentage of agriculture is more than others occupations. Therefore most of the households are depends on agriculture like areca nut farming.

4.6 Annual Income of Respondents

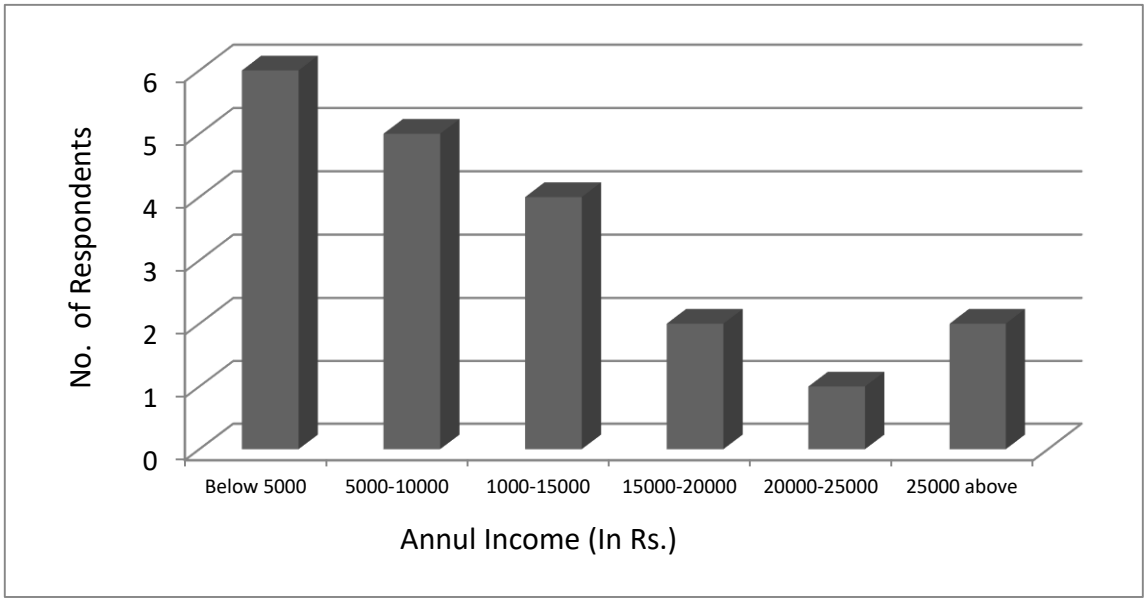
In this study income denotes the earning of the member of micro-credit through any income generating activities. Income sources of respondents of study area are agriculture, services, business, foreign employment etc. Among them agriculture is main income source of households in study area. In context of Nepal, there are 80% of people involve in agriculture. Areca nut crop is most important income source of people in this study area. The income may form of money, articles as food grains and other physical production. To know the source of income of the study area listed from the method of questionnaire. Incomes per month of respondents are as table No. 4.5 and which is represents in bar graph as following figure No. 4.5.

Table No. 4.5 Annual Incomes of the Respondents

S.N.	Income per month (In Rs.)	Number of Respondents	Percentages
1	below 5000	6	$\frac{6}{20} \times 100\% = 30\%$
2	5000-10000	5	$\frac{5}{20} \times 100\% = 25\%$
3	10000-15000	4	$\frac{4}{20} \times 100\% = 20\%$
4	15000-20000	2	$\frac{2}{20} \times 100\% = 10\%$
5	20000-25000	1	$\frac{1}{20} \times 100\% = 5\%$
6	25000 above	2	$\frac{2}{20} \times 100\% = 10\%$
	Total	20	100%

Source: Field Survey, 2023

Figure No. 4.5 Annual Incomes of the Respondents



The table No. 4.5 and shows that the income of the respondents below 5000 is 30 percent, 5000-10000 is 25 percent, 10001-15000 is 20 percent, 15000-20000 is 10 percent , 20000-25000 is 5 percent and 25000 above is 10 percent. According to above data, per month income below 5000 is more than other data it indicates that poverty in study area due to lack of sources.

4.7 Land Ownership

As agriculture is the main occupation of Nepalese, this study conducted in Buddhashanti-7 Dharagola Jhapa also depicts the same result. Most of the farmers cultivated by own but some farmer are cultivated by others whose owner went in foreign country for employment. The data of land ownership sampled respondents is given bewow,

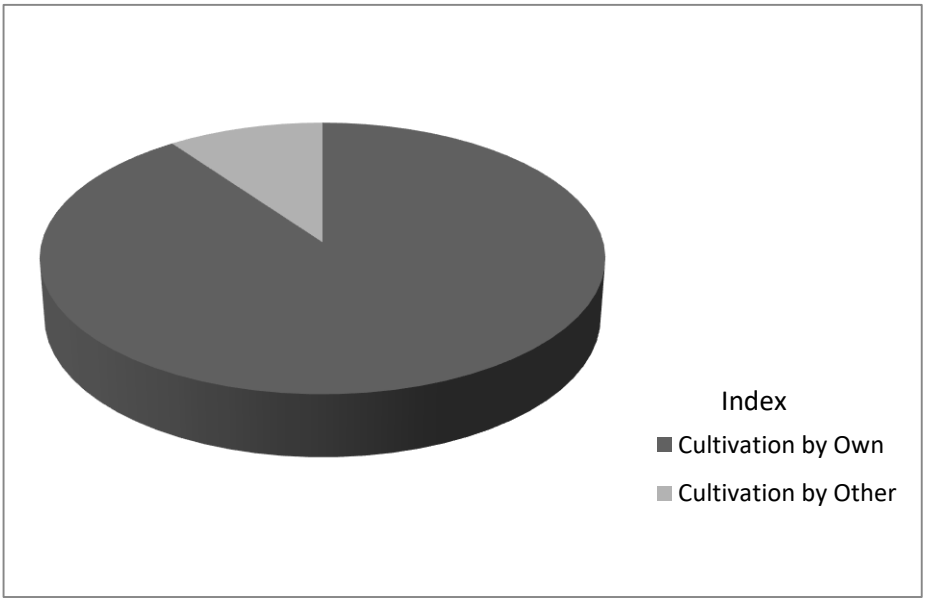
Table No. 4.6 Land Ownership of the Study Area

S.N.	Ownership	Number of Respondents	Percentages
1	Cultivation by Own	18	$\frac{18}{20} \times 100\% = 90\%$
2	Cultivation by Other	2	$\frac{2}{20} \times 100\% = 10\%$
	Total	20	100%

Source: Field Survey, 2023

According to table No 4.6 reflect that among the sampled households, 90% of households cultivate their own land and 10% of sampled households cultivate land but as cultivation by others. These households cultivate land by the system of byaj marauni. It concludes that most of the households have their own land.

Figure No. 4.6 Land Ownership of the Study Area



4.8 Average Annual Production of Areca nut

Nepal is one of the important country producers of Areca nut and areca nut is main crop production of study area but sometime due to its change in price and marketing may change the production of the areca nut.

Table No. 4.7 Average Annual Production of Areca nut

S.N.	Production (In ton)	Number of Respondents	Percentages
1	Below 4 ton	5	$\frac{5}{20} \times 100\% = 20\%$
2	4 ton – 8 ton	10	$\frac{10}{20} \times 100\% = 50\%$
3	8 ton - 12 ton	3	$\frac{3}{20} \times 100\% = 15\%$
4	12 ton – 16 ton or above	2	$\frac{10}{20} \times 100\% = 10\%$
	Total	**20**	**100%**

Source: Field Survey, 2023

Table no. 4.7 shows that the producing the average Areca nut below 4 ton were 20 percent, 4 ton – 8 ton were 50% which shows the production is starting as in high volume, 8 ton - 12 ton were 15% percent, and 12 ton – 16 ton or above were 10 percent in production. Average production of areca nut can calculate as below,

Table No. 4.8 Calculation of Average Areca Nut Production

Production (In ton)	Mid point (m)	Number of Respondents (f)	f×m
0 - 4	2	5	10
4 - 8	6	10	60
8 - 12	10	3	30
12 - 16	14	2	28
		N = 20	$\sum fm$ = 128

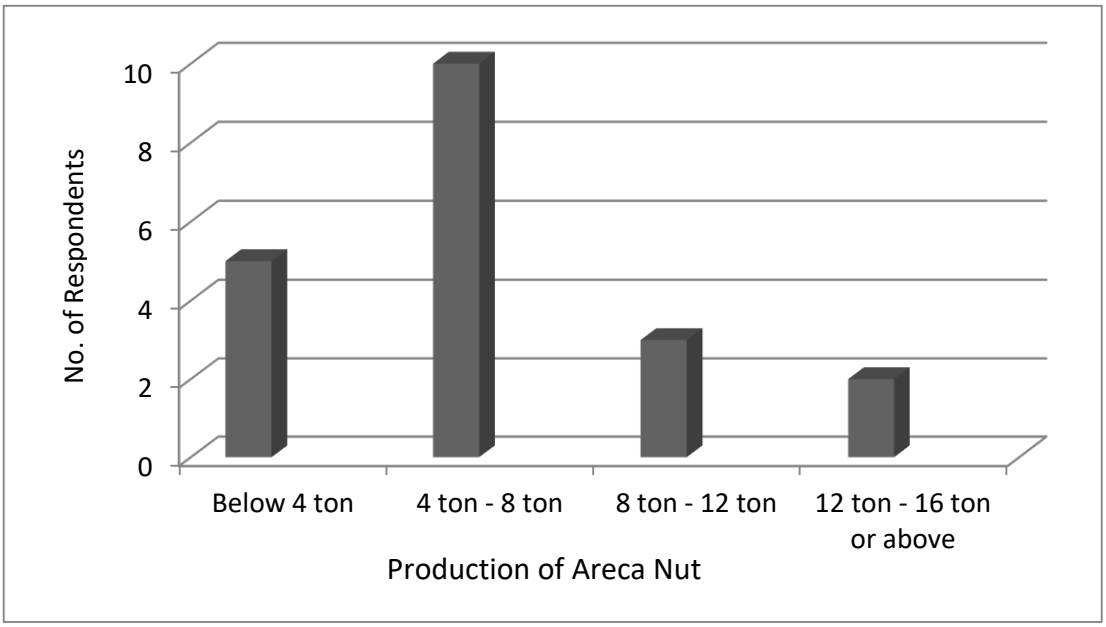
Average production $(\bar{X}) = \frac{\sum fm}{N}$

$= \frac{128}{20}$

= 6.4 tons

Above calculation clearly shows that the average production of areca nut of 20 respondents is equal to 6.4 tons or 6400 Kg. It concludes that areca not crop is main income source of this study area. In research area it found that areca nut production play important role in study area. Above data can show in bar graph as below.

Figure No. 4.7 Average Production of Areca nut



4.9 Organic and Non-Organic Farming

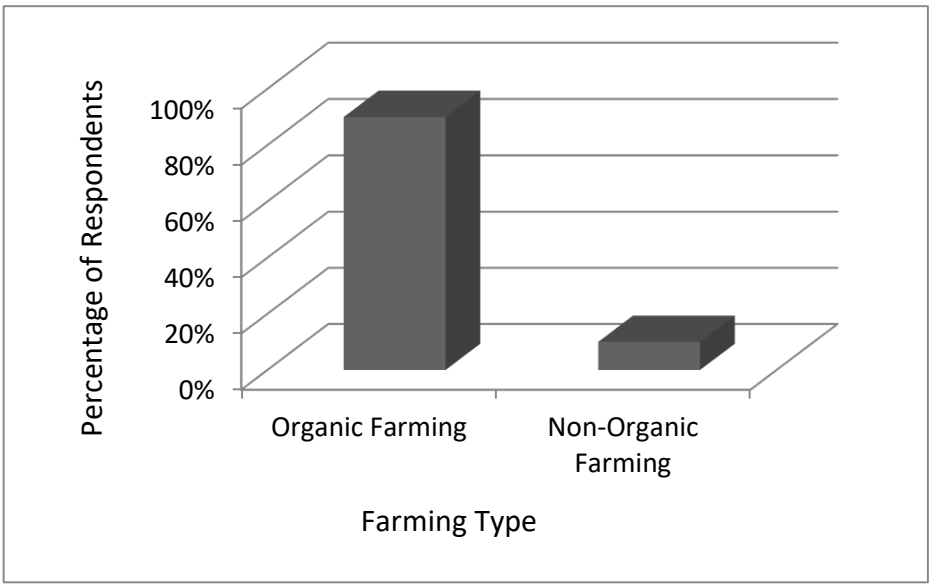
Most of the farmers have cultivated areca nut under the organic system. But it needs more compost manure. Some farmers have been found using chemical to farm areca nut at initial time of plantation which is shown in bar graph below.

Table No. 4.9 Organic and Non-Organic Farming

S.N.	Farming	Number of Respondents	Percentages
1	Organic Farming	18	$\frac{18}{20} \times 100\% = 90\%$
2	Non-Organic Farming	2	$\frac{2}{20} \times 100\% = 10\%$
	Total	20	100%

Source: Field Survey, 2023

Figure No. 4.8 Organic and Non-Organic Farming



The study area comprises 80 households. Among them the researcher has selected 20 households as sample of the study. The figure revved that 10% farmers have used chemicals out of the 20 households in their areca nut farming. Rest of the other farmers produces pure organic areca nut.

Generally, areca nut is pure organic product however; in course of the study some farmers have used chemicals and pesticides in order to control the pests of areca nut. Similarly it is better to change the farm for the better production of areca nut. Because of the limited land the farmers are compelled to use the same land for years. Therefore, some farmers used chemicals in order to increase the production.

4.10 Land Holding Type

The land available at the research site was categorized into two categories based on their use namely khet land, bari land. Khet land denotes the low land which has the irrigation facility and rice is transplanted; the un-irrigated and upland where rice cultivation is not possible is categorized as bari land where finger millet, rainy season and maize other plantation crops like Avocado, Guava, Papaya are the main crop. The land used for fodder, forage and fruit orchard is categorized as forest land which is also on bari land. Nowadays , due to lack of irrigation system khet land is change into bari land and study area is very dry place due to lack of water resources and irrigation. Land and soil of study area is suitable for areca nut farming but essential components to areca nut plants like N, P, K should be manage.

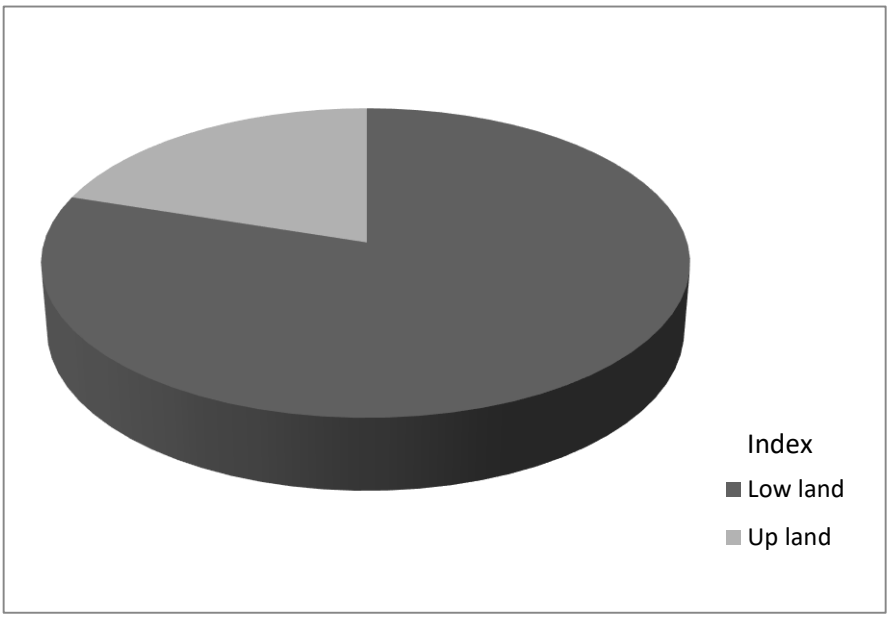
Table No. 4.10 Land Type and Holding

S.N.	Land Type	Area in Bigha
1	Low land (Khet and land)	$\frac{80}{100} \times 100\% = 80\%$
2	Upland (Bari and land)	$\frac{20}{100} \times 100\% = 20\%$
	Total land	100%

Source: Field Survey, 2023

The table no 4.10 shows that 20 % of the land is bari type, all the farmers prefer bari. In low land or khet type, where areca nut planted were in higher i.e. 80%. Farmers feel easy to farming areca nut due to low formation of land. Above data can represent in pie chart as below.

Figure No. 4.9 Land Ownership of the Study Area



4.11 Family Type

There are mainly two types of families among the respondents of study area i.e. nuclear and joint. Nuclear type of family includes parents, unmarried daughter and sons. Likewise joint family is defined as grandparents, parents and married sons and daughter living together.

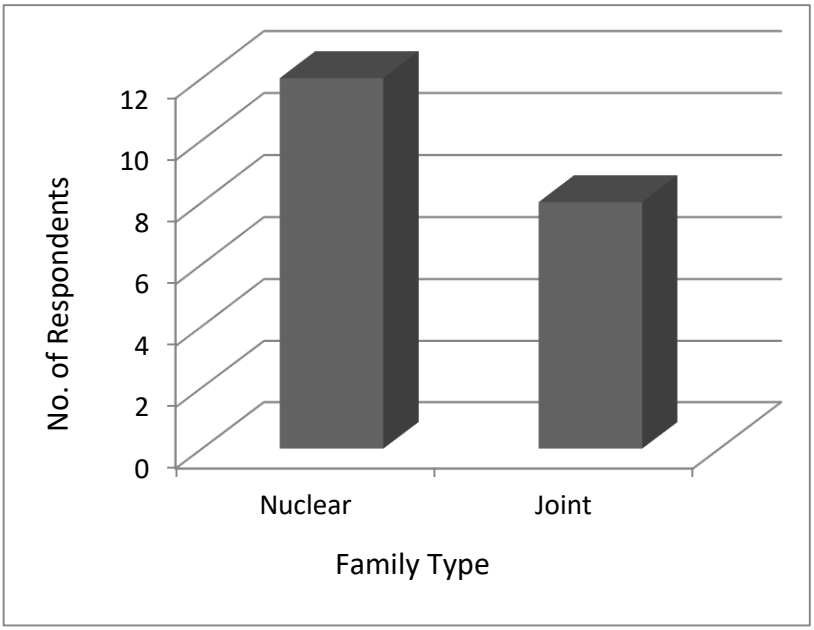
Table No. 4.11 Family Types

S.N.	Family Type	No. of family	Percentage
1	Nuclear	12	$\frac{12}{20} \times 100\% = 60\%$
2	Joint	8	$\frac{8}{20} \times 100\% = 40\%$
	Total	20	100%

Source: Field survey, 2023

The above table clarifies that out of the 20 families, 12 are living as nuclear family, which comprises to 60% and 8 families are living as joint families that is 40%. Out of 20 households nuclear family is more than joint family. The main cause of living in nuclear family is due to the lack of accommodation because shelter is not sufficient for all members. Composition of family in sampled are represent in bar graph as below.

Figure No. 4.10 Family Types



4.12 Marital Status

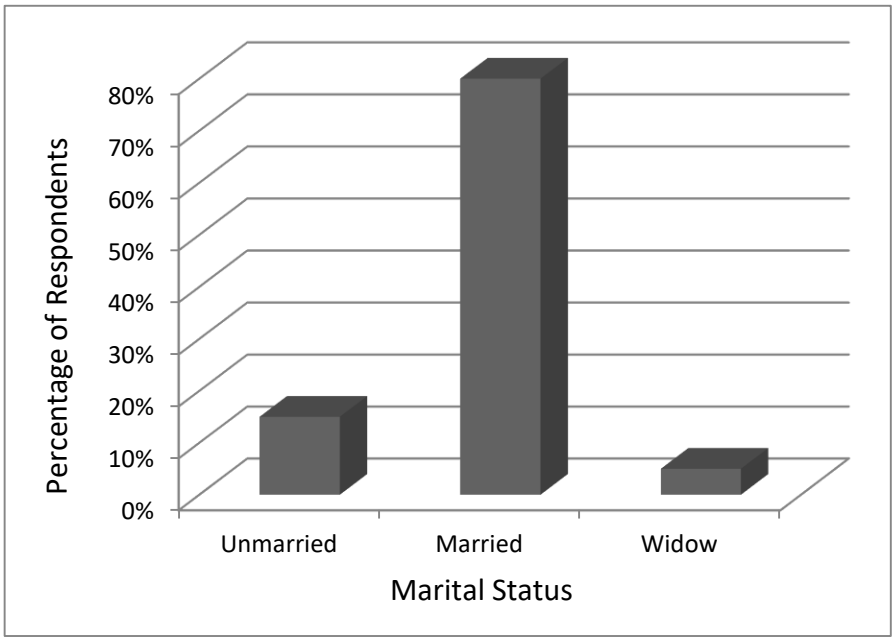
Marital status is the important indicator of social status. It is the most important event in the social life. According to Hindu tradition, marriage is a must of all whether men or women. The data of marital status of sample respondents are given below.

Table No. 4.12 Marital Status

S.N.	Marital Status	No. of family	Percentage
1	Unmarried	3	$\frac{3}{20} \times 100\% = 15\%$
2	Married	16	$\frac{16}{20} \times 100\% = 80\%$
3	Widow	1	$\frac{1}{20} \times 100\% = 5\%$
	Total	20	100%

Source: Field survey, 2023

Figure No. 4.11 Marital Status



The present table 4.12 shows that out of the total respondents 15% are unmarried. 80% are married and 5% widow. There is no family restriction to work in this field. It seems that the participation of under privilege is significant.

4.13 Educational Status

Educational qualification is a vital indicator of respondent's social status and also the basic requirement of the development of the nation. Generally, one who is able to read and write is known as literate.

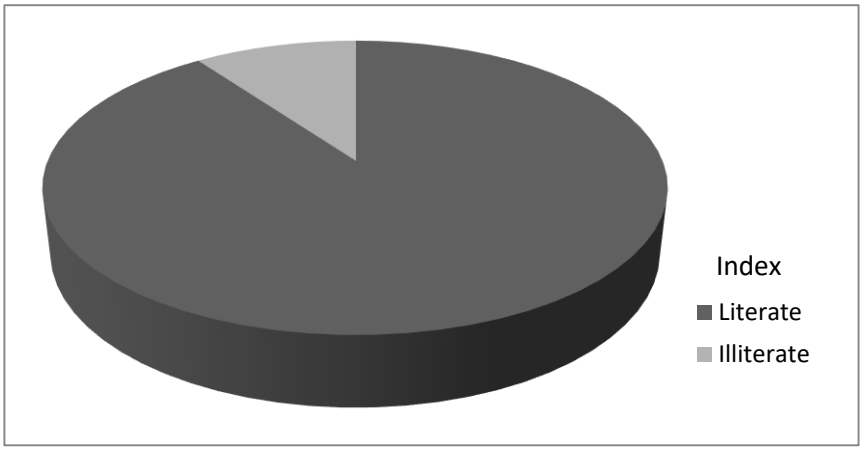
In this study, an attempt is made to find out the educational status of the women and they were asked whether they were literate or not. The educational condition is given of the following table 4.13 and pie chart 4.12

Table No. 4.13 Educational Status

S.N.	Education	Number of Respondents	Percentages
1	Literate	18	$\frac{18}{20} \times 100\% = 90\%$
2	Illiterate	2	$\frac{2}{20} \times 100\% = 10\%$
	Total	20	100%

Source: Field survey, 2023

Figure No. 4.12 Educational Conditions



The present table 4.12 indicates that most of the respondents are literate. Out of the total respondents only 10% are illiterate. Among them no one has crossed even the primary school/ they are just only able to read and write.

Although 90% respondents are literate but they are just only able to read and write only. 10% are illiterate according to them they want to educate their children. Among

them their children are going to school. Only few women are not able to duet to server poverty and hand mount problem.

4.14 Areca Nut Production and Sale Problem

A good road is needed whatever we produce in our field in order to take the goods to the nearest market. In Dharagola some area has rough motor road. Due to this reason, farmers haven't got exact price of current market value. Areca nut demand depends upon Indialln market. There is not internal high consumption. This has made complex to Nepali farmers who produce areca nut. Farmers of Dharagola are also suffering from the same problems.

There are not any domestic industries which has used areca nut as raw materials to produce secondary goods in the eastern region. This condition has made farmer of Dharagola compel to sell their crop production what the local brokers offer the price of areca nut, even these local brokers don't offer the exact price. If these local brokers don't buy areca nut, farmers are compelled either to keep stock as storage or to sell at the low price.

Because of rough road, farmers can't sell their areca nut product at current market price in rainy season. They have to transport the harvested crop to grocer's place by using porters as labor force in place of motor. This reduces the income and increases cost.

4.15 Problems of Areca nut Crop in the Study Area

Here, the researcher has described those factors which are equally important in affecting in ginger farming. During the research period, the researcher has found out such factors which are to be considered highly in ginger farming. Such factors are;

- Soil erosion
- Diseases
- Transportation
- Market and traders.
- Mulching problem

Those factors are described below, which has been found by the researcher in the study area during the field visit.

4.15.1 Soil erosion

Dharagola village of Buddhashanti Municipality lies in chure region. In course of field visit, the respondent farmers have told the problem of soil erosion in the study area. According to them, the rain washes away all manure before the plantation. Similarly, after plantation, all the top soil of wastrel has been washed away too. Though the crop is

disease free, this process reduces the production of ginger. To produce more crop, the soil have to be contained NO_3 nitrogen trioxide phosphorus, and potassium. But these soil nutrients wash away by the rain water.

4.15.2 Diseases

There are mainly three kinds of diseases found in ginger crop in the study area. These diseases are as follows.

- Yellow leaf diseases (YLD) or 'Chandiroga'.
- Inflorescence death and batten flaking.
- Flower or bud decomposes.
-Sun scorch or Stem breaking.
- Nut splitting (front and back).
- Inflorescence death and batten flaking.
- Flower or bud decomposes.
- The spring or 'Hirimundige'.
- Sun scorch or Stem breaking.
- Nut splitting (front and back).
- Fungal infection.

4.15.3 Mulching Problem

Mulching has to be done in the areca nut planted area. So, mulching foliage needs a lot for big areca nut farming. Farmers have told that, every year the trees do not give proper shoots. This way it is difficult to get mulching foliage from trees. This is way , the farmers are complicated to use dry straw for mulching.

4.16 Food Security

The researcher has found out that the farmers produces areca nut as well as other food crops. When the food crops don't feed the family, areca nut has become the main source of income to buy food.

4.17 Case Study of Areca-Nut Farmer

A case study is a research approach that is used to generate an in-depth, multi-faceted understanding of a complex issue in its real-life context. It is an established research design that is used extensively in a wide variety of disciplines, particularly in the social sciences. In study area, Production of areca nut is decreases day by day so that income of areca nut farmers are also decreases. Therefore, a case study for areca nut farmer has been needed in study area which is given below.

A Case Study of a Areca Nut Farmer

Kaluman Rai has one bigha of land as his ancestral property where he has about 500 areca nut trees. He has been farming areca nut for 16 years. In the past, he had to go Charaali (nearly 12 km southern market) to sell raw areca nuts as cash crops and used to earn good income from the same areca nut farming. He used to run his daily life smoothly. More interesting fact was that he used to grow only areca nut and the total area of field was only one bigha (0.2508382079 Hectare) Further more, he expanded the area and planted nursery and made his field more fertile and productive.

Nowadays, Mr. Rai sells only 3 tons (300 kg) raw areca nut in average from his own yard without going anywhere. Fifteen years ago, he was selling dried betel nuts for Rs. 120 per kg, and three years ago, raw nuts were sold at Rs. 95 per kg due to lockdown of universal corona diseases. This year he is hardly selling at 100 per kg. Rai says, "I'm not making any benefits, really hard to run daily bread and butter". He has nuclear family; his wife and two children. His children are studying in reputed private school for which he has to pay huge amount of money. He is quite unsatisfied in areca nut farming. Beside these, have livestock, a cow and a pair of buffaloes as other sources of income but still he has financial shortage. It's the greatest economically slum period of his life. Moreover, he knows chemical pesticides are not best manure; he uses pure organic manure for areca nut trees. The main reason behind his low income is gradual decline in the price of areca nut. Fifteen years ago, he was selling dried betel nuts for Rs. 120 per kg, and three years ago, raw nuts were sold at Rs. 95 per kg. Last year, he sold only 3 tons since 200 tree nuts had decayed and wasted as the workers from dealer didn't come on time. Similarly, this year he is hardly selling at 110 per kg. On the other hand, Indian government bans the import of beetle nuts due to the complaints of widespread illegal trade this year. The deflection of areca nut has direct impact on Rai's family and other farmers of Dharagola.

Rai family was rich before 16 years, in 2064 BS. Kaluman Rai as a bread runner of family was able to manage his basic needs easily. Besides these, he could spend the income on additional needs luxuriously having privilege social status. He could invest sum in the finance also. All these things were possible through the income of raw betel nut selling. But slowly and gradually, Mr. Rai lost his sound economic status and experienced the direct impact of economic crisis which is a great depression for Rai family.

Source: Field Survey, 2023

CHAPTER -V
SUMMARY CONCLUSION AND RECOMMENDATION

This chapter deals with the summary, conclusion and recommendations based on the data and information traced for the study. This chapter has been divided into two sections. This chapter has been divided into two sections.

The first section deals the summary or conclusion of the study which has been divided into two sections. The first section deals the summary or conclusion of the study which has been derived from the data analysis. The second section deals with the recommendation part which can be useful for professional areca nut farmers. Similarly, NGO's and co-operative can get benefits from this study. Likewise, the students who are studying areca nut farming can find more useful. This study of areca nut gives only about spice elder areca nut. This study does not deal with the wild areca nut.

There are many kinds of elder spice areca nut. Those all kinds of areca nut are not found. The researcher has found out that how the areca nut crop has helped the farmers to earn money and for the food security.

5.1 Summary of the Finding

Areca nut cultivation in Nepal is done mostly by traditional methods. The major components in production of Areca nut include Input costs, labor cost and land preparation cost. The cost of machineries (plough, spade, sickle etc) for cultivation is very nominal. Similarly, home-made organic manure (Farmyard manure and Compost) is mostly used rather than chemical fertilizers. The use of improved seed is also very rare and most of farmers are using locally available seed varieties. In Areca nut cultivation, the major part of the cost goes in seed with 48.74% of the total production cost, but in the study by was 46.0% and 61.25% respectively. The difference in percentage may be due to different price of seed rhizome and different seed rate in different location. Usually, seed are being produced by farmers themselves and keep for next season plantation. Farmers keep 20% to 25% of their production as a purpose of seed. New growers purchase seeds from neighboring farmers or from local market. The cost of seed is higher than the fresh Areca nut. They use only organic manure and Areca nut produce in that area is purely organic.

Varieties of spices are traditionally grown in Nepal. Areca nuts one of the important high value spice crops for the mid-hills of Nepal as identified by APP. Nepal’s

varied climatic nature and soil type offer a wide potentiality for cultivation of Areca nut. Areca nut has beep emerging as a potential export product of Nepal. Despite the considerable increments in the area as well as production, farmers are not getting reasonable price for there produce. Keeping in view these situations, this study was designed to analyze the marketing system of major exportable spices in Nepal with special reference to Areca nut in Jhapa district. The specific objectives were to identify the marketing system and business tradition of Areca nut, to analyze the gender role in household decision making process related to production and marketing of Areca nut, to identify the production and marketing problems of Areca nut and to assess the export potential of Areca nut.

5.2 Finding of the Study

Obviously, research finding from the study explains that there is lack of government institutions which deals with areca nut farming. The government of Nepal has to decentralize authority with local level DAO to rural municipality in order to make the policy. There is only agro-based project launched in the name of Prime Minister Agriculture Modernized Project at the community level by Nepal Government but the project only deals with the areca nut farming. There is not any project launched related with the areca nut farming by the Nepal. The areca nut growers in Buddhashanti are unknown to many kinds of areca nut. For instance, there is no differentiation of price between organic areca nut and chemical fertilizer used production areca nut. Out of the total respondents only 10% are illiterate. Among them no one has crossed even the primary school/ they are just only able to read and write.

In the study area there are 90% respondents are literate but they are just only able to read and write only. 10% are illiterate according to the them they want to educate their children, total respondents of the age group of 20-30 represents 30%, 30- 40 represents 40%, 40-50 represents 25%, and 50 above represents 5%. 20% respondent are owned above 2 bigha, 25% respondents are owned 1-2 bigha, 45% respondents are owned 10 katha-1 bigha and only 10% respondent have less than 10 katha. Out of the total respondents 15% are unmarried, 80% are married and 5% widow. Findings of this research are summarized in points below.

1. Areca nut growers are using traditional technology.
2. There is no facility about areca nut farming loan.
3. No any office of the agriculture is working with the areca nut farmers.

4. Areca nut growers are monotonous due to the prize ups and downs fluctuation.
5. No specific program on areca nut production is seen from the side of District Agriculture Office and Rural Municipality office in Jhapa District.
6. Lack of laboratory for testing the soil quality and organism.
7. Lack of agro-forest increment in whole Jhapa district.
8. Areca nut growers don't know the methods of producing production of areca nut at the study area.
9. Areca nut growers are not skilled in technical activities which can add value on areca nut.
10. No P^H test of soil is done properly.
11. Areca nut growers do not know about the micro organism which damages the areca nut crop and the cure of these diseases to increase the production.
12. There is not any agriculture co-operative which deals with farmers.

5.3 Conclusion

Areca nuts have significant contribution to raise the socio-economic status of the rural people, earn foreign currency and decrease environmental degradation. It can be cultivated in crop field, sloppy land and even in marginalized land. Labor required for the cultivation practices of Areca nut was relatively higher than that of labour required for another agricultural commodity. Benefit cost ratio indicates that the crop appears profitable in the selected area of Jhapa district. This crop contributes significantly to the household income thus can be better option for uplifting the socio-economic status of the farmers of study site. The export share of the commodity implies that it is highly export oriented cash crop commodity The marketing system in the study area was poorly organized. Farmers were not getting reasonable price for their produce for few years. The existing marketing system was not in favor of Areca nut growers, as they were not getting reasonable price for their produce. Pricing of Areca nut was highly influenced by traders. The farm gate price of Areca nut was mainly affected by volume of sale and location. Production volume and location played the importance role in determining the selling time of Areca nut as well. Among different problem regarding production and marketing of Areca nut, unavailability of necessary inputs was the major production problem whereas low price of their produce and fluctuation in market price were the major marketing problems.

5.3 Recommendations

A recommendation is a suggestion or proposal for some thing that should be done, as derived from the findings. Recommendations can conclude improvements in a study approach or methodology and policy suggestions. According to findings of the study Recommendation to Government and NGOS are given below.

5.3.1 Recommendation to Government

Government should be established industry as well as new technology about areca nut farming should be applied to the farmer because all farmers used to traditional technology for areca nut farming. Areca nut farmers are monotonous about price ups and downs fluctuation so government of Nepal should be established cold store center. Government of Nepal should be protect to farmer economically as well as should provide transportation facilities, agricultural loan etc.

Records of all the cash crops export must be kept while internal tax source is made through bids every year. So many constraints are not disclosed by RM office which is essential data for the research. It is seen to keep all necessary data properly. Similarly, agriculture workshop should be organized to make clear about the importance of agriculture.

5.3.2 Recommendation to NGOs

NGOs, which are working among the women of Buddhashanti should launch project related with the agriculture products and value addition which can directly benefit their target groups.

This can be done through the co-operative organizing among the farmers. Co-operatives can operative cottage industry of areca nut to produce production of areca nut and other materials of areca nut. This work can be model for the other farmers. This work is community based. It will be employment creating work at the local level. The community can feel as their own which should be the strategy of the NGOs.

Recommendations of this research are summarized in following points:

- Government should be established institutions for areca nut.
- Agricultural co-operatives for areca nut should be established.
- Financial loan should be provided for areca nut farmers.
- Specific program on areca nut production should be managed to areca nu farmers from the side of District Agriculture Office and Rural Municipality office in Jhapa District.
- Agro-forest increment in Jhapa district should establish.

- Technology of farming should be modernized
- Government and non government organization should be managed for areca nut farming.
- Suitable prize of areca nut should be given for farmers.
- Soil testing laboratory should be managed.

References

Bhat, K. , Devasya, S. , Ashwin, S. M. , Bhat, S. (2018). *Arecanut (Areca catechu L.) is not carcinogenic but cures cancer: A bibliography.* International of Jernal

Bhat, K. , Devasya, S. Ashwin, S. M. (2017) . *Arecanut, (Areca catechu L.) as such is not carcinogenic in normal dose if chewed without tobacco: compilation of research work*. Int. J. Food Sci. Nutr, 2; 46-51

Buddhashanti Rural Municipality (2079) *Rural Municipality report* Buddhashanti Rural Municipality, Jhapa Nepal

Dhakal K. P. (2016) *Areca nut cultivation in Nepal*. Buddhashanti, Jhapa, Nepal

DOI (2021) *Reviews In Food And Agriculture (RFNA)*, :http//doi.org/10.26480/rnfa. 01.20202)

Food and Agriculture Organization (2021) *Report* Nepal

Garg, A. , Chaturvedi , P. , Gupta, P.C. , (2014), *A review if the systematic adverse effects of areca nut or betel nut* Concept Publishing Company

Giriappa, S. (1994): *Areca nut production and marketing in India*. M.D. Publications Pvt. Ltd. ISBN 978-81-85880-45-7.

Gupta, P. C. , Warnakulasuriya , S.(2002) *Global epidemiology of areca nut usage. Addiction Biology*. ;7(1):77-83.doi: 10.1080/13556210020091437. [PubMed]

Hang, C.H., S. L., NO A. M.S., et al. (2014) Betel-quid dependence domains and syndrome associated with betel-quid ingredients among chewers: *an Asian multi-country evidence*. Addiction.109(7):1194-1204.doi: 10.1111/add.12530. [PubMed]

Ministry of Finance (FY2078/79) *Economic Survey*, Kathmandu, Nepal.

Shah, G. , Chaturvedi, P., Vaishampayan, S. (2011) *Areca nut as an emerging etiology of oral cancers in India*. Ind J Med PaediatrOncol. 33,71-79 (PMC free article) (PubMed)

Singh, W.S. , Pallak, A. and Trisha, R. (2017): *Journal of Oral Biology and Craniofacial Research* Deep and Deep Publication Pvt. Ltd

Annex – A

This Questionnaire has been designed to explore the informative for purely academic purpose. This is to enable the researcher Yogendra Yokpangden. This thesis on the topic Role of Areca nut Cultivation on Rural Economy: A Case Study of Buddhashanti Rural Municipality-7, Jhapa, Nepal in pursuance of Master of Arts in Rural Development.

Name: Address:

Occupation: Age:

Questionnaires

1) How much land do you have?

Ans_____

2) Which your farming is main farming?

Ans_____

3) When did you start areca nut cultivation?

Ans_____

4) Where did you bring the areca nut plant at first?

Ans_____

5) When does the areca nut plant start giving production after plantation?

Ans_____

6) What type of land is suitable for areca nut cultivation?

Ans_____

7) Did you test the soil for areca nut plantation?

Ans_____

8) How much areca nut do you produce a year?

Ans_____

9) How many times do you have picking up the leaves in a year?

Ans_____

10) What types of areca nut do you cultivate?

Ans_____

11) How much raw materials betel nut can be produced in one Kattha?

And_____

12) How many workers are needed for picking areca nut per Kattha?

Ans_____

13) How much raw materials areca nut is needed for making 1 kg frying areca nut?

Ans_____

14) What types of technique (method) have you used for drying areca nut?

Ans_____

15) How much cost can be needed for drying per kg areca nut?

And_____

16) Where do you sell your produced areca nut?

And_____

17) How much kg picking areca nut by the one worker?

Ans_____

18) Did you sell your produced areca nut to the consumer or businessman?

Ans_____

19) What's the difference between market price and village price?

Ans_____

20) Which do you sell raw or dried?

Ans_____

21) How much income from areca nut in a year?

Ans_____

22) Are you satisfied with the present rate of the areca nut?

Ans_____

23) Have you ever got training for areca nut cultivation?

Ans_____

24) Have you ever taken lone from the bank for areca nut cultivation?

Ans_____

25) How much rupees save from your income of areca nut farming in a year?

Ans_____

26) Has areca nut cultivation improved your economics status?

Ans_____

27) What kind of irrigation system have you applied?

Ans_____

28) Which do you prefer areca nut farming and other farming?

Ans_____

29) How many members have you got in your family?

Ans_____

30) Have you solved your lodging and fooding from the areca nut farming income?

Ans_____

31) Have you taken income from your next farming with areca nut farming?

Ans_____

32) Does it help your economic status?

Ans_____

33) How much areca nut do you use?

Ans_____

34) How much areca nut do you sell?

Ans_____

35) What are you faced difficulties to manage your areca nut farming?

Ans_____

36) Do you give any suggestions about areca nut farming?

Ans_____

Date …….. Sign……..

Thank you

Annex – B

This Check List has been designed to explore the informative for purely academic purpose. This is to enable the researcher Yogendra Yokpangden. This thesis on the topic Role of Areca nut Cultivation on Rural Economy: A Case Study of Buddhashanti Rural Municipality-7, Jhapa, Nepal in pursuance of Master of Arts in Rural Development. Give your personal information as asked and tick Yes or No with the questions below.

Check List

1. Name: …….
2. Age: .....
3. Cast: .....
4. Education: ……
5. Do know about areca nut production?

a. Yes b. No.

6. Do you know about loan process of agricultural sector?

a. Yes b. No

7. Are you satisfied about local government to support you?

a. Yes b. No

8. Do you have any idea about farming system?

a. Yes b. No

9. Do you know about the diseases of areca nut?

a. Yes b. No

10. Do you use pesticides to cure diseases?

a. Yes b. No

11. Do you about the Nematodes?

a. Yes b. No

12. Are your basic needs maintained by areca nut farming?

a. Yes b. No

13. Is areca farming good source of income?

a. Yes b. No

14. Are you satisfied with areca nut value/market?

a. Yes b. No

15. Is this right to use chemical in areca nut farming?

a. Yes b. No

16. Have you any problem in areca nut farming?

a. Yes b. No

\

Thank you

Annex – C

Research Related Photos

Photo No.-1: Meeting with Representative of Local Government

Photo No.-2: Field Visit for Research

Photo No.-3: Drying Areca Nut in Local Factory

Photo No.-4: Garden of Areca Nut Tree

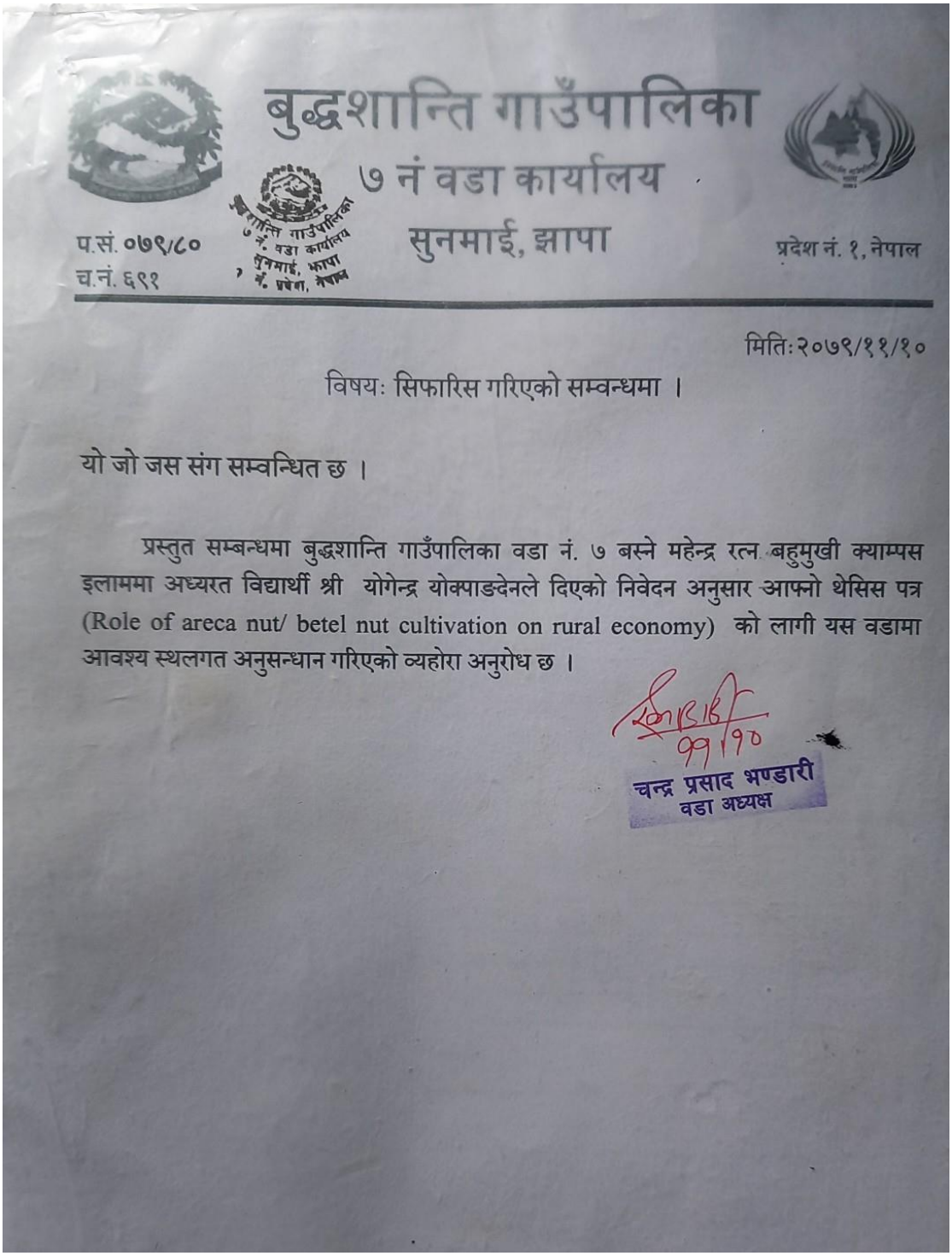
Photo No.-5: Garden of Areca Nut Tree

Photo No.-6: Plantation of Areca Nut

Photo No.-7: Research Area

Photo No.-8: Research Area

Photo No.-9: Collecting Data from Respondent



बुद्धशान्ति गाउँपालिका
७ नं वडा कार्यालय
सुनमाई, झापा
प्रदेश नं. १, नेपाल

प.सं. ०७९/८०
च.नं. ६९१

मितिः २०७९/११/१०

विषयः सिफारिस गरिएको सम्वन्धमा ।

यो जो जस संग सम्वन्धित छ ।

प्रस्तुत सम्बन्धमा बुद्धशान्ति गाउँपालिका वडा नं. ७ बस्ने महेन्द्र रत्न बहुमुखी क्याम्पस इलाममा अध्यरत विद्यार्थी श्री योगेन्द्र योक्पाङदेनले दिएको निवेदन अनुसार आफ्नो थेसिस पत्र (Role of areca nut/ betel nut cultivation on rural economy) को लागी यस वडामा आवश्य स्थलगत अनुसन्धान गरिएको व्यहोरा अनुरोध छ ।

९९/१०

चन्द्र प्रसाद भण्डारी
वडा अध्यक्ष

Photo No.-10: Document Related to Research