CHAPTER-I

INTRODUCTION

1.1 Background

Nepal is an agricultural country. Agriculture is the backbone of the Nepalese economy. To break its cycle of under development, it is the time that market oriented approach and commercialization processes are initiated in agriculture sector. Contribution of agriculture sector to the Nepalese economy has been noteworthy. The agriculture sector occupies almost one third of Gross Domestic Product (GDP) with about two third of country's population are dependent in this sector. Contribution of this sector to GDP was 33.87 percent in fiscal year (FY) 2012/13, which is expected to remain at 33.10 percent in fiscal year 2013/14. In fiscal year 2070/71, the annual growth rate of agriculture sector is expected to be 4.72 percent at constant prices of 2000/01.The structure of Nepalese economy has been changing gradually. Contribution of agriculture and industry sectors to GDP showed a declining trend while that of services sector showed the opposite. From the sectoral perspective, the contribution of primary, secondary and tertiary sector contribution to nominal GDP are estimated to remain at 33.7 percent, 14.1 percent and 52.3 percent respectively. While classifying GDP into agriculture and non-agriculture sectors, contribution of the agriculture sector showed declining trend while the non-agriculture sector showed the opposite. Contribution of the agriculture sector to GDP at current prices stood at 37.4 percent in FY 2001/02, while it has come down to 33.1 percent in current fiscal year 2013/14.(MOF, 2014:XII)

Agriculture is the major economic activity of Nepal. More than 80 percent of the total population on is dependent upon agricultural sector for their livelihood. It is reported that not more than 66 percent of the total area of Nepal is worth cultivating. Of the country's total 2,641,000ha of arable land, 1,766,000ha of land are irrigable. Out of the total cultivable land of Nepal, hearty 34 percent or nearly 875 thousand hectors land is still deprived of the irrigation facility. The terai region which is known as the store of the food grains constitutes merely 43 percent of the total cultivable land. The rest lies in other mountainous region. The disproportionate distribution of the land has abstracted the maximum utilization of this sector. Despite the fact that there is the

preponderance of small farmers each of them possesses merely 0.15 percent hectors land on an average. (CBS 2010: 56)

Economically, Nepal is one of the poorest and underdeveloped countries in the world. Agriculture is the backbone of Nepalese economy. More than 80 percent Nepalese people are involved in agriculture and they have not used the modern farming technology, the reason of poverty, lack of education transportation, communication and political instability. Coffee is an important high value commodity and a popular beverage. Over 2.25 billion cups of coffee are consumed in the world every day. One of the good things about coffee is that over 90% of its production takes place in the developing countries. Worldwide, 25 million small producers rely on coffee for a living. In Brazil alone, where almost a third of the world's coffee is produced, over 5 million people are employed in the cultivation and harvesting of over 3 billion coffee plants. (PACT, 2012:1)

Though coffee is not traditional drink of average Nepalese, it is becoming popular drink in Nepal in recent past. According to survey (COPP, 2010) consumption of coffee increased from 156mt. in 2006 to 384mt. in 2010: around 146 percent increase in three year. This quantity convert to drink represents only about three cups of coffee per capita in 2009.

There are two main varieties of coffee being cultivated: Arabica and Robusta. Arabica coffee trees are more delicate, must be grown at higher elevations, and yields fewer beans per tree per growing season. Robusta coffee trees are much hardier, may be grown at lower elevations, and have a high bean yield. Of the two, Arabica beget the better beans and about 70 percent of the harvest in the world. The harsher Robusta tree account for about 30 percent of the world's production and are used for 'mainstream' (lower quality) coffee blends. Arabica is being cultivated in Nepal because of its quality as demanded by specialty market. (PACT, 2012:1)

Coffee is one of the important cash generative crops in the mid hill regions of Nepal. Historically, it is believed that a saint named Hira Giri in Aanpchaur, Gulmi district, introduced coffee for the first time in Nepal from Myanmar in 1944. Initially, coffee spread to several districts through the initiation of individual farmers as well as by an ADB/N supported programs. From the mid-seventies, coffee was grown as a commercial crop. During mid-eighties, the coffee production in some districts was

quite high. However, during late eighties marketing problems and poor returns from the crop forced many farmers to cut down their mature trees. (Cited in Shrestha, 2004:1)

Presently, coffee is cultivated in around 40 districts, but it has been producing commercially in about 20 to 22 hill districts. In Nepal, coffee is predominately grown by resource poor and small scale farmers under marginal upland condition and mostly they don't use chemical fertilizers and pesticides in the production process. Coffee cultivation has an enormous potential to provide farmers a good employment and income generation opportunities especially in the mid-hills regions where there is a huge amount of land and suitable climatic condition for growing the coffee successfully. (Cited in Tiwari, 2010:138)

Now a days, almost all the world drink coffee but it is not in demand like tea in Nepal. Its' consumption is mainly confined to urban areas and in affluent societies. Globally, increasing demand rate of coffee expanding the market so that many countries have been involving in coffee farming. There are different verities of coffee that can grow however; Arabia coffee is the most popular in Nepal. Arabia Coffee is grown at altitudes over 2,000 (usually 4,000 - 6,000) feet above sea level and is typically harvested by hand when the cherries are perfectly ripe. Coffee production plays on important role in poverty reduction and thereby sustainable rural development in developing countries. It is the major source of foreign currency. (Cited in Baudhacharya, 2011)

The Coffee farming is better than other farming like paddy, maize and sugarcane with respect to the production and return, use of waste land, environmental conservation, conservation of forest, control of landslide and convenience. Its impact is seen positive not only economically but also socio-environmentally. According to survey (COPP, 2010) scenic beauty, greenness, conservation of forest and water resource, control of landslide and flood are its environmental contributions. Coffee is relatively a new cash crop started growing in Nepal almost with no inorganic fertilizers and pesticides use. It could be an important occupation in the rural economics with massive participation of marginal, poor and down trodden class of the rural communities. Additionally, it could be an important means for the soil conservation, biodiversity maintenance and watershed balance in the mid-hills of Nepal. Likewise;

it could be a major commodity to link the Himalayan Kingdom with the consumers of international market. According to annual report (LCC, 2064) mid hill locations with an altitude of 800 to 1500 meters above sea level are considered suitable for organic coffee cultivation and Lekhnath is one of the place where there are lots of mountainous land of such altitude.

Nepal produced coffee is sold both at domestic as well as the overseas markets. However, due to the lack of information and adequate publicity about Nepalese coffee and the prevailing taste preference for the imported instant coffee its consumption is not that encouraging in the domestic market. Furthermore, tea drinking vastly shadows it. However, it is important to note that coffee consumption is rapidly gaining its momentum and about 25 to 30 percent of the domestic demand is estimated to be fulfilled by the domestic production. Nepal imports around 40mt.of coffee part of which can be substituted with domestic production, this way country may be able to huge amount of foreign currency. This may however need to switch beverage consumption behavior marketing techniques. (FNCCI/AEC, 2006: II)

Coffee is an important beverage of the world. Coffee drinking has become a regular habit of people in many countries and it has also being increasingly popular among Nepalese. Coffee plantation is still a new adventure in Nepal. The suitable climate for coffee is available in Nepal as well as Lekhnath municipality of Kaski district (LCC, 2064). The government of Nepal started to promote the coffee production, so Ministry of Agriculture (MOF) established different boards, one of them is National Tea and Coffee Development Board (NTCDB), in that sector other non-governmental sector are also supported, one of them is Halvetas, which helps the farmers for production, plantation, training and other technical supports. Respecting the interest of the people on coffee and favorable climatic conditions for its cultivation, Ministry of Agriculture (MOA) decided to launch Coffee Development Program in the country. The Government provided technical and financial support to the farmers; its cultivation has gradually spread to about more than 40 districts of the middle hills of Nepal. Lalitpur, Kaski, Gulmi, Palpa, Syangja, Sindupalchowk, Kavre, are some districts known for coffee production. (NTCDB, 2012). About the specialty of Nepali coffee, area of production and trend of coffee export from Nepal is given in Appendix B and C.

1.2 Statement of the Problem

The development of different aspects of agriculture is essential for the national development. The pace of industrial development is very slow and in infant stage, which cannot integrate the whole national economy together due to climate variation, lack of capital, accessibility and market etc. of the country.

Though the Nepal is an agricultural country, Nepalese farmer are facing various constraints in the field of agriculture. Traditional and subsistence farming system is still in existence although people are adopting cash farming system. There are various factors which affect the production of coffee e.g. the absence of proper education of the farmer and shortage of fertilizer, technical knowledge, financial aids, market availability, irrigation, types of soil and transportation facilities etc. The main factors that affect the production of coffee is price factor, farmers are too conscious towards the price factor is reflected by the money which they receive. So to improve the quality of coffee is also the problem facing the farmer in the study area.

Coffee cultivation is one of the important cash crops. It is the best crop of hilly region. But the crops have not been highlighted as less priority is given to them by the government and the private sector too. The history of the coffee cultivation in the study area has been practiced since many years and gradually improving its cultivation.

Being a profitable occupation than other traditional occupation, coffee production has better prospects in the hilly region western part of Nepal, but the production of coffee in such a region as well as in Lekhanth Municipality specially in ward no. 10 & 11 (the study area) has not increased to that extent should be. The rise and fall in its production was not taken seriously. Mostly of the farmers use their land to produce traditional crop production which is less profitable. Most of the farmers are involving in multiple farming and few are involving in single (specific) farming. It is the main constraint problem of the study area as well as a whole country for economic development of hilly region.

This study is focused on the analysis of the following major problems:

- What kinds of farmers are attracted towards coffee farming?
- What is the trend of coffee production in study area?

- Is there a significant effect of human labour, land and compost manure on the production of coffee?
- What is the optimum level of coffee production in Lekhnath municipality?
- What about the cost and benefits of coffee farming?

1.3 Objectives of the Study

The general objective of this study is to analyze the production and profitability of coffee farming of Lekhnath Municipality of Kaski District. The specific objectives of this study are to:

- To study the present situation of the coffee farming in the study area.
- To analyze the coffee production function, cost and revenue of the coffee farming.
- To examine the state of profitability in coffee farming.
- To examine the production trend and prospects of the coffee cultivation in the study area.

1.4 Significance of the Study

In Nepalese context, the economic development of the country is almost synonymous to the agricultural development. In the mid hill area of Nepal, coffee production is regarded as the most important for overall development because it is the rain-fed area. Coffee production has contribution a lot to the local farmers in improving their socio-economic life. This research will try to study the condition of the coffee growers who are facing different problems like illusion of its profit, relation between inputs and output etc.

Besides other food grains and other commercial crops, coffee is large quantity traditionally because of its economic significance. So it is essential to analyze its production process and on the basis of the finding what steps will be taken effectively to increase its productivity and encourage profitability. Consequently this study will be helpful in analyzing coffee production in Lekhnath Municipality of Kaski District. So this study helps those who are interested to know about production of coffee, its impact on farmers, present situation and marketing in the study area of the coffee product.

The findings of the study may be useful for the planners, policy makers and implementers as well as change agents of coffee marketing and production sectors. The studies may also be useful for the future researcher particularly in the study area.

1.5 Limitations of the Study

The limitations of the study are as follows:

- The study covers only Lekhnath Municipality (ward no. 10 & 11) of Kaski Districts. So it can be representative to some extent only for mid-hilly region of western part of Nepal regarding coffee farming but may not be generalized to the national level as a whole.
- This study in only related with the coffee farming and its marketing system of the sample area.
- The main constraints are time factor as well as finance, due to which large sample has not been included to study.

This study is expected to reveal the trend of coffee farming and enhance the farmers to motivate in coffee farming so that they feel about the significance of commercial production over traditional multi farming.

1.6 Organization of the Study

This study has been divided into five chapters. First chapter deals with the introduction of the study. It includes the general backgrounds of the study, statement of the problem, objectives of the study, significance of the study, limitation of the study and organization of the study. Second chapter covers the review of literature. It includes the theoretical and empirical review of the coffee farming. Third chapter deals with the research methodology. It includes rational for the selection of study area, research design, nature and source of data, method of data collection, tools of data collection, population and sampling, specification of the model and method of data analysis. Fourth chapter deals with the data presentation and analysis. It includes the demographic distribution and social characteristics, production trend of coffee and profit analysis with regression, cross analysis, major findings of the study and prospects of coffee farming. Fifth chapter covers summery conclusion and suggestions.

CHAPTER-II
REVIEW OF LITRATURE

Some conceptual and empirical studies are available in the national and international coffee sector. In the context of Nepal some students and institutions have prepared research concerning coffee production, cultivation and marketing. But very few have given their attention towards cost and benefit aspect. It has no doubt that the cost influences grew deal on the production quantity of any commodity so, as in coffee production. Besides, encouragement and facilities to coffee farmers also take an important part.

There are many literature and research papers available in the field of coffee farming in Nepal. Most of the works are concerned with development of coffee farming, production and problems. Few of them could be found about profit. It is general truth that cost and revenue influence significantly to the production of any commodity. Here some of the relevant literatures are reviewed.

2.1 Theoretical Review

The present study deals with the profit aspect of coffee production. Every firm and industry wants to maximize the profit. Profit maximization is the short run or long run process by which a firm determines the price and output level that returns the greatest profit. There are several approaches to this problem. The total revenue minus total cost perspective relies on the fact that profit equals revenue minus cost and focuses on maximizing this difference and the marginal revenue is based on the fact that total profit reaches its' maximum point where marginal revenue equals marginal cost.

Mathematically,

Profit = Total Revenue – Total Cost

i.e. $\pi = TR - TC$

Or,

Profit = (AR – AC)* Q

Where, AR is the average revenue, AC is average cost and Q is the total output.

Profit Maximization

- In classical economics it is assumed that firms will seek to maximize their profits. This occurs when the difference between TR – TC is the greatest.
- Profit maximization will also occur at an output where MR = MC
- When MR > MC the firms is increasing its profits and Total Profit is increasing. When MR < MC total profit starts to fall· Therefore profit is maximized where MR = MC

Normal Profit

This occurs when TR = TC. This is the breakeven point for a firm. It is the minimum profit level to keep the firm in the industry in the long run

Supernormal Profit

This occurs when TR > TC

Whether to produce at all,

If AR > ATC The firm is making supernormal profits If AR = ATC The firm is making normal profits. In classical economics it is assumed that firms will seek to maximize their profits. This occurs when the difference between TR – TC is the greatest.

If AR < ATC but AR > AVC. It is making an operating profit, and is covering its variable costs. However it is making a loss because it cannot cover its fixed costs as well. In the short run it is best to keep producing because it has already paid for its fixed costs. It is at least making a contribution to its fixed costs.

If AR < AVC The firm is likely to shut down in the short run. (Watson and Getz, 1981).

2.1.1 Concept of Revenue

The amount of money that a company actually receives during a specific period, including discounts and deductions for returned merchandise. In business, revenue or turnover is income that a company receives from its normal business activities, usually from the sale of goods and services to customers. For non-profit organizations, annual revenue may be referred to as gross receipts. This revenue

includes donations from individuals and corporations, support from government agencies, income from activities related to the organization's mission, and income from fundraising activities, membership dues, and financial investments such as stock shares in companies.

In general usage, revenue is income received by an organization in the form of cash or cash equivalents. Sales revenue or revenues is income received from selling goods or services over a period of time. Total revenue is the total receipts of a firm from the sale of any given quantity of a product.

It can be calculated as the selling price of the firm's product times the quantity sold, i.e. Total revenue = Price× Quantity, or letting TR be the total revenue function:

$$TR(Q) = P(Q)*Q$$

Where Q is the quantity of output sold, and $P(Q)$ is the inverse demand function (the demand function solved out for price in terms of quantity demanded). (A. Koutsoyannis, 1979)

- Total Revenue (TR): This is the total income a firm receives. This will equal Price * Quantity
- Average Revenue (AR) = TR / Q
- Marginal Revenue (MR): The extra revenue gained from selling an extra unit of a good.

2.1.2 Concept of Cost:

Real Cost: It covers both direct and indirect expenses including efforts made to produce and output i.e. it covers money cost and the efforts made by produces and labors.

Opportunity Cost: The opportunity cost alternatives cost of any good is the next best alternative good that are sacrificed.

Explicit Cost: It is cost paid by a producer for borrowing all factors of production to produce an output. For example, interest of capital, wages of labor and other overhead costs.

Implicit Cost: It is a cost of factor of production, which the producer himself owes. Thus total cost comprises total explicit cost plus total cost.

Variable Cost: It is the cost of factor of production which could be varied to increase or decrease in output production. For instance, labor, raw materials, chemicals, etc. are variable factors and their cost is called variable cost.

Fixed Cost: It is the cost of those factors of production which cannot be varied on short run i.e. fixed. For example: machinery, plant, building of a firm entrepreneurship, salaries and administrative expenses.

Operating Money Cost: It is a cost spent by firm covering all its expenses to produce an output at covers the cost of labor, interest of capital, insurance charge, cost of raw materials and all other required to produce an output. In general, cost means operating money cost.

Theory of Cost: The relationship between cost and output is called cost function. The production function of the firm and prices of input determines the firm cost function. Thus, cost function is derived function from production function. We have to cost functions.

I) Short Run Cost Function

II) Long Run Cost Function

Short run cost distinguished to fixed cost and variable cost. In fact, short run cost is the cost over a period during which some factors of production are fixed. Fixed cost is that which continue if the firm is temporarily shot down, producing nothing at all, whereas variable cost are those that vary with the volume of output. In long run all is variable. The production has no fixed inputs and no fixed costs. Thus, the long runs costs are the costs over a period long enough to permit the change of all factors of production. Input-output relations in the production function are those of returns to scale.

The short run and the long run are not definite periods of calendar time. Strictly speaking, they are sets of conditions, not periods of time at all. Still, it is almost impossible to keep the idea of time out of analysis of the short run and the long run. So both in the short and the long run, the cost of production (total cost) is influenced

by various factors: that is to say, total cost is a multivariate function (Watson and Getz, 1981).

$$C = f(Q, T, P\ldots\ldots\ldots\ldots..)$$

And

$$C = f(Q, T, P, K\ldots\ldots\ldots\ldots)$$

are the long run and the short run cost functions respectively. Where,

C= Total Cost

Q= Output

T = State of Technology

P = Price of Factors of Production

K = Fixed Factors.

A cost curve is a curve which describes the changes in cost as output changes. There are four important costs curves in economic theory. They are average cost AC, marginal cost MC, average variable cost AVC and average fixed cost AFC. These curves are of great significance especially in explaining pricing and equilibrium of firm. Graphically, costs could be represented in two dimensional diagrams. Other things being held constant, such curves imply that the cost is a function of output i.e. C = f (Q). These constants are called determinants of cost. Sometimes they are called shift factors, because, as they change their effect could be shown in the graph by the shifting of cost curve.

2.1.3 The Traditional Theory of Cost

According to the sets of conditions, the traditional theory of cost could be distinguished as the short run and the long run. In the short run, some inputs are fixed in the amount: a firm can expand and contract its output only by varying the amount of other inputs. Usually, fixed inputs are capital equipment and entrepreneurship. In the long run, all inputs are variable in amount: a firms output can range from zero to an indefinitely large quantity.

2.1.4 Cost under Short Run

In the short run traditional theory of cost, the total cost (TC) has been divided into two components. They are total fixed costs (TFC) and total variable costs (TVC).

$$TC = TFC + TVC$$

The fixed costs include items such as:

- Capital equipment
- Interests on investment in plants and equipment
- Most kinds of insurance
- Property taxes
- Depreciations and maintenances
- Salaries of administrative staffs etc.

And the variable costs include:

- Wages of labour
- Payments for raw materials and other goods bought
- Payments for fuel
- Interests on short term loans
- Excise taxes, if any and so on.

Diagrammatically, the total fixed cost is represented by a straight line parallel to the output x-axis. Whereas, the total variable cost takes the shape of inverse 's' due to the application of the law of variable proportions. (A. Koutsoyiannis, 1979)

The law of variable proportions is related to the short run. The law comprises three stages of production. At the initial stage, the total production to a point increases at an increasing rate. That is more the variable factors employed, its productivity increases and the average variable cost (AVC) falls. This process continues till the optimal combination of fixed and variable factors is reached. Beyond this point, the total product continues to increases at a diminishing rate. At this stage, both marginal and average product of variable factor is diminishing but positive. Simultaneously, the average variable cost rises. This stage is very crucial and important because a firm will seek to produce in its range. This stage is known as diminishing return as both the average and marginal products of the variable factor continuously fall. After this, comes the stage of negative return. Since marginal product of a variable factor is negative i.e. below x-axis.

Since total cost (TC) is the sum of total fixed cost (TFC) and the total variable cost (TVC), average cost curves could be obtained from the total cost. Thus, average total

cost (ATC), average fixed cost (AFC) and average variable cost (AVC) are found out by dividing the corresponding total costs by the level of output (Q).

Diagrammatically, the shape of both the ATC and AVC are U shaped due to law of variable proportion and the shape of AFC is rectangular hyperbola showing all its points are of same magnitude i.e. the level of TFC.

The concept of marginal cost (MC) occupies an important place in economic theory. Marginal cost is addition to the total cost caused by producing one more unit of output. It is the change in total cost (TC) which results from a unit change in output. Graphically, MC can be measured by the slope of total cost curve corresponding to that output by drawing tangent to it. As the TC is inverse S shape, the MC will be of U shaped. (A. Koutsoyiannis, 1979)

2.1.6 The Long Run Traditional Theory of Cost

In the long run, all cost will be variable. The firm's production function has no fixed inputs; the firm has no fixed cost. The firm expands its output by building and operating wholly new larger plants. Input-output relations are those of returns to scale (increasing, constant and decreasing). The long run average cost curve (LAC) is often called the panning curve, because a firm plants to produce any output in the long run by choosing a plant on LAC curve corresponding to the given output.

The LAC is the locus of points representing the least cost for producing the corresponding level of output. Each point representing the least cost for production the corresponding level of output. Each point on the LAC correspond to points on short run cost curves (SACs) which is tangent to LAC showing the minimum cost for producing the corresponding level of output. Thus, LAC is the locus of minimum points of SACs. LAC supports SACs from below. No part of SACs lies below LAC. It envelopes SACs/ in fact, sometimes it is called envelope curve. Due to close proximity with laws of returns to scale, LAC also takes the form of U shape. Besides, external economies and diseconomies also affect the cost of production. The optimum level of output at minimum cost will be given by the point where LAC = LMC = SMC = SAC. (A. Koutsoyiannis, 1979)

2.1.7 Modern View of Cost

It is found quiet conflicting about the conventional and modern view regarding the shapes of cost curves. Conventional view clarifies that the shape of cost curves (AC, AVC and MC) whether in the short run or on the long run are of U shape. It is due to the application of the law of variable proportions and the laws of returns to scale.

The conventional U shape of cost curves have been questioned by some economists like George Stigler and Koutsoyiannis, both in the theoretical and empirical grounds/ back in 1939, G. Stigler wrote that the short run AVC was flat over a considerable range of output; firms build plants which permit some variations in output without change in the cost. Further, the greater attention has been given towards the shape of the long run cost curves in the economic literature, due to its implacability and applicability in the economies of large scale production. Nevertheless, Koutsoyiannis argued that, "the managerial diseconomies can avoid by the improved methods of modern science." And any increase because of managerial diseconomies can be more than compensated by fall in costs because of technical economies. Therefore, the long run average cost curve is not U shaped, it is L shaped. (Cited in Poudel, 2012: 11)

2.2 Review of Related Studies

Some related studies are available in national international context. Out of these the review of most studies which are most essential for the study are listed below. Out of them most of the studies are related to coffee and some are of other production.

Kurg and Poerck (1968) mentioned that present status of coffee production and trade in Africa, North and Central America, South America, Asia, Oceania, Australia and Antilles. According to this survey, coffee is produce on some 3 to 4 million farm units in the world. All of the countries analyzed, more than half- grow coffee exclusively on small holding and in many others small and medium size coffee orchards predominate. Coffee is thus of considerable importance to small holders in tropics. Only it is rarely a cash crop needed for the subsistence of farmers. Coffee has contributed substantially much more than coca or any other crop in the tropics to raise the standard of living of millions of people, particularly in Africa. This study has also pointed out that in most of the coffee growing countries, this crop has been established has been hundreds of thousands of hectors without the guidance of research work. This survey also shows only very few countries are giving serious

consideration to research and experimental work, and that is about one third of the countries, no coffee work of any kind is in progress.

International Trade Centre (1969) states the present situation and status of soluble and liquid coffee in European market. The volume of soluble coffee sales in United Kingdom increases on average by 10% per annum. Soluble coffee sales increased by about 3% per annum in France, 8% in Spain, 1% in Italy and so on. This describes the market situation, consumption, sales and productions of soluble and liquid coffee in European market. Comparatively there is the higher sale of soluble coffee in United Kingdom among the European countries. The liquid coffee sales in European market are less than soluble coffee because there are some differences in taste between liquid and soluble coffee. The taste of soluble coffee is better than liquid coffee.

Food and Agricultural Organization (1997) states that coffee is the second most valuable commodity in international trade, surpassed only by petroleum and in spite of its high economic importance to many nations, production methods are still primitive in many areas. In some, it is still picked from sub-spontaneous coffee population; in many others, it is still considered a forest plant, efforts being made o create artificially an environment similar to that prevailing in its native habitat; in others, it is grown without any alignment in association with banana, cocoa, rubber, various fruit trees or even annual food crops. It is only in a few regions that coffee is grown intensively as an orchard crop according to modern techniques to secure the highest economic production per hectare of a high-quality product.

Poudel (1997) made a study entitled 'Orange Production and Socio-Economic Changes in Syangja District. The main objective of the study is to identify various factors that determine the production of orange, the marketing system and its problems and socio-economic change of the people of Kanrendada VDC of Syangja due to orange farming. He observed that the social behavior of the people of Karendada VDC has started to change as they have started to produce orange. He has also found the cereal crops cultivation has decreased in comparison to the production of cash crops. The people of the study area according to him have changed their food habits and housing strictures offer, they have starting farming orange. The perception of the peopled on primary health care, education and sanitation has changed

significantly. People were found pay more attention to these factors. Hence, the peopled of the study area have changed their life style, as they have farming orange.

In the study area, the study has identified the problems of orange farming as; farmers adopting traditional cultivation and storage method due to lack of knowledge, lack of technology etc. with regards to soil, varieties and fiber content, lack of credit facilities influences of disease and pests, lack of co-ordination between support services and organizations, lack of developed markets, unwire the right of price and above all the farmers, fragmented institutional support is coming forth for marketing etc.

Gyawali (2003) made a study entitled on 'Coffee Production and Marketing; A Case Study of Madan Pokhara VDC of Palpa District. The main objective of the study is to find out the coffee marketing system and to assess the role of supporting institution in coffee farming and find out the present status of production, consumption of coffee in the study area. To estimate the production function of coffee in linear and nonlinear forms with labor based on the primary as well as secondary data. The raw data collected through the study are converted into logarithmic form and are presented in regression analysis hypothesis testing. The production function gives mathematical expression on the relationship between qualities of inputs and outputs. A Cub-Douglas production function is fitted to analysis the data collected. The study has concluded that though the coffee growers of the study area have been facing so many problems, they are still optimistic about better prospects of coffee farming moreover. With the acceleration of coffee production, the problems of unemployment, disguised unemployment will be solved and the flow of migration from hill to terai region will be checked to some extent as the coffee production is the labor intensive occupation. Not only this he concluded that coffee farming helps to maintain the environment balance by checking the landslides, soil erosion, floods, air pollution etc.

Coffee policy (2004) has formulated to pave the way for involving the private sectors, NGOs, cooperatives and other members based organizations for promoting the production, processing and marketing of coffee in a sustainable and organized way. This policy came to bring momentum in the business of coffee in the context whereas other agricultural policies did not stress visibly for the promotion of coffee. The emphasis of coffee policy is to substitute the import and promote the export of coffee expanding area under coffee production and finally to conserve the ecological

environment of mid hills area (MOAC, 2004). This policy has focused on developing the modern technologies for the production and processing of coffee with the active participation of government and private sectors. Importantly, the policy has also given priority to develop necessary manpower for promoting the production and processing of coffee; encouraging the manufacturing of necessary machines and equipments for the coffee processing within the country. Additionally, this policy stressed to coordinate with foreign countries consulates located in Nepal for exporting the coffee; messages about important of organic coffee and other promotional activities conducted and promoting the organic coffee production. Equally, this policy focuses to establish laboratory for improving the quality aspect of coffee; higher education and trainings and conducting the research for promoting production, processing and marketing of coffee. Nevertheless, this policy doesn't focus for the development of special pockets for organic coffee, which is paramount importance for the strengthening the organic coffee in the country.

Tiwari (2010) made the study entitled ‘Agricultural Policy for the Coffee Promotion in Nepal.' The study concluded that although most of agricultural policies have focused for increasing production and area coverage of high value crops like coffee, the area expansion and productivity is not expanding as expectation owing to several limiting factors: lack of sufficient motivation to the farmers, inadequate technical and material supports to the coffee producers, coffee is grown in the marginal area, producers don’t adopt the improved cultivation practices, production pockets of coffee have not developed. In Nepal majority of coffee is wet processed and coffee processed by this method is considered good quality than dry processed method. Generally, cooperatives at the local level do preliminary processing (pulping, washing, fermenting etc.) and prepare dry parchment. The District Coffee Producers Association (DCPA) do further processing and final processing is generally done by traders/trading companies at the central units. Due to lack of adequate well trained manpower and modern technologies, the quality of Nepalese coffee is not as demanded by the traders and international consumers. At present, more than 65% of Nepalese coffee is exported especially to Japan, Europe and USA and 35% of the total product is processed and supplied in the domestic market. Nepal exports only super quality green bean to overseas markets.

Dhakal (2010) made a study entitled on 'Cost Benefit Analysis of Orange Production in Rural Area: A Case Study of Phaparthum VDC of Syangja District.' The main objective of this study is to find out the cost and benefit of orange production in the study area. He used the primary as well as secondary data in his study and applied the cost benefit ratio by dividing percent work of benefit by the percent of cost. The study concluded that though the farmers (involved in orange production) in the study area have been facing many problems, they are still optimistic for the future prospects of orange. People are being attracting day by day for its cultivation. This thesis mainly focused on different difficulties during the production of orange and market mechanism. He recommended that there should be the use of modern technology, irrigation facility, use of insecticides and good market mechanism.

Sharma (2011) made a study entitled on 'An Economic Analysis of Orange Production in Syangja District: A Case Study of Ganeshpur VDC.' The main objective of the study is to estimate and analyze the production function of orange with labours and farmyard manure as the inputs. This study was mainly based on primary data to analyze the relationship between output and corresponding inputs. Secondary data are also included there in some cases. To estimate the production function of coffee in linear and nonlinear forms with labor based on the primary as well as secondary data. The raw data collected through the study are converted into logarithmic form and are presented in regression analysis hypothesis testing. The production function gives mathematical expression on the relationship between qualities of inputs and outputs. A Cub-Douglas production function is fitted to analysis the data collected. The study concluded that there is significant effect of human labor and farmyard manure on orange production and found that there is decreasing return to scale in orange production in case of traditional mode of production and focused on the significant factors affecting the orange production like chemical fertilizers, human labor, modern technology, farmyard manure etc.

Baudhacharya (2011) made a study entitled on 'A Study on Coffee Farming in Aanpachaur VDC of Gulmi District.' The main objective of the study is to show the present situation of the coffee farming and the marketing in the study area. In this study the researcher mainly used primary data which were collected from the field through questionnaire were grouped, sub-grouped and classified as necessary so as to meet the objectives. To analyze the data fundamental operations along with sample

statistical tools such as percentage, ration, average etc. have been used. The study concluded that the acceleration of coffee production, the problems of unemployment, disguised unemployment will be solved and the flow of migration from hill to Terai will be checked to some extent as the coffee production in labor intensive occupation. Finally he recommended that there is a need of compost manure, shelter of trees, irrigation and processing and also the need the help of government in economic and technological supports.

Karki (2012) has done a study on 'Value Chain Development Plan for Organic Coffee in Nepal. He concludes that Coffee production increased by almost 12 times in the last one decade. Similar is the case of export. It has been one of the major sources of foreign exchange earnings. In the domestic front, consumption of Nepali ground coffee is not catching up fast mainly due to lack of awareness of the benefits from organic coffee and habit of consuming tea and instant coffee. Concerned authorities need to give attention on this matter for two reasons: first, it saves hard earned foreign currency being spent on coffee import and second we cannot always depend on foreign market for our products. Coffee cultivation is much more remunerative compared to traditional crops such as maize and millets. It provides 3.33 times higher net return than maize, 3.30 times higher net return than millet cultivation and 0.87 times higher net return than maize and millet combined. Those figures would be much higher if coffee is intercropped with ginger and if banana is cultivated with coffee as double purpose tree: fruits and shade.

2.3Research Gap

The researcher consulted the conceptual and empirical studies prepared on the coffee production in and outside the country. Most of them have focused on the trend of marketing and production procedure. Some of them have targeted only on the role of the activity in national economy. These studies move around the methods of farming and marketing only.

No research has been made with the objectives to analyze the profitability of agriculture sector. The research consist the detail analysis of production function and cost function related to the coffee production. It broadly calculates and defines the revenue and profit of the coffee production of the area using different statistical methods.

CHAPTER –III
RESEARCH METHODOLOGY

3.1 Introduction

This is a micro level study of input, output analysis of coffee production and its profitability of the farmers of Lekhnath, Kaski. The basic objective of this study is to assess the characteristics of different inputs like human labour, land and compost manure in coffee production. This chapter has included the rational for the selection of the study area, research design, nature and source of data, population and sampling, method of data collection, specification of variables, specification of the model used in the study and method of data analysis.

3.2 Rational for the Selection of the Study Area

The coffee is a cash crop and plays significant role in the economy of Nepal. Various research works have been carried out in different parts of Nepal. The western Nepal, especially the mid-hilly area is one of the leading coffee production area of Nepal. The study area is located in western part of Nepal, Gandaki Zone. Kaski district is one of the most popular place for coffee in Gandaki zone as well as in Nepal. Lekhnath municipality; A Garden City of Seven Lakes, where Lekhnath Chamber of Commerce (LCC) has brought the concept of "One Village One Product (OVOP)" in the fiscal year 2064/2065. According to that concept two wards viz. 10 and 11 of the municipality are related as coffee production area. Under the supervision of LCC and this project presently 9 hectors land of these wards are cultivated with coffee plant. The sketch map of study area is shown below.

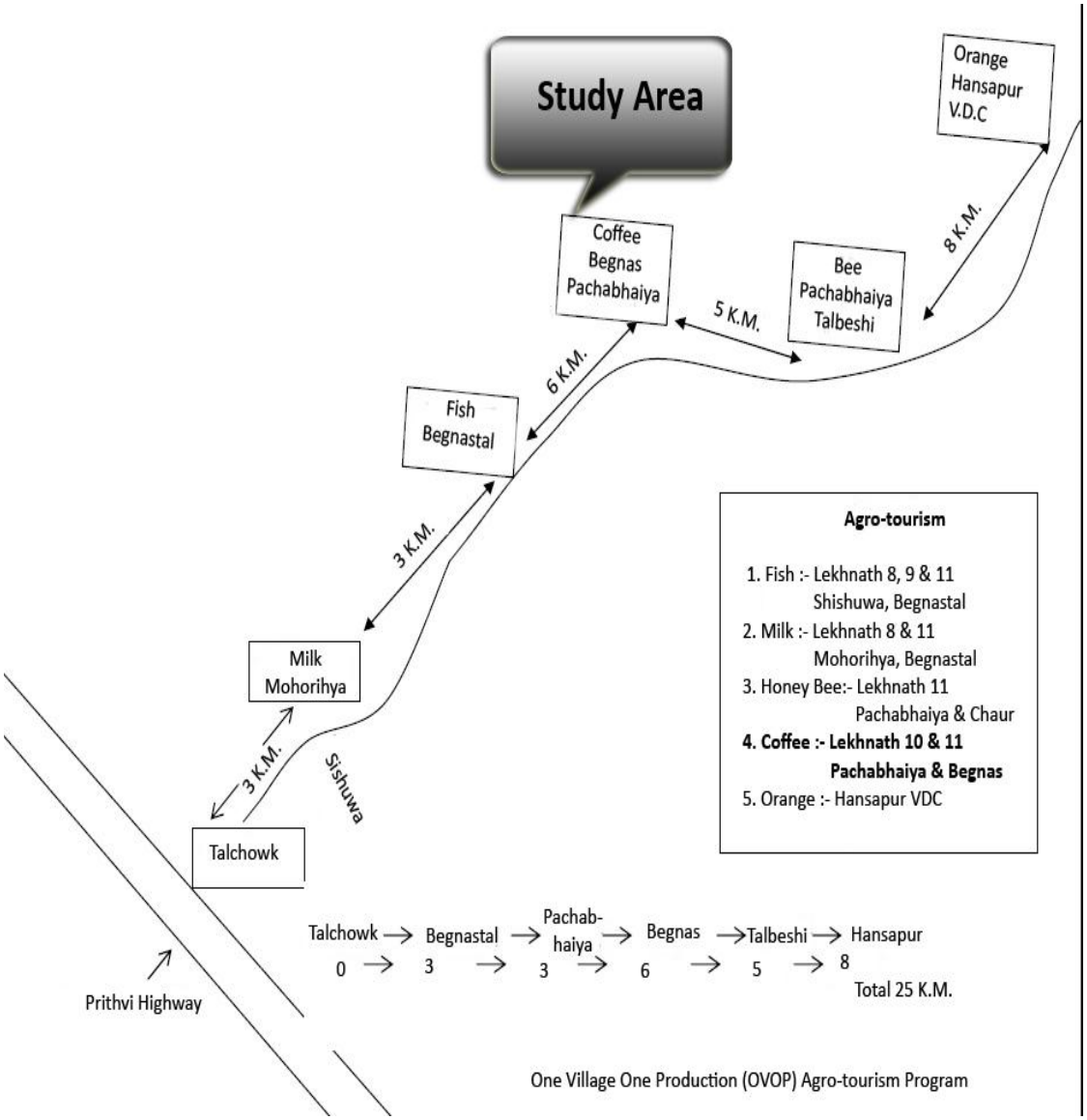


Figure 1: Sketch Map of Study Area

3.3 Research Design

This research attempts to analyze the profitability on coffee production of local farmers on the basis of the specific objectives of this research. Mainly, the analysis has based on the result of the collected data where the specific area is defined. The researcher has been adopted descriptive and analytical research design. The research design basically designed to find the profit with the help of revenue and cost of coffee farming. For this, primary data has been collected by the aids of direct personal interview with the set of interview schedule. Data available has been tabulated and interpreted in numerical values. Consequently, the relationship has been explained by correlation and regression analysis. However, average, standard deviation, maxima-minima and percentage have been used wherever necessary.

3.4 Nature and Sources of Data

Data in research are categorized into two types, they are quantitative and qualitative. In the research, researcher applied quantitative data and it is a true fact the primary data has the close proximity with reality. Thus, to fulfill the objectives of the present study primary data was given emphasis between two types of quantitative data (primary and secondary). Primary data has been collected by personal interview and the field survey at Lekhnath municipality. However, to some extent, some of the secondary data (available from governmental and non-governmental organizations) have also been used to supplementary the analysis, wherever necessary.

3.5 Population and Sampling

The researcher selected Lekhnath Municipality as the study area as Lekhnath Chamber of Commerce has brought the concept of OVOP and its two wards 10 and 11 were chosen since they come under the coffee production regarding their geo suitability. The analysis concentrates mainly on the primary data. These data were collected by direct personal investigation, interview with general and key persons relating to coffee farming and the field survey with the help of set of interview schedule. In the study are there are 298 households directly involving in coffee farming. On the basis of coffee production, the household has been divided into four different strata (very low, low, medium and high) and 65 number of households of different strata has been selected by simple random sampling method in the condition to represent the strata. These selected households represent the sample of the present study. The condition of 65 households was analyzed interviewing with any member of the family in accordance with the convenience of the researcher.

3.6 Method of Data Collection

In developing countries like Nepal, most of the farmers are illiterate. They are unconscious and unaware about their responsibility and contribution in national development. Thus the probability of non-response and miss response is an obvious factor. Generally four common methods have been used in data collection procedure. They are direct personal investigation, indirect personal investigation, local reports and interview schedule. Out of which the method of direct personal interview and questionnaires has been used in the analysis, to minimize the chance of non-response

and miss response error. For this the investigator himself visited door to door and the data has been collected.

3.7 Specification of the Model

The main theme of present analysis is to find out the profit from coffee farming. Firstly this first it is necessary to find out the total cost and total revenue.

3.7.1 Cost Function

The relationship between the total cost of coffee production and the quantity of output will take as the model of the study. The linear, quadratic and cubic cost functions will be applied in the following terms.

$C = a + bQ$ (linear cost function)

$C = a + bQ + cQ^2$ (Quadratic cost function)

$C = a + bQ + cQ^2 + dQ^3$ (Cubic cost function)

Where C = Total cost

Q = Output

a = Constant (fixed cost)

The model specified above will establish a relationship in between the total cost of coffee production and quantity of output. The necessary variables are defined as follows:

- Total cost of coffee Production (C):
  The total cost comprises fixed cost and variable cost. Fixed cost includes land cost and cost of plants. Variable cost includes labour cost, fertilizer cost and tools and instrument cost.
- Quantity of coffee output (Q):
  The quantity of coffee output is taken as an average per ropani per year (season).
  Test of significance of coefficients, standard errors and statistics have been utilized to interpret statistical significance of data.

The production function analysis is based on the Cobb-Douglas type of production function model.

Model,

$$Q = b_0 L_1^{b1} L_2^{b2} M^{b3}$$

$$\log Q = \log b_0 + b_1 \log L_1 + b_2 \log L_2 + b_3 \log M$$

Where, Q = Output of coffee

L_1 = Human labour

L_2 = Land

M = Manure

The coefficients b_0, b_1, b_2 and b_3 are the output elasticity's output of inputs; human labour, land and manure respectively.

3.7.2 Revenue Analysis

The amount of money that a company actually receives during a specific period, including discounts and deductions for returned merchandise. In business, revenue or turnover is income that a company receives from its normal business activities, usually from the sale of goods and services to customers. For non-profit organizations, annual revenue may be referred to as gross receipts. This revenue includes donations from individuals and corporations, support from government agencies, income from activities related to the organization's mission, and income from fundraising activities, membership dues, and financial investments such as stock shares in companies.

In general usage, revenue is income received by an organization in the form of cash or cash equivalents. Sales revenue or revenues is income received from selling goods or services over a period of time. Total revenue is the total receipts of a firm from the sale of any given quantity of a product.

It can be calculated as the selling price of the firm's product times the quantity sold, i.e. total revenue = price× quantity, or letting TR be the total revenue function:

$$TR(Q) = P(Q) * Q$$

Where Q is the quantity of output sold, and $P(Q)$ is the inverse demand function (the demand function solved out for price in terms of quantity demanded).

Total Revenue (TR): This is the total income a firm receives. This will equal Price * Quantity.

3.7.3 Profit Analysis

After calculating the cost and revenue by above method, profit on coffee farming will be calculated by using formula;

Profit = Total Revenue – Total Cost

i.e. $\pi = TR - TC$

3.8 Method of Data Analysis

The data collected from the field through interview were grouped, sub-grouped and classified as the necessary so as to meet the objectives of the study. The systematic analysis is made using quantitative techniques. Different statistical tools percentage, mean, standard deviation, maxima and minima with regression analysis are also used. Mainly two methods; tabular method and regression analysis are used to analyze the data.

Tabular Method

The data collected by researcher have been analyzed by dividing the collected data into different sectors and are tabulated them in different tables accordance with necessity. General statistics and the descriptive analysis are done by tabular method. Cross tabulation between two topics is also done in tabular method also. Frequency table with mean and standard deviation is also discussed.

Multiple Regression Analysis

Regression analysis is a mathematical measure of the average relationship between two or more variables in terms of the original units of the data. Thus, it can be said that regression is the estimation of prediction of one variables' value from the given of other variables' value.

Multiple regression equation with two or more independent variables is called multiple regressions. Multiple regression equation is the algebraic relationship between one dependent variable and two or more independent variables. This

relationship is used to estimate the value of dependent variable for the given value of independent variable. The general form of linear multiple regression equation is;

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \ldots\ldots\ldots\ldots\ldots\ldots b_n$$

Where, b_0, b_1 …….. b_n are constants.

X_1, X_2 ……X_n are independent variables

Y = dependent variable

In this research there are three independent variables so the linear multiple regression equation is,

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

The value of constants b_0, b_1, b_2, b_3 including t-ratio, f-ratio, R, R^2 and adjusted R^2 are determined by using SPSS program in computer.

CHAPTER IV
ANALYSIS AND INTERPRETATION OF DATA

4.1 Introduction

This chapter focuses on the characterization of respondent of household, socio-economic status of respondents, current status of coffee farming, profit analysis and problems and prospect of coffee farming.

4.2 Background Characteristics of Respondents

Generally demographic characteristics like sex, family size, population structure educational status etc. play an important role in any research work as these characteristics affect the economic activities and other activities of the people and nation.

4.2.1 Demographic and Social Characteristics

There are 298 households which are directly involved in coffee farming in the study area. Out of 298 households, 65 households of different strata have been selected as sample households for the study. Table 4.1 shows the statistics of respondents by their gender, caste, age, educational status, land used and annual income.

Form the Table 4.1 we came to know that out of 65 sample households 52 (80%) respondents are male and 13 (20%) are female. It is not mean that females are not more involved in coffee farming. Females are also jointly working with male. Out of these 65 sample households, 42 (64.4%) are Brahmin, 10 (15.4%) are Chhetri, 9 (13.8%) are Janajati and 4 (6.2%) are Dalit. This shows that mostly Brahmin are involved in coffee farming and the people of Dalit caste are rarely found to involve in coffee farming.

Table 4.1 also shows the age distribution of respondent of the study area that also has the significant role in coffee farming. Out of 65 respondents 13 (20%) respondent farmers has the age below 44, 25 (38.5%) farmers has the age lies in between 45-54, the age of 13 (20%) farmers lies in between 55-64 and 14 (21.5%) farmers has the age 65 years and above. By the study of table we came to know that the majority of coffee growers have the age above 55 years which is the economically inefficient age.

Table 4.1: Frequency Table of Respondents by Their Characteristics

Characteristics	Categories	Frequency	Percentage (%)
Gender	Male	52	80
	Female	13	20
Caste	Brahmin	42	64.4
	Chhetri	10	15.4
	Janjati	9	13.8
	Dalit	4	6.2
Age (in Year)	Less than 44	13	20
	45 - 54	25	38.5
	55 - 64	13	20
	65 and above	14	21.5
Status of Education	Literate	15	23.1
	Primary Level	14	21.5
	High School Level	19	29.3
	Intermediate Level	14	21.5
	Bachelor and above	3	4.6
Annual income (in Rs. ,000)	Less than 100	11	16.9
	100 - 200	22	33.8
	200 - 300	20	30.8
	300 - above	12	18.5
Occupation	Business	6	9.2
	Agriculture	41	63.1
	Labour	7	10.8
	Service	11	16.9

Source: Field Survey, 2071
Note: Total no. of respondents is 65.

Education is one of the crucial parameters to uplift the economy. It helps to generate the living status, income opportunity, creative powers in the study area as well as national level. The condition of educational status in the study area (only sample households) is presented in the table 4.1, which shows the information that 15 (23.1%) are literate, 14 (21.5%) are literate up to primary level. 19 (29.3%) farmers involved in coffee farming have attended the high school level education, 14 (21.5%) farmers have the qualification of Intermediate Level and only 3 (4.6%) farmers have the qualification of Bachelor's Degree and above. It shows that educated people are not involved in coffee farming. The majority of the coffee farmers have the qualification below SLC. It may cause of multi and traditional farming not

commercial and specific farming due to the lack of economic significance of specific farming.

Total annual income of the respondents is explained by the table 4.1. 11 (16.9%) respondents have the total annual income less than 100 thousand, 22 (33.8%) have income lies in between 100 - 200 thousand, 20 (30.8%) respondents have total annual income 200 - 300 thousand and 12 (18.5%) respondents have total annual income more than 300 thousand. This shows that more people (33.8%) have low annual income. Some are economically very poor as they have annual income less than 100 thousand and some are high annual income above 300 thousand.

Occupation structure implies the income earning pattern of the people. Nepal is agricultural country. Most of the people depend upon this sector. Most of the people are directly and indirectly involved in agriculture. This study also attempts to find out the present occupational status of the respondents. Table 4.1 shows that, out of 65 respondents 6 (9.20%) are engaged in business, 41 (63.10%) are in agriculture, 7 (10.80%) are in labour and 11 (16.90%) are engaged in service. It is found that majority respondents are engaged in agriculture. So, it is necessary to motivate them to farm cash crops that help to uplift their economic status.

4.3 Coffee Farm Size and Production Trend

Coffee production was started in Lekhnath Municipality from 2039 B.S. Mr. Surya Prasad Adhikari had started coffee farming first in Lekhnath as well as in Kaski district. After this other farmers realized that coffee is the most valuable cash crop and its farming is suitable in terms of soil so that they started to plant the coffee in their land. Now-a-days, about 9 hector land is used for coffee farming.

4.3.1 Number of Coffee Plants and Their Production

The temperature varies from minimum 20^0C to maximum 37^0C in the study area where record of rainfall is also good. Mostly the ward no. 10 and 11 of Lekhnath Municipality has hilly area and is suitable for coffee farming. Out of two types of coffee viz. Robusta and Arabica, Arabica is suitable in such type of climate. Although the climatic condition of the study area is favorable for coffee production the production has not been increasing significantly. However, it is seen that the farmers

of the study area are broadening their coffee orchard which is proved by the number of unproductive coffee plants.

Out of total plants of sampled households, 11133(67.99%) are productive and 5241(32.01%) are unproductive. Even productive plants have low production because some plants are old and some plants have just started to give the returns. Thus the production as a whole seemed to be low; total cost is about Rs.1708000. The coffee growers of the study area sell their coffee at the coffee pulping center established in four different places of the study area at the fixed rate Rs.50 per kg and the average production per tree is 2.086 kg which is not satisfactory because some respondents told that one plant gave about 20kg fresh cheery in a year. (Field survey, 2071)

Note: Production of coffee in kg as mentioned in above paragraph is fresh cherry excluding the amount that had been wastage, distributed as gift and self-consumed.

4.3.2 Annual Coffee Production across Caste Group

In the study area people of different castes like Brahmin, Chhetri, Janjati and Dalit are involving in coffee farming. The caste wise production trend of coffee production of 65 respondents is explained with the help of table 4.2.

Table 4.2 Annual Coffee Production by Caste and Ethnicity (in Kg)

Caste	Quantity of Coffee (in Kg)				Total
	0 - 100	100 - 350	350 - 800	800 - above	
Brahmin	5 (11.90)	10 (23.81)	18 (42.86)	9 (21.43)	42 (100)
Cheetri	0 (0.00)	2 (20.00)	7 (70.00)	1 (10.00)	10 (100)
Dalit	1 (25.00)	3 (75.00)	0 (0.00)	0 (0.00)	9 (100)
Janajati	0 (0.00)	4 (44.44)	5 (55.56)	0 (0.00)	9 (100)
Total	6 (9.23)	19 (29.23)	30 (46.15)	10 (15.39)	65 (100)

Source: Field Survey, 2071
Note: Figure in parenthesis indicates percentage.

Table 4.2 shows the real composition regarding caste and annual coffee production. The quantity of production is divided into very low (less than 100kg), low (100 – 350kg), medium (350 – 800kg) and high (800 and above). Out of 65 respondents 42 are Brahmin among which 5 (11.90%) produce very low amount of coffee, 10

(23.81%) produce low, 18 (42.86%) produce medium, rest 9 (21.43%) of Brahmin produce high amount of coffee annually. Likewise among 10 Chhetri, 2(20%) produce low, 7 (70%) produce medium and only 1 (10%) produce high amount of coffee. There are 4 Dalit respondents out of 65 respondents among which 1(25%) produce very low and 3 (75%) produce low amount of coffee. None of the Dalit respondents produce the coffee in medium and in large scale. Similarly 9 respondents are Janajati among which 4 (44.44%) produce low and 5 (55.56%) produce the coffee in medium scale. None of the Janajati respondents also produce the coffee in large scale. This shows that Brahmin caste holds the first rank in comparison with others, Chhetri holds second rank and Janjati holds third rank in racial coffee Production structure after Chhetri. Also shows that most of the growers are producing low amount of coffee and only few are producing more. Janajati and Dalit are no more interested for coffee farming due to the lack of education, awareness and property.

4.3.3 Annual Coffee Production across Landholding Size

In the study area the people holding different land size are involving in coffee farming. On the basis of land holding size, coffee production tend of 65 respondents is explained with the help of table 4.3.

Table 4.3 Annual Coffee Production by Landholding Size

Landing Holding Size (in ropani)	Quantity of Coffee (in Kg)				Total
	0 - 100	100 – 350	350 - 800	800 - above	
0 – 4	3 (50.00)	2 (33.33)	1 (16.67)	0 (0.00)	6 (100)
4 – 8	1 (5.26)	7 (36.85)	10 (52.63)	1 (5.26)	19 (100)
8 – 12	1 (6.25)	4 (25.00)	10 (62.5)	1 (6.25)	16 (100)
12 – above	1 (4.17)	6 (25.00)	9 (37.50)	8 (33.33)	24 (100)
Total	6 (9.23)	19 (29.23)	30 (46.15)	10 (15.39)	65 (100)

Source: Field Survey, 2071
Note: Figure in parenthesis indicates percentage.

Table 4.3 shows the real composition regarding landholding size of respondents and their annual coffee production. The quantity of production is divided into very low (less than 100 kg), low (100 – 350 kg), medium (350 – 800 kg) and high (800 and above). Out of 65 respondents, 6 have less than 4 ropani land among which 3(50%)

produce very low amount of coffee, 2(33.33%) produce low, 1(16.67%) produce medium and none of these respondents can produce high amount of coffee annually. Likewise, among 19 respondents who have land size (4 – 8 ropani), 1(5.26%) produce very low, 7(36.85%) produce low, 10(52.63%) produce medium and only 1(5.26%) produce high amount of coffee. There are 16 respondents out of 65 who have (8 – 12 ropani) land among which 1(6.25%) produce very low, 4(25%) produce low, and 10 (62.5%) produce high amount of coffee. Then the rest 24 respondents holding land size (12 and above) among which 1(4.17%) produce very low, 6(25%) produce low, 9 (37.5%) produce medium and 8(33.33%) produce high amount of coffee annually.

The data depicts the relation between ownership of land and the coffee production. People having sufficient land seem to have employed maximum to the coffee production. One who possesses confined land (0 – 4 ropani and 4 – 8ropani), they were found to have used little land portion to coffee production. The studies vividly visualizes that land possession is proportionally related to the coffee production. Due to fragmentation of land, lack of people consciousness on coffee production, expected involvement of land in coffee production has not been found.

4.3.4 Annual Coffee Production across Annual Income of Respondents

Income refers to the total earning capacity of a man over a year. It plays the vital role in people's involvement in agro activities. The researcher collected the information on participation of different economic level people on coffee production to widen the studies and analyze with the help of table 4.4.

Table 4.4 Annual Coffee Production by Income Level

Total Annual Income (in Rs ,000)	Quantity of Coffee (in Kg)				Total
	0 - 100	100 - 350	350 - 800	800 - above	
0 – 100	2 (18.18)	4 (36.36)	5 (45.46)	0 (0.00)	11 (100)
100 - 200	1 (4.54)	6 (27.28)	14 (63.64)	1 (4.54)	22 (100)
200 - 300	0 (0.00)	6 (30.00)	9 (45.00)	5 (25.00)	20 (100)
300 - above	3 (25.00)	3 (25.00)	2 (16.67)	4 (33.33)	12 (100)
Total	6 (9.23)	19 (29.23)	30 (46.15)	10 (15.39)	65 (100)

Source: Field Survey, 2071
Note: Figure in parenthesis indicate percentage

Table 4.4 presents the comparative studies on coffee production concerning to annual income. The number of respondents was 65 and they were divided into four – four different groups in terms of annual income and coffee production respectively. Out of 11 persons having Rs(0 – 100) thousand annual income 2 persons grow (0 – 100)kg coffee, which occupies 18.18 percent, 4 persons grow for (100 – 350)kg which holds 36.36 percent, 5 persons grows (350 – 800) kg and catches 45.46 percent and no one grows more than 800kg. likewise out of 22 people collecting Rs(100 – 200) thousand as annual income 1 person grows (0 – 100)kg, 6 (100 – 350)kg, 14 (350 – 800)kg and 1 (800 – above)kg holding 4.54 percent, 27.28 percent, 63.64 percent, 4.54 percent and 22 percent respectively.

Similarly, out of 20 people earning Rs (200 – 300) thousand no one grows (0 – 100) kg, 6 (100–350) kg, 9 (350 – 800)kg and 5 (800 – above)kg grabbing 0 percent, 30 percent, 45 percent and 25 percent respectively. And in the category of annual income from Rs 300 thousand to above, 3 persons produced (0 – 100) kg, 3 (100 – 350) kg, 2 (350 – 800) kg and 4 (800 – above) kg coffee having 25 percent, 25 percent, 16.67 percent and 33.33 percent respectively.

The table 4.4 clearly express the interaction between grow income and coffee production. People of low income grow less coffee and people having high income grow much coffee.

4.3.5 Utilization and Wastage of Coffee

Some farmers produced their coffee with commercial point of view as well as self-consumption but most of the farmers are involved multi farming and they do not focus in coffee farming with commercial view. They used their production only for their self-consumption. But slowly they have been motivated to coffee production with commercial view after receiving the better income by selling the fresh cherry at near coffee pulping center. According to respondents, the use of coffee in different topic is given in the table 4.5.

Table 4.5 Utilization and Wastage of Coffee

Use of Coffee	Quantity in kg	Percentage (%)
Self-Consumption	4330	10.42
Distributed as Gift	1805	4.34
Wastage	1250	3.01
Sale	34160	82.23
Total	41545	100

Source: Field survey, 2071

Table 4.5 shows that out of total production of 41545kg, the large amount of coffee or 34160kg (82.23%) was sold. Similarly, 1250kg (3.01%) was damaged due to various diseases, insects and birds, 1805kg (4.34%) was distributed as a gift and only 4330kg (10.42%) was self-consumed. According to respondents, all the coffee growers of the study area sold their production at coffee pulping centers at fixed price, i.e. Rs.50 per kg.

4.4 Analysis of Cost of Production

The farmers bear many direct and indirect expenses in his practice. Total cost constitutes mainly five components of cost which are separated to two well-known classes; fixed cost and variable cost.

There are two items that included in fixed cost. Rent of land is the first and that the cost of new plants is the second item used as fixed cost. Also there are three items that included in variable cost. They are; labour, manure and tools and equipment. The detail of the fixed, variable and total input cost used in the coffee farming of the study area is given in the table 4.6.

Total cost of production comprises fixed cost and variable cost. Rent of land and cost of baby plants are taken as fixed cost. Whereas labour cost and manure cost are taken as variable cost. The description is on the table 4.6.

Table 4.6 Descriptive Statistics of Different Items of Input per Year

Inputs Type	Particular	Minimum (in Rs)	Maximum (in Rs)	Average (inRs.)	St. deviation (inRs.)
Fixed Cost	Baby plants	270.00	18500.00	2519.08	2700.11
	Land	625.00	50000.00	5989.62	6921.69
Variable Cost	Labour	900.00	42750.00	6417.31	6466.11
	Manure	208.00	16650.00	1693.31	2250.60
	Tools and Equipment's	100.00	4500.00	636.08	751.52
Total	Total Fixed Cost	895.00	98500.00	8508.69	9621.80
	Total Variable Cost	1208.00	63900.00	8746.70	9377.83
Total Cost		2188.00	132400.00	17255.39	18790.00

Source: Field survey, 2071

Fixed cost can't be changed in very short time. This is the cost which is borne by farmers wheather s/he produces coffee or not. As the farmers invest Rs.10 per plant while buying, the above table 4.6 shows that the minimum cost for buying new baby plants is Rs.270 and maximum is Rs.18500. Where its average cost is Rs.2519.08 and that of standard deviation is Rs.2700.11. Like this, minimum invest on land is Rs.625 and the maximum invest is Rs.50000 where its average cost is Rs.5989.62 and that of standard deviation is Rs.6921.69. Standard deviation means a measure of the dispersion of a set of data from its average value (mean). Here the values of standard deviation are greater than average value means the date is more spread apart.

Table 4.6, shows that most of the farmers spent maximum amount for labour. Coffee growers spent minimum Rs.900 and maximum Rs.42750 for labours. Out of 65 sampled households the average cost for labours is Rs.6417.31 and that of standard deviation is Rs.6466.11 like this, other variable costs are the cost of manure and tools and equipment. For the manure they spent minimum Rs.208 and maximum Rs.16650. Similarly for tools & equipment minimum Rs.100 and maximum Rs.4500 where the average cost is Rs.1693.31 and Rs.636.08 and standard deviation is Rs.2250.6 and Rs.751.52 for manure and tools and equipment respectively. Here also the standard deviation has greater value than average value due to long ranged data.

Table 4.6 also shows that most of the farmers spent more in variable input than in fixed inputs. The average cost for variable inputs is Rs8746.70 and that for fixed

inputs is Rs8508.69. Farmers spent minimum Rs895.00 and Rs1208.00 whereas maximum for Rs86500 and Rs63900 for fixed and variable inputs respectively. Altogether farmers spend minimum Rs2188.00 and maximum Rs132400.00 as total cost whose average cost is Rs17255.39 and that of standard deviation is Rs18790.99.

4.4.1 Regression Research and Discussion

Variable tasted in regression is total annual cost of production C (in Rs.) as dependent variable and amount of annual coffee output Q (in Kg) as independent variable. Computer software SPSS is used to carry out linear, quadratic and cubic estimations. Table 4.7 shows the regression result.

Table 4.7 Statistical Result for Linear, Quadratic and Cubic Regression Analysis

Model	Costants and coefficients	Values	t-statistic	F-ratio	d.f	R = 0.968
Linear	b_0	242.959 (805.296)*	0.302 (0.764)**	949.031 (0.000)**	64	R^2 = 0.938
	b_1	0.968 (1.030)*	30.806 (0.000)**			
Quadratic	b_0	3574.84 (967.884)*	3.693 (0.000)**	660.019 (0.000)**	64	R = 0.977
	b_1	0.643 (2.346)*	8.979 (0.000)**			R^2 = 0.955
	b_2	0.351 (0.001)*	4.902 (0.000)**			Adj. R^2 = 0.954
Cubic	b_0	-1482.922 (941.350)*	-1.575 (0.120)**	892.651 (0.000)**	64	R = 0.989
	b_1	1.396 (3.553)*	12.876 (0.000)**			R^2 = 0.978
	b_2	-1.730 (0.003)*	-6.421 (0.000)**			Adj. R^2 = 0.977
	b_3	1.419 (0.000)*	7.866 (0.000)**			

Source: Field survey, 2071

Note: * indicate standard error

** indicate significant level

With the help of table 4.7, the estimated linear relation between cost C and coffee output Q is **C = 242.959 + 0.968Q.** Respective t ratios are calculated by using; t = (value of unstandardized coefficients)/ (standard error of that coefficient). Tabulated value of t for 63 degrees of freedom with 1 percent level of significance is 2.58. Since

the t ratio of 'b' has greater value than the tabulated value. So, the alternative hypothesis (H_a) is accepted. This indicates that there is a positive significant relationship between cost and coffee output.

The coefficient of Q is 0.968 which is the cost elasticity of output. This exponent indicates the response of cost and output. The coefficient of Q (0.968) indicates that if the output is increased by one unit then the cost increases by 0.968 units. Owing the value coefficient of determinant R^2 is 0.938, we conclude that the regression is statistically significant. This value of R^2 indicates a strong relationship between output and cost variables. It signifies that 93.8 percent of total variation of cost is explained by coffee output. Similarly, the correlation coefficient (R) is 96.8, showing strongly significant positive correlation between cost and output.

F-test provides the information on overall fit of the model by ANOVA. Here the p value is 0.000 which is less than value of α (i.e. 0.01) and the model is fit at 1 percent of level of significance. Hence we conclude that the regression equation is useful in prediction the value of cost.

However to estimate second degree polynomial with quadratic and cubic multiple regression has been carried out which checks the possible deviation.

From the statistical result of cubic regression analysis total cost function can be written as;

$$TC = -1482.922 + 1.396Q - 1.730Q^2 + 1.419Q^3$$

Marginal cost is the first derivative of total cost function.

$$d(TC)/dQ = 1.396 - 3.46Q + 4.257Q^2$$

$$MC = 1.396 - 3.46Q + 4.257Q^2$$

To find out total variable cost (TVC), the fixed cost component (-1482.922) is subtracted from total cost (TC).

$$TVC = 1.396Q - 1.730Q^2 + 1.419Q^3$$

And average variable cost (AVC) can be find out by dividing TVC by output (Q). That is,

$$AVC = TVC/Q$$

$$AVC = 1.396 – 1.730Q + 1.419Q^2$$

The minimum point of AVC occurs at its intersection with MC. Equate the AVC and MC function to find Q. That is,

$$AVC = MC$$

$$1.396 – 1.730Q + 1.419Q^2 = 1.396 – 3.46Q + 4.257Q^2$$

$$\text{Therefore } Q = 0.61$$

By calculation, the value of optimum level of output comes out 0.61 which is much less and is not expected. The coefficient values of independent variable in cubic regression analysis are seen to be little bit good even if the optimum level of output becomes very low than that of expectation. Here coffee growers are seen more profitable from coffee farming but while observing form economic point of view economic efficiency is not attractive because decreasing rate of AVC is too less. It indicates the traditional theory of cost but the result is not seen economically significant. The cost function for linear model and quadratic model seem to be good while observing the regression values in this model. But the cubic model does not become fit for the collected data. From this it can be concluded that farmers have the profit but they have no any economic analysis. The causes lead to the result may be;

- The large variation in the coffee growers.
- Non recorded data given by the respondents of they do not have any record about the cost of production.
- Most of the farmers growing coffee in their own land by themselves laboring and don't analyze the cost of land, labour and manure properly.

4.5 Revenue Analysis

The amount of money that the coffee growers actually receive during one year, without deducting the cost of production is called revenue. The detail of revenue received by growers is listed in the table 4.8.

Table 4.8 Descriptive Statistics of Revenue from Coffee Farming per Year

Particular	Minimum	Maximum	Average	St. deviation
Revenue from seeds	1750.00	173750.00	26815.38	28682.07
Revenue from baby plants	0.00	14500.00	1000.77	2760.02
Total Revenue	1750.00	185250.00	27816.15	31134.78

Source: Field survey, 2071

Farmers earn the revenue from two items; revenue from seeds and from baby plants. Table 4.8 shows that growers receive minimum Rs1750 and maximum Rs173750 from seeds whose average value is Rs26815.38. Like this, minimum Rs0.00 and maximum Rs14500 from baby plants whose average value is Rs1000.77. Growers earn minimum Rs1750 and maximum Rs185252 as total revenue where the average revenue is Rs27816.15 and standard deviation is 31134.75. This shows that farmers earn more revenue from seeds and the revenue earned from baby plants is much less than that from the seeds.

4.6 Profit Analysis

Net profit gained by the coffee growers per year from coffee farming has been calculated by deducting total cost per year from total revenue per year. The total profit from coffee production is tabulated in the table 4.9.

Table 4.9 Descriptive Statistics of Profit from Coffee Farming per Year

Particular	Minimum	Maximum	Average	St. deviation
Total Revenue	1,750.00	185,250.00	27,816.15	31,134.78
Total Cost	2,188.00	132,400.00	17,255.39	18,790.99
Total Profit	(-438.00)	70,768.00	10,560.76	13,921.52

Source: Field survey, 2071

Table 4.9 shows that some people are in loss from coffee farming and some are in more profit. The loss from coffee is due to the lack of awareness about coffee farming, its importance, lack of efficient man power in farming. Growers gain minimum -Rs438.00 and maximum Rs.70768.00 from coffee farming as profit. The average profit is Rs.10560.76 and standard deviation is Rs.13921.52. Out of 65 households, only one household face loss and rest of the respondents are in profit even if, almost all the households are involving in multi-farming in traditional way

and few are farming coffee commercially. They themselves prepared the packeting coffee and sell in the market.

Here the respondents are divided into four different class on the basis of their annual coffee production to show the average profit percentage of the respondents of different class. They are; very low, low, medium and high. The coffees growers that grow less than 100kg coffee annually are categorized in very low, that grow in between 100kg to 350kg are in low, the growers that grow in between 350kg to 800kg are in medium and that grow more than 800kg annually are categorized in high class. The annual production of coffee by the respondents and their profit percentage is discussed with the help of table 4.10.

Table 4.10 Average Profit of Respondents with their Classes

Quantity of Coffee Production (in Kg)	Frequency	Average Profit (in %)
Less than 100	6	11.97
100-350	18	45.22
350-800	30	59.57
800 and above	10	78.49

Source: Field survey, 2071

Table 4.10 shows the annual coffee production and their profit percentage according to their quantity of production. The quantity of production is divided into very low (less than 100kg), low (100 – 350kg), medium (350 – 800kg) and high (800 and above). Out of 65 respondents, 6 produces very low amounts of coffee and their average profit percent is 11.97%. Likewise 18 respondents produce low amount of coffee and their average profit percent is 45.22%. Similarly 30 respondents produce medium amount of coffee and their average profit percent is 59.57% and the rest of the respondents produce high amount of coffee whose average profit percentage is 78.49%. This shows that the farmers who produce more coffee are more profitable than the growers that produce less. Some respondents compare the coffee seed with diamond and are increasing their production annually. But most of the growers are still in illusion. They do not know about the value of coffee seed and they are not motivating to coffee farming commercially.

4.7 Economic Analysis of Production Function

This study analyses the coffee production in former Lekhnath Municipality of Kaski district. In this study coffee production has been analyzed in relation to two variables. The dependent variable is the quantity of coffee production 'Q' and independent variables are the quantity of human labor 'L_1', land 'L_2' and manure 'M'.

Multiple regression analysis based on Cobb-Douglas production function has been applied to explain the relationship between dependent and independent variables. As we know that Cobb-Douglas production function takes the form:

$$Q = b_0 L_1^{b1} L_2^{b2} M^{b3}$$

Taking log in both sides, we can get linear form of the production function. Thus:

$$\log Q = \log b_0 + b_1 \log L_1 + b_2 \log L_2 + b_3 \log M$$

Presentation and Interpretation of Result

For the study, correlation and two different models are used separately and Cobb-Douglas production functions are used to analyze the collected data. The collected data of different levels of inputs and outputs are given in Appendix and correlation and estimate models are given in the following tables (table 11 and 12).

Table 4.11 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Quantity of coffee production in Kg (Q)	65	35	3475	536.308	573.64146
Human labor (L_1)	65	2	95	14.0923	14.15619
Land in Ropani (L_2)	65	0.25	20	2.7862	2.8941
Manure in Kg (M)	65	126	8325	899.123	1147.87741
Common log of Q (logQ)	65	1.54	3.54	2.559	0.39006
Common log of L_1 (logL1)	65	0.3	1.98	1.0061	0.34557
Common log of L_2 (logL2)	65	-0.6	1.3	0.294	0.36838
Common log of M (logM)	65	2.1	3.92	2.7677	0.39157

Source: Field survey, 2071

Regression Results

Model 1:

$$Q = b_0 L_1^{b1} L_2^{b2} M^{b3}$$

In this model three independent variables are taken to design model 1. Whose required summary is presented in the table 4.12.

Table 4.12 Estimate Value of Regression Constant, Coefficient, t-ratio, R, R^2 and R^{-2} for Model 1

Constants and coefficients	Values	t-ratio	F-ratio	
b_0	-54.397 (23.222)*	-2.343 (0.022)**	579.347 (0.000)**	R = 0.983
b_1	0.518 (5.003)*	4.198 (0.000)**		R^2 = 0.966
b_2	0.831 (16.247)*	10.137 (0.000)**		AdjR^2 = 0.964
b_3	-0.365 (0.060)*	-3.045 (0.003)**		D.f = 64

Note: * indicate standard error
** indicate significant level (p value)

The estimated Cobb Douglas production function is given below,

$$\log Q = -54.397 + 0.518 \log L_1 + 0.831 \log L_2 - 0.365 \log M$$

In this model, the regression coefficients are fitted with a view to examine the response of three inputs namely human labour (L_1), land (L_2) and manure (M) to the output of coffee. The tabulated critical value of t for 64 degree of freedom at 1 percent level of significance is 2.58. Since the calculated t-ratios for b_1 and b_2 have greater value than the tabulated value. So, from the above analysis coefficient of L_1 and L_2 are found to have positive effect. P value shows that he estimated are significant at 1% level of significance. So, alternative hypothesis (H_a) is accepted because calculated t is greater than tabulated t at 64 degree of freedom. This indicated that there is positive significant relationship between these three variables (L_1, L_2 and M) with production of coffee. In this model, production elasticity of the input shows that the response of land and human labour is greater than manure to the output of coffee. This implies that by increasing land, labour forces and manure the production of coffee can be

increased. Therefore this model suggests that human labour and manure should be used more with more land to increase the production.

The coefficient of L_1, L_2 and M are 0.518, 0.831 and 0.365 respectively, which are output elasticity's of the inputs. These exponents indicate the response of respective input and output. Here the regression coefficient (b_1) with labour (L_1) is 0.518 suggesting that if labour (L_1) is increased by 1 percent, coffee production will increase by 0.518 percent. Like this the regression result shows land has significant effect for the coffee production. The regression coefficient (b_2) with land (L_2) is 0.831 suggesting that if land (L_2) is increased by 1 percent, coffee production will increase by 0.831 percent. This implies that by increasing the labour force and all kind inputs, the production of coffee can be increased.

The F Value or F ratio is the test statistic used to decide whether the model as a whole has statistically significant predictive capability, that is, whether the regression sum of square is big enough, considering the number of variables needed to achieve it. F is the ratio of the Model Mean Square to the Error Mean Square. F-test provides the information on overall fit of the model by ANOVA. Under the null hypothesis that the model has no predictive capability, that is, that all population regression coefficients are 0 simultaneously-the F statistic follows an F distribution with p numerator degrees of freedom and n-p-1(*The Error df is the difference between the total df (n-1) and the model df (p), that is, n-p-1.)* denominator degrees of freedom. The null hypothesis is rejected if the F ratio is large.

The model is significant at 1 percent level of significance and alternative hypothesis (H_a) is accepted because p value is less 0.01. It shows that there is significant relationship between inputs and output of coffee. The value of coefficient of multiple determinations (R^2) is 0.966 that shows 96.6% of total variation in the total production of coffee is explained by inputs used. The adjusted coefficient of multiple determinations (R^{-2}) is 0.964 and it justifies 96.4% goodness of fit in regression line. Similarly, the correlation coefficient (R) is 0.983, showing strongly significant positive correlation between inputs and output.

4.8 Major Findings

From the collected data, observation in field survey, this study has succeeded to find out various facts and findings related to different aspects in the study area. These major findings of the study are presented below.

- Mostly Brahmin and Cheetri are involved in coffee farming than other caste.
- The large number of farmers who have small size of landholding are found in coffee farming.
- The rate of fresh cheery of coffee is Rs.50 and there are no difficulties for selling green coffee seed. The coffee growers sell their coffee seed in nearby coffee pulping centers. In accordance with the growers, the rate of fresh coffee seed (Rs.50 per kg) is satisfactory.
- The study of annual coffee production across land holding size visualizes that land possession is proportionally related to the coffee production. Due to fragmentation of land, lack of people consciousness on coffee production, expected involvement of land in coffee production has not been found.
- The farmers that grow coffee in very low scale have only 11.97 percent average profit, low scale have average profit 45.22 percent, medium scale have 59.57 percent and the farmers that grow in large scale have 78.49 percent average profit. That is higher amount profit is observed for the farmers that grow the in the large scale than that of the farmers that grow in low scale.
- Regression coefficient of all inputs found to be positive and significant. The variables L_1 (land), L_2 (labour) and M (manure) have significant effect on production of coffee. It shows that these inputs play vital role for change in coffee production.
- Generally the farmers do not record about the cost of production, selling and distribution expenses and income generate from this crop. They also do not calculate their own labour, own manure cost, land revenue depreciation, repairing and maintenance cost of their agricultural tools in the study area.
- There is no clear figure of employed persons and the amount of manure under its cultivation.
- The popular system of fulfilling the labour requirement in the study area are labour exchange and hired labour for the production of coffee as well as other crops.

- Coffee growers are seen more profitable from coffee farming but while observing form economic point of view economic efficiency is not attractive because decreasing rate of AVC is too less. It indicates the traditional theory of cost but the result is not seen economically significant.
- The cost function for linear model and quadratic model seem to be good while observing the regression values in these models. But the cubic model does not become fit for the collected data because the value of optimum level of output is very low even if they seem more profitable. From this it can be concluded that farmers have the profit but they have no any economic analysis.
- There is positive linear relationship between cost and coffee output in sampled data.

4.9 Prospects

Coffee has bright prospects in the study area as well as mid-hilly region of the western part of Nepal. Economically, it is more profitable that the other traditional cereal crops. Topographically and climatically, the study area is suitable for coffee cultivation and accordance with the growers there is no problem about transportation and marketing for coffee. So it has better economic prospects for the cultivation of coffee farming. Thus, if all the farmers of the study area grow the coffee trees instead of other prevailing traditional food grain 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 coffee not only gives better income for coffee growers, but also creates additional employment opportunities for unemployed people at various levels such as orchards operation, transport media, storage and processing factory, technical personnel etc. which help to check the out migration from the study area as many people migrate either permanently of temporarily in search of employment opportunities. The prevailing situation of disguised unemployment can also be removed to some extent by growing coffee orchards. By growing coffee trees, the environmental balance can also be maintained by checking the landslides, soil erosion and drought, floods, floods which problems are being faced by the people of hilly regions and globally it helps to reduce global warming with greenery.

CHAPTER V
SUMMARY, CONCLUSION AND SUGGESTIONS

5.1 Summary

Coffee farming is one of the significant components in the agriculture sector. The necessity is felt to study the aspect of cost and revenue to analyze the profitability of coffee production along with various factors influencing it. A micro level study has been done in Lekhnath Municipality of Kaski district to find the profit from coffee farming. This study has been divided into five chapters. The first chapter is an introduction of the study, which includes general background, historical background, Statement of the problem, Main objectives, Limitation of the study, Justification of the study and Organization of the study. Specific objectives of the study are to show the present situation of the coffee farming in the study area, to analyze the state of profitability in coffee farming and to find out the problems and prospects of the coffee cultivation in the study area.

The study is based mainly upon the primary data collection by means of direct personal interviews in the survey. For analysis and presentation of data various statistical tools have been employed including SPSS program of computer in order to calculate the Cobb Douglas production function, linear regression, correlation, mean, standard deviation and percentage etc. The main objective of the study was to analyze the profitability of coffee farming to suggest the coffee growers for better profitability on the basis of finding and recommend the best alternative method to increase the level of output with minimum increase in input.

The present study has been prepared on the basis of primary data collected by field survey and secondary data have been collected from government, semi-government and non-government journals and publication. Sample primary data for the study were collected from selected 65 coffee growers of Lekhnath Municipality at ward no. 10 and 11 by dividing the growers into different classes and then by random sampling. Hence the relationship between total cost of coffee production and coffee output was taken as the model of the study in particular linear, quadratic and cubic function and their solutions are summarized.

The analysis of the data are tabulated and discussed in the chapter of analysis and presentation of data. Various components of total fixed cost, total variable cost, total cost, total revenue and profitability of coffee farming. The farmers that grow coffee in very low scale have only 11.97 percent average profit, low scale have average profit 45.22 percent, medium scale have 59.57 percent and the farmers that grow in large scale have 78.49 percent average profit. That is higher amount profit is observed for the farmers that grow the in the large scale than that of the farmers that grow in low scale.

The physical relationship between inputs and output is called production function. Production not only depends upon the quantity of inputs but also depends upon the technique of production. The production function gives mathematical expression to the relationship between quantities of inputs and output. A Cobb Douglas production function is fitted to analyze the collected data. In the present study, a general linear form of production function is used because it gives more significant test than other forms. Multiple regression analysis has been used to find out the cost output relation of coffee production. Positive linear relation is seen in between cost and coffee output but the cubic cost function is seen no more suitable because the value of optimum level of output is found only 0.61 in the sampled study area this may due to the lack of record of labours and manure used for coffee farming. The coffee production problems are derived and their solutions are also suggested.

5.2 Conclusion

The profit analysis of coffee farming concludes that the coffee growers have seen more profitable than the people involved in other crops in the study area. The growers that grow coffee in large scale have seen more profitable than that of the growers that grow in small scale. According to the regression result there is high and significant effect of labour and manure on coffee output. It is found that no people use the chemical fertilizers, insecticides and pesticides during coffee production which is more positive and best way so as to prevent people from health hazard.

Although the growers of the study area have been facing many problems, they are still optimistic about better prospects of coffee farming. Moreover, being highly potential area, the establishment of modern processing factory accelerate the production speed with the development of better and marketing areas. With the acceleration of coffee

production, the problem of unemployment, disguised unemployment will be solved and the flow of migration from hilly region to plain and urban areas will be checked to some extent as the coffee production is the labour intensive occupation. Coffee farming increases the greenery of the earth surface, reduce the amount of carbon dioxide and anchor the soil. So that it helps in atmospheric balance, reduce the global warming and check soil erosion, landslide and flood.

5.3 Suggestions

Coffee is one of the more important cash crops. Its development can increased the income of farmers in greater extent. It can be a major source to earn foreign currency by exporting it to other countries and even for the domestic consumption, it is not necessary to import coffee. On the basis of finding drawn from this study, the following suggestions have been put forth for consideration of farmer and Ministry of Agriculture.

- The study found that the effect of human labour is a significant factor for coffee production. Now a day young active and educated people are far from agricultural sector. Only the children, women and old persons are in agriculture sector. The government and other organizations should motivate the energetic and educated people to agricultural sector to increase the production.
- The study shows that the effect of farmyard manure is positive and significant in all models. It is because farmyard manure has long term effect on the soil. However, the method of making farmyard manure is very traditional. Scientific method should be taught to farmers to make compost manure.
- Most of the growers have not been keeping the record of inputs (fixed and variable inputs) and output so that they are unknown from their profit from coffee. Thus farmers should keep their account of input and output to know their profit and coffee value.
- Harmonization of the price should be based on the quality.
- Adequate research activities should be conducted and research outcomes should be implemented.
- After the research farmers have been found involving in traditional multi-farming activities. They have not given the priority in commercial coffee

farming as it is profitable and easy economic activity. It is therefore suggested to all the concerned that coffee farming is reliable geographically and climatically suitable to Nepal, it can uplift the economic standard of people fast, so farmers should get training and knowledge. Due to the favorable climate, soil and landscape in the study area and nearby areas, coffee production has better prospects.

- In order to increase the large private sectors participation in coffee farming. The government must adopt and implement private sectors friendly favorable and attractive policies to attract and involve them.
- It is vivid that farmers are the first stake holder of the commercial farming. As they cultivate their mind and work with full enthusiasm, the economic enhancement can be made fast from coffee farming. Farmers should not depend upon government fully rather assist the government to get subsidy and bringing empowering programme.

Bibliography

Aryal, J. & Gautam, A. (2001). *Quantitative Technique, 2nd Revised Edition.* New Hira Books Enterprises Kathmandu, Nepal.

Baudhacharya, N. (2011). *A Study on Coffee Farming in Aanpchaur VDC of Gulmi District.* An MA thesis submitted to Central Department of Economics, Tribhuvan University, Kirtipur, Kathmaqndu, Nepal.

Aryal, J. & Gautam, A. (2001). *Quantitative Technique, 2nd Revised Edition.* New Hira Books Enterprises Kathmandu, Nepal.

CBS (2010). *Statistical Pocket Book.* Central Bureau of Statistics, Nepal.

Chalise H.R. (2005). *An Analysis of Cost of Production Aspect of Dairy Livestock, a Case Study of Jagatpur VDC, Chitwan.* MA thesis submitted to Central Department of Economics, Tribhuvan University, Kirtipur, Kathmaqndu, Nepal.

CoPP 2010. *Annual Report 2010*. Coffee Promotion Program, Helvetas, Kathmandu.

Dhakal, T.P. (2010). *Cost Benefit Analysis of Orange Production in Rural Area: a Case Study of Phaparthum VDC of Syangja District.* An MA thesis submitted to Department of Economics, Prithvi Narayan Campus, Pokhara, Nepal.

FNCCI/AEC (2006). *The Study Report on Trade Competitiveness of Nepalese Coffee.* Federation of Nepalese Chamber of Commerce and Industry / Agro Enterprise Center, Nepal.

Gewali, L. (2003). *Coffee Production and Marketing, A case Study of Madan Pokhara VDC Palpa District, Nepal.* An MA thesis submitted to Central Department of Economics, Tribhuvan University, Kirtipur, Kathmaqndu, Nepal.

Ghimire, B.K. (2001). *Coffee Farming in Gulmi: A Case Study of Aapchaur VDC.* An MA thesis submitted to Central Department of Economics, Tribhuvan University, Kirtipur, Kathmaqndu, Nepal.

ICO (2013). *Annual Review, 2011/12*. International Coffee Organization, Berners Street, London, United Kingdom.

Jhingan, M.L. (1992). *The Economics of Development and Planning, 25th Revised Edition.* Konark Publishers Pvt. Ltd. India.

Kafle, B.P. (2001). *Profit Planning in Agricultural Farm, a Case Study of Potato and Cardamom Production in Pyang VDC in Ilam District.* An MBA thesis submitted to Central Department of Management, Tribhuvan University, Kirtipur, Kathmaqndu, Nepal.

Koutsoyiannis, A. (1979). *Modern Microeconomics, Second Edition.* Replika Press Pvt. Ltd. Kundli, India.

Kurg, C.A. & Poerck, R.A. (1968). *World Coffee Survey*. Food and Agriculture Orgonization, Rome.

LCC (2064). *One Village One Product Program.* Lekhnath Chamber of Commerce, Lekhnath-1, Bhandardhik, Kaski.

MOAC (2008). *National Coffee Policy*. Ministry of Agriculture and Cooperatives, Nepal.

MOF (2014). *Economic Survey, Fiscal Year 2013/14.* Ministry of Finance, Nepal.

NTCDB (2013). *Annual Coffee Report 2012/13.* National Tea and Coffee Development Board, Kathmandu, Nepal.

NTCDB (2067). *Tea-Coffee Smarika.* National Tea and Coffee Development Board, Kathmandu, Nepal.

PACT (2012). *Value Chain Development for Organic Coffee.* Project for Agriculture Commercialization and Trade, Nepal.

Poudel, B. (2012). *An Analysis on Costs of Cow Milk Production, a Case Study of Lekhnath Municipality, Kaski.* An MA thesis submitted to Department of Economics, Prithvi Narayan Campus, Pokhara, Nepal.

Poudel, N. (1997). *Orange Production and Socio-economic Changes in Syangja District, a Case Study of Karendada VDC.* An MA thesis submitted to Central Department of Economics, Tribhuvan University, Kathmaqndu, Nepal.

Sharma, D. (2011). *An Economic Analysis of Orange Production in Syangja District: A Case Study of Ganeshpur VDC.* An MA thesis submitted to Department of Economics, Prithvi Narayan Campus, Pokhara, Nepal.

Tiwari, K.P. (2010). Agricultural Policy Review for Coffee Promotion in Nepal. *The Journal of Agriculture and Environment Vol.11*.

Watson and Getz (1986). *Price Theory and It's Uses, Fifth Edition.* Fifth Edition, Houghton, Mifflin.

Weitz, Ranam (1978). *"Agriculture in third world",* Agriculture Planning and implementation, a case study of Israel, Holand, D. Red.

Websites

http://www.ico.org

http://en.wikipedia.org/wiki/ economics of coffee

http://www.coffeeresearch.org/coffee/history.htm

http://www.nationalgeographic.com/coffee/frame.html

http://www.teacoffee.gov.np/index about coffee.php

APPENDIX A

Interview Schedule

1. General introduction

   Ward No.:

   Name of the Village/Tole:

   Date of interview:

2. Name of the respondent:

   Age: Sex:

   Academic qualification:

   Main occupation:

3. Family composition: (General information)

S.N.	Name	Age	Sex	Education	Occupation

4. Information on landholding:

Total area owned (in ropani)	Irrigated	Non-irrigated	Rented in
Khet Bari Pakho			

5. Production of food grains:

S.N.	Cereals Crop	Annual Production (in ropani)	Total cost of Production (In Rs.)	Self Consumption	Profits
a. b. c. d. e. f.	Rice Maize Wheat Millet Coffee Others (----------)				

6. Starting of coffee farming (in years). ……

7. Give the composition of coffee orchards.

Area	Plant No.		Production Amount (in Kg)	Values (in Rs.)
	Productive	Unproductive		

8. What is your purpose of coffee farming?

9. Please provide information about the total input cost for coffee production within one year?

S.N.	Items	Quantity	Cost/Price
1.	Land		
2.	Labors		
3.	Fertilizers		
4.	Insecticides and pesticides		
5.	Tools and instruments		
6.	Others		

10. Do you sustain your family from the production of coffee?
    a. Yes b. No

11. If no, how do you manage?

12. Did you get any training for this farming?
    a. Yes b. No

13. Have you got any type of help from govt. or NGOs?
    a. Yes b. No
14. If yes, what type of help did you get?
    a. Technical c. Farming management
    b. Irrigation d. Others.
15. Have you taken loan for coffee farming?
    a. Yes b. No
16. If yes,

Source of Loan	Amount	Interest Rate (in %)
a. Banking and financial institutions b. Co-operative society c. Money lenders d. Others		

17. Where do you sell your product?

S.N.	Market	Distance from Field	Means of Transportation	Time	Quantity of Selling	Total Amount (in Rs.)

18. Can you sell your production in time?
    a. Yes b. No
19. If no, why?

20. Are you getting satisfactory price of your production?

    a. Yes b. No

21. If not what are the causes?

    a. Lack of suitable market
    b. High transportation cost
    c. Lack of storage
    d. Middle man agent
    e. Others

22. What are the difficulties of market of coffee?

    a. Transportation
    b. Unsatisfactory price
    c. Lack of storage
    d. Others

23. How much income did you have from selling the coffee in the following three years?

S.N.	Years	Income in Rs.
1.	2068	
2.	2069	
3.	2070	

24. Did you spend this income entirely on coffee farming?

    a. Yes
    b. No

25. Is it more profitable than cereal crop farming?

    a. Yes
    b. No

26. What do you think about the future of coffee farming?

    a. Good
    b. Bad
    c. Normal

27. What are the problems and prospects for coffee farming in your view?

28. Do you have any suggestion about the coffee farming to increase its' production and to make more profitable?

Thank you

APPENDIX B

Area and Production of Coffee in Nepal, 2010/11

Districts	Area (ha)	Green Bean Prod. (mt.)	Districts	Area (ha)	Green Bean Prod. (mt.)
Palpa	188	22.7	Sankhuwashava	18	3
Gulmi	112	45.2	Ilam	45	15
Arghakhachi	76	23.5	Rasuwa	32	1
Syangja	230	48.4	Panchthar	33	7
Kaski	95	24.6	Lalitpur	115	47.8
Parbat	45	9.5	Sindhupalchok	87	17.3
Lamjung	149	15	Kavrepalanchok	130	35
Gorkha	95	5.5	Nuwakot	79	30.5
Baglung	42	14.7	Dhadimg	35	6.5
Tanahu	52	4	Makawanpur	25	4
Myagdi	12	2	Other Districts	47	19.3
			Total	1742	401.5

Source: Nepal Tea and Coffee Development Board, 2069

Figure 2: Major Coffee Producing Districts of Nepal

APPENDIX C

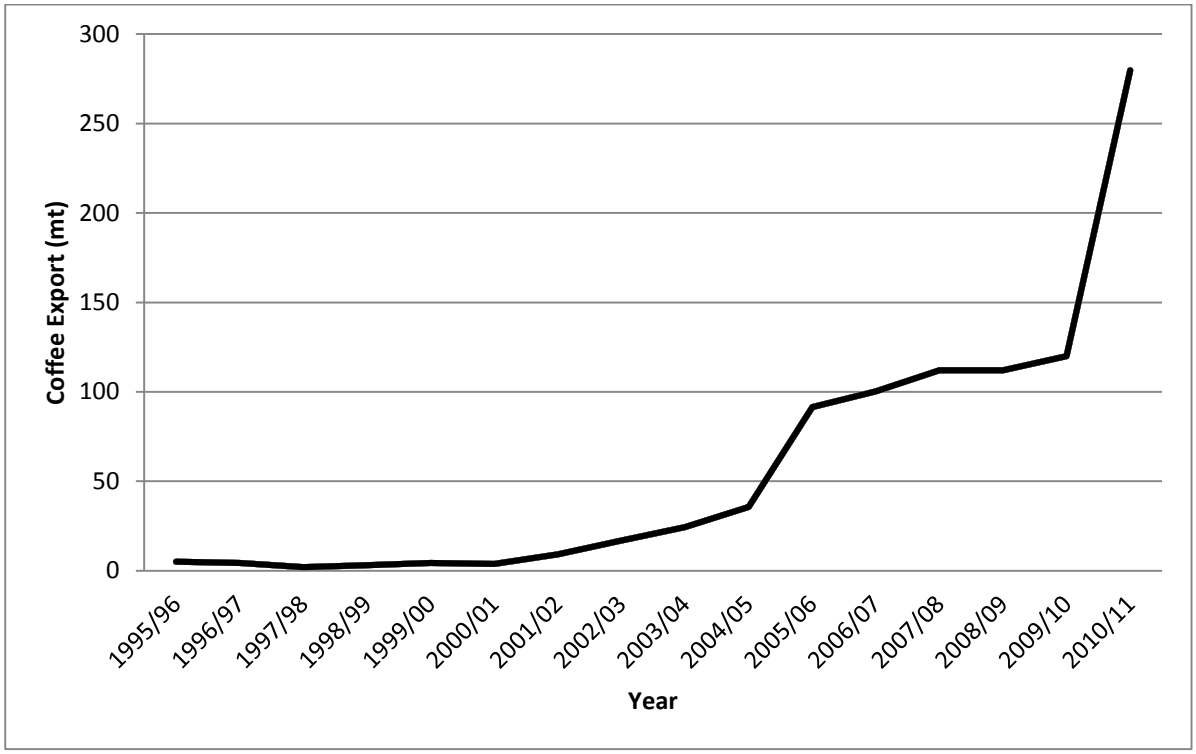
Production and Trade of Coffee in Nepal

Year	Dry Cherry Production (mt.)	Parchment Production (mt)	Export (mt)	Export (in Rs.000)	Import (in Rs.000)
1996/97	37.35		4.25	6023	15316
1997/98	55.90		2.00	318	16264
1998/99	44.50		3.10	634	32741
1999/00	72.40		4.25	1415	36437
2000/01	88.70		3.68	673	43200
2001/02	139.20		9.08	2455	4621
2002/03	139.20		16.86	5205	142
2003/04	217.60		24.30	5947	410
2004/05	250.00		35.68	1966	169
2005/06	391.00		91.50	27678	2265
2006/07		270.00	100.18	40117	56000
2007/08		265.00	112.00	NA	64481
2008/09		334.00	112.00	NA	84400
2009/10		429.00	120.00	NA	54400
2010/11		502.00	279.76	93089	12513

Note: *Most of the export were in terms of green beans.*

Source: *Tea and Coffee Development Board, 2069*

Figure 3: Trend of Coffee Export from Nepal



APPENDIX D

Data Sheet of Fixed Cost, Variable Cost and Total Cost of Production

S. N.	Qty of Coffee Prod. (in Kg)	Total Income (in Rs.)	Area of Land (in ropani)	Cost of Plants (in Rs)	Cost of Labour per year (in Rs)	Cost in Manure (in Rs.)	Cost of land (in Rs)	Tools Cost (in Rs)	Total cost of Prod. (in Rs)	Fixed Cost (in Rs)	Variable Cost (in Rs)
1	3475	173750	20	18500	42750	16650	50000	4500	132400	68500	63900
2	1175	58750	5	5850	12800	3672	12500	2200	37022	18350	18672
3	980	49000	4.25	4600	12600	3312	10625	2100	33237	15225	18012
4	285	14250	1.5	1540	3600	1386	3000	325	9851	4540	5311
5	395	19750	1.75	1700	4050	1912	3500	450	11612	5200	6412
6	65	3250	0.4	280	1350	252	800	100	2782	1080	1702
7	1280	64000	5	7910	20250	6328	10000	2500	46988	17910	29078
8	720	36000	3.5	3610	9000	2166	8750	1300	24826	12360	12466
9	65	3250	0.4	320	1350	384	1000	115	3169	1320	1849
10	355	17750	1.5	1340	3150	938	3750	235	9413	5090	4323
11	378	18900	1.8	2150	5850	1548	3600	425	13573	5750	7823
12	492	24600	3	2150	6750	1720	6000	425	17045	8150	8895
13	512	25600	3	2250	6750	1800	6000	450	17250	8250	9000
14	205	10250	1	820	2700	820	2000	200	6540	2820	3720
15	312	15600	1.5	1820	4950	1620	3000	450	11840	4820	7020
16	450	22500	2.5	2450	5850	1470	5000	475	15245	7450	7795
17	115	5750	0.5	650	1800	490	1250	175	4365	1900	2465
18	550	27500	3	2750	6750	2200	7500	600	19800	10250	9550
19	35	1750	0.25	270	900	243	625	150	2188	895	1293
20	472	23600	2.8	2050	6300	1476	6160	425	16411	8210	8201
21	1645	82250	7.4	6050	15000	3636	16280	1800	42766	22330	20436
22	1365	68250	6.5	5250	16000	4200	13000	1950	40400	18250	22150
23	160	8000	1	940	2700	846	2000	250	6736	2940	3796
24	78	3900	0.5	470	1350	282	1250	150	3502	1720	1782
25	180	9000	0.8	770	2250	577.5	1760	225	5582.5	2530	3052.5
26	325	16250	2	1820	4500	1638	4000	525	12483	5820	6663
27	130	6500	0.8	660	1800	594	1600	175	4829	2260	2569
28	195	9750	1.5	1000	3150	1188	3000	300	8638	4000	4638
29	310	15500	2.5	1170	3600	702	5500	325	11297	6670	4627
30	2210	110500	10	7870	18000	4362	22000	2000	54232	29870	24362
31	626	31300	2.5	3100	9000	2254	5000	1100	20454	8100	12354
32	920	46000	4	4920	12500	1764	8000	1175	28359	12920	15439
33	535	26750	3	2800	7200	1680	6000	975	18655	8800	9855
34	201	10050	1	750	2250	450	2000	200	5650	2750	2900
35	182	9100	1	870	2250	522	2000	225	5867	2870	2997

36	642	32100	3.2	3420	6300	1524.6	6720	625	18589.6	10140	8449.6
37	436	21800	2	2470	5400	1122	4200	375	13567	6670	6897
38	286	14300	1.5	970	2700	523.8	3300	220	7713.8	4270	3443.8
39	93	4650	0.5	520	1350	208	1000	130	3208	1520	1688
40	500	25000	4	1900	4950	1282.5	8000	470	16602.5	9900	6702.5
41	185	9250	1.5	670	2250	361.8	3000	175	6456.8	3670	2786.8
42	373	18650	2	1740	4050	844.2	4200	300	11134.2	5940	5194.2
43	122	6100	0.5	670	1800	256.5	1050	150	3926.5	1720	2206.5
44	83	4150	0.5	540	1350	396	1100	135	3521	1640	1881
45	163	8150	1.25	740	2250	370	2625	180	6165	3365	2800
46	356	17800	1.5	1940	3600	1078	3000	345	9963	4940	5023
47	392	19600	1.75	2250	4050	661.5	3500	335	10796.5	5750	5046.5
48	253	12650	1.5	880	2700	462	3000	220	7262	3880	3382
49	410	20500	2.5	2360	5850	1062	4500	440	14212	6860	7352
50	415	20750	2.5	2460	6300	1476	5000	450	15686	7460	8226
51	605	30250	4	3970	11500	2382	8400	645	26897	12370	14527
52	1020	51000	5	4340	10800	3038	11000	880	30058	15340	14718
53	380	19000	2	2000	5400	1600	4000	375	13375	6000	7375
54	112	5600	0.5	570	2250	351	1000	145	4316	1570	2746
55	721	36050	3.5	2400	1350	245	7000	125	11120	9400	1720
56	421	21050	2.4	1340	3150	750.4	4800	360	10400.4	6140	4260.4
57	362	18100	1.8	1550	3600	930	3600	380	10060	5150	4910
58	221	11050	2	950	2700	570	4200	215	8635	5150	3485
59	400	20000	2.5	1790	5400	805.5	5000	335	13330.5	6790	6540.5
60	410	20500	2.5	2040	6300	1428	5000	520	15288	7040	8248
61	612	30600	3.5	2600	7650	1820	7000	570	19640	9600	10040
62	425	21250	2.4	2290	6750	1374	5040	530	15984	7330	8654
63	520	26000	3.4	2750	8100	1650	7140	560	20200	9890	10310
64	514	25700	3	3070	6750	1440	6000	530	17790	9070	8720
65	2050	102500	8.75	7100	19475	4970	17500	1650	50695	24600	26095

Data Sheet used for Regression Analysis

S.N.	Qty of Coffee Production in Kg (Q)	Labor used per year (L1)	Land in Ropani (L2)	Manure in Kg (M)	logQ	logL1	logL2	logM
1	3475	95	20	8325	3.541	1.978	1.301	3.920
2	1175	32	5	2040	3.070	1.505	0.699	3.310
3	980	28	4.25	1840	2.991	1.447	0.628	3.265
4	285	8	1.5	693	2.455	0.903	0.176	2.841
5	395	9	1.75	956	2.597	0.954	0.243	2.980
6	65	3	0.4	126	1.813	0.477	-0.398	2.100
7	1280	45	5	3164	3.107	1.653	0.699	3.500
8	720	20	3.5	1444	2.857	1.301	0.544	3.160
9	65	3	0.4	128	1.813	0.477	-0.398	2.107
10	355	7	1.5	536	2.550	0.845	0.176	2.729
11	378	13	1.8	860	2.577	1.114	0.255	2.934
12	492	15	3	860	2.692	1.176	0.477	2.934
13	512	15	3	900	2.709	1.176	0.477	2.954
14	205	6	1	328	2.312	0.778	0.000	2.516
15	312	11	1.5	810	2.494	1.041	0.176	2.908
16	450	13	2.5	980	2.653	1.114	0.398	2.991
17	115	4	0.5	245	2.061	0.602	-0.301	2.389
18	550	15	3	1100	2.740	1.176	0.477	3.041
19	35	2	0.25	135	1.544	0.301	-0.602	2.130
20	472	14	2.8	820	2.674	1.146	0.447	2.914
21	1645	30	7.4	2020	3.216	1.477	0.869	3.305
22	1365	32	6.5	2100	3.135	1.505	0.813	3.322
23	160	6	1	423	2.204	0.778	0.000	2.626
24	78	3	0.5	141	1.892	0.477	-0.301	2.149
25	180	5	0.8	231	2.255	0.699	-0.097	2.364
26	325	10	2	819	2.512	1.000	0.301	2.913
27	130	4	0.8	297	2.114	0.602	-0.097	2.473
28	195	7	1.5	495	2.290	0.845	0.176	2.695
29	310	8	2.5	351	2.491	0.903	0.398	2.545
30	2210	40	10	2908	3.344	1.602	1.000	3.464
31	626	20	2.5	1127	2.797	1.301	0.398	3.052
32	920	25	4	1176	2.964	1.398	0.602	3.070
33	535	16	3	840	2.728	1.204	0.477	2.924
34	201	5	1	225	2.303	0.699	0.000	2.352
35	182	5	1	261	2.260	0.699	0.000	2.417
36	642	14	3.2	847	2.808	1.146	0.505	2.928
37	436	12	2	561	2.639	1.079	0.301	2.749

38	286	6	1.5	291	2.456	0.778	0.176	2.464
39	93	3	0.5	130	1.968	0.477	-0.301	2.114
40	500	11	4	855	2.699	1.041	0.602	2.932
41	185	5	1.5	201	2.267	0.699	0.176	2.303
42	373	9	2	469	2.572	0.954	0.301	2.671
43	122	4	0.5	171	2.086	0.602	-0.301	2.233
44	83	3	0.5	198	1.919	0.477	-0.301	2.297
45	163	5	1.25	185	2.212	0.699	0.097	2.267
46	356	8	1.5	539	2.551	0.903	0.176	2.732
47	392	9	1.75	441	2.593	0.954	0.243	2.644
48	253	6	1.5	308	2.403	0.778	0.176	2.489
49	410	13	2.5	708	2.613	1.114	0.398	2.850
50	415	14	2.5	738	2.618	1.146	0.398	2.868
51	605	23	4	1191	2.782	1.362	0.602	3.076
52	1020	24	5	1519	3.009	1.380	0.699	3.182
53	380	12	2	800	2.580	1.079	0.301	2.903
54	112	5	0.5	195	2.049	0.699	-0.301	2.290
55	721	3	3.5	140	2.858	0.477	0.544	2.146
56	421	7	2.4	469	2.624	0.845	0.380	2.671
57	362	8	1.8	620	2.559	0.903	0.255	2.792
58	221	6	2	285	2.344	0.778	0.301	2.455
59	400	12	2.5	537	2.602	1.079	0.398	2.730
60	410	14	2.5	714	2.613	1.146	0.398	2.854
61	612	17	3.5	910	2.787	1.230	0.544	2.959
62	425	15	2.4	687	2.628	1.176	0.380	2.837
63	520	18	3.4	825	2.716	1.255	0.531	2.916
64	514	15	3	720	2.711	1.176	0.477	2.857
65	2050	41	8.75	2485	3.312	1.613	0.942	3.395

APPENDIX E

Regression Result of Model 1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.983[a]	0.966	0.964	108.19566

a. Predictors: (Constant), M (manure), L2 (Land), L1 (Human Labour)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20346045.56	3	6782015.185	579.347	.000[b]
	Residual	714084.291	61	11706.3		
	Total	21060129.85	64			

a. Dependent Variable: Quantity of coffee production

b. Predictors: (Constant), Manure (M), Land(L_2), Human labor(L_1)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-54.397	23.222		-2.343	.022
	Human labor (L_1)	21.004	5.003	.518	4.198	.000
	Land (L_2)	164.696	16.247	.831	10.137	.000
	Manure (M)	-.183	.060	-.365	-3.045	.003

a. Dependent Variable: Quantity of coffee production in Kg (Q)