CHAPTER I

INTRODUCTION

1.1 Introduction

Agriculture is the country's major economic sector, employing about 65 per cent of the economically active population and accounting for about 40 percent of gross domestic product (GDP) in 2005. Forests and farmland together occupy half of Nepal's total land area. Cereals such as rice, maize, wheat and millet account for nearly 90 per cent of crops produced, and for 56 per cent of all agricultural production (MoF, 2008).

Agriculture's contribution to GDP has fallen gradually from 72 per cent in the mid 1970s. The decline in the sector's growth over recent decades has in part been the result of an expansion in trade and tourism, transport and other services, and in part a consequence of conflict and its devastation of rural areas. But it is also a result of population pressure and cultivation of marginal hillsides, which has caused severe soil erosion and declining crop yields. Agricultural productivity has not kept pace with population growth and Nepal has gradually become a country with a food deficit problem. The ratio of population to arable land is now one of the highest in the world. In a country already dominated by marginal and small farmers, landholdings are becoming smaller and more fragmented than ever (NCA, 2001/02).

Some positive trends in agriculture include an increase in dairy production and the strong performance of the tea and coffee industries. The vicinity of China and India affords access to huge markets for agricultural products, which could be better exploited by Nepal especially through high-value commercial agriculture.

The majority of the population involvement in the agriculture sector has contributed 39.16% in GDP (ABPSD, 2003). The agriculture sector in the country is very complex and encompasses different disciplines like livestock, agronomy, horticulture to name but a few. Agriculture has always been a major sector of economy of the country from ancient time to date. The total area of land available for agricultural

activities is estimated as 25, 98,970 ha. This is second biggest type of land use after forest in the country. Gross domestic product (GDP) of the nation contributed by the agricultural sector is NRS 1, 83, 557 million in FY 2060/61 (NPC, 2058).

The participation of farmers' in the process of technology generation has been overwhelmingly realized all across the developing countries since very long. However, the type and modalities of farmers' participation were different even within Nepal in the process of technology verification (Kayastha et al., 1989).

Furthermore, Todaro (2004) has identified the following reasons regarding the backwardness of agriculture at present with respect to both developed and developing countries.

- *A major reason for the relatively poor performance of agriculture in developing countries has been the neglect of this sector in the development priorities of their governments.*
- *In the developed countries, there has been a steady growth of agricultural output since the mid-eighteenth century. This growth has been spurred by technological and biological improvements which have resulted in ever higher levels of labor and land productivity.*
- *In many poor countries agricultural production methods have changed relatively slowly over time. ……..For the vast number of farm families, whose members constitute the main agricultural work force, agriculture is not merely an occupation or a source of income; it is a way of life. This is particularly evident in traditional societies, there farmers are closely attached to their land and devote long hard days to its cultivation. Any change in farming methods perforce brings with it changes in the farmer's way of life. The introduction of biological and technical innovations must therefore be adapted not only to the natural and economic conditions but perhaps even more to the attitudes, values, and abilities of the mass of producers who must understand the suggested changes, must be willing to accept them and must be capable of carrying them out.*
- *Asian agricultural is being transformed from a subsistence to a commercial orientation, both as a result of rising local demand in new towns and more important in response to external food demands of colonial European powers.*

- *On the classic peasant subsistence farm, most output is produced for family consumption and a few staple food crops are the chief sources of food intake. Output and productivity are low and only the simplest traditional methods and tools are used. Capital investment is minimal; land and labor are the principal factors of production. The law of diminishing returns is in operation as more labor is applies to shrinking parcels of land.*
- *The failures of the rains, the appropriation of this land, and the appearance of the money lender to collect outstanding debts are the curse of the peasant's existence and cause him to fear for his survival. Labor is underemployed for most of the year, although workers may be fully occupied at seasonal peak periods such as planting and harvest. The peasant usually cultivates only as much land as his family can manage without the need for hired labor, although many peasants' farmers intermittently employ one or two landless laborers. The environment is harsh and static. Technological limitations, rigid social institutions and fragmented markets and communication networks between rural areas and urban centers tend to discourage higher levels of production. Any cash income that is generated comes mostly from non farm wage labor. (Todaro, 2004)*

The poor performance of agriculture in developing countries is due to the neglecting in the priority. The agricultural production method has changed relatively slow due to the lack of technological and biological innovation, which was restricted by farmers' attitude, values and ability. Todaro flashes the condition of traditional agriculture that, out-put is produced only for family consumption, the land and labor are principal factors, capital investment is minimal, technological limitation, rigid social institutional, fragmented markets and communication network between rural area and urban center tend to discourage higher level of production.

Throughout much of the developing world, agriculture is still in its subsistence stage. But in spite of the relative backwardness of production technologies and the misguided convictions of some foreigners who attribute the peasants' resistance to change as a sign of incompetence or irrationality, the fact remains that given the static nature of the peasants environment, the uncertainties that surround them, the need to meet minimum survival levels of output and the rigid social institutions.

“Subsistence agriculture is a highly risky and uncertain venture. It is made even more so by the fact that human lives are at stake. In regions where farms are extremely small and cultivation is dependent on the uncertainties of variable rainfall, average output will be low, and in poor years the peasant and his family will be exposed to the very real danger of starvation. Accordingly, when risk and uncertainty are high a small farmer may be very reluctant to shift from a traditional technology and crop pattern that over the years come to know and understand to a new one that promises higher yields but may entail greater risks of crop failure” (Todaro, 2004).There are various factors affecting the transformation process of subsistence farming into commercial farming in Nepal.

The twenty years long term Nepal Agricultural Perspective Plan (APP, 1995), has mentioned the objectives: to accelerate the growth rate in agriculture through increased factor productivity; to alleviate poverty and achieve significant improvement in the standard of living through accelerated growth and expanded employment opportunities; to transform the subsistence-based agriculture into commercial one through diversification and widespread realization of comparative advantage; to expand opportunities for an overall economic transformation by fulfilling the precondition of agricultural development; to identify immediate, short term and long term strategies for implementation, and to provide clear guidelines for preparing periodic plans and programs in the future.

Observing the APP the researcher has selected the title to analyze the factors affecting the transformation of subsistence farming into commercialization with respect to the mid hill of Nepal.

1.2 Statement of the Problem

The rural societies have not diversified and intensified the production horizontally and vertically, and have not added value to the production through mechanization, post harvest technologies, processing agribusiness and commercialization.

The central challenge for development in Nepal is to shift from subsistence to a commercial farming in an environment characterized by great disparity in land ownership, high unbearable rental, inadequate knowledge of modern production

technology, ineffective extension services, lack of timely availability of external inputs, scarcity of institutional credit and other support services for tenants and small farmers, deteriorating environment, declining soil fertility and reduced yield, reduced availability of full range of forest products (NLSS 1996).

A mountainous terrain and poorly developed road network restrict access to markets, constraining agricultural growth and diversification into higher value added and non-farm activities. Weak and poorly integrated institutions and inadequate technical support for supply chain development have further limited marketing opportunities (APP, 1995).

Agriculture is the principal source of food, income, and employment for the majority, particularly the poorest. Growth in agriculture is, therefore, crucial for reducing poverty, and preliminary findings from the National Living Standards Survey (NLSS) indicate that despite the insurgency, the sector has made a significant contribution to poverty reduction. The food security and sustainability are the most challenging problems of today and the future (MoAC, 2005). However, agriculture is largely based on low-value cereals and subsistence production, with a mere 13 percent of output traded in markets. The sector's current 39.16 percent share in national GDP is declining, although there is considerable scope for increasing productivity and value-added.

Despite an increasing reliance on remittances from laborers abroad, the absence of economic opportunities outside subsistence agriculture keeps most Nepalese poor, which further limits prospects for development, causing a vicious cycle of poverty in rural areas. Since very long, so many researches were done in different aspect of agriculture and in its different components although the farming system is in stagnant condition, NGOs / INGOs/ GOs were focused on agricultural transformation, modernization and commercialization. Agricultural issue always in the core of first five years plans to present, twenty years long Agricultural Perspective Plan (APP) is working, all budget addressed the agriculture but no change was found due to psycho-social condition of the Nepalese society. So this study searched the different factors focusing in psycho-social factors affecting on transformation and obstacle/ hindrance on transformation of agriculture. The agricultural performance of the study area in

stagnant condition so, this study tries to find out the factors affecting on agricultural transformation.

1.3 Research Questions

This study has been carried out striking the following questions in the mind of the researcher.

1. Has the holdings been suitable and sufficient for large scale farming?
2. Why are not farmers specified in mono-cropping or mono farming?
3. What are the sources of inputs on farming?
4. Why can't farmers invest more in farming?
5. Is the interest rate suitable for agricultural investment?
6. What types of farming system are practiced by the farmers?
7. What types of seeds and fertilizers are used on farming?
8. Are the farmers trained? Are they getting agricultural education?
9. What is the status of farmers in society (i.e. Social prestige)?
10. Who are actively participating on farming?
11. Whether there is significant income from farming or not?
12. How farmers deal for selling their produces?
13. What are the motivating and de-motivating factors on farming system?
14. What are the most important obstacles on farming system?

1.4 Objectives of the Study

The general objective of this study is to analyze the various factors affecting on transformation of subsistence farming into commercial farming. The specific objectives are as follows.

1. To diagnose the status of farming.
2. To explore the factors affecting on transformation.
3. To examine the hindrances on transformation.

1.5 Scope of the Study

To identify the factors affecting subsistence farming to commercial farming, the factors are classified into four major groups i.e. economic, technological, physical and psychosocial. There may be several aspects affecting on TOSFCF, but a successful scrutiny of the literature has reveled these factors as the major critical ones.

The study with above objectives includes analyzing incorporating technology, economic, physical and psycho social factors (Table 1.1).

Table 1.1: Variables under Study

Psycho-socio Factors	Economic Factors	Physical factors	Technological factors
Training Information Award Subsidies Network Not visiting Org. Food sufficiency, Visiting DADO, Visiting NGO/INGOs Visiting Agro vet Visiting with JT/JTA Family size Education Future security Satisfaction Getting as a farmers	Profit earning Animal husbandry Amount of earning Rationale cost of products Labors Main source of income is agriculture. Invest in Farming Loan for farming	Area of agricultural land Number of parcels Own land Share cropping land Contracted land (*Thekka*) Rented land Natural Calamities	Changing in farming Technique of farming Chemical fertilizer JT/JTA Improved seeds Insecticides Cold storage

1.6 Limitation of the Study

The limitations of the study are as follows.

1 This study will be carried out in only four wards of the Arva V.D.C of Kaski district. Therefore findings may not be generalized in wider context but it can be generalized in the same setting.

2 This study will not cover all aspects of farming. Only field crops farming are given the preference for the study. It could not cover all sociological aspects.

3 Due to the lack of time series data, the study may not present time series analysis.

1.7 Basic Assumption

Following are the basic assumptions of this study.

1. The existing farming system in the study area is assumed to be commercializing as it is close to the large urban center.

2. At the very beginning of data collection rapport will be built with the farmer group executive committee.
3. The farmers are imagined to be very responsive to the modernization.
4. Despite being as part of urban farming, farmers are not expected to be market oriented as they practice.

1.8 Hypothesis

The following hypotheses were set for the study.

Farmers having high level of education are not different in commercializing their farming to the farmers having low level of education.

Farmers having more land are not different in commercializing their farming to the farmers having less land.

The farmers using AT are not different in food security than the farmers not using AT.

There is no significant relation between AT and profit earnings of farmers

There is no significant relationship with subsidies and commercialization.

There is no significant different in commercialization between the farmers who had received adequate information about modern technologies, and who did nor had not receive.

Farmers are not significantly satisfied with the agricultural occupation than having other occupations.

Farmers have not significantly changed the pattern of farming system than their parents.

1.9 Significance of the Study

1. This study will attempt to provide an overview of the major factors that check the transformation of farming system.
2. It helps to report the status of farming system and people's participation and perception towards agriculture.
3. It helps to transfer the traditional farming system to modern farming system; it's also helpful to create the awareness to farmers and other people about importance of agriculture.
4. Finally report will serve as a guide to farmers, DADO and planners for the betterment of farming system all over the country.

1.10 Definition of Terms

The study has taken subsistence farming, commercial farming, modern technology, transformational agents as the major terms for study and analysis which has been defined as below.

Farming: Farming is the business of working or managing a farm to grow crops or keep animals. In this study farming refers only soil farming.

Subsistence Farming: Farming in which crops production, stocks raring and other activities are conducted mainly for personal consumption, characterized by low productivity, risk and uncertainty.

Semi-subsistence Farming: Farming in which partially using modern tools, fertilizers, improved seeds but crops production, stocks raring and other activities are conducted mainly for personal consumption, characterized by low productivity, risk and uncertainty.

Commercial Farming: The production of crops for sale and profit, although the farmers and their families may use a small amount of what they produce. Profits may be reinvested to improve the farm. Large-scale commercial farming is called agribusiness. The opposite of commercial farming is subsistence farming, in which no food is produced for sale.

Subsistence Economy: An economy in which, production is mainly for personal consumption and the standard of living.

Modern Technology: Technology is a skill, knowledge, and producer for making, using, and doing useful things. Agricultural technology refers to use in improving agricultural production. “If production is continued an old established methods, not much can be produced even if the land were rich and people worked hard. Application of science and technology on the other hand, enables greater production even soil are poor and men devote less labor.

Mono Cropping: Mono cropping is the agricultural practice of growing the same crop year after year on the same land, without crop rotation through other crops.

Mixed Cropping/Farming: Mixed crops are two or more different temporary or permanent crops grown simultaneously in the same field or plots (as oppose to "pure stand" crops) Temporary and permanent crops cultivated together are called "associated crops". Mixed crops include interplant crops and crops planted unsystematically as a mixture in a field. The area of mixed was estimated using what ever convenient method was appropriate. In some cases, the mixed crops land was divided according to estimate of the area under each crop. In all cases the total area of the crop areas for the mixed crops land was the same as the area of the land it self.

Transformation: The action or instance of transforming subsistence farming into commercial farming.

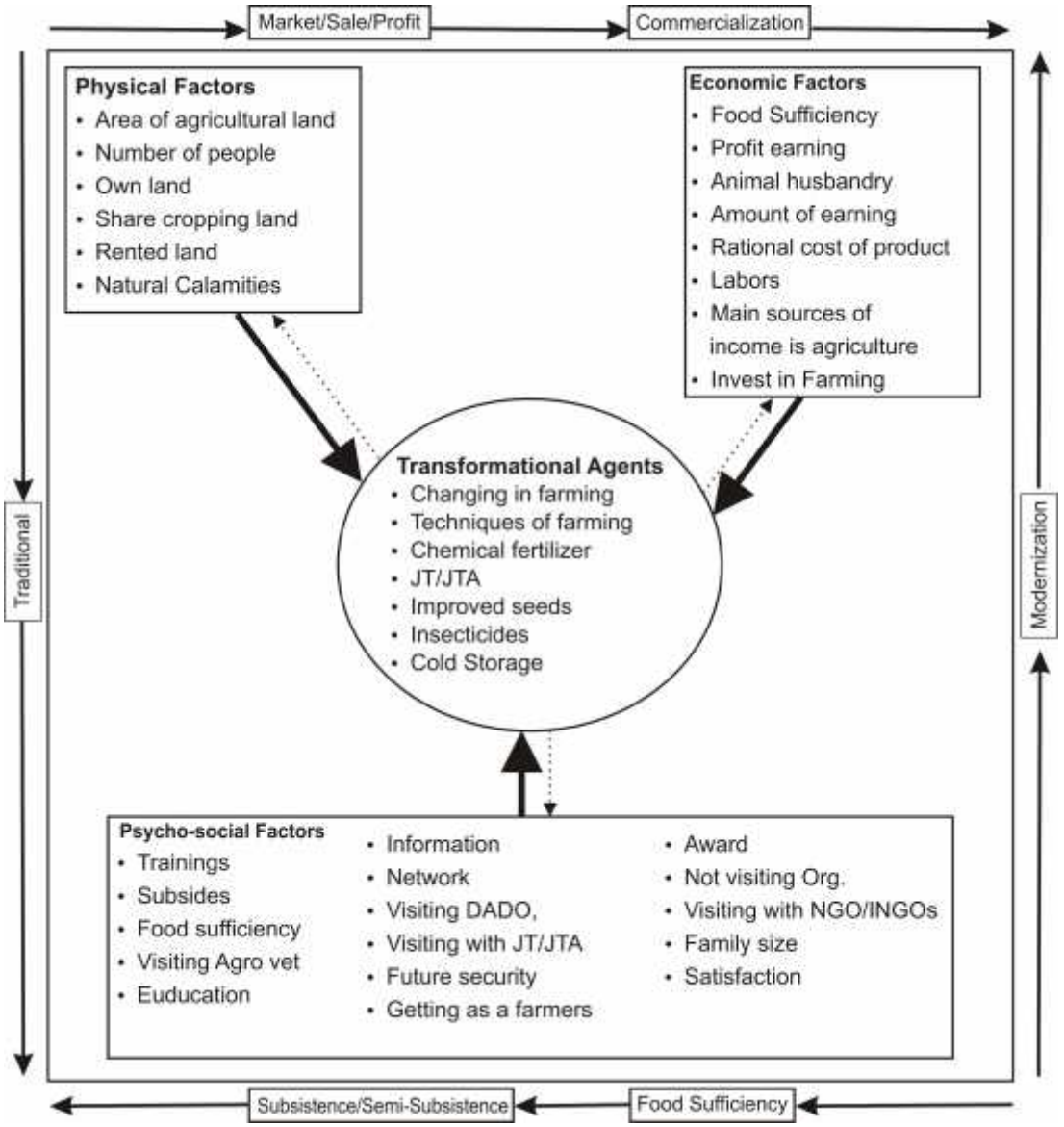
Transformational Agents: The agents which lead to transform subsistence farming into commercial farming. Here Changing in farming, Technique of farming, Chemical fertilizer, JT/JTA, Improved seeds, Insecticides, Cold storage and machinery are considered as the transformational agents.

Components of Commercialization: Here nine components such as Technique of farming, Chemical fertilizer, JT/JTA, Improved seeds, Insecticides, Cold storage, food security, Profit and training are considered as components of commercialization. On the basis of using the components, the commercialization process is divided into two categories i.e. low level of commercialization (using at less than four components out of nine) and high level of commercialization using at least four components.

1.11 Conceptual Framework

The great effort had been carried out to transform the subsistence based agriculture into commercial farming in the developed countries and developing countries including the third world countries like Nepal. Nepalese agricultural system is subsistence based (APP, 2005). For the transformation of subsistence based farming into commercial, here the researcher has chosen the technological factors like improved seed, chemical fertilizer, insecticides, cold storage, JT/JTA, technique of farming, changing in farming pattern, machinery, irrigation on the basis of NAPP which has focused for inputs like fertilizer, road, irrigation, power and technology for the commercialization.

Figure 1: Conceptual Framework



They are considered as the transformational agents as they play vital role on the transformation process from subsistence to commercial. To make more clear the inter link among physical factors (area of agricultural land, number of parcels, own land, share cropping land, contracted land (*Thekka*), rented land, natural calamities), economic factors (Profit earning, animal husbandry, amount of earning, rationale cost of product, labors, main source of income is agriculture, invest in farming and loan for farming) and psycho-socio factors (training, information about commercial farming, award, subsidies, network, not visiting service providing organizations, food sufficiency, visiting DADO, visiting NGO/INGOs, visiting agro-vet, visiting with JT/JTA, family size, education, future security, satisfaction, getting as a farmers). A diagrammatic presentation of the conceptual framework is presented in figure 1.

CHAPTER II

LITERATURE REVIEW

Pertinent literature has been reviewed in this chapter, focusing on Sociological and developmental perspectives. This chapter discusses the relevant theories and literature available on different aspect of agricultural developmental issue; Schultz's theory of transformation of traditional agriculture, Mellor's theory of agricultural development, Todaro's theory and Prevost' concept of today's farmers with different developmental strategies and past practices as well as economic aspect, psycho-sociological aspect, technological aspect, and physical aspect, of agriculture and recent studies on agricultural field.

2.1 Theoretical Overview

In this section old doctrine of agricultural importance, Schultz's theory of transformation of agriculture, Mellor's agricultural development and Prevost concept of today's farmers is discussed**.**

2.1.1 Old Doctrine

Old doctrine did recognize the importance of agriculture in the process of economic development. Physiocrats believe that agriculture alone is productive, for its yields, the subsistence of its workers, the earning of the entrepreneurs and a surplus (rent) while industries and trade are sterile since no such surplus (extra income) is produced in these two sectors.(Sadhu & Singh, 2005)

2.1.2 Schultz's Theory of Transformation of Traditional Agriculture

Traditional agriculture can transformed into a relatively cheap source of economic growth He tries to show What such transformations entails end a what means are required to accomplish it efficiently.

According to Schultz (cited in Sadhu & Singh, 2005), new factor production is needed to transform the traditional agriculture. Introduction of new factors brings in some problems. Whereas the past practices have to be discarded, on the one hand, new strategies have to be developed, on the other to meet the new situation arising out of

risk and uncertainness involved in agricultural transformation. It is therefore not, only significant to introduce new factors of production and reap richer harvest, but learning from experience, what risk and uncertainties are involves. The hypothesis is to be investigated, therefore, that the rates at which farmers who have settled into traditional agriculture except a new factor of production, depends upon its profit, which due allowance for risk and uncertainty and in this regard the response is similar to that observed by the farmers in modern agriculture.

Reallocating or the readjusting the allocation of resources, according to Schultz (Sadhu & Singh, 2005) is not going to make any substantial improvement in farm income. Even if the imperfections of capital market are corrected, it is not going to open any sound opportunities of economic growth. Even when it is known that there is superior technology available, the farmers may not be forthcoming to adopt it. This is a riddle.

The hypothesis Schultz set before himself is "there are comparatively few significant influences in the allocation of factor of production in traditional agriculture." (Sadhu & Singh, 2005)

The factors refer to traditional factor of production in possession of community. All the poor agricultural communities may not be traditional and may have to be excluded because these have witnessed the change. The implications of proposed were;

a. "That no appreciable increase in agricultural production is to be had by reallocating the factor at the disposal of farmers who are bound by traditional agriculture''. By further implications, it means that all factor of production are allocated with full regard to marginal return and marginal cost.
b. Significant individualities will not hamper agricultural production.
c. No farm management expert shall be in position to discover any major inefficiency in the allocation of factors.
d. No production factors remain unemployed.

According to Schultz (1964), treatment of the hypothesis, if any one of the implications mention above is proved wrong the hypothesis of allocate efficiencies in traditional agriculture fails.

Schultz equally refuses the connection that large size farm are more efficient. There is no correlation, according to Schultz, between size of farm land and productivity. Small and large size farms may be equally efficient or inefficient in different situation. Marx in particular, developed the theme of efficiency of large farm and talked of the returns to scale. Schultz attributes this to political considerations.

Traditional agriculture according to Schultz can be transformed into the relatively cheap source of economic growth. Schultz asserts that transformation of agriculture predominantly depends upon the availability and price of non traditional (modern) agricultural inputs. He says that "the supplies of these factors in a very real sense hold key to such growth." Producing and distributing these factors cheaply makes investment in agriculture profitable and farmers accept these modern inputs and learn how to best to use them. This also stimulates the saving and builds up institution to finance investment in agriculture. Schultz firmly believes that the supplies of modern factors have not been given due attention by economist. They are producer of the factor of production concealed under "technological change". Some of them engage in research and some in developmental activities. Some produce only information.

Finally, Schultz (1964) asserts that investment in human capital has radical social economic implications. In this direction the role of schooling is emphasized. People earn while young, skilled are formed at a relatively young age and new ideas weighted against traditional outlook through better education. Schultz wants peasant economics to learn lesion from aboard have many snags. Schultz wants, peasants' economics to learn lesson from industrialization. The belief that the investment in would shrink investment in ore productive enterprise is out rightly rejected. According to him; education is the best form of investment in human capital. The man who is bound transitional agriculture cannot produce much food no matter how rich the land. Thrift and hard work are not enough to overcome the niggardliness of this type of agriculture to produce an abundance of farm product required that the farmers have access to and have the skills and knowledge to use what science knows about soils, plant, animal and machines. To command farmers to increase production is doomed to failure even though they have an access to knowledge. Instead, an approach that provides incentives and reward to farmers is required. The knowledge that makes the transformation possible is a form of capital, which entails investment.

Investment not only in material inputs in which the part of this knowledge is embedded but importantly also investment in farm people.

2.1.3 Mellor's Theory of Agricultural Development

J.W. Mellor had developed a model entitled, "The Economics of Agriculture Development" in 1966 believes that at any point of time agriculture of an economy found to be one of the following three phases; Traditional Agriculture, Technologically dynamic agriculture-low-capital/ labor intensive technology and Technologically dynamic agriculture high-capital/ labor saving technology. The following characteristics are proposed by Mellor for traditional agriculture.

- The principle inputs of a traditional agriculture are land & labor.
- By increasing amount of labor on the farm, total production may be increased but average production per labor as well as income per worker will fall.
- Some traditional inputs like fertilizer have been used in traditional agriculture but in the absence other supporting inputs, their impact on the total production remains negligible.
- The various incentives created by the institutional change (land reform) may prove ineffective unless these are accompanied by technological change. Since change in technology refers to a wholesome package, half hearted changes do not help in breaking the shackles of traditional agriculture.
- Private investment, innovations is not forthcoming owing to lower farm incomes and government incentives do not effectively bring about the required changes due to illiteracy, superstition and resistance to change.
- The agriculture development once was not possible but which is facilitated by modern sciences.

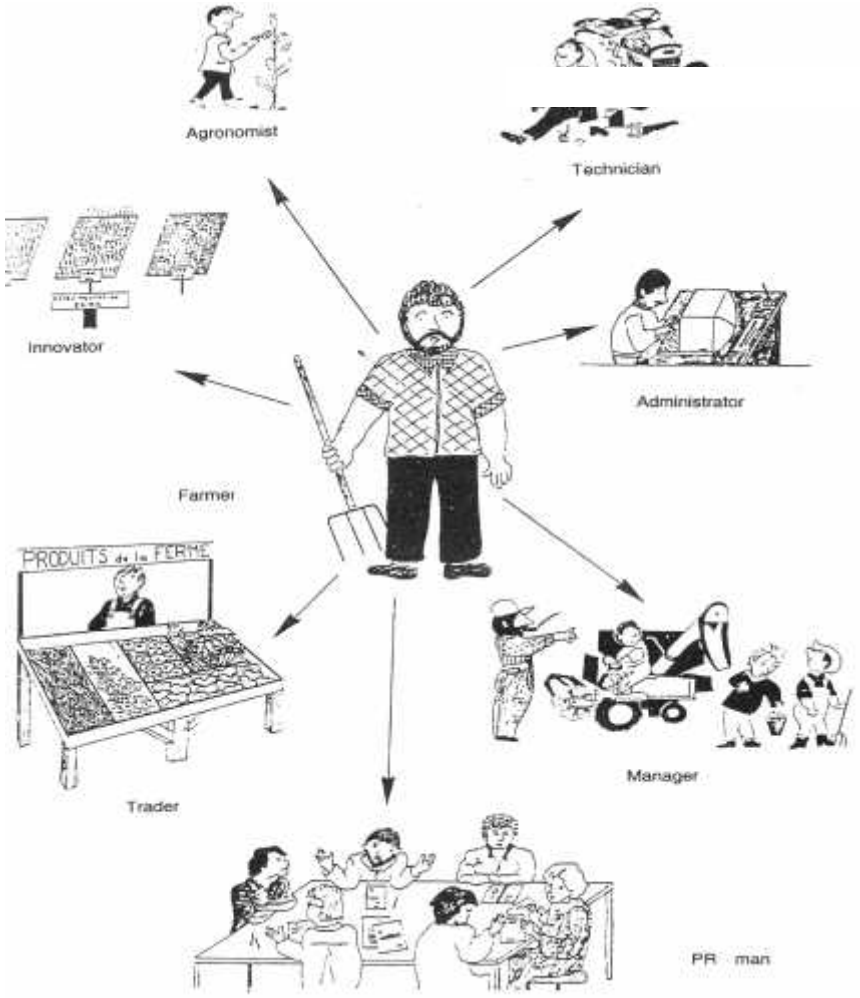
Mellor (1966) suggested the following five steps to smoothen as also to the rapid agricultural growth during technologically dynamic agriculture-low-capital/ labor intensive technological phase. At the first strengthening institutional environment: credit/ marketing / technical relations are focused. Secondly, encouragements to research in which new production techniques, and disseminate the findings among the farmers are developed. Thirdly, supply of new improved physical inputs: new seeds varieties, improved breeds of livestock, commercial fertilizer, and insecticides are

taken. At fourth, setting of institutions to service agricultural production: servicing facilities like distributing new inputs, marketing, processing, extending credit are identified and lastly, spread of education: the final success of the programme depends upon trainings to farmer.

2.1.4 Prevost Concept

In earlier times, knowledge based on experience was handed down from father to son with no intervention from external environment. Presently, there are rapid scientific, social and cultural developments; a young man who wishes to be trained in agriculture must be exposed to the external environment and this exposure should not be confined to training alone. There should be a training of the state of mind of a future agriculturist because in the profession of farming, all human qualities are essential (Prevost1997).

Figure 2: Today's Farmer



Source Prevost, 1997

2.2 Evolution and Development of Agriculture

The primary aim of agriculture is to cause the land produce more abundantly and at the same time to protect it from deterioration and misuse. The diverse branch of modern agriculture includes agronomy, horticulture, economic entomology, animal husbandry, dairying, agricultural engineering, soil chemistry and agricultural economics. (www.farming.com.uk).

2.3 Early Agriculture

Early people depend for their survival on hunting, fishing and food gathering. To this day, some groups still pursue this simple way of life, and others have continued as robing herders. However, as various groups of people under took deliberate cultivation of wild plant and domestication of wild animals, agriculture came into existence. Cultivation of crops notably grains such as wheat, rice, corn, rye, barley, and millet encourage settlement of stable farm communities, some of which grew to be town and city-state in various parts of world. Early agricultural implements the digging stick, the hoe, the scythe, and plow developed slowly over the countries, each innovation (e.g.., the introduction of iron) causing profound change in human life. (www.farming.co.uk).

2.4 World Scenario

The Wikipedia encyclopedia has given the list of countries by GDP sector composition based on nominal GDP estimates and sector composition ratios provided by the CIA World Fact Book at market in 2005 AD.

Table 2.1: List of Countries by GDP Sector Composition (figures are in percentage)

Rank	Country	Agriculture	Industries	Service
—	World	4	32	64
—	European Union	2.1	27.3	70.5
1	United States	0.9	20.4	78.6
2	Japan	1.6	25.3	73.1
4	China	11.9	48.1	40
5	U. K.	1	25.6	73.4
11	India	19.9	19.3	60.7
31	South Africa	2.6	30.3	67.1

Rank	Country	Agriculture	Industries	Service
41	Pakistan	22	26	52
55	Bangladesh	19.9	20.6	59.5
78	Sri Lanka	17.3	27.3	55.3
116	Nepal	38	21	41
169	Bhutan	25.8	37.9	36.3
173	Maldives	20	18	62

Source: Wikipedia, the free Encyclopedia <http//:www.wikipedia.com> 2008-10-13

2.5 World Agricultural System

Small land holders mainly fed up with rain fed farming and it is being carried out with high risk. However rapid changes in economic, technologies and demographic condition demands adjustment in small holders farming system. In 1987 the WECD called attention to the immense problem and challenges facing world agriculture for meeting present and future food needs for a new approach to agricultural development (WECD, 1987).

The World Bank Report 1983 has stated that larger farmers adopt innovation involving higher fixed cost at higher rate. All classes of farmers eventually adopt innovation, which are neutral to scale but larger farmer is typically among the early adaptors. This is also evident that the intensity of adoption may be higher on smaller farmers under the certain condition while in other case the opposite is observed. The conflicting evidence stern from the fact is that farm size is a surrogate for the number of factors.

During the past 50 years, agricultural developmental policies have been successful in emphasizing external inputs as the means to increase food production. This has greatly increased global consumption of agricultural product but it became apparent that aggregate increase in food production inputs such as pesticides, chemical fertilizer, farm machinery and animals feed stuffs. Pesticides, chemical fertilizer farm machinery and mechanical method of controlling pest weeds and diseases, in organic fertilizer have substituted for livestock manure, compost and nitrogen fixing cropping information for management decision comes from input suppliers, researcher and

extension rather than from local sources and fossil fuel have substituted for locally generated energy sources.(Altieri 1995 cited in, Poudel 2006)

2.6 Agriculture in Developed Countries

In the developed countries, there has been a steady growth of agricultural output since the mid-eighteenth century. This growth has been spurred by technological and biological improvements which have resulted in ever higher levels of labor and land productivity. The growth rate accelerated after the First World War and particularly after the Second World War. The end result is that fewer farmers are able to produce more food. This is especially the case in the United States, where in 2000 only 3% of the total workforce was engaged agriculture, compared with more than 70% in the early nineteenth century. For example, in 1820, the American farmer could produce only four times his own consumption. A century later, in 1920, his productivity had doubled, and he could provide enough for eight persons. It took only another 32 years for this productivity to double again, and then only 12 more years for it to double once more. By 2000, a single American farmer could provide enough food to feed nearly 100 people. Moreover, during the entire period, average farm incomes in North America rose steadily (U.S. Census Bureau, 1996).

2.7 Agriculture in Developing Countries

Over 2.5 billion people in the developing world grind out a meager and often inadequate existence in agricultural pursuits. To develop the economy of developing countries agriculture based strategy is required with at least three basic complementary elements: i) Accelerated output growth through technological, institutional and price incentive changes designed to raise the productivity of small farmers; ii) Raising domestic demand for agricultural output derived from an employment-oriented urban development strategy; and iii) Diversified, nonagricultural, labor-intensive rural development activities that directly and indirectly support and are supported by the farming community. To a large extent, therefore, agricultural and rural development has come to be seen by many as the sine qua non of national development (Todaro, 2004)

The agricultural performance in Asia was varied. In the Near East, there was a decline the rate of growth compared to the pre-1960 period. During the 1960s, both per capita

food production and agricultural production tended to stagnant, whereas in the 1970s and especially in the late 1980s and early 1990s food production rose sufficiently to provide growing increase in per capita output. Only in the Far East region of Asia (and to a much lesser extent in Latin America) has per capita production expanded steadily. Nevertheless, India's great drought of 1987 demonstrated the still insecure nature of food production in Asia (World Resources, New York: 1996-97).

2.8 Fragmentation and Subdivision of Peasant Land in Asia and Africa:

If the major agrarian problem of Latin America can be identified as too much land under the control of too few people, the basic problem in Asia is one of too many people crowded onto too little land. For example, the per capita availability of arable land in 1994 in India, China, and Bangladesh was 0.19, 0.08 and 0.07 hectares respectively. The land is distributed more equally in Asia than in Latin America but still with substantial levels of inequality. Throughout much of the twentieth century, at least until its last two decades rural conditions in Asia deteriorated.

Gunner Myrdal identified three major interrelated forces that molded the traditional pattern of land ownership into its present fragmented condition: i) the interventional of European rule, ii) the progressive introduction of monetized transactions and the rise in power of the moneylender and iii) the rapid growth of Asian Populations (Poudel 2006, cited in, Gunner 1968).

The sub-Saharan Africa is particularly acute. The United Nations FAO has repeatedly warned of catastrophic food shortages. In a majority of African Countries, the average per capita calorie intake has now fallen below minimal nutritional standards. The FAO recently estimated that of Africa's 750 million people more than 270 million suffer from some form of malnutrition associate with inadequate food supplies. From 1982 to 1994 the food crisis became much more widespread, with more than 22 nations threatened by severe famine, including, in addition to the Sahelian nations, Zambia, Tanzania, Malawi, Uganda, Botswana, Mozambique, Zimbabwe and Angola (World Resources: 1996-97).

A major reason for the relatively poor performance of agriculture in developing countries has been the neglect of this sector in the development priorities of their governments. For example during the 1950s and 1960s, the share of total national

investment allocated toward the agricultural sector in a sample of 18 LDCs was approximately 12 % even though agriculture in these countries accounted for almost 30 % of GNP and more than 60% of total employment (David W Pearce et. al., 1993).

2.9 Successful Agricultural Transformation: The cases of Israel, China and Indonesia

The agricultural development in the three nations Israel, China and Indonesia is discussed here assuming the situational changes in different time period. At present these countries have established themselves strong nations in the world. Their base of economic development was agriculture though they have shifted the economy towards industrialization and information technology at present.

The State of Israel covers an area of approximately 20,000 Km² but only 20% of it is arable land. 60% of Israel is desert and just 10% of the population lives there. The remaining 40% of the country is semi-arid land. It is densely populated, and holds 90% of the population.

Israel's population has a relatively high standard of living with an annual GNP of nearly US$ 18,000 per capita. The society is mostly urban, with some 92% of the population living in cities. Although 8% of the population lives in rural areas, only 2.7% of the total national work force is engaged in agricultural production. Most of Israel's agriculture is irrigated, although water is the most limiting factor. Agricultural production in the desert takes advantage of some unique conditions: abundance of land, high temperatures and intensive radiation. The main water source is either saline water or recycled sewage water. The crops are winter vegetables and flowers in greenhouses, dates, grapes and olives irrigated with saline water. Also dairy cattle are raised under reduced heat stress. The climate in the north of Israel is different which enables a great variety of crops to be grown: citrus, avocado, mango, grapes, apples, peaches, banana, dates, wheat, corn, cotton, peanuts, potato, vegetables, flowers, flower bulbs, etc. Animal husbandry consists mostly of dairy cattle, poultry and fish culture. Farming in Israel is highly sophisticated, capital intensive, and based on a high level of technology. One third of the agricultural production is for export, while two-third of the production is for the local market. Agricultural production in Israel is market oriented and geared mostly to supply the demand of the urban population. It

can in effect be considered as peri-urban agriculture. (Wikipedia, the free encyclopedia)

In addition, Chinese scientists and officials brought in technology from abroad and adapted it to Chinese conditions. In the 1940s and 1950s, Chinese scientists brought in cotton, corn, and sorghum varieties from the United States and elsewhere. These imported varieties and hybrids were gradually modified to be resistant to China's pests, diseases, and cultural practices (Stone, 1988). Chinese pesticides were copies of chemicals originally developed by private firms in the United States, Europe, and Japan but produced using methods of production developed in China. Agricultural machinery is based on Japanese, Western, and Soviet designs and modified to meet local needs. Improved breeds, feed, and management techniques have made major contributions to the increase in swine and poultry production. Imported breeds have made a major contribution to swine production. In the early 1990s, 30-50 percent of all hogs slaughtered were crossbreeds (Simpson, et. al, 1994).

Sutawan (1979) in his study on the impact of technological change in Indonesia has shown that there is a significant upward shift in the production function for HYV compared to local varieties. His study suggests that highest than higher production and production and productivity are attainable by means of increasing the rate of adoption of HYV together with the application of fertilizer, pesticides, insecticides and credit facilities.

Perhaps the most veiled generalization about the poor are that they are disproportionately located in rural areas, that they are primarily engaged in agriculture and associated activities that they are more likely to be women and children than adult male and they are often concentrated among minority ethnic group and indigenous peoples. We find that about two-third of the very poor scratch out their livelihood from subsistence agriculture either as a small farmer or as low paid farm workers (Todaro, et. al, 2005)

2.10 The Green Revolution

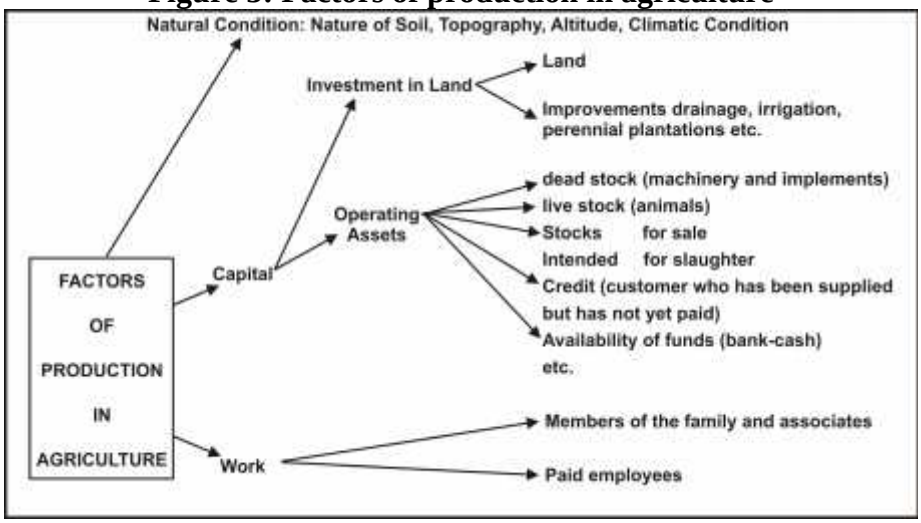
The green revolution is the name given to the world wide development in the late 1960s that allowed many countries to boost agricultural production and reach national

level food security. This was achieved by using high yielding verities of plants, particularly wheat. In south Asia, much of this happened in the wheat growing areas of northwestern India, particularly Punjab, Haryana and western Uttar Pradesh. The green revolution, however, has been mixed blessing. While the increase in food production has led to countries such as India becoming self sufficient in food, the over use of fertilizer and pesticides, as well as excessive pumping of ground water from privately operated tube wells has had negative environmental impacts (declining of ground water level, highly inefficient energy use in pumping, pollution etc). The green revolution has also been linked with altering the condition under which laborers and small land holders now operate, not all of them beneficial nor were production increase accompanied by needed improvements in the distribution and accessibility of food. Hunger and malnutrition are still serious problems (Dichhit, 2002).

2.11 Factors Affecting Agriculture

Sociologist economist, anthropologist and agronomist and geographers have spent much time and effort in studying factor that influences the adoption of technologies, Sociologist and anthropologist have identified many Sociological and anthropological factors inhibiting adaptation of new agricultural practices. These factors include the characteristics of rural countries; the proposal and situational characters of farmers and their families such as farmers age educational background the size and other characteristics of the business and psychological factors especially farmer's attitude (Achraya, 1998). The following figure clearly shows the factors of production in agriculture.

Figure 3: Factors of production in agriculture



Source: Prevost, 1997

2.12 Subsistence Farming

Schultz, the famous agriculture scientist, in his thesis 'Transforming Traditional Agriculture focused that farming that is carried out on with the factors of production used for generations may be called traditional/subsistence agriculture. Here the factors of production are categorized into four major group i.e. Physical factors, Economic factors, Technological factors and psycho-socio. The subsistence faming system in the study area is now compared to Schultz theory in this study. On the classic peasant subsistence farm, most output is produced for family consumption and a few staple food crops are the chief sources of food intake. Output and productivity are low and only the simplest traditional methods and tools are used. Capital investment is minimal; land and labor are the principal factors of production. The law of diminishing returns is in operation as more labor is applies to shrinking parcels of land (Todaro, 2005).

2.12.1 From Divergence to Specialization: Modern Commercial Farming

The specialized farm represents the final and most advanced stage of individual holding in a mixed market economy. It is the most prevalent type of farming in advanced industrial nations. It has evolved in response to and parallel with development in other areas of the national economy. General rises in living standards, biological and technical progress, and the expansion of national and international markets have provided the main impetus for its emergence and growth.

In specialized farming, the provision of food for the family with some marketable surplus is no longer the basic goal. Instead, pure commercial profit becomes the criterion of success, and maximum per-hectare yields derived from synthetic (irrigation, fertilizer, pesticides, hybrid seeds etc) and natural resources become the object of farm activity. Production, in short, is entirely for the market. Economic concepts such as fixed and variable costs, saving, investment and rates of return, optimal factor combinations, maximum production possibilities, market prices, land price supports take on quantitative and qualitative significance. The emphasis in resource utilization is no longer on land, water, and labor as in subsistence and often mixed farming. Instead, capital formation, technological progress, and scientific research and development play major roles in stimulating higher levels of output and productivity.

Production efficiency refers to yields per acre for crops produced and the production rates per animals for livestock enterprises maintained on the farm (Efferson1953, cited in, Todaro, 2004). Within the limits of the actual practice of farmers, the higher the production efficiency, the greater are the returns from farming. Good yields of crops and higher production rates for animals are more important in obtaining low cost of production and higher net returns per unit than any other management factor. Productivity therefore is related to efficiency (Jamison 1982 cited in, Todaro 2004).

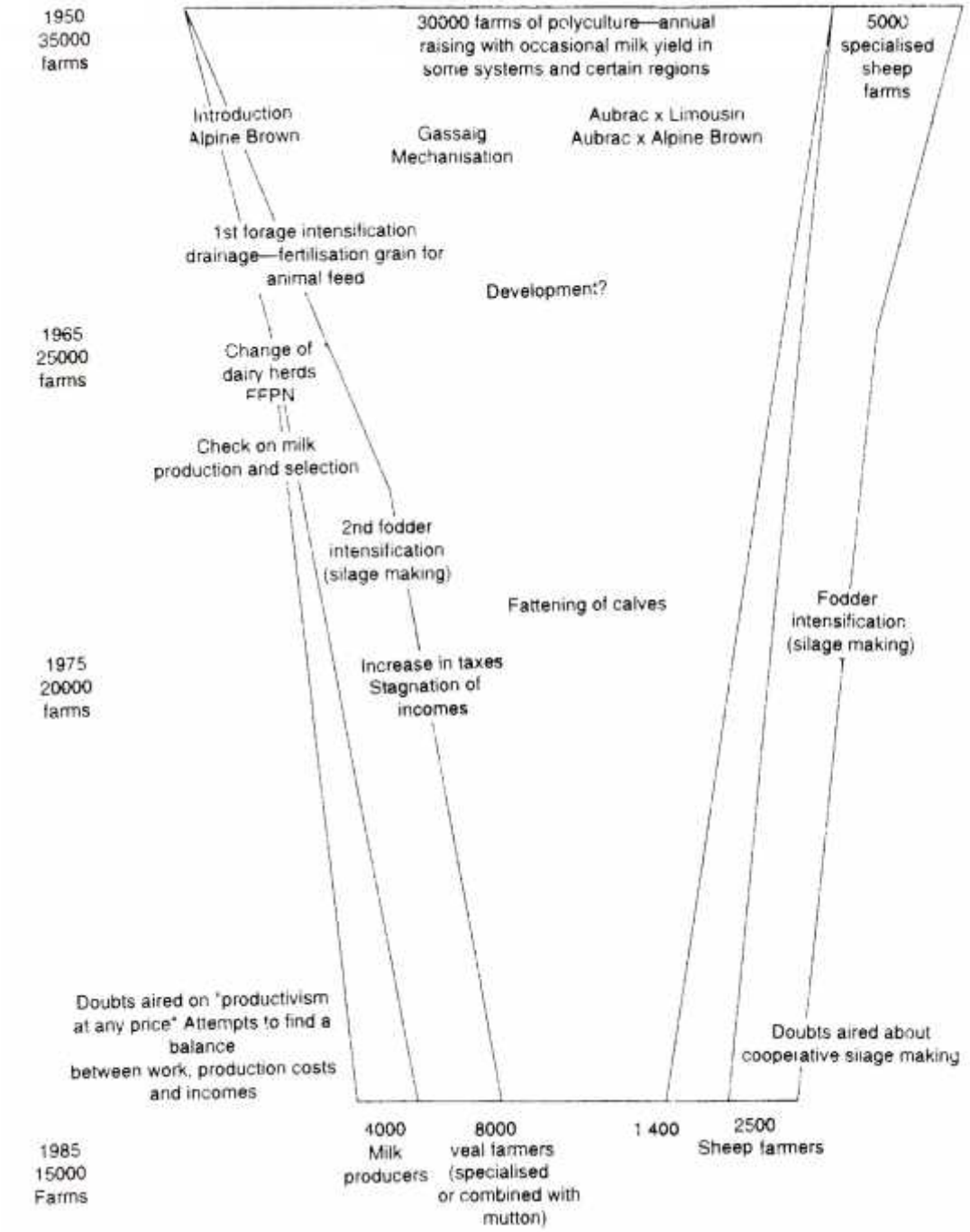
The general methods of improving crop yields include: (i) proper adjustment of the crops grown to the topography and soils of the farm; (ii) high quality seeds adapted to the area; (iii) timely applications of the proper fertilizer; (iv) adequate preparation of the land; (v) use of soil building crops ad proper crop rotations; (vi) proper drainage, terracing and irrigation where needed; and (vii) timely planting, cultivating and harvesting (Adams 1921; Efferson 1953 cited in, Todaro 2004).

In terms of differences in productivity, the world of agriculture in fact is comprised of two distinct types of farming: (i) the highly efficient agriculture of the developed countries, where substantial productive capacity and high output per worker permit a very small number of farmers to feed entire nations, and (ii) the inefficient and low-productivity agriculture of developing where in many instances the agricultural sector can barely sustain the farm population, let alone the burgeoning urban population, even at the minimum level of subsistence (Weitz, 1971).

Three types of efficiency are usually distinguished in the literature: technical efficiency, price (allocative efficiency) and economic efficiency (Farrell, 1957 cited in, Todaro, 2004). A technically efficient farm is one, which produces the maximum quantity of output for a given quantity of inputs, given the production function. A price efficient farm applies that quantities of inputs, which maximize profits, given of course the production function and the price, it face. An economically efficient farm is one that is both technically and prices efficient (Papads and Dahl 1991 cited in, Todaro, 2004). Within the limits of the actual practice of farmers, the higher the production efficiency, the greater are the return from farming.

The specialized example of agricultural development in the Averyon Segala is shown below. The specialization and commercialization of past 35 years (1950AD – 1985AD) reflects that even though population is increased the no of farms were decreased from 35000 to 15000.

Figure 4: Development in Agriculture in the Averyon Segala



Source Prevost, 1997

2.13 Rise of Commercial Agriculture

As the Middle Ages waned, increasing communication, the commercial revolution, and rise in cities in Western Europe tended to turn agriculture away from subsistence farming to wards the growing crops for sale outside the community. In Britain the practice in the closure allowed land lords to set aside plots of land, formally subject to common rights, for intensive cropping or fenced pasture, leading to efficient production of single crops.

In 16th and 17th century horticulture was greatly developed and contributed to the so called agricultural revolution. Exploration and intercontinental trade, as well as scientific investigation, led to the development of horticultural knowledge of various crops and the exchange of farming methods with products such as the potato which was introduced from America along with beans and corn and became common in north Europe as rice in south East Asia (<http://www.farming.co.uk>).

The industrial revolution, after the late 18th century, swelled the population of town and cities and increasingly forced agriculture into greater integration with general economic and financial pattern. The era of mechanized agriculture began with the invention of such farm machine as a reaper, cultivar, thresher, combine and tractor which continued to appear over the year of leading to a new type of large scale agriculture. Modern science has also revolutionized food processing. Breading programs have developed highly specialized animals, plant and poultry varieties thus increasing production efficiency greatly. All over the world, agricultural collages and government agencies attempt to increase output by disseminating knowledge of improved practices through the release of new plant and animals and by continuous intensive research into basic and applied scientific principle relating to agricultural production and economics. (Vyas 2004, cited in, Poudel 2007).

The green revolution strategy evolved when the problems of poverty and hunger were vied primarily as the problems of production. Production strategies were to exploit high agricultural production areas. Better quality soil and irrigated lands among farmers with substantial asset became the focal point of green revolution. The green revolution subjected farmers to forceful extension messages and new technology. They adopted the practices and awarded with higher yield. Intensification programs

discouraged farmer's traditional skills, including the habits of questioning, testing and reflection. This causes great erosion in indigenous knowledge (Jha, 2000).

2.14 Agricultural Economics

Economic growth is driven by technical change. Understanding the many factors that influence technical change is therefore key to an understanding of economic growth and its potential. Technical change has two aspects first, it has to be generated, and second, it has to be implemented. Incentives and Constraints in the Transformation of Punjab Agriculture, Research Report 87, examine the factors that determined the pace of implementation of new techniques in agriculture in Punjab, India, from 1960 to 1979. It is widely recognized that new crop varieties usually take many years to fully come into use. The same is true of other new practices; for instance, the mechanization of agriculture or, more recently, cultivation under plastic. This time lapse has several explanations. Producers have to learn to grow the new varieties, or more generally, to use the new techniques, which requires information. The use of more sophisticated techniques requires human capital, and farmers with inadequate schooling will be unable to adopt them quickly. At the learning stage, there is uncertainty as to the performance of the new techniques, so farmers consider them risky and are cautious about using them. Another element of risk may be that more productive varieties sometimes perform well under very specific climatic and soil conditions, but when such conditions are not met their performance may be poor. (Anya. and Mundlak, 1991)

2.15 Agriculture in Nepalese Economy

Nepal's agriculture particularly the hill and mountain is subsistence in nature and therefore, availability of food security from their own farm throughout the year is the life goal of the majority of the farmers (Sharma, 1994). This is evident from the fact that the farmers themselves used the factor of 'Food Availability' from their own farm to differentiate their standard of living (Joshi, et al., 1994).

With the sharp acceleration in agriculture, farm incomes will rise rapidly. Farmers will then have the purchasing power to boost the demand for high-value agricultural commodities-particularly milk, vegetables, and fruits- and for non agricultural goods and services from the small and medium-scale enterprises of villages and market towns.

Over the course of the twenty-year Agriculture Perspective Plan, the rural poor will decline by 5.5 million and the proportion of the rural population in poverty will be only one-quarter that at present. Ecologically fragile lands will revert to forestry and an increased area will be planted to soil-conserving tree fruits and to fodder crops, including fodder trees and legumes. As nonagricultural employment then gathers momentum, it will be diffused throughout the nation's market towns, thus slowing the growth rate of Kathmandu, with salutary environmental effects. The APP states the condition not only of accelerated growth in agriculture but also of employment growth, which is the key to reducing poverty in Nepal (NAPP, 1996).

Agriculture plays a vital role in evolution of agrarian culture in Nepal from ancient times. It has always been a major sector of economy of the country from ancient time to date. The total area of land available for agricultural activities is estimated as 25,98,970 ha. This is second biggest type of land use after forest in the country. Gross Domestic Product (GDP) of the nation contributed by the agricultural sector is NRS 1,83,357 million in FY 2060/61. Agriculture sector was contributing 39% of GDP in 2060/61 reducing from 51.22% in 2042/43. This reduction was because of development of other non agricultural sector of production of the country. Despite that the agricultural sector has remained the central concern of policy planner in the kingdom from the beginning of planned development intervention. Government expenditure in this sector has augmented to 8599.6millions of NRs in 2000/01 from 1367.9 NRS in 1974/75. So far total area receiving irrigation facility has been increased to 1001412 ha Agricultural sector provides employment for 65.5 percent work force of the country in2001 reducing from 94.3%in 1971 and 82.44 in 1996/97 (NPC, 2058 BS)

2.16 Nepalese Agricultural System

Nepal's economy is vulnerable with rugged topography and limited croplands. Of total 147000 Sq. km, land area limits to 17.0 percent, which is not all time suitable for cultivation of food and cash crops throughout the kingdom, except in the Tarai. Mid hill is especially appropriate only for tropical products (Dahal, 2004).

Traditional agriculture in Nepal essentiality a cultural characterization where traditional cultivation practices are being practiced from generation to generation and

have been prevalent and customary usage. Since the beginning of the ancient history agriculture alone is considered as productive one, for it yields so they believed the subsistence its works, the earning of its entrepreneur and surplus, while industry and trade would be sterilize. Nepalese agriculture are natured with traditional because of low capital, unskilled labor and lack of incentives towards environment on agriculture related works. Despite the unchanged of traditional agriculture there is necessities towards modernization if the country spends more of its resource on productive new plants and then proceeds spending more on education. To divert agricultural modernization there is equally need to developed new productive plants and trained manpower as well. Beside there are so many conditional factors that has to adopted for the modernization. These factors are physical; as well as institutional infrastructure expansion of agriculture, the use of science and technologies, extension program as well as experimental research policy should be laid down in the number of village's farms. Relevant research findings and its implementations program should be carried out towards he specified area (Poudel, 1986).

In general integration is higher in mid hills than in the Tarai. Hill and Tarai crops, livestock, trees pasture farming households and market are integral component of farming system. Nepalese farming system is enormous and diverse, different farming systems are followed by different ethnic groups. Family and non family labor are the major source of human labor in both hills sand Terai. Bullocks are important in both Terai and hills, but are still important in the hills because modern machinery can't be used in hills. Small farmers live in various intensities of marginal and fragile environment and fallow traditional farming system (i.e subsistence farming system). According to Pyakural 1998, in Nepal there are four types of farming system in practice. They are crop dominated farming system, horticulture dominated farming system, and livestock dominated farming system and integrated farming system.

Nepalese farming system are small farm based, and are highly intensified, diversified and complex. In recent years non traditional crops such as flowers, fruits and vegetable have been included into diversified agricultural programs to enhance the earning of foreign exchange.

A study of nature of agriculture in western hill economy by Gauchan (1998) finds that the farmers of western hilly region gives emphasis to cereals grains like rice, maize, wheat, potato, and barley. So far as the type of farming is concerned fruit farming, vegetable farming poultry farming etc. Ploughing, sowing, inter culture and harvesting is primitive in nature in this region. (Gauchan, 1998)

Adhikari (1981) studied chemical fertilizer use in Nepalese agriculture, and he finds the traditional production in Nepal is labor intensive with small field sparsely planted with seeds of mixed genetic type. Plants grown are also under tillage system of traditional agriculture. Evan most of the big farmers of the country have not applied capital intensive technique. Now the big farmers of the Tarai area are going to use capital intensive technique also such as tractor, chemical fertilizer, improved seeds and plant protection materials etc. In modernization agricultural animals' power and machinery are substituted for human labor than mechanical power replaced animal power. The increased use of agricultural inputs also modernized also substitute both land and labor.

The potential and exiting practice of agriculture in the nation are very much heterogeneous in terms of the variation in agro ecological and physiographic characteristics. High Himalayas is feasible for cattle and sheep rearing whereas hills carry potentiality in horticulture development. Tarai is feasible for various type of grain vegetable, and cash crops. Nevertheless, the fragmentized land holding and household based farmland operation practice constrained mechanization of the sector in the country. Whatever be the potential and comparative advantages in this sector, Nepalese farmers are operating their small holdings land for their subsistence purpose. Almost mixed farming practice s of vegetable, grains and fruits production combine with a small number of livestock raising are the prevalent pattern in Nepalese farm regardless of the different agro-ecological region. (APP Monitoring and Evaluation System, 2005)

Agricultural economics of rural Asia has always been centered on small farms that include maintenance and use of livestock. In this sense, almost all farmers in Asia are mixed farms. In Nepal, particularly in the mountain and hill areas, reliance on livestock had traditionally been even higher. Livestock has provided a sort of famine

insurance and has been important form of asset accumulation for the poor (Mid term evaluation of APP, 2006).

2.17 Agriculture in recent Planning in Nepal (last one decade)

Different planning's (APP, Ninth Plan, Tenth plan and Interim plan) regarding agricultural are discussed below.

Nepal Agricultural Perspective Plan (1997 – 2017AD)

The twenty years long term Nepal Agricultural Perspective Plan has mentioned the objectives: to accelerate the growth rate in agriculture through increased factor productivity; to alleviate poverty and achieve significant improvement in the standard of living through accelerated growth and expanded employment opportunities; to transform the subsistence-based agriculture into commercial one through diversification and widespread realization of comparative advantage; to expand opportunities for an overall economic transformation by fulfilling the precondition of agricultural development; to identify immediate, short term and long term strategies for implementation, and to provide clear guidelines for preparing periodic plans and programs in the future.

Observing the APP the researcher has selected the title to analyze the factors affecting the transformation of subsistence farming into commercialization with respect to the mid hill of Nepal.

Ninth Plan (1997 – 2002 AD)

In the background of natural resources of Nepal, agriculture and forest resource are the main basis of Nepalese economy, which contribute to rising living standard of the people. Indication of transformation in agriculture towards commercialization and diversification has been noticed in the areas with the transport, electricity and technology. Now it is a need transform subsistence agricultural development by reducing the pressure of increasing population and generating modern technology with existing utilization pattern and developing transport market mechanism (Ninth plan NPC,1998).

Tenth Plan (2002-2007AD)

Key goals and target set by the Tenth plan is, to reduce the overall poverty rate through the creation of income and employment-generating activities in the key sector like agriculture, an overall GDP growth rate of 6.2 p.a. at factor cost is also envisaged, together with a substantial improvement in agricultural growth to round 4.1 percent per annum. The rural area oriented poverty reduction strategy of Tenth Plan firstly stressed on the economy with strong potential for income and employment growth, the growth strategy will need to broad based and pro-poor, and focus on rural agricultural growth. For the broad based economic growth, prioritizing and refocusing policies and activities in the agriculture, irrigation, forestry, and power (rural electrification) sector are crucial for achieving agricultural growth targets. The major objectives set for the agricultural sector are to increase agricultural production, productivity and income, both to reduce poverty of rural farmers and increase food security. The tenth plan also seeks to promote agro-biodiversity conservation and environment protection, in addition to encouraging to the adaptation of need based technology. Likewise, one of the major objectives is to promote domestic agro-products in local as well as foreign markets. The growth strategies for agriculture to modernize diversify and commercialize crops by expanding the use of technology, and increasing the access of farmers to modern agricultural inputs and credit. Similarly to promoting the participation of private sector and NGO/ INGOs in service delivery, market promotion and infrastructure development, the main activities to implement the APP, includes package programme that promote smooth supply of fertilizer, provision of irrigation facilities, and expansion of rural agricultural roads, rural electricity and improving the market network. Policies and activities conductive to carrying out research and development will also be adopted.

Interim Plan (2007-2010AD)

In order to revitalize national economy, investment will be increased in physical infrastructures supporting agriculture. The agriculture is gradually transforming toward commercialization from subsistence system due to past development efforts. There has been an increase in production and consumption of cash crops. There is also coordinated mobilization of research, extension services, market, vocational development, food technology and quality control, supply of production inputs and rural infrastructure development and promotion work. There is an effective

emergence of cooperative, private and community organizations and corresponding decrease in involvement of government sector in the flow of services. The production of consumer goods is increasing more than expected. At the policy level, Agricultural Policy, 2004, and National Agricultural Vocation Policy, 2006 have been promulgated for the development of agricultural sector. In the agriculture and cooperative sector, the per person food consumption was 275 kg. while the target for the first year was to increase from 264 kg. to 286 kg., vegetable production (including non seasonal) was 80 kg. while the target was to increase from 66.74 to79.15 kg., fruit production remained 21.63 kg. while the target was to increase from 16.17 kg. to 17.89 kg., fish production was 1.87 kg. while the target was to increase from 1.5 kg. to 1.87 kg., meat production was 8.6 kg. while the target was to increase from 8.5 kg. to9.94 kg., milk production was 51 kg. while the target was to increase from 47.05 liters to 50.85 liters. The increase has been more than expected. Similarly, there has been diversification of production technology of herbs like chiraito, allo, and keshar. In addition, there has been development of farming technology of varieties of high-value agricultural production. Similarly, efforts are underway for diversification and modernization in the agricultural sector. Due to difficulties in transportation and non-competitive market, especially in remote hilly areas, food problem is complicated. Inability to effectively use investment and physical facilities, lack of intensive crops, inadequate supply and inadequate use of basic agricultural materials like chemical fertilizers, improved seeds, irrigation and credit; the weakness of market mechanisms, higher risk in production, ineffectiveness of agricultural extension services; and lack of agricultural research in required sectors are seen as major problems. There is food deficit in remote areas. There has been a decrease in food security due to lack of access to means and resources, inequality within the family, lack of emergency assistance; increase in the habit of eating easily available but unhealthy food. The lack of access of the landless and economically deprived groups to land, the continued existence of dual ownership in practice, fragmentation of agricultural land, non implementation of land use project, and lack of management of the landless and freed bonded laborers remain the main challenges. < http://www.npc.np>

2.18 Holding Size in Asia

The different countries whether they are large or small in area the per capita land holding size is differ to each other. The following table shows the land holding size in Asia.

Table 2.2: Per Capita land holding size of Asia

Countries	Size
Bhutan	0.10 hectare
Bhutan, Bangladesh, China, Nepal::	less than 0.20 hectors
Sri Lanka, Indonesia, Philippines, India. Laos	0.25 to 0.24 hectors
Myanmar, Cambodia, Thailand, Afghanistan, Malaysia	More than 0.5 hectare

Source: Tiwari, 1998

2.19 Land Holding Size in Nepal

The land holding size in Nepal on the basis of time series data is given below.

Table 2.3: Per Capita land holding size in Nepal

Year in AD	Area in hectare	Area in Ropani
1961	1.11	22.2
2001	0.80	1.6
2016	0.081	0.162

Source: Economic Survey2006/07

2.20 Nepalese Agricultural Market

Nepalese agricultural market is traditional. The organizations which are working on agricultural market are also being neutral. Some participatory organization (like *Shajha*) are busy for selling salt, sugar, seeds, manure etc. rather than to promote the farmers saving. Some organizations are buying milk, sugarcane, jute, tobacco, tea, coffee etc. But here is the lack of organized market for crops production, so that the farmers are deprived of getting fixed price. The production and productivity is less because of less output in agriculture. Actually Nepalese agriculture market can be found in different forms like daily, weekly, monthly, or in *hatbazar*. But now a day's market is being enlarged in some of the cities. People are running some systematize vegetables and fruits collection center to promote the agricultural market smoothly.

Lack of national market, lack of infrastructure , loss in distribution, small transaction, inability of delivery, lack of coordination are the key feature of Nepalese agricultural market. And difficulties of transport and collection, lack of market information, lack of storage facility, lack of institutional credit, presence of middle man, lack of grading and standardization, adulteration lack of farmers organization are the major problem of agricultural market in Nepal (Pant & Joshi, 2063BS). The Nepalese agricultural market is affected by import of Indian production. In order to improve Nepalese agricultural system, import of Indian yield should be checked and ensure the transportation of yield of small farmers, systematized agricultural market should be established in every district. (Sharma, 2065BS,)

Nepalese farmers don't have direct approach on market for selling their products. Many brokers are benefited by the present marketing system, it should be stopped and farmers are promoted by the decentralization of selling and collection centers. (Kantipur daily, editorial, year 16. vol. 35)

2.21 Technology and Innovation

Technology refers is the combination of knowledge, inputs, and management practices to achieve desired outputs. The technology must have newness, appropriate for the particular situation, economically profitable, with environmentally safe and sustainable. Transfer of technology is the transfer of knowledge, information, skills and adoption.

In most developing countries, new agricultural technologies and innovations in farm practices are preconditions for sustained improvements in levels of output and productivity. In many parts of Africa and Latin America, however, increased output in earlier years was achieved without the need for new technology simply by extending cultivation into unused but potentially productive lands. Almost all of these opportunities have by now been exploited, however, and there is not much scope for further significant improvement.

2.22 Modern Technology

Technology is a skill, knowledge, and producer for making, using, and doing useful things. Agricultural technology refers to use in improving agricultural production. "If

production is continued an old established methods, not much can be produced even if the land were rich and people worked hard. Application of science and technology and the other hand, enables greater production even soil are poor and men devotes less labor" (Sadhu & Singh, 2005).

Technology plays the basic role in making production possible. If the input is not selected properly, either there may be no production or low production. The selection of appropriate technology is important to ensure the continuation of effective production system in society. The nature of agricultural technology has been changed gradually from its traditional character modern stage. Improved agricultural technologies have also developed and enriched the farmer's harvest. The last few decades after the Second World War have witnessed significant advance in farm technology and yields rate have increased beyond expectations (Sadhu & Singh, 2005). Especially modern agricultural technology consist of chemical fertilizer, plant protection, (insecticides, pesticides), improved seeds, mechanization, irrigation etc.

Rajendra (2006), in his study in Nepal stated that, the activities like manure carrying and dispersing, chemical fertilizer application, spreading seeds, planting and weeding and marketing are done by women. In addition activities like land preparation irrigation harvestings are done by both women and man. Activities like chemical fertilizer application, buying seed were done by men.

Chourisea and Shing (1972) found that the yield of HYV rice was about three times as larger as that of local verities and that of new return of HYV was around 236 percent higher than that of local varieties in 1968-69.

2.23 Review of Empirical Studies

To examine the situation of transformation of farming in the study area, it is contextual to analyze the similar studies performed in the similar setting. The different studies made by different researchers would give the inferential analysis for the study.

Gender and Agriculture

Woman in Nepal are working primarily in agriculture and are involved in income generating activities. They contribute a very significant contribution to GDP, but they have very little access to economic resource that they generate. The agricultural sector contribute to 40% of total GDP of Nepal and out of which more than 60% is contributed by women (FWLD and TAF 2003, quoting Adhikari 2006). Now a days the participation of woman in commercial vegetable farming, marketing and market related decision making is increased. Women have played a major role in manure carrying and dispersing, chemical fertilizer application, planting, weeding and marketing. Men cooperation is increased in domestic chores after adopting commercial farming. Men start to consult their women counter parts before making decision in household as well as in community level. Woman work load has been increased because of commercial farming and again the work load has been decreased slightly in household chores. Woman's role has been diverted from household work to productive and communal work.

The income has reduced women's dependency to their men counter parts. Women are also able to establish self-help saving credit group. This has improved their bargaining power, decision making roles in household as well as community and ultimately building their capability. The commercial vegetable farming has increased women's access to land, and control over resources. It has also increased social prestige, decision making power, organizational activities and exposure. In aggregate women have empowered them significantly, women are empowered socially, technically and economically through the commercial farming. The increase in income level of the women have changed the lifestyle and thinking pattern. The light of fact that woman have carried out about 60.5% of the agricultural work in Nepal. But women have limited access to resources and only limited control over those they can access. Of the total land holding woman own only 8.1% and average size of their land is just two-third that of average men holding. Only 4% HH have women ownership of both house and land. Marital status determines woman's access to land and other property (UNDP 2004, cited on Adhikari, 2006). While in the case of agricultural land the woman ownership is hardly 4.4%, regarding the land holding as higher as 81% women own less than 1ha. of land. Now day's women have come out from the house and do every kind of work, women's contribution is not only important for

production, but also for reproduction and communal work. So that women's bear triple work responsibility in Nepal (Adhikari, 2006).

Uprety (2004) in his study in Nepal stated that woman work longer hours than man. Regarding the decision for on farm activities outside the household, woman plays the major role in selecting seeds because if their better knowledge about the yield. They are also good in preserving the seeds. But man makes more decision for the land preparation whereas woman influence decision about the transplantation. Decision for weeding and harvesting are jointly made. Decision on post harvest activities are generally made by women. Decision on marketing of food grains in larger quantity are made by men. But women do also make decision about the sale of vegetable, milk and similar quantities of food grains.

Nakro and Kikhi (2006), studied about the women vegetable vendor under title "Strengthening market Linkage for Women Vegetable Vendors: experience from Kohoma.Nagaland, India". Here they observed that 90to 95 percent of vendors were women. Women looked after the management, cultivation, harvesting and processing of the crops. Although the men sometime helped to bring their product to the local market, (Adhikari, 2006)

Rajendra may have urge that the participation of married women in the work force is associated with smaller families. More precisely, the probability of mother being employed outside her home is influenced by the number on infant of child caring age (Peek 1978:51), and her marital family's wise, especially her husband wise. Small children need supervision and attention while they are growing up. The most likely person on the family to care the young children is the mother. So, if she does look after her own children, it will be difficult for her to accept employment in the modern sector, for example factory work. Child care activities are incompatible with this kind of modern employment. However, if the mother is working informally around the house, for example, vending and processing food, she can easily combine child care with her income earning work. Agriculture field work falls in the same category. Women can take their children to the field and care for them while they are working. Therefore, according to this argument vegetable growing and selling is very suitable for women farmer to earn cash income.

Upadhya (2004), stated that majority of activities pertaining to vegetable farming under drip irrigation in study areas (Three village of Palpa District of western Nepal) is carried out by women, men's involvement is relatively limited, Data show that a total of 186 labor is required for vegetable production in dry season, in which women contribution is significantly higher(86%). The total man hours used for irrigation for vegetable production is highest (80 hours) in comparison with other activities. Interestingly activities like harvesting, weeding, fertilizer application and marketing are completely dominated by women. Women spent total of 328 hours per annum for vegetable farming while man spent only 44 hours. Nepal remains one of the lowest ranking countries in terms gender related development indicator (GDI), which clearly illustrate the gender inequality prevalent in the country. It is also evident that those countries that are lower achievers in GDI are predominantly represented under low income food deficient countries and so is the case of Nepal.

Labor

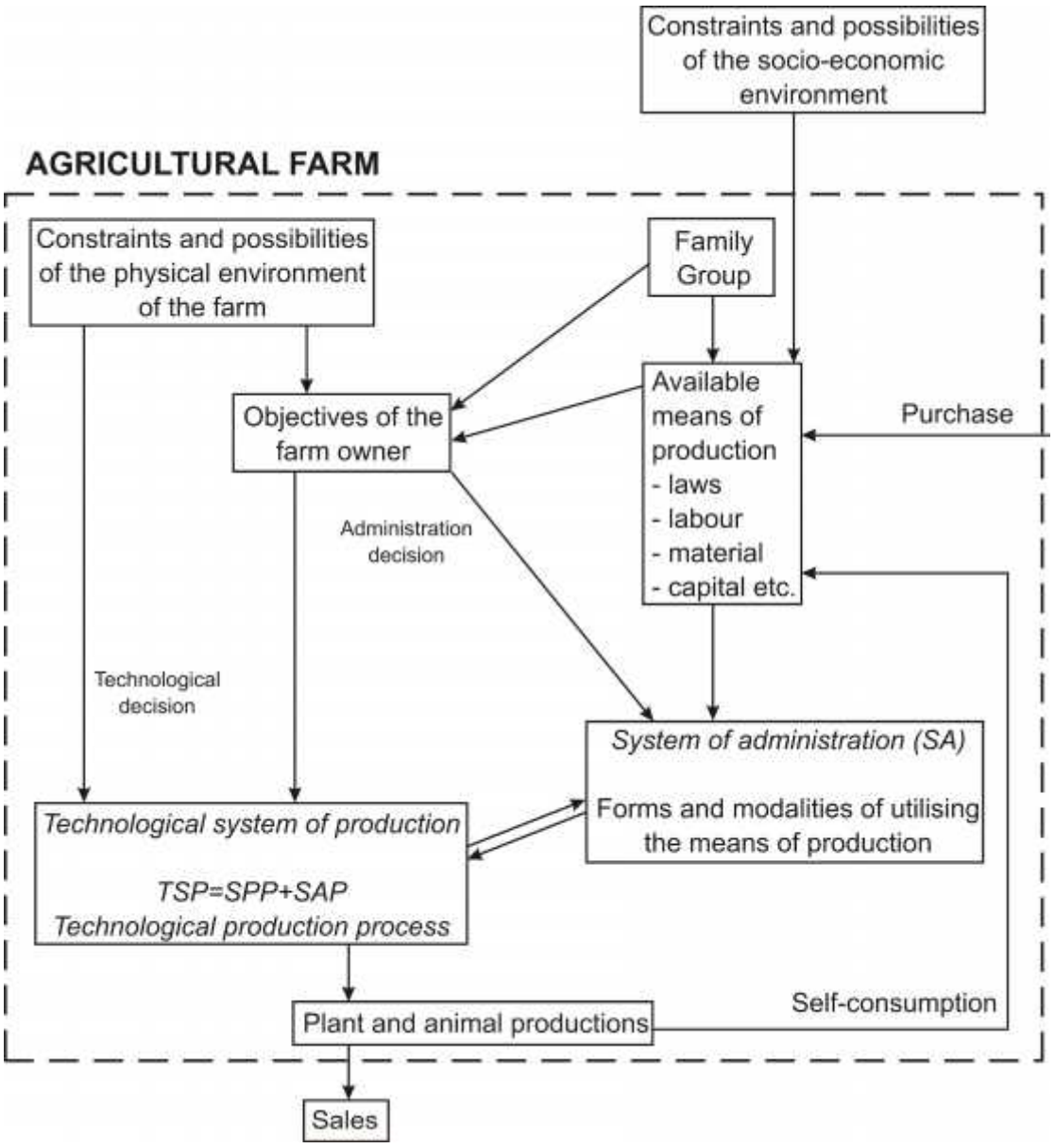
In production of services, whatever work is done by household members productivity of labor and labor cost are not maters of concern at all. Such subsistence agriculture with a component of cash crop had rendered an increased standard of living on Java. Despite the rapid population increase, intensive labor utilization in every process of farming and double cropping made this achievement possible (Tiwari, 1998). Intensive and multiple cropping systems, water management through appropriate irrigation systems, diversification of agricultural activities by specialization and /or adoptions of innovations. Introducing high yielding varieties, using modern appropriate technology and agrarian reform are major components that have the potentiality of intensifying labor absorption in agriculture, improving its productivity.

Farm land

In the rural context, agricultural land is the major resource and there is some capital resources have been utilized for employment creation and income generation. People have carved stiff slopes and constructed terraces their in for crop production. (Tiwari, 1998). *Khet bari*, *kharbari* and *parti* are the major land types reported across all the peri urban of Pokhara Municipality. Broadly two types of land used systems: *Khet* and Bari were reported in the area as elsewhere in Nepal. The proportion of *Khet* land was the lowest in Amlachaur Arva in comparison to other sites. (LIBIRD, 2005).The

River basin of Bijaypur River traditionally called the '*Arba ko Ghari*' is one of the fertile *Khet*/land. The following table is a model of operation of farm land.

Figure 5: Model of operation of an agricultural farm



Source Prevost, 1997

Distribution of landholdings

In the hill and mountain belts the ratios of *Pakho* is distinctly greater than of *Khet*, the ratio is more than double particularly in hill and mountain valleys. *Pakho* would require more labor, yet production output would be less than in *Khet* lands. Scholars have identified the two views regarding distribution the first view in "since land is major source of income in the rural area.. …differences in landownership translate

directly into differences in the income distribution. The structure of land ownership is therefore a major contributory cause of rural poverty. (Tiwari 1998, cited in, Seddon 1987)

"In Nepal, ownership of land, the overwhelming item of wealth and thus receipt of income, is very concentrated. Two percent of all rural households cultivated about 27 per cent of the land, Three recent publications provide estimates for concentration of income which show Nepal as having one of the worst income concentration problems in Asia" (Tiwari 1998, quoting Butterfield 1979). "The second group of experts argued that the inequalities in land distribution are far from serious since the large landowners with more than 5 hectares in Nepal 'would be small elsewhere in the world". Land holding is one of the major indicators of wealth in the majority of farming communities in the peri urban of Pokhara municipality. 92.2 percent possessed their own land. In case of Arva 8.1 percent was land less. The size of agricultural land holdings in the area ranged from 0.26 to 50.44 ropani (i.e.0.02 ha. - 3.88 ha.), the size of land holdings was higher in Brahmin caste.(LIBIRD, 2005)

Quality of Land

The issue of land quality is related to the sustainability of agriculture… Farmers' assessment of the present quality of land by ecological belt indicated that most landholdings in the hilly and mountain belts had not undergone any change overtime. However, a small proportion of farmers, i.e. less than one fifth had experienced some improvement in soil quality. Contrary to it more than one fifth had experienced degradation in quality of land. Likewise, the same proportion of farmers from the hill and mountain valleys and one quarter from the Terai plains reported worsening of the quality of their lands. (Tiwari, 1998)

Fragmentations of Landholdings

Fragmentation of landholdings might have happened for two reasons. First given their closeness to the homestead household heads, while buying new pieces of land, does not consider the increase on the number of plots. Secondly the subsistence farming practice required at least three plots to produce corn. Millet and dry paddy or some additional plots which are too low value yet make cultivation of minor crops like taro means and legumes possible. Furthermore "on the average more than two and up to

eight plots were hold by various categories of farm households in the different ecological belts. Households in the hills and mountain valleys hold the largest number of plot i.e. six plots on average." (Tiwari, 1998)

Crop Cultivation

"Crops are cultivated mainly to fulfill the food requirements, feed livestock and if possible, earn some cash". In Nepal the various types of crops are cultivated, they include cereal crops various types of paddy, corn wheat and millet. Pulses, oilseeds, roots and tubers potato, yam, taro. Thatch forest and other minor crops including buckwheat, fox-tailed millet, *lete* and amaranth. There is significant variation in deed in the production of identifies crops unlike the situation in the upper Pokhara valley where there is no significant variation (Tiwari 1998 quoting Thapa and Wever 1990).Corn, millet, ginger, thatch and other crops were produced most by farmers in the hill and mountains ridges and least by farmers in the terai plains. In the hill and mountain belts corns are the major crops followed by millet and pulses in *Pakho* and paddy and wheat crops in *Khet* lands as complementary ones. There is diversified cropping pattern in hills and mountain belts.

Cropping Intensity

Cropping intensity is a process of efficient utilization of limited land resources for higher production by doubling or tripling crop cultivation in a plot or part of plot land. Farmers in this region are found producing 1.72 hectare crop for every 1.00 hectare of landholding. The index of crop intensity is lowest among the households with marginal farm size in the Terai plains (Tiwari, 1998).

Crop Diversification

On an average, farmers are producing six crops per year or four to eight crops annually. A subsistence oriented production strategy implies that the higher the diversification in the stronger would be the household economic base. Marginal and small farms with their holding of vary small size could not grow as many crops as the medium and large farm households (Tiwari, 1998).Similarly a study made by LIBIRD Pokhara has stated that in Arva, Paddy, Maize, Millet, taro, Wheat, are the main crops produced. Fruits like Peach, Pear, Orange, Banana, Jackfruit, Papaya, Mango, Lime, and Guava are produced (LIBIRD, 2005).

Input Use

Extent and intensity of the use of inputs like modern varieties manure traditional plant protection chemical fertilizer, plant protecting chemicals modern tools like iron pew, tractor, machinery; production play crucial roles in increasing output and hence income and satisfaction. Manu ring is a traditional practice, with negligible negative effects. The proportion of households using manures is decreasing from the hill and mountain ridges through the valleys and more than half in Terai plains. The traditional plant protection measures have now been replaced by pesticides and insecticides, which are largely used in areas where the green revolution has make and impact. The plant protectors like Pati (Artemisia vulgaris), a shrub Asuro (adhatola vasica); Khirro (Sapiuym insighne); and bush plants as we as litter form specific plants were biological means used to teat soils.

About one quarter of the farmers were using those traditional plant protecting inputs, whereas only 11.4 percent farm households are using plant protecting chemicals. At, it's maximum in the hill and mountain valleys. Input Statistics reveled that modern inputs had been used only by few households, with the exception of the use of chemical fertilizer used by 62.2 percent of the large farm size. (Tiwari, 1998). Similarly 96.1 percent HH reported to have compost in their farms and 66.8 percent HH also reported to have used chemical fertilizers. Farmers reported to have used the highest dose of compost in Taro (40.8 t/ha.) and than Maize (21.7 ton/ha.). Rice, Wheat and vegetables were the major crops fore which farmers used chemical fertilizer. However the trend of using chemical fertilizer has neither been increasing nor decreasing for the last couple of years. (LIBIRD, 2005)

Draft Power Utilization

Draft animals are raised by 66.6 percent of the farm households. The common procedure is traditional one using a pair of oxen, one ox each reared by out of two form households are sharing them for plowing. Those who are not rearing oxen are mostly restoring to contract plowing. Others not involved in either sharing of oxen or contracting would replace draft power with human labor. (Tiwari, 1998)

Market

The dominant market mechanism in the rural areas is the function of demand and supply of agricultural produce and wage labor. Most produce and wage labor do not enter the formal markets therefore the formal market mechanism and the price of wage do not fully affect the rural people (Tiwari, 1998). Whereas marketing of agricultural products for cash income was not common in peri urban of Pokhara. Some farmers from *Amalachaur* Arva were found to be selling potatoes and rice in nearby markets. Except seasonal vegetables, the marketing agricultural produces was carried out during the winter season (LIBIRD, 2005).

From the above literature, it was found that, regarding the transformation of agriculture different scholar (Schultz, Mellor, Todaro and Prevost) propounded the postulate, different plans and strategy are purposed. Since very long, so many researches were done in different aspect of agriculture and its different components even though the farming system is in stagnant condition. NGOs / INGOs/ GOs paid attention to agricultural transformation, modernization and commercialization. Agricultural issue always in the core of first five years plans to present, twenty years long Agricultural Perspective Plan (APP) is working, all budget address the agriculture but no change was found due to psycho-social condition of the Nepalese society. So this study searched the different factors focusing in psycho-social factors affecting on transformation and obstacle/ hindrance on transformation of agriculture.

CHAPTER III

RESEARCH METHOD

3.1 Study Area

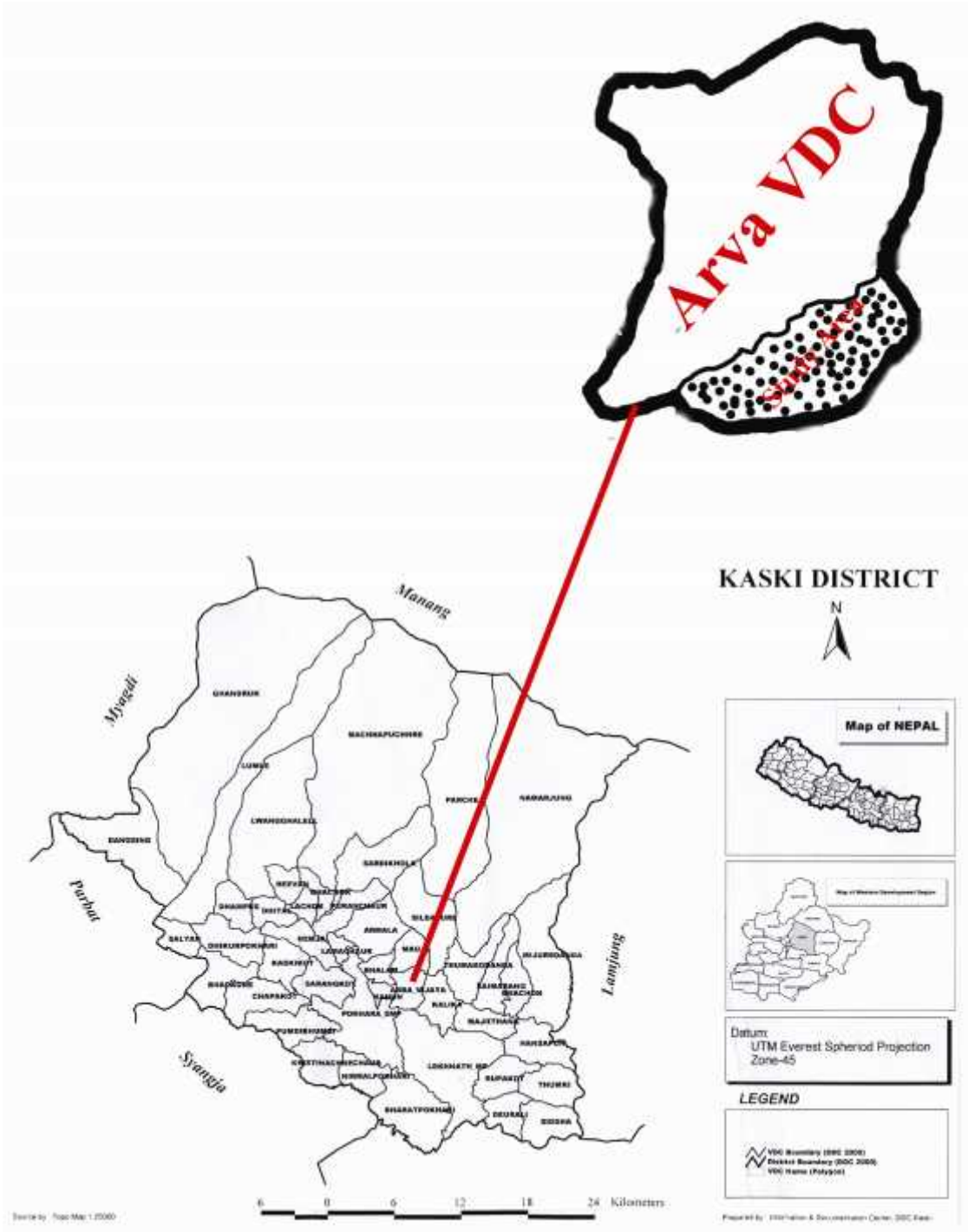
The proposed study area is Arva VDC. It lies in the Pokhara valley and about 2km east from the regional headquarters of WDR, Pokhara and occupies an area of 14.6 sq. km having total population 2720 according to National Population Census 2058 BS within 769 households. Although the study area lies outside the Pokhara Sub Metropolitan City, it is a part of the peri urban farming having high influence from the market function of Pokhara valley. Study area is situated at the altitude of 1392 masl from the sea level. Geographically the area lies in Mahabharat range and extending from west to east, with southern face. Among the nine wards, the study had been carried out in the wards 2, 3, 4 and 5 only. The real study area has about 327 households and 1502 population (DADO Kaski 2062/63). It has heterogeneous types of community including Bhramin, Chhetry, Gurung and *Dalits*. Agriculture is the major occupation of the people. Some adults are *lahure*, some are job holders. Most of the people are Hindus. In Arva about 83% people are engaged in agricultural activities (CBS, 2001). In the study area about 70% economically active people resided, where the number of female exceeds male (Annex Table1).

3.2 Rational of Selection of Study Site

This research has been conducted on Arva VDC, which is situated 2km far from Kaski headquarter. The following are main base for the selection of the study area.

1. This particular district represents the whole middle hill part of the country Nepal, which ranges from 450m to 8091masl. Although being small village, Arva VDC has the diversified types of soil, physical setting, and agricultural diversity.
2. The area is easily accessible from the district headquarter by vehicles.
3. This is one of the best renowned villages for the agricultural production. The River basin of Bijaypur River traditionally called the ‘Arba of Ghari’ is one of the fertile *Khet*/ land.
4. The farmers are considered to be very active; they work most of the days.
5. The study sites also represent heterogeneous society and ethnic composition.
6. DADO Kaski has selected Arva as the pocket area of vegetable production.
7. Agricultural service centre is also situated in this area.

Figure 6: Map of Study Area



3.3 Research Design

The major emphasis in this study is to diagnose and analyze the condition of farming and find out the factors of transformation as well as hindrances on farming. Descriptive, Exploratory and Analytical Research Design have been used for this research.

3.4 Sampling Method

Both non probability as well as probability sampling methods is used in sampling**.** Out of nine wards of Arva, four wards were purposively selected on the basis of high agricultural activities both from the recommendation made by DADO, Kaski and general observation. The pocket area for agriculture and literally known for the famous *Arvako Ghari* is situated in wards 2, 3, 4 and 5 respectively. The most recently LIBIRD Pokhara and JICA in past had launched their agricultural programme in these wards.

Observing from the voters List of Arva VDC Ward No.2, 3, 4 and 5 only 327 households were found. By the help of the key informants it was identified that out of 327 households of study area Arva VDC Ward No.2, 3, 4 and 5; 236 Household were at least engaged in agricultural activities. Out of them 148 (62% of 236 HH) households were selected by using Simple Random Sampling method taking help from the internet source. (Annex Table13) and the household hands were selected as the respondent of the research.

3.5 Nature and Sources of Data

Both primary as well as secondary data were employed in this study. But the primary data and information was extensively utilized as the main source of this research work. These primary data were both quantitative as well as qualitative. Equal importance has been given to both quantitative and qualitative data. Quantitative data were collected mainly from interview schedule and qualitative data from focus group discussion, key informants interview, and case studies method. Some secondary data and information were also extracted from the different published and unpublished sources such as journals, books, articles, village profiles, etc as per need**.**

3.5 Data Collection Techniques

The following techniques were applied in collecting primary data.

a. Interview Schedule: A detail interview schedule was developed with the help of supervisor and on the basis of observations. The pilot test was done and the questionnaires were re-edited. For the interviewing procedure a group of six persons were oriented how to get the real information. (Annex 1)

b. **Focus Group Discussion:** For the qualitative information a focus group discuss on was hold in the study site. The farmers from different groups had shared their views regarding the transformation system of farming (Annex 2). The name of the farmers is given in Annex 6.

c. **Key-Informants Interview:** For the real information key informants were selected on the basis of political leader, real farmer and extension workers (Annex 5). A set of questions were asked to them (Annex 3).

d. **Observation:** A full cycle observation was made in the study area to observe the farming activities. (Annex 4)

3.6 Methods of Data Analysis and Presentation

All the collected data from the field were analyzed both qualitative as well as quantitatively as per their nature. The information collected from the field were coded, and entered to the computer using statistical package for social sciences (SPSS12). Simple descriptive statistics such as percentage, mean etc were used to analyze the data and necessary tables and figures were prepared and inserted under suitable headings. Central tendency (mean, median, mode, standard deviation, range coefficient of variance), Coefficient of variance, graphs and figures were also included in the thesis report to support the analysis and discussion. Much more qualitative data were manually managed and analyzed.

CHAPTER IV

SOCIO ECONOMIC COMPOSITION OF THE RESPONDENTS AND STATUS OF FARMING

In this chapter the general discussion is carried out for the consistency of the objectives and data received from the field survey. The discussion is carried out in major four groups considering the factors related to the assumptions.

4.1 Socio- Demographic Status of the Respondents

Respondent represents the multi ethnic and heterogeneous features in Arva. There is diverse caste ethnic composition in study area dominated by Brahmin, followed by *Dalits, Chhetry* and *Janajaties*. Dailts were found most deprived community group in the study area. The total respondents were 148 in numbers out of them 81 percent were male and 19 percent were female. The age of the respondents ranges from 30 years to 80 years, the mean age of the respondents were 54.82 years while the most of the respondents were 50 years. The family size ranges from nuclear (only one persons) to joint (16 Persons) with mean family size 5.64 persons. Most of the family contained 5 persons (Annex Table 4A). Nepal has two major religion; Hinduism and Buddhism among them majority of the people (86.51%) are Hindus and only 7.78 percent are Buddhist. But in the study area the entire sampled households were found Hindus (Table 6). All of them verbalize Nepali language.

4.1.1 Sex of the Respondents

The age of the respondents ranges from 30 years to 80 years, the mean age of the respondents were 54.82 years while the most of the respondents were 50 years. Following table describes about the sex of the respondents (Annex Table 4A).

Table 4.1: Sex of the Respondents

Sex	**Frequency**	**Percentage**
Male	120	80.1
Female	28	19.9
Total	**148**	**100**

Source: Field survey 2008

The total respondents were 148 in numbers out of them 81 percent were male and 19 percent were female.

4.1.2 Age group of the Respondents

The total respondents were 148 in numbers out of them 81 percent were male and 19 percent were female. The age of the respondents ranges from 30 years to 80 years, the mean age of the respondents was 54.82 years while the most of the respondents were above 50 years (Annex Table 4A).

Table 4.2: Age group of the Respondents

Age	Frequency	Percentage
30-39	18	12.2
40-49	26	17.6
50-59	43	29.1
60 and above	61	41.2
Total	**148**	**100**

Source: Field survey 2008

The total respondents were 148 in numbers out of them 12 percent respondent were lies between 30 to 39 years age group. Two fifths of respondents were the elderly people. The age of the respondents varied from 31 years to 80 years (Table 4.2).

4.1.3 Ethnicity of the Respondents

Respondent represents the multi ethnic and heterogeneous features in Arva. There is diverse caste ethnic composition in study area dominated by Brahmin, followed by *Dalits, Chhetry* and *Janajaties*. Dailts were found most deprived community group in the study area.

Table 4.3: Ethnicity of the Respondents

Ethnicity	Frequency	Percentage
Brahmins	121	81.8
Chhetries	7	4.7
Janajaties	5	3.4
Dalits	15	10.1
Total	**148**	**100**

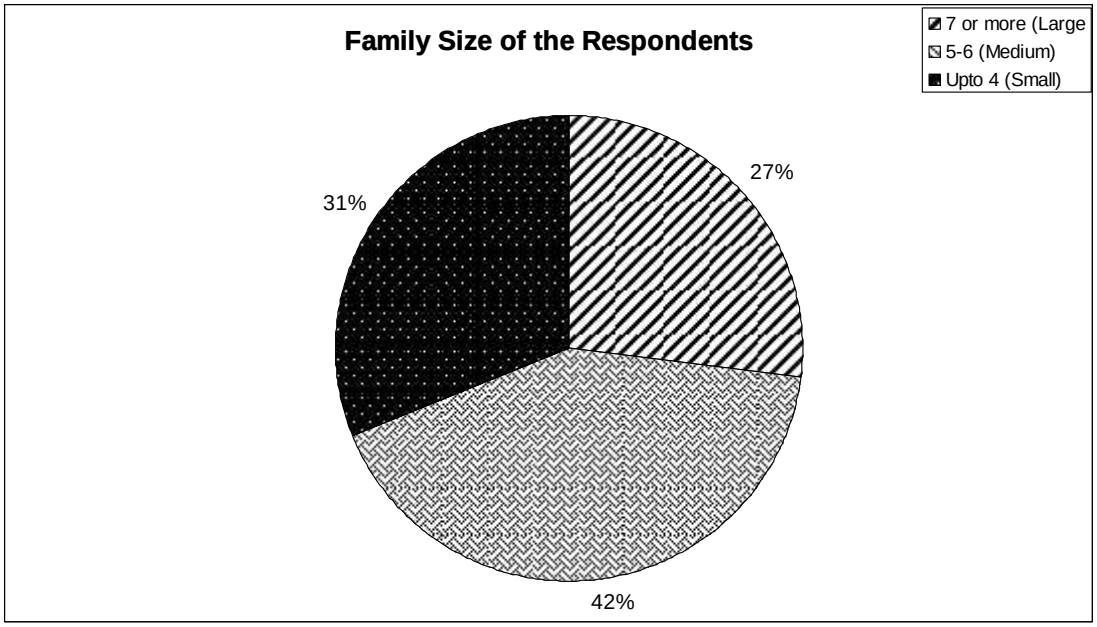
Source: Field survey 2008

The total respondents were 148 in numbers out of them 86.5 percent of respondents were *Bramins* and *Chhetries* (Table 4.3).

4.1.4 Family size of the Respondents

Family size has the important role on farming, grater the family size higher the availability of farm labor. The farmers who can contribute more time on farm land can produce more. Family size of the respondents ranges from minimum one to maximum16 members, the average is 5.64 members in a family. Annex Table 4A *reveals* that most of the households had 5 members in their family.

Figure 7: Family size of the respondents



One fourth of the respondents had 6 and above family size whereas family size having 5 to 6 were in majority covering 42 percent, the 31 percent respondents were in nuclear family having up to 4 persons in the family (Figure 7). All of the respondents reported that they follow Hinduism.

4.1.5 Education of the Respondents

Education has been regarded as a vehicle of change of development. How ever in Nepal, due to traditional 'value system' prevalent in the society and gender discrimination at homes, most women and girls have been deprived of educational opportunities. Table 4.2 reveals that the education of the respondents.

Table 4.2 Educational Attainment of the Respondents by Sex

Education has been regarded as a vehicle of change and development. The following table describes about the education of the respondents by sex.

Table 4.4: Educational distribution of the Respondents by Sex

Sex	**Male**		**Female**		**Total**	
Education of Respondents	Freq	Per	Freq	Per	Freq	Per
Illiterate	29	19.6	18	12.2	47	31.8
General Education	41	27.7	7	4.7	48	32.4
School Education	33	22.3	3	2.0	36	24.3
Campus Education	17	11.5	0	0	17	11.5
Total	**120**	**81.1**	**28**	**18.9**	**148**	**100.0**

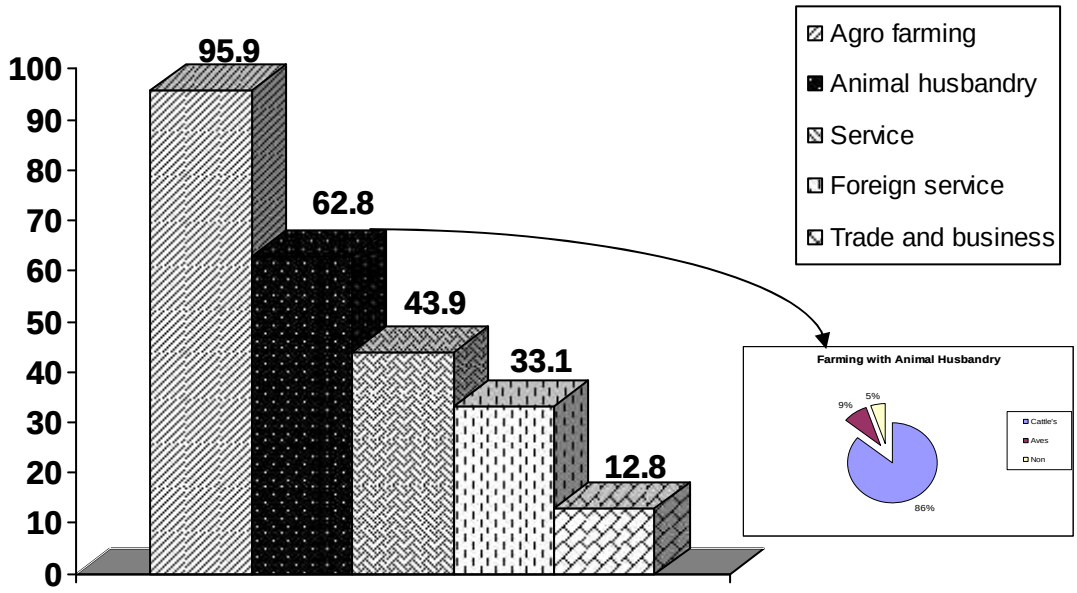
Source: Field survey 2008

About one third (31.8%) respondents were illiterate, about same percent (32.4%) were literate only, about one fourth (24.3%) had taken school education and 11.5 percent had taken campus education (Table 4.4).

4.1.6 Occupational Structure

The main source of livelihood in the study area is agriculture. The economy of Arva consist predominantly of agro-farming, followed by animal husbandry, service, foreign service and very few in trade business.

Figure 8: Occupational Structure



The majority of the respondents (86.5%) answered that their major occupation was agriculture and few of them were engaged in off farming activities like service, foreign service, trade and business. 96 percent respondents having major source of income agro-farming, 62 percent having animal husbandry, 44 percent in service, 33 percent in foreign service, and the least (13%) are in trade and business. The practice of animal husbandry was dominant, 93 percent farmers performed animal husbandry. They also keep the aves in their farm. Main source of income in the study area is agriculture Figure 8.

4.2 Cropping Pattern

Crops were cultivated mainly to fulfill food requirements, feed livestock and if possible, earn some cash. Depending upon the types, size and quality of land and availability of labor, the process of crop cultivation is discussed in this section, with the premise that substantial proportion of cereals and cash crops were produces at high degree of intensity and diversification. This would not only increase employment but also increases production and hence boost food sufficiency and income. The economy of Arva consists predominantly of the cultivation of cereals production, vegetable cultivation, horticulture and livestock rearing and so on.

Table 4.5: Cropping Pattern by Area of Farm Land (Figures are in %)

	Area of Land				
Yield Varity	**<5 Ropani**	**5-10 Ropani**	**10-20 Ropani**	**>20 Ropani**	**Total**
Cereals	51.4	23.0	16.2	7.4	98.0
Horticulture	30.4	19.6	12.2	8.1	70.3
Vegetable	48.6	23.0	14.2	7.4	93.2
Herbs	4.7	.0	.7	.7	6.1

Source: Field survey 2008

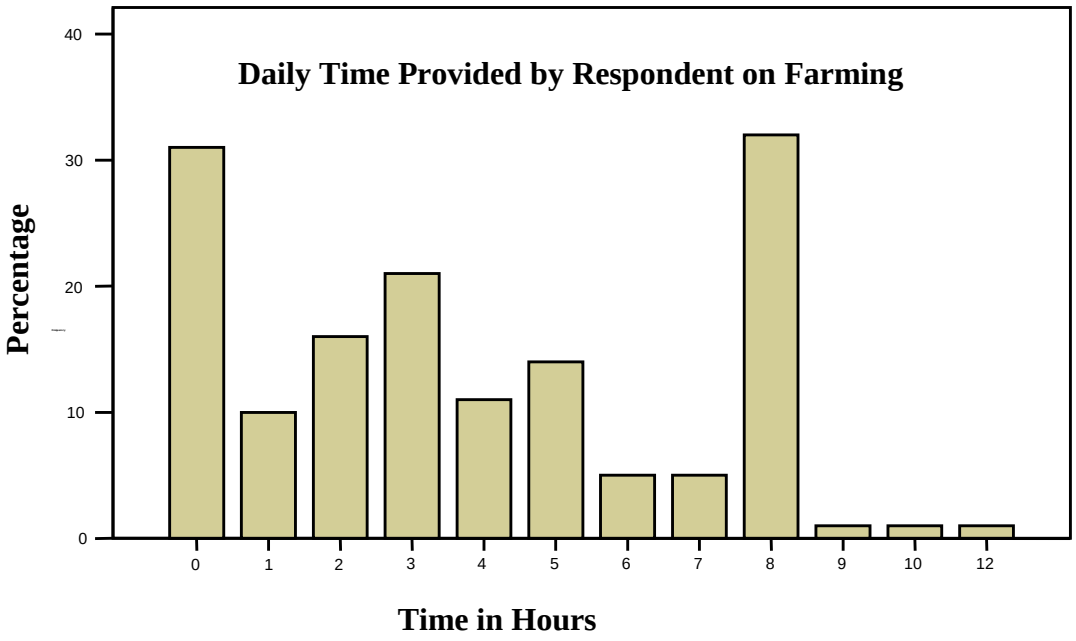
Almost all farmers perform the system of producing cereals grains. 93 percent farmers cultivate vegetables, 70 percent have the system of horticulture. Only 6 percent farmers follow the farming herbs (Table 4.5).

4.2.1 Daily Time Provided by Respondents on Farming

Labor helps in ensuring that work is done in farm, it is assessed in MPU (Manpower units). 1MPU= an adult-bodied man or women working for 270days/yr on a farm, or 2160hrs/yr.

Some specific characteristics of the work are done in farms that are linked to constrain imposed by environment, production, the structure of production. The total work done by women in farming is significantly higher than those of male (Annex Table 4A).

Figure 9: Daily Time Provided by Respondents



Most of the House hold head contributed one to four hours for the farming, whereas about 21 percent did not work (Figure 9). However the average time provided by individual Household was 15.36 hours, where male contributed 5.05 hrs. and female significantly contributed 10.31 hrs. per day for farming activities, the most repeated time of work found 8 hours a day for all male and female (Annex Table 4A), this shows the vast gender difference .

4.2.2 Area of land

Land is the fundamental component for farming. Produce depends upon the quality of land**.** But no more can be produced without using technology even though the land is rich**.** There is no equal distribution of land holding and used in the study area .The

prosperous family, especially Brahmins and *Chhetries* have occupied large piece of land than *Dalits* (Annex Table 4B).

Figure 10: Graph of Land Holding in *Ropani*

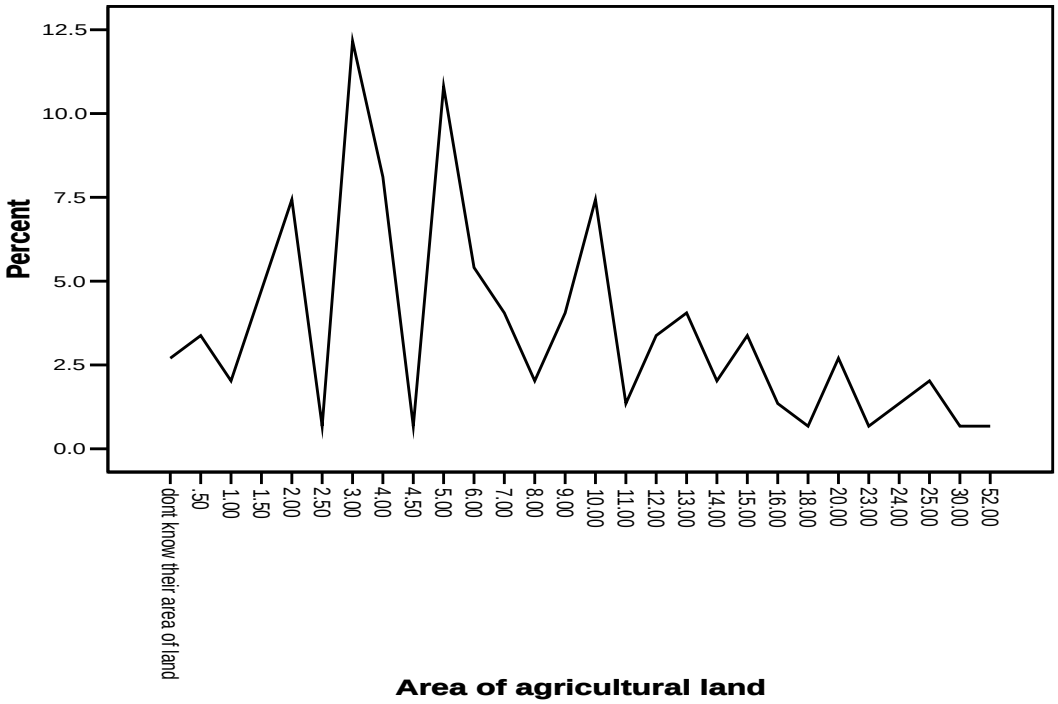


Figure 10 reveals that, area of land ranged from 0.5-52 *ropanies* (0.025ha.-2.64 ha.) with one to twenty four parcels. Most of the Household owned three *ropani* (0.15ha.) lands with two parcels, 7.7 *ropani* (0.39ha.) land in average (Annex Table 4B).

4.2.3 Parcels of Farm Land

Since land has been recognized as the major production resource, or major wealth and income generator, the pattern of this distribution is a focus of interest to those who deals with earning and poverty alleviation in rural areas. Typically, the land holding of an individual house hold was divided into tinny plots. The average number of plots was 4.51 with standard deviation 4.272. The minimum number of plots was one and the maximum was 24 per farm household (Annex Table 4B).

Table 4.6 *reveals* that, over 60 percent household (60.8%) owned five kitta, one fifths (18.9%) five to ten, only one Household more than 20 parcels of land, ranging from one to twenty five parcels. Three fourth of the Household owned *plain Khet* and over half (50.7%) of them owned *Pakho bari* and *tari Khet*.

Table 4.6: Types of land by Parcels (Figures are in Percentage)

Number of Parcels	Tari *Khet*			*Pakho* Bari			Plain *Khet*		
	No	yes	Total	No	yes	Total	No	yes	Total
Don't know	6.1	4.1	10.1	6.8	3.4	10.1	4.1	6.1	10.1
<5 Kitta	36.5	24.3	60.8	31.1	29.7	60.8	16.9	43.9	60.8
5-10 Kitta	6.1	12.8	18.9	8.1	10.8	18.9	2.0	16.9	18.9
10-15 Kitta	.7	7.4	8.1	3.4	4.7	8.1	2.0	6.1	8.1
15-20 Kitta	.0	1.4	1.4	.0	1.4	1.4	.0	1.4	1.4
>20 Kitta	.0	.7	.7	.0	.7	.7	.0	.7	.7
Total	49.3	50.7	100.0	49.3	50.7	100.0	25.0	75.0	100.0

Source: Field survey 2008

Majority of the respondents (75%) cultivated in plain *Khet* land. Whereas percentage of having *Pakho bari* and *tari Khet* was 50.7 percent each (Annex Table 2).

4.2.4 Land Tenure System

Land tenure system has been a never-ending controversial issue .It is still a matter of debate in Nepal. Owner cultivation, share-cropping, and contracting were the three major types of land tenure system identified in the study area. Most of the household farming in own land, less than one fifth households practiced share-cropping. In the FGD the participants said that share crops land was worked by in-migrant settlers and wage based household.

Table 4.7: Tenancy of Farm Land

Tenancy	Frequency	Percentage
Own	131	88.5
Share Cropping Land	25	16.9
Contracted land	2	1.4
Rented Land	2	1.4
Bandhaki	0	0

Source: Field survey 2008

Out of which Household 88.5%had owned their own land 16.9% were share cropping with on the contracted and rented land. None of the Household had *bandhaki* land.

4.2.5 Mode of Cultivation on Farm Land

Cropping intensity is a process of efficient utilization of limited land resource s for higher production by doubling or tripling crops cultivation in plots or a part of a plot of land. Plots of land held by a farm household cannot be equally productive in all season. Crops differ in characteristics, some are perennial while other is annual and some overlaps cropping seasons and restrain double triple crops production. There is no standard intensity index for any economy in study area.

Table 4.8: Proportion of Time of Cultivation in Different types of Land

Land Type	*Pakho bari*		Plain *Khet*		*Tari Khet*	
Time of Cultivation	Freq	Per	Freq	Per	Freq	Per
12 Months	64	69	11	9.9	35	47.3
8 Months	14	17.3	67	60.4	25	33.8
4 Months	3	3.7	32	28.8	13	17.6

Source: Field survey 2008

About two third (69%) *Pakho bari* cultivated whole year whereas very few (9.9%) plain *Khet* and 47.3 percent *tari Khet* cultivated year round. About one fifth (17.3%) *Pakho bari, 60.4* percent *plain Khet* and 33.8percent *tari Khet* were cultivated only eight months in a year. Very few *Pakho* bari (3.7%), more than one fourth *plain Khet* (28.8%) and 17.6 percent *tari kher* cultivated only four month in a year i.e. only one seasonal crop was planted (table 4.8).

4.2.6 Mode of Irrigation on Farm Land

An appropriate scheme and water management system are basic infrastructure or facilities for agricultural development Construction of new irrigation modes, and maintenance and repair of existing ones generate direct employment, increase yield and cropping intensity. The following table *reveals* about the mode of irrigation on farm land.

Table 4.9: Mode of Irrigation in Different type of Land

Land Type ì	***Pakho bari***		**Plain *Khet***		***Tari Khet***	
Time of Irrigation	Freq	Per	Freq	Per	Freq	Per
12 Months	2	2.5	10	9.1	22	29.7
8 Months	2	2.5	64	58.2	9	12.2
4 Months	2	2.5	34	30.9	1	1.4
Rain fed	75	92	2	1.8	42	56.8

Source: Field survey 2008

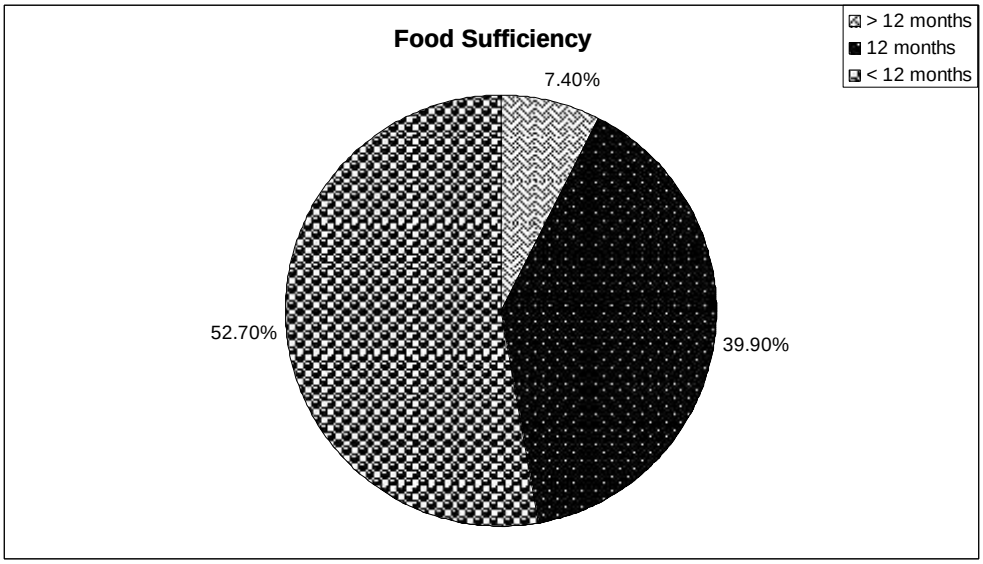
All most all *Pakho bari* (92%), more than half *tari Khet* (56.8%) and too less 1.8 percent plain *Khet* based on rain fed irrigation (Table 4.9). Over half Household depend upon rain fed in *Pakho bari* 28.37 percent in *tari Khet* About 23 percent Household used the facility of irrigation for twelve months (Annex Table 3)

4.3 Economic Status

4.3.1 Food Security

Food is the fundamental needs of life; main indicator of subsistence farming is just food sufficiency or insufficiency of food. A large number of poor people have the small farms.

Figure 11: Food Security



About two fifths of the farmers produced food for their just sufficiency. More than half of the farmers produced insufficient of food from their farms Figure 11.

4.3.2 Market Mechanism and Pricing

The semi-subsistence nature of the rural economy under study has a faint influence of the market mechanism. In one way or another, farmers would give first priority to food-self sufficiency. The dominant market mechanism in rural areas is the function of demand and supply of agricultural produce and wage labor. Most produce and wage labor does not enter the formal markets. Therefore, the formal market mechanism and the price and wage do not fully affect the rural people**.**

Table 4.10: Marketing, Saving, Accounting, Pricing

Marketing Activities	**Percentage**
Agent of selling Whole seller	7.1
Agent of selling Direct to customer	71.4
Agent of selling All	14.3
Getting rationale amount product	50.0
Saving from farming	14.3
Keeping Agricultural Accounting	28.6
Product Price Determination According to Investment	7.14
Product Price Determination Demand of Customer	92.86

Source: Field survey 2008

Note: Percent based on N=14 (Who sold the Produces)

Most of the farmers (93%) sold their products direct to the customer. The farmers determined their cost of production on three ways. Two-third of the farmers determined their cost on the basis of demand of the customer. About one third of the farmers determined according to the market value (Table 4.10).

4.3.3 Amount of Profit Earning

The following table reveals that the Profit earning by selling the agricultural produces.

Table 4.11: Amount of Profit Earning by Food Sufficiency (figures are in percentage)

	Amount of Earning				Profit Earning	
Food Sufficiency	< 5 thousand	5-10 thousand	10-20 thousand	20-50 thousand	No	yes
< 1 year	.0	7.1	.0	.0	.0	7.1
One year or more	28.6	7.1	35.7	21.4	28.6	64.3
Total	28.6	14.3	35.7	21.4	28.6	71.4

Source: Field Survey 2008

Note: Percent based on N=14 (Food sufficiency)

Only 7.4percent farmers had the food surplus and enough for more than 12 months. Only one tenths (N=14; 9.4%) of the farmer's sold their products, among them only 71 percent (10HH) farmers made profit by selling their agricultural products. Those who made profit, 43 percent earn less than 10 thousand rupees and 57 percent earn more than 10 thousand per year (Table 4.11).

Table 4.12: Financial Scenario of the Farming (figures are in percentage)

	Loan Feeder Organizations					Reason for not taking loan		
Taken loan for Farming	Bank	Cooperative	Villagers	Neighbors	Getting Loan easily	No need	Difficulties	High Interest
No	.0	.0	.0	.0	3.2	49.3	16.2	20.9
yes	6.1	12.2	1.4	2.0	83.9	.7	.7	.7
Total	**6.1**	**12.2**	**1.4**	**2.0**	**87.1**	**50.0**	**16.9**	**21.6**

Source: Field survey 2008

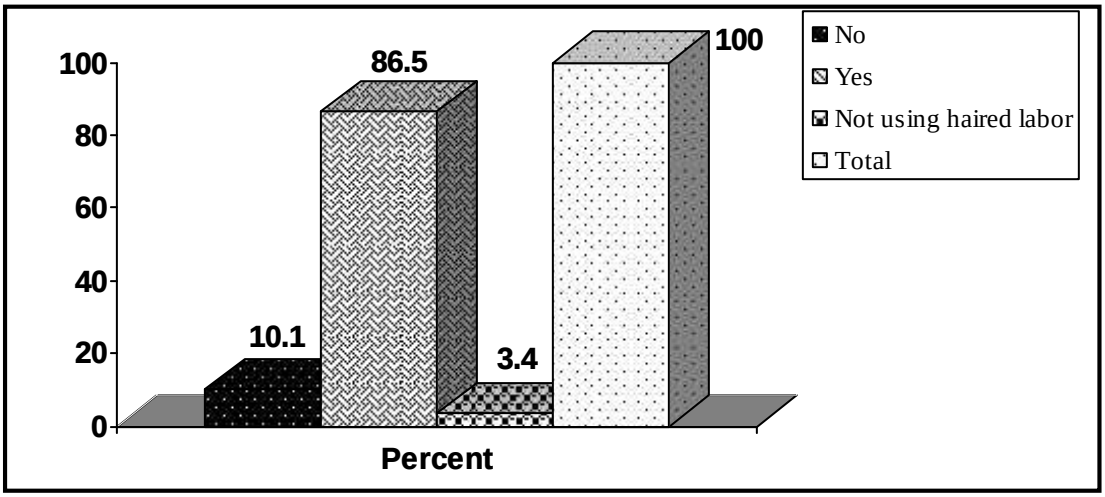
Table 4.10 reveals that, four fifths of the farmers did not take loan for farming purpose, only one fifths of them have taken loan .More than 50 percent of the farmers have taken loan from co operatives, 30 percent from bank, 10 percent from the neighbors and 6 percent from the villagers. Farmers those who take loan, 87 percent responded that they get loan easily from different intuitions. 62 percent of them responded that they do not need loan for farming purpose.21 percent farmers

responded they do not take loan because of difficult process difficulties and high interest rate in each case (Table 4.12).

4.3.4 Labor Utilization in Farming

Since farm mechanization had not been adopted even in topographically feasible areas, animal draft power and human labor were two major forms of power inputs in performing agricultural activities. This study reveals two types of human labor utilization practiced in study area. There were paid contracted or casual labor, and household labor.

Figure 12: Availability of farm labors



Majority of the farmers (86.5%) responded that there is availability of farm labor called *Khetala.* Most of the farmers (96.6%) used hired labor in their farms.

Table 4.13: Reason of not Haring Labor

Reason	Frequency	Percentage (N=148)	Percentage (N=14)
High cost	3	2.0	42.9
Not availability	4	2.7	57.1
Total	**7**	**4.7**	**100.0**

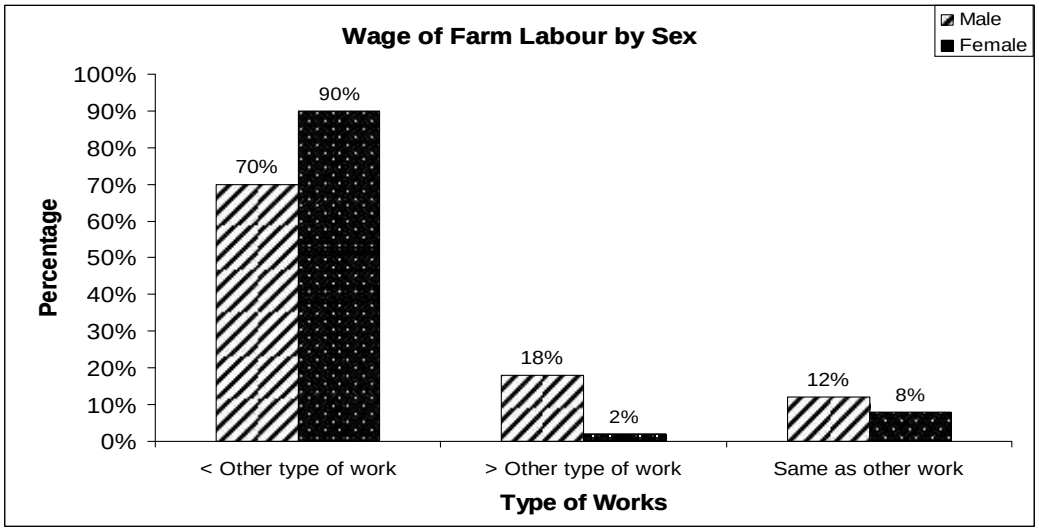
Source: Field survey 2008

More than half (57.1%) did not haired labor because of not availability, those farmers who did not use haired labor. And 42.9 percent due to high cost (Table 4.13).

4.4 Monetization of Wage Labor

Determination of wage is controversial issue, whether raised in terms of efficiency or equity. Governments in many developing countries attempted to raise wage by fixing minimum wage rate for farm labor, construction and maintenance works, and portage. In Nepal the wage rates for various wage labor across various areas are largely determined by groups of village. Some specific characteristics of the work are done in a farm that is link to constrain imposed by environment, production, the structure of production. The total work done by women in farming is significantly higher than those of male. In study site there is still gender inequality in wage labor between man and women. Man works as *Bause* and got high amount but women works as *Khetala* got less amount. The majority of the respondents, key informants and focus group discussion participants agreed with the statement that participation of women in farming, marketing is greater than male. The women play predominant role in almost all farming activities

Figure 13: Wage of Farm Labor by Sex



Seven out of ten (70%) farmers responded that the wage of male hired labor was less than other works. Only 18 percent farmers responded that the male wage in farming is more than other types of works. Nine tenths of the farmers told that the female labor wage is less than other works. In comparison to farm-wage the female hired labor get fewer wages than the male hired labor (Figure).

4.4.1 Gender Variation in Farm Labor

A gender variation in labor use in farming was observed significantly. In study site there is still gender inequality in wage labor between man and women. Man works as *Bause* and got high amount but women work as *Khetala* got less amount. The majority of the respondents, key informants and focus group discussion participants agreed with the statement that participation of women in farming, marketing is greater than male. The women play predominant role in almost all farming activities.

Table 4.14: Division of Responsibilities

	Land Preparation		Using manure fertilizer		Using chemical fertilizer		Buying seeds		Spreading seeds		Harvesting product	
	Freq	**Per**	**Freq**	**Per**	**Freq**	**Per**	**Freq**	**Per**	**Freq**	**Per**	**Freq**	**Per**
Male only	3	2.0	1	0.7	17	11.5	20	13.5	5	3.4	2	1.4
Female only	48	32.4	67	45.3	73	49.3	57	38.5	65	43.9	14	9.5
All Members	91	61.5	69	46.6	55	37.2	68	45.9	73	49.3	126	85.1
Hired labor	6	4.1	11	7.4	3	2.0	3	2.0	5	3.4	6	4.1

Source: Field survey 2008

In case of land preparation more than two-third farmers said that it is prepared by all the family members together, in which females shared the major responsibilities occupying one third of work .Males have very less roles (2%) on land preparation. Hired labors have 4 percent roles on it. or using manure fertilizer 46.6 percent responsibility was covered by all family members followed by only female (45.3%). 7.4percent responsibilities goes to hired labor whereas male only has negligible responsibilities (0.7%). In using chemical fertilizer about half (49.3%) of the responsibilities went to female only whereas responsibilities of all family members together was 37.2percent. Male only has 11.5percent responsibilities and hired labors have 2 percent responsibilities. In the responsibilities of buying seeds all family members together shared 45.9 percent, female only shared 38.5 percent male only has 13.5 percent and hired labor 2 percent respectively. In case of harvesting products the responsibilities for all family members shared 85.5 percent, which is followed by female only by 9.5 percent, the responsibilities of hired labor was 4 percent and male only is negligible i.e. 1.4% (Table 4.14).

4.5 Getting Relief Package and Training

Training and relief package are the most important factors on the Agro farming. For the agricultural modernization training is only one effective way of dissemination of technological information and implementation on the farm management. And on other hand food security should be sure while using the modern inputs and technologies. Other wise farmers are not ready to change their farming methods. The participants of the FGD and key informants also stressed on the statement.

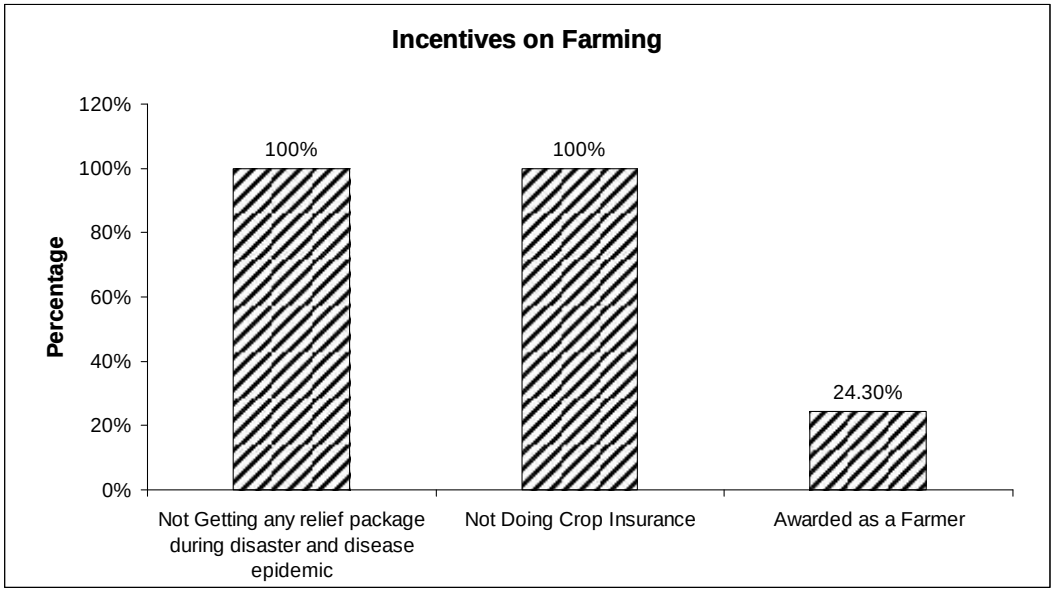
Table 4.15: Support for Farming from NGO/INGO and Government

	Buying tools		Chemical Fertilizer		Insecticides		Storage		Seeds	
NGO/INGO										
	Freq	Per	Freq	Per	Freq	Per	Freq	Per	Freq	Per
Yes	1	0.7	0	0	0	0	0	0	0	0
No	147	99.3	148	100	148	100	148	100	148	100
Government										
Yes	1	0.7	0	0	0	0	0	0	2	1.4
No	147	99.3	148	100	148	100	148	100	146	98.6

Source: Field survey 2008

Only one farmer (0.7%) got support on farming for buying tool from NGO/ INGOs and government, Even though so many agricultural NGO/ INGOs were established to promote the agricultural performance (Table 4.15).

Figure 14: Incentives on Farming



None of the Household received government or non government relief packages in case of physical or any sort of disasters. Almost all (99.3%) farmers responded that they do not get subsidies while buying agricultural tools from NGO\INGOs. Similarly in buying seeds, chemical fertilizers, storage facilities, from NGO\INGOs and government have not given any subsidies Figure 14. As a farmer about one-fourth (24.3%) were awarded at least once with production performance. More than three fourth (75.7%) farmers responded that they are not awarded in their farming life (Figure 14).

4.5.1 Trainings about Farming

The following table reveals the status of training taken by farmers. This results that the very few farmers had taken training. Without training we shouldn't think about the agricultural transformation training. The agricultural economist Mellor stressed on the trainings for the agricultural transformation.

Table 4.16: Training taken by Respondents

Number of Trainings	**Frequency**	**Percentage**
Only one	18	12.2
Two	14	9.5
Three	7	4.7
More than three	9	6.1
Not taking training	100	67.6
Total	**148**	**100.0**

Source: Field survey 2008

For the agricultural knowledge more than two-third (67.6%) farmers have not got any training. Only about one third (32.4%) got at least a training. Among the members who received trainings respondents itself (29.1%.), spouse (4.1%) and child (0.7%) (Table 4.16).

4.6 Awareness about Commercial farming

This age is the age of information; information has the power to lead. It is impossible to change with out information. But this study shows that very few farmers were

informed about the modern farming system and the means of information had the least impact on the farmers.

4.6.1 Medium of Information

One fourth (26.4%) farmers have got at least some information about commercial farming. Three fourth (73.6%) of the farmers never got any information about commercial farming.

Table 4.17: Getting Information about Commercial Farming

Source of Information	Frequency	Percentage
Neighbor	16	10.8
Relatives	12	8.1
Agro-vet	19	12.8
JT/JTA	23	15.5
Agricultural Magazine	17	11.5
Radio	20	13.5
Not Getting Information	108	73.6

Source: Field Survey 2008

One out of ten (10.8%) farmers got information about commercial farming through their neighbors, 8.1 percent from relatives, 12.8 percent from agro-vet, 15.5 percent from JTA, 11.5 percent from agricultural magazine and 13.5 percent from radio (Table 4.17).

4.6.2 Information about Transformational Agents

Majority of the farmers informed about the chemical fertilizer, whereas very few of them informed about the more potential transformational agents JT/JTA. This signifies the facts of agricultural condition.

Table 4.18: Getting Information about Technologies

Technologies	Frequency	Percentage
Improved seed	108	73
Chemical fertilizer	116	78.4
Insecticides	103	69.6
Tractor	68	45.9
Cold storage	26	17.6
JT/JTA	22	14.9

Source: Field survey 2008

Almost one fourth farmers (73%) knew about improved seeds, 78.4 percent about chemical fertilizer, 69.6 percentages about insecticides, 45.9 percent about tractor, 17.6 percent about JT / JTA and 14.9 percent about the cold storage (Table 4.18)

4.6.3 Potentiality of Farmers

Agro-vet was the more effective informative and relevant institution for agricultural consultation. More than half (50.7%) Farmers did not visit any places for the information and knowledge, Very few (2%) farmers consulted with DADO.

Table 4.19: Visiting Service Providing Organizations

Consulting during Farming Season	Frequency	Percentage
Visiting JT\JTA	22	14.9
Visiting DADO	3	2
Visiting agro vet	59	39.9
Not visiting any places	73	50.7

Source: Field survey 2008

During the time of cultivation about two fifth (39.9%) farmers visit agro-vet , about 15 percent farmers visit JT / JTA, and only 2 percent farmers visit DADO for the necessary information. More than 50 percent farmers did not visit any concerned organization / service post (Table 4.19).

4.6.4 Status of Application of Technology

Among the modern technology, chemical fertilizer dominated others technologies followed by insecticides, improved seeds cold storage and JT/JTA was in minority.

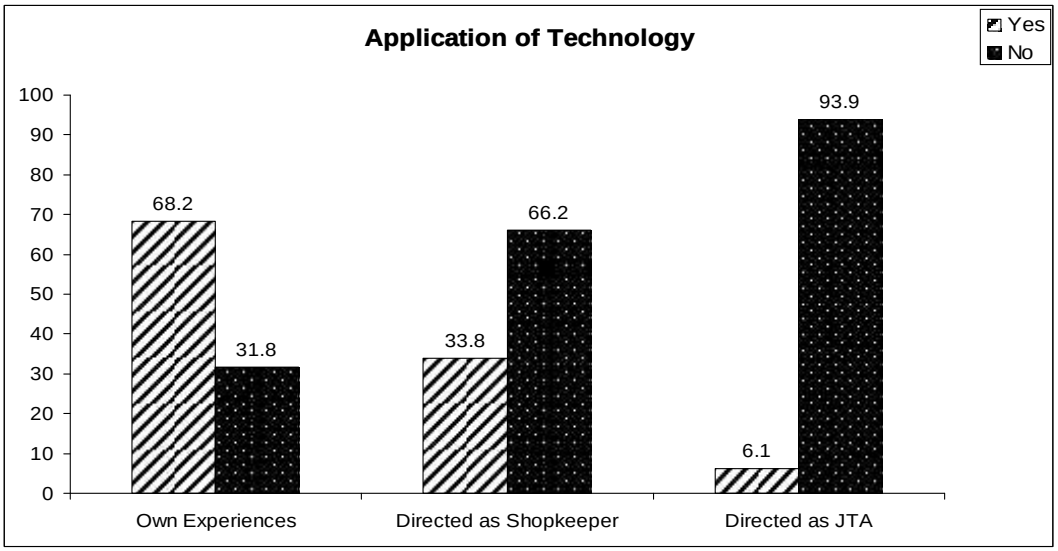
Table 4.20: Using modern Technologies on Farming

Technologies Used	Frequency	Percentage
Improved seed	72	48.6
Chemical fertilizer	93	62.8
Insecticides	86	58.1
Cold storage	28	18.9
JT/JTA	10	6.8

Source: Field survey 2008

Table 4.20 *reveals* that, about half (48.6%) of the farmers used improved seeds, about two-third (62.8%) farmers used chemical fertilizer, about two-fifth (58.1%) farmers used insecticides, about one fifth (18.9%) farmers used cold storage and only 6.8 percent farmers used JT / JTA. More than two-third (68.2%) farmers used fertilizer and insecticides as own experiences, one-third (33.8%) by shopkeeper and 6 percent by as directed by JT/ JTA. (Annex Table 5)

Figure 15: Application of Technology



More than two-third (68.2%) farmers used fertilizer and insecticides as own experiences, one-third (33.8%) by shopkeeper and 6 percent by as directed by JT/ JTA. (Figure 15)

4.7 Mode of Production after using Modern Technology

Technology plays the basic role in making production possible. If the input is not selected properly, either there may be no production or low production. The selection of appropriate technology is important to ensure the continuation of effective production system in society. The nature of agricultural technology has been changed gradually from its traditional character modern stage. Improved agricultural technologies have also developed and enriched the farmer's harvest. The last few decades after the Second World War have witnessed significant advance in farm technology and yields rate have increased beyond expectations (Sadhu & Singh, 2005). Especially modern agricultural technology consist of chemical fertilizer, plant protection, (insecticides, pesticides), improved seeds, mechanization, irrigation etc.

Table 4.21: Innovation and Adoption on Farming system

		Frequency	Percentage
Mood of production after Using modern technology	Increased	71	48.0
	Stagnant	72	48.6
	Decreased	5	3.4
Types of farming	mono cropping	21	14.2
	Mixed farming	124	83.8
	Multi cropping	3	2.0
Changing Farming System than parents	No	55	37.2
	Yes	93	62.8
Innovating on farming	No	123	83.1
	Yes	25	16.9
Type of farming is suitable for soil type and atmosphere	No	38	25.7
	Yes	103	69.6
	Don't know	7	4.7

Source: Field survey 2008

About half of the (48.6%) farmers answered that their mode of production after using modern technologies was stagnant. Equal percent farmers (48%) responded that their mode of production increased whereas 3.4 percent decreased. More than four-fifth farmers (83.8%) followed mixed farming, 14.2 percent mono cropping and only 2 percent multi cropping. More than three-fifth farmers (62.8%) changed in the farming system compared to the system followed by their parents, whereas 37.2 percent farmers continued same old farming system. Only 16.9 percent farmers innovated at least a new method in farming. They innovated in using chemical fertilizer, insecticides, high yielding species as their soil type and climatic condition (Table 4.21).

4.8 Psycho-social Status

Psychology is the leading energy of human to perform the activities. Psychologically strong farmers devoted more for the betterment of his farm. Every one must feel that he/she has higher social prestige and social security in the community for the promotion of his occupation, other wise the occupation is just adopted for the subsistence of life. Even though the farmers of study area responded that they have social prestige, Satisfaction, secure future actually not like that in the society. The key

informants and the FGD participants deny the statement. They responded that the Psycho-social factor is the most de-motivating factor for the transformation.

Table 4.22: Psycho-social Perception of the Respondents

Psycho-social Perception		Frequency	Percentage
Satisfaction	Highly Satisfied	17	11.5
	Satisfied	95	64.2
	Not Satisfied	36	24.3
Future Security	Yes	38	25.7
	No	53	35.8
	Can't Say	57	38.5
Received as a Farmer	Money	10	6.8
	Employment	100	67.6
	Nothing	24	16.2
	Everything	3	2.0
Perception of Peoples	Positive	33	22.3
	Neutral	106	71.6
	Negative	9	6.1
Status on Community	High	12	8.1
	Medium	133	89.9
	Low	3	2.0
Connected on Network	No	101	68.2
	Yes	47	31.8
Adopted Farming System	Traditional	50	33.8
	Modern	98	66.2

Source: Field survey 2008

About two-third (64.2%) farmers were satisfied being farmers. Over the tenth farmers (11.5%) were highly satisfied whereas about one-fourth (24.3%) farmers were not satisfied being farmers. About two fifth (38.5%) farmers can't say that wheatear there is future security being farmers. More than one-third (35.8%) farmers responded that there is no future security being farmer whereas one fourth (25.7%) farmers responded there is future security. More than two-third (67.6%) farmers responded that they got employment being farmers. About 7.4 percent responded that received prestige, equal percent (6.8%) earned money. Two percent farmers acquired everything whereas 16.2 percent farmers responded that, they got nothing being

farmer. About three fourth (71.6%) farmers responded they found neutral perception from relatives and community members, about one fourth (22.3%) responded perceived the positive perception from others and 6.1 percent thought negative. Almost all farmers (89.9%) thought that they acquired medium status on the community; 8.1percent acquired high status and 2 percent in low status. About one-third (31.8%) farmers are the members of agricultural community group, whereas more than two-third (68.2%) not associated with those farmers group. Two-third (66.2%) farmers adopted modern farming system whereas one-third (33.8%) farmers practiced traditional farming system (Table 4.22).

4.9 Perception towards Lower Productivity

The following table *reveals* that the perception of farmers about natural calamities for less productivity. Almost all the respondents reported that natural calamities are de-motivating factors for transformation.

Table 4.23: Perception of Farmers about Lower Productivity

Perception	**Highly Agreed**		**Agreed**		**Disagreed**	
Natural Calamities	**Freq**	**Per**	**Freq**	**Per**	**Freq**	**Per**
Land slide	82	55.4	52	35.1	14	9.5
Hailstone	74	50.0	58	39.2	16	10.8
High rain fall	81	54.7	63	42.6	4	2.7
Less rain fall	80	54.1	64	43.2	4	2.7
Sloppy land	34	23.0	94	63.5	20	13.5
Land fragmentation	58	39.2	73	49.3	17	11.5
Modern tools can't be used due to sloppy land	66	44.6	60	40.5	22	14.9

Source: Field survey 2008

In case of natural calamities almost all farmers agreed that it is affected by land slide, hailstone, and heavy rain fall, low rain fall. 95.3 percent farmers agreed that the physical factors, soil type and atmosphere affect their production; similarly 88.5 percent farmers agreed land fragmentation affect it and 85.1 percent agreed it is affected by sloppy land. About 70 percent (69.6%) farmers agreed that their type of farming is suitable according to soil and atmosphere whereas 30.4 percent responded it is not accordingly (Table 4.23).

CHAPTER V

TRANSFORMATION OF FARMING SYSTEM

This chapter describes the correlation of different factors with transformational agents.

5. 1 Subsistence Farming

Schultz, the famous agriculture scientist, in his thesis 'Transforming Traditional Agriculture' focused that farming that is carried out on with the factors of production used for generations may be called traditional/subsistence agriculture. Here the factors of production are categorized into four major group i.e. Physical factors, Economic factors, Technological factors and psycho-socio. The subsistence farming system in the study area is now compared to Schultz theory in this study. On the classic peasant subsistence farm, most output is produced for family consumption and a few staple food crops are the chief sources of food intake. Output and productivity are low and only the simplest traditional methods and tools are used. Capital investment is minimal; land and labor are the principal factors of production. The law of diminishing returns is in operation as more labor is applies to shrinking parcels of land (Todaro, 2005).

5 .2 Production System

As Schultz (1964), has mentioned those countries which are dependant upon traditional/subsistence agriculture are poor and spend much of their income in food. It is observed that 86.5 percent household had main occupation was agriculture together almost all (95.9%) household had agro farming the main source of income followed by animal husbandry (62.8%). Average time provided by the household was ten and half hours. Similarly average family size of the study area was 5.64 persons. A study by Adhikari revealed that the average land holding was 6 ropani per household and almost all the farmers made profit but in case of Arva only 7 percent household made nominal profit (NRS. 10000.00) sufficient to justify the study area remained in subsistence farming.

The average land holding was 7.7 ropani per household. 93.2 percent household performed animal husbandry where 98 percent were engaged in producing Cereals

crops. As farmers had average landholding of 7.7 ropani per household (0.39 ha./0.0724 ha. per capita, 1 ha. = 19.657178 ropani) and with 0.038 ha.-0.418 ha they are marginal farmers (Tiwari, 1998.) on the other hand the study revealed that, in the small land holdings they applied multi cropping (Cereals, Vegetables, Horticulture and herbs) which justified the subsistence farming was still in practice (Table 5.1) . Average per capita land holding in Nepal much smaller compared to Bhutan (0.10 hectare), Bangladesh and China, (< 0.20 ha.), Srilanka, Indonesia, Philippines, India. Laos (0.25 to 0.24 ha.), Myanmar, Cambodia, Thailand, Afghanistan, (> 0.5 ha.), Malaysia (0.90 hectare).

Table 5.1: Types of land and yields

	Cereals Farming		**Horticulture Farming**		**Vegetable Farming**		**Herbs Farming**	
	Freq.	**Per**	**Freq.**	**Per**	**Freq.**	**Per**	**Freq.**	**Per**
Self Land	128	86.5	97	65.5	123	83.1	9	6.1
Share Cropping Land	25	16.9	15	10.1	23	15.5	0	0
Thekka (contract) land	2	1.4	1	.7	2	1.4	0	0
Rented	2	1.4	1	.7	2	1.4	0	0

Source: Field survey 2008

5.3 Food Security

About two fifths of the farmers produced food for their just sufficiency. More than half of the farmers having insufficiency of food from their production .Only 7.4 percent farmers had the food surplus and enough for more than 12 months. Only one tenth of the farmers sold their products. Among them only 71 percent farmers made the profit by selling their agricultural products. Those who made a profit, 43 percent earn less than 10 thousand rupees and 57 percent earn more than 10 thousand per month.

A study made by LIBIRD (2005) reported that the length of self food sufficiency about six months. As the mean of food sufficiency in the study area was 0.55, the average food self sufficiency was 6.6 months. This contradicts with the fact that the occupation of more than 86 percent Household in this site was agriculture. Those who worked more than 12 hours per day also faced the problems of food insecurity.

Similarly, Household having more than 20 *ropani* land also suffered from food insufficiency. (Table 5.1)

Table 5.2: Food Sufficiency, Main Source of Income is Agriculture and Daily time provided by Household (Figures are in Percentage)

Main source of income is agriculture	Time provided by male member									
	Did not work		1-4 hours daily		5-8 hours daily		9-12 hours daily		more than 12 hours	
	Less than 1 year	One year or more	Less than 1 year	One year or more	Less than 1 year	One year or more	Less than 1 year	One year or more	Less than 1 year	One year or more
No	.7	.7	2.0	0	0	.7	0	0	0	0
Yes	14.2	5.4	12.2	18.9	13.5	12.8	6.1	6.8	4.1	2.0

Source: Field survey 2008

Table 5.2 reveals that 4.5 percent farmers who had the main source of income is agriculture and did not work in the farm had food sufficient for their family. Whereas near about one fifth (18.9%) farmers who worked 1 to 4 hours daily on farm had sufficient food for their families. About 13 percent farmers who spend 5 to 8 hours daily on farm land had produced sufficient food for their families.

5.4 Agricultural Production Surplus and Marketing.

Most of the farmers (93%) sold their products direct to the customer. The farmers determined their cost of production in three ways. Two-third of the farmers determined their cost on the basis of demand of the customer. About one-third of the farmers determined according to the market value. Four-fifths of the farmers not took loan for farming purpose, only one fifths of took loan. More than 50 percent of the farmers taken loan from cooperatives, 30 percent from bank, 10 percent from the neighbors and 6 percent from the villagers. Farmers who took loan, 87 percent responded got loan easily from different intuitions. About two-third responded (62%) need loan for farming purpose. 21 percent farmers answered not took loan because of process difficulties and high interest rate . Majority of the farmers (86.5%) responded availability of farm labor (*Khetala).* Most of the farmers (96.6%) used hired labor. Adhikari (2006), in Hemja VDC Kaski reported 95.6 percent of the

Household sold their products themselves in market. Only 4.4 p-percent of Household sold to retailers or wholesalers in their own house and not sold to market. Similar activities identified in this study too, as more than three-fourth of Household sold their products direct to the customer (Table5.3). Owning large area of land tended to more food sufficiency (Annex Table 6).

Table 5.3: Food Sufficiency, Place and Agents of Selling

Food Sufficiency	Sell the product		Place of selling is Pokhara.		Place of village		Agents for selling					
							Whole Seller		Direct Customer		All	
	Freq	Per	Freq	Per	Freq	Per	Freq	Per	Freq	Per	Freq	Per
< 12 months	1	6.7	0	0	1	7.1	0	0	1	7.1	0	0
12 months	2	13.3	1	7.1	2	14.3	1	7.1	0	0	1	7.1
> 12 months	10	66.7	5	35.7	6	42.9	0	0	10	71.4	1	7.1

Source: Field survey 2008

Percentage based on N=14 (who sold the produces)

More than one third farmers who had the sufficient food sold Their product, among them 35.7 percent sold in pokhara valley, 42.9 percent in village itself, no one sold to the wholesaler and about three fourth (71.4%) sold their produces direct to the customer. Only one farmer sold produces even though he had food insufficiency direct to the customer in village itself (table 5.3).

5.5 Agricultural Transformation and Commercial Farming

This section of the chapter discuss about different indicator of farming system, impact of different factors, perception, innovation and adoption.

5.5.1 Transformation Process

For the transformation of subsistence based farming into commercial, here the researcher has chosen the technological factors like improved seed, chemical fertilizer, insecticides, cold storage, JT/JTA, machinery, irrigation on the basis of NAPP, as an APP has focused for inputs like fertilizer, road, irrigation and power.

Here the correlations among the physical factors, economic factors, psycho-socio factors discussed with respect to transformational agents. i.e. improved seeds,

chemical fertilizer, pesticides/ insecticides, JT/JTA, cold storage, changing in farming system compared to parents, newly adopted technique of farming.

5.5.2 Agents of Transformation

To be commercialized it is hypothesized used of some particular components of technological factors, physical factors, psycho-socio factors, and economic factors. Here used of improved seeds, used of chemical fertilizer, used of pesticides/ insecticides, used if JT/JTA, used of cold storage, perception on technique of farming, changing farming system than parents are considered the agents of transformation.

Among the nine components (improved seeds, chemical fertilizer, pesticides/ insecticides, JT/JTA, cold storage, profit, technique of farming, food sufficiency, training) if a household had used four or more than four components it was considered as high level adoption and if a household had used less than four components was considered as low level adoption of modern technology, taking mean at four components. About half (48.6%) of the farmers used improved seeds, about two-third(62.8%) farmers used chemical fertilizer , about two fifth (58.1%) farmers used insecticides, about one fifth farmers(18.9%) used cold storage and only 6.8 percent farmers used JT/JTA. Two-third (66.2%) farmers responded that they have adopted modern farming system whereas one-third farmers (33.8%) are still in traditional farming system. About two fifths of the farmers produced food for their just sufficiency. More than half of the farmers having insufficient food from their production. Only 7.4 percent farmers had the food surplus and enough for more than 12 months. Only one tenths (N=14, 9.4%) of the farmer's sold their products, among them only 71 percent (10 HH) farmers made the profit by selling their agricultural products. Household, who made profit, 43 percent earned less than 10 thousand rupees and 57 percent earned more than 10 thousand per year which is negligible amount.

For the agricultural knowledge more than two-third (67.6%) farmers have not taken any training. Only about one third (32.4%) have taken at least a training. Following discussions of factors affecting commercialization with respect to agents of transformation made clear about the process.

5.5.3 Physical Factors and Transformational Agents

Area of agricultural land significantly correlated with cold storage used, similarly number of parcels of land significant correlation with cold storage used (Table 5.4). Having own land significantly correlated with changing in farming system than parents. Area of agricultural land kept positive relationship with changing in farming system, chemical fertilizer used, and JT/JTA used, whereas negative relation with technique of farming improved seed used and insecticide used. Number of parcels of land has positive relationship with changing in farming system, technique of farming, improved seed used, chemical fertilizer used, insecticides used but negative relation with JT / JTA used. Having self land has positive relationship with technique of farming, improved seeds used, cold storage used , and JT / JTA used but has negative relationship with chemical fertilizer used, and insecticides used. The farmer who cultivated in share land has positive relationship with technique of farming, chemical used; insecticides used and has negative relationship with changing in farming system than parents, improved seed used, cold storage used and JT/JTA used (Annex Table 7).

The result of qualitative correlations between physical factors and transformational agents revealed the following facts (Table 5.4). The physical factors like own land, area of agricultural land, and number of parcels, had the significant positive relationship with transformational agents. But none of the physical factors had the significant negative correlation with transformational agents. Number of parcels, rented land, contracted land had the positive but not significant relation with most of the transformational agents whereas share cropping, own land, area of land had negative but not significant relation. This showed that the farmers are having large area of land, own land, share cropping, farming in contracted land refused to use the transformational agents.

Table 5.4: Physical Factors and Transformational Agents

	Significant		Not Significant	
	Positive	**Negative**	**Positive**	**Negative**
Changing in farming system than parents	Own land		Area of agricultural land Number of parcels Rented land	Share cropping land Contracted land (*Thekka)*
Technique of farming			Number of parcels Own land Share cropping land Contracted land (Thekka) Rented land	Area of agricultural land
Improved seeds used			Number of parcels Own land Contracted land (Thekka) Rented land	Area of agricultural land Share cropping land
Chemical fertilizer used			Area of agricultural land Number of parcels Share croppingland Contracted land (Thekka) Rented land	Own land
Insecticides used			Number of parcels Share cropping land Contracted land (Thekka) Rented land	Area of agricultural land Own land
Cold storage used	Area of agricultural land Number of parcels		Own land Contracted land (Thekka)	Share cropping land Rented land
JT/JTA used			Area of agricultural land	Number of parcels Own land Share cropping Contracted land (Thekka) Rented land

Source: Field survey 2008

5.5.4 Psycho-Social Factors and Transformational Agents

Family size has significant relation with cold storage used, but education of the respondent has negatively significant with cold storage used. Cold storage used is highly significant with food sufficiency (Table 5.5). Getting subsidies is significantly related with changing in farming system than parents. Taking training about farming system has strongly significant relationship with changing in farming system than parents and technique of farming whereas significant relation with improved used and JT / JTA. Those who got information about commercial farming has highly significant relationship with changing in farming system than parents, improved seed and cold storage. Visiting in DADO is highly significant to JT/JTA; similarly visiting an agro-vet has highly significant with technique of farming, chemical fertilizer used and insecticides used. Meanwhile not visiting any places has got highly negative relationship with all the transformational factors. Getting awarded from the farming is highly significant with JT/JTA and changing farming system than parents, similarly significant with cold storage used. Remarkably getting award from the farming has

negative relationship with chemical fertilizer and insecticides. Satisfaction being farmer has no significant relation with all transformational factors. Perception on future security being farmer has negative relationship with the agents of transformation. Being the member farming group has highly significant relationship with changing in farming system than parents whereas highly negative relation with chemical fertilizer used and insecticides used but it has significant positive relation with JT / JTA used (Table 5.5).

Training is the prominent factor which had highly significant relationship with the transformational agents. Similarly information about commercial farming, award and visiting agro-vet had equally significant relationship with the agents. Not visiting service providing organization and network had negative significant relationship with the agents of transformation. Likewise food sufficiency had most not significant positive relationship followed by satisfaction of the farmers, visiting agro-vet, information about commercial farming, visiting NGO/INGO and getting being a farmer. Food security family size, education had negative not significant relationship followed by subsidies, not visiting service providing organizations, visiting NGO/INGO, getting as a farmer. In FGD the farmers reported that they are not satisfied with agricultural occupation but they are compelled to do so because they were not taking risk and they didn't have others skills on their hand. Similarly the youths were ignorant about the traditional auricular activities because their parents first did not allow their children for farm work, secondly the so called literate youths did not give attention towards it because the agricultural occupation is dirty and with less dignity. According to key informant the JT/JTA were not effective in the study area because their suggestions some times became valueless. In the observation it is found that some of the NGOs had focused for the organic farming and the use of chemical fertilizer, insecticides, even though organizations gave trainings and taught about the modern technique of farming (Annex Table 8).

Table 5.5: Psycho-social Factors and Transformational Agents

	Significant		Not Significant	
	Positive	**Negative**	**Positive**	**Negative**
Changing in farming system than parents	Training Information about Commercial Award Subsidies Network	Not visiting service Providing organization	Food sufficiency, Visiting DADO, Visiting NGO/INGos Visiting Agro vet Satisfaction Visiting with JT/JTA	Family size Education Future security Getting as a farmers
Technique of farming	Training Visiting Agro vet	Not visiting service Providing organization	Food sufficiency Education Subsidies Information about Commercial Visiting with JT/JTA Visiting NGO/INGOs Award Satisfaction Network	Getting as a farmers Future security Visiting DADO Family size
Improved seeds used	Information about Commercial Training*		Food sufficiency Subsidies Visiting with JT/JTA Visiting NGO/INGos Award Satisfaction Visiting Agro vet Network	Education Family size Getting as a farmers Future security Not visiting service providing organization
Chemical fertilizer used	Visiting Agro vet**	Visiting with JT/JTA Network	Food sufficiency Information about Commercial Satisfaction Getting as a farmers	Education Family size Future security Subsidies Training Visiting NGO/INGos Award Not visiting service providing organization
Insecticides used	Visiting Agro vet	Network Not visiting service providing organization	Food sufficiency Information about Commercial Getting as a farmers Training	Education Family size Future security Subsidies Visiting NGO/INGos Award Satisfaction Visiting with JT/JTA Visiting DADO
Cold storage used	Food sufficiency Information about Commercial Award Family size	Education	Getting as a farmers Visiting DADO Visiting Agro vet Satisfaction Network	Future security Subsidies Visiting NGO/INGos Visiting with JT/JTA Training Not visiting service providing organization
JT/JTA used	Award Visiting DADO Network Visiting with JT/JTA Training		Family size Food sufficiency Information about Commercial Visiting Agro vet Future security	Subsidies Visiting NGO/INGos Not visiting service providing organization Education Getting as a farmers Satisfaction

Source: Field survey 2008

5.5.5 Economic Factors and Transformational Agents

In general, the land use ratio of individual crops, cultivation of additional crops, crops productivity, intensive utilization of cultivated land, increased land use of cash crops and partial or complete transformation cropping pattern have a significant influences on making differences of cash value of production within the same size of land. (Lama 2002)

Farmers having main source of income from agriculture were found highly negatively significant with cold storage used and JT/JTA used and negative relation with others (Table 5.6). Getting rational amount of product has significant relation with improved seed used. Profit earning has significant relationship with changing in farming system than parents, technique of farming and improved seeds used. Taking loan for farming has negatively relationship with all agents except technique of farming and insecticides used. Profit earning, and getting rational amount of products had highly significant relationship with transformational agents whereas availability of farm labor had both positive and negative significant relationship with different agents but not significantly positive relationship. Earning had most not significant positive relation followed by availability of farm labors. Where taking loan for farming, main source of income is agriculture, animal husbandry and expense in farming had negative but not significant. In FGD the farmers told that they were unable to change in farming system because they were not getting proper education about farming system, those who had changed at least some systems than parents had also less influences. In another hand farmer who had main source of income was agriculture got very less amount of running capital in their hand and found always in economic crisis as very few Household made profit. In observation it was found that those Household engaged animal husbandry not used chemical fertilizer.

Table 5.6: Economic Factors and Transformational Agents

	Significant		Not Significant	
	Positive	**Negative**	**Positive**	**Negative**
Changing in farming system than parents	Profit earning		Doing animal husbandry Amount of earning Getting rationale amount of money for product Availability of farm labors	Main source of income is agriculture Money expended in Farming Taken loan for farming
Technique of farming	Profit earning		Amount of earning Getting rationale amount of money for product Taken loan for farming Availability of farm labors	Main source of income is agriculture Doing animal husbandry Money expended in Farming
Improved seeds used	Getting rationale amount of money for product Profit earning		Amount of earning Money expended in Farming Availability of farm labors	Main source of income is agriculture Doing animal husbandry Taken loan for farming
Chemical fertilizer used	Availability of farm labors		Amount of earning Getting rationale amount of money for product Profit earning	Main source of income is agriculture Doing animal husbandry Money expended in Farming Taken loan for farming
Insecticides used			Amount of earning Availability of farm labors	Main source of income is agriculture Doing animal husbandry Getting rationale amount of money for product Money expended in Farming Profit earning Taken loan for farming
Cold storage used		Main source of income is agriculture	Doing animal husbandry Amount of earning Getting rationale amount of money for product Money expended in Farming Profit earning	Taken loan for farming Availability of farm labors
JT/JTA used		Main source of income is agriculture Availability of farm labors	Doing animal husbandry Amount of earning Money expended in Farming	Getting rationale amount of money for product Profit earning Taken loan for farming

Source: Field survey 2008

5.5.6 Perception towards Transformation

While discussing transformation this study also tried to diagnose and analyze the perception of farmers towards transformation (Table 5.7)**.** About two-third farmers (64.2%) are satisfied being farmers. Over eleven percent farmers (11.5%) were highly satisfied whereas about one fourth farmers (24.3%) are not satisfied being farmers. About two fifth farmers (38.5%) couldn't say that whether there is future security being farmers. More than one third farmers (35.8%) responded there was no future security being farmer whereas one fourth farmers (25.7%) saw future security. More than two-third farmers (67.6%) responded getting employment being farmers. About

7.4 percent responded receiving prestige, equal percent (6.8%) earned money, Two percent farmers responded received everything whereas 16.2 percent farmers responded received nothing being farmer. About three fourth farmers (71.6%) responded acquired neutral perception from relatives and community members being farmers, about one fourth (22.3%) responded got positive perception from others and 6.1 percent thought negative. Almost all (89.9%) farmers thought acquired medium status on the community, 8.1 percent acquired high status and 2 percent in low status. About one third farmers (31.8%) were the members of agricultural community group, whereas more than two-third (68.2%) not associated with those farmers group.

Table 5.7: Perception towards Transformation

		Improved seeds	Chemical fertilizer	Insecticides	Cold storage	JT/JTA
Satisfied farmer as a farmer	Highly Satisfied	9	10	10	3	2
		6.1%	6.8%	6.8%	2.0%	1.4%
	Satisfied	41	61	56	18	6
		27.7%	41.2%	37.8%	12.2%	4.1%
	Not Satisfied	22	22	20	7	2
		14.9%	14.9%	13.5%	4.7%	1.4%
Future security as a farmer	Yes	19	26	21	10	3
		12.8%	17.6%	14.2%	6.8%	2.0%
	No	28	35	33	10	2
		18.9%	23.6%	22.3%	6.8%	1.4%
	Can't Say	25	32	32	8	5
		16.9%	21.6%	21.6%	5.4%	3.4%
Perception of relatives and community member towards farmer	Positive	17	14	12	13	5
		11.5%	9.5%	8.1%	8.8%	3.4%
	Neutral	49	73	69	11	5
		33.1%	49.3%	46.6%	7.4%	3.4%
	Negative	6	6	5	4	
		4.1%	4.1%	3.4%	2.7%	

Source: Field Survey 2008

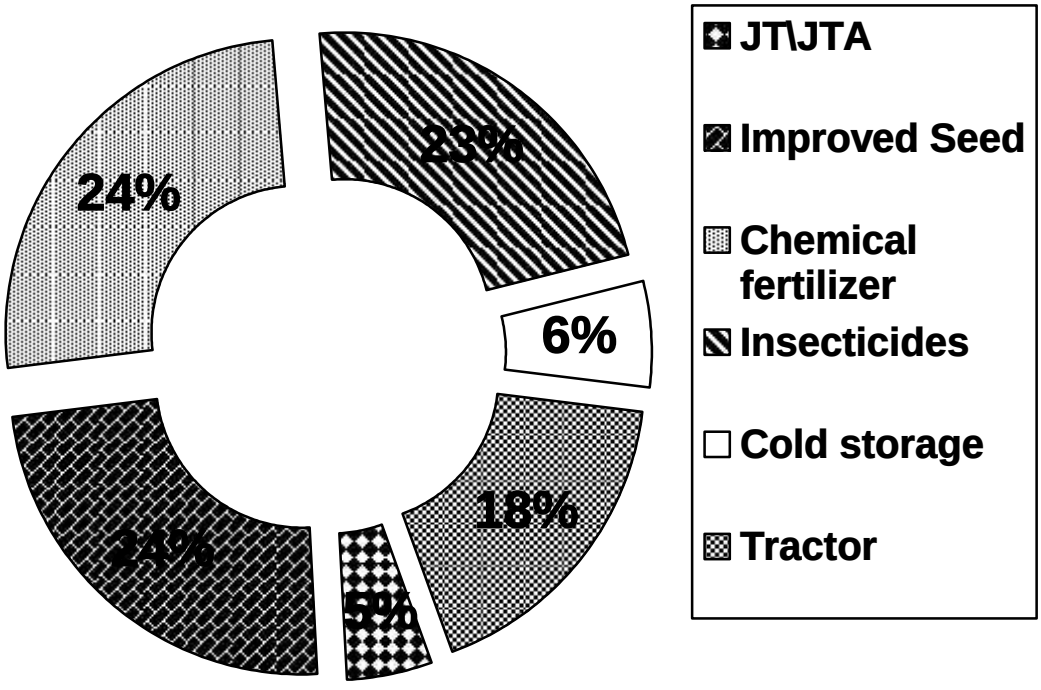
5.6 Awareness

During the time of cultivation about two-fifth (39.9%) farmers visited agro vet, about 15 percent farmers visited JT JTA, and only 2 percent farmers visited DADO for the necessary information. More than 50 percent farmers did not visit any related organizations.

One fourth farmers (26.4%) got at least some information about commercial farming. Three-fourth of the farmers (73.6%) got at least information about commercial farming. Out of them 10.8 percent farmers got information about commercial farming through their neighbors, 8.1 percent from relatives, and 12.8 percent from agro-vet,

15.5 percent from JTA, 11.5 percent from agricultural magazine, and 13.5 percent from radio. For the agricultural knowledge more than two-third farmers (67.6%) not took any training. Only about one third (32.4%) taken at least a training. Among the members who had taken trainings were respondents it self (29.1 %.), spouse (4.1%) and child (0.7%). During the time of cultivation about two fifth (39.9%) farmers visited agro-vet, about 15 percent farmers JT JTA, and only 2 percent farmers DADO for the necessary information. More than 50 percent farmers visited none of the related organizations. As a farmer, about one fourth farmers (24.3%) were awarded at least once. More than three fourth farmers (75.7%) responded not awarded in their farming life. (Annex Table 9 / 10)

Figure 16: Knowing about Transformation Agents



Among known and used of agents of transformation showed that improved seeds used is highly significant with knowing of improved seed itself, chemical fertilizer, insecticides, machinery, cold storage were significant with JT/JTA. Chemical fertilizer used highly significant with knowing of fertilizer itself and insecticides known, whereas positive not significant with improved seed known, machinery known, cold storage and JT/JTA known. Further insecticides used highly significant

with improved seeds, chemical fertilizer, and insecticides known itself, and positive but not significant with machinery known and cold storage known, whereas negatively not significant with the network of JT/JTA. Cold storage used highly significant with machinery, JT/JTA and cold storage known it, it was significant with insecticides and positive not significant with chemical fertilizer and improved seeds. Consulting with JT/ JTA highly significant with cold storage known and JT/JTA known itself, whereas negatively significant with chemical fertilizers known. Positively not significant with improved seeds and cold storage known but negatively not significant with insecticides known. Technique of farming highly significant with improved seeds, insecticides, machinery known; significant with JT /JTA consultation whereas positively not significant with chemical fertilizer and cold storage known. Changing in farming system than parents is not significant with any agents of transformation. (Table 5.8).

Table 5.8: Known and used of Agents of Transformation

Used / known	Improved Seeds	Chemical Fertilizer	Insecticides	Cold Storage	JT/JTA	Technique of farming	Changing in farming system than parents
improved seed		.130	.347(**)	.139	.103	.480(**)	.130
chemical fertilizer	.216(**)		.585(**)	.086	-.186(*)	.010	-.064
insecticides	.349(**)	.495(**)		.169(*)	-.115	.302(**)	.069
machinery	.378(**)	.092	.151	.385(**)	.076	.385(**)	.148
Cold storage	.332(**)	.098	.068		.229(**)	.093	.024
JT\JTA	.201(*)	.007	-.030	.429(**)		.163(*)	.046

Source: Field Survey 2008

5.7 Adoption/Adaptation/ Innovation

Among the nine components if a household used four or more than four components it considered as high level commercialization and if a household used less than four components considered as low level commercialization, taking mean at four components. About half of the farmers (48.6%) used improved seeds, about two-third farmers (62.8%) used chemical fertilizer, about two fifth farmers (58.1%) used

insecticides, about one fifth farmers (18.9%) used cold storage and only 6.8 percent farmers used JT/JTA.

Table 5.9: Adoption of Modern Farming Technique

	Frequency	Percent
Low level of Adoption	67	45.3
High level of Adoption	81	54.7

Source Field survey, 2008

Two-third farmers (66.2%) responded that they have adopted modern farming system whereas one-third (33.8%) farmers are still in traditional farming system. More than four-fifth (83.8%) farmers followed mixed farming, 14.2 percent followed mono cropping and only 2 percent multi cropping (Table 5.9).

Table 5.10: Change and Innovation in Farming System

	Innovation		Changing in Farming System	
	Frequency	Percentage	Frequency	Percent
No	123	83.1	55	37.2
Yes	25	16.9	93	62.8
Total	148	100.0	148	100.0

Source: Field survey 2008

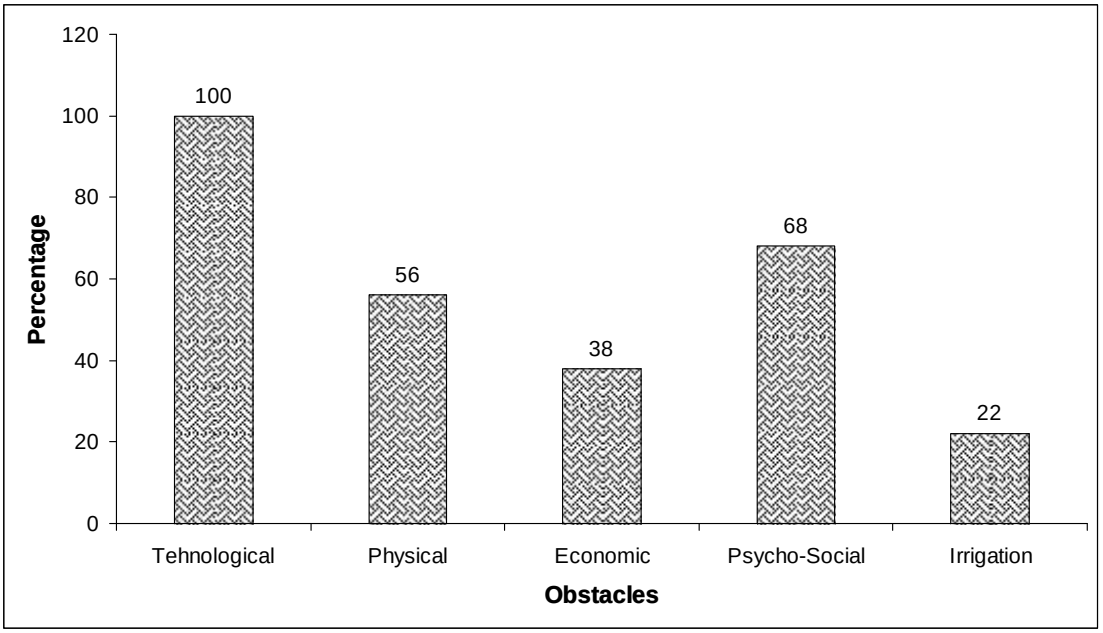
More than three-fifth farmers (62.8%) changed in the farming system compared to their parents, whereas 37.2 percent farmers did not change the farming system to their parents. Only 16.9 percent farmers innovated at least a new method in farming. According to FGD, farmers innovated in using chemical fertilizer, insecticides, high yielding species as their soil type and climatic condition. (Table 5.10)

CHAPTER VI

OBSTACLES TOWARDS AGRICULTURAL TRANSFORMATION AND COMMERCIAL FARMING

The different types of obstacle on farming are discussed in this chapter, cent percent respondents reported that the Technological input were the most influencing hindrance for not adopting commercial farming, Followed by psycho-social factors, physical factors and economic factors.

Figure 17: Obstacles on Transformation of Farming System



All farmers (100%) responded that the technology is the main hindrance on transformation, 68 percent responded that for the psycho-social factors, 56 percent for physical causes, 38 percent viewed that economy is the obstacle and only 22 percent for irrigation (Figure 17).

6.1 Technological Obstacles

This age is age of technology; technology can save the time and minimize the human labor as well as other resources. If production cost is minimal only than farmers can sell their produces easily and can get more profit. These also encourage and accelerate

the rate of farming. Technology is only one key element for the agricultural modernization. In the absence of technologies no more can produces how rich the land and labor.

Table 6.1: Technological Obstacles for not Adopting Commercial Farming

Obstacles	Frequency	Percentage
Lack of improved seeds	52	35.13
Lack of tools	23	15.54
Lack of fertilizer	12	8.13
Selecting seeds	11	7.43
Lack of insecticides	3	2.1
Lack of transportation	7	4.9
Lack of Soil appropriateness	1	.7
Absences of JT \JTA	1	.7

Source: Field survey 2008

The hindering for not adopting commercial farming in order of strength was technological, psychosocial, physical and economical. Technology considered as the most hindering factor by 100 percent respondents. The following technological components lack of improved seeds (35.13%), lack of tools (15.14%), lack of fertilizer (8.13%), selecting seeds (7.43%), lack of insecticides , lack of transportation, lack of Soil appropriateness and absences of JT \JTA were the hindering factors in order of severity (Table 6.1).

6.2 Physical Obstacles

Nepal is a developing mountainous country, 67 percent area is covered with mountains, most of the places are out of motor able road, so it is too difficult to bring and use modern tools and other technologies. Lacks of irrigation, natural calamities, wild lives are the enemies of agriculture in these areas. Most of the remote areas are from the technicians. Physiographical suitable species of yields, horticulture and animal husbandry are the most effective in hills and vegetable farming, cereals farming is suitable in the Tarai region to over come the physical obstacles in farming. Following table 6.2 reveals the physical Obstacles on farming.

Table 6.2: Physical Obstacles for not Adopting Commercial Farming

Obstacles	frequency	Percentage
Sloppy land	33	22.29
Natural disasters	32	22.4
Physical obstacles	23	16.1
Diseases	6	4.2
wild lives	5	3.5
Small Parcels (Land size)	2	1.4

Source: Field survey 2008

In physical obstacles, 22.29 percent of the farmers reported that sloppy land was the main physical obstacles followed by natural disaster 22.4 percent, Physical obstacles 16.1 percent, diseases 4.2 percent, wild lives 3.5 percents and land size 104 percents in severity.

6.3 Economical Obstacles

Economic investment is the first basic input in farming. For managing farm land**,** to manage fertilizer and seeds farmers should economically sound. Difficulties to take loan from bank, high interest rate, expensive technology, lack of market, transportation, and rationality of selling price of produces are the leading economic hindrance responded by the participants of FGD. The following table reveals tat the economic obstacles on transformation of farming system.

Table 6.3: Economical Obstacles for not Adopting Commercial Farming

Obstacles	frequency	Percentage
Lack of economic support	49	34.3
Less land	14	9.8
Lack of agricultural market	7	4.9
Expensive tools	7	4.9

Source: Field survey 2008

Further more economic factors considered as the most hindering factor reported by 38 percent respondent. The following economic components lack of economic support (34.4%), less land (9.8%), lack of agricultural market (4.9%) and expensive tools (4.9%) were the hindering factors in order of strength (Table 6.3).

6.4 Psycho-social Obstacles

Social activities, norm and values, social status, prestige and social constrains with culture is responsible for the psychology of human. Psychologically weak man can not achieve goal in his/ her mission. Like wise, Nepalese farmers psychologically is in low profile, they have not social prestige with respect to other business and profession, they didn't see their future security, ignorance of agricultural concern authorities, award, not providing subsidies and incentives were the leading obstacles for transformation reported by farmers and others relevant persons in FGD, and the following table also fleshed the same.

Table 6.4: Psycho-social Obstacles for not Adopting Commercial Farming

Obstacles	frequency	Percentage
Lack of trainings	57	39.9
Lack of awareness	11	7.7
Lack of encouragement	4	2.8
Lack of concern of DADO	6	4.2
Less Government investment	9	6.3
Lack of security	4	2.8
Instability of government	9	6.3
Lack of irrigation	33	22.29

Source: Field survey 2008

Similarly psycho–social factors considered as the most hindering factor by over two-third respondents (68%). The following psychosocial components lack of trainings (39.9%), lack of awareness (7.7%), lack of encouragement (2.8%), lack of concern of DADO, less government investment, lack of security and instability of government were the hindering factors in order of strength. 22.9 percent respondents responded that one of the most hindering factors is lack of irrigation, which was also focused by the FGD participants and key informants too (Table 6.4).

CHAPTER VII

SUMMARY, FINDINGS, CONCLUSION AND RECOMENDATIONS

7.1 Summary

Nepal with limited base, unable to exploit the existing water and mineral resources, increased population with fewer employment opportunities, in and around; increased agricultural production is therefore imperative for employment creation income generation in the time of world economic crisis. With small portion of land area suitable for agricultural operation the agents of transformation played vital role for the commercialization, where about two third economically active populations are engaged in. This study was carried out with the objective to identify the factors affecting on transformation of subsistence farming into commercial farming with the four major factors as economic factors, physical factors, psycho social factors and technological factors. Commercializing process was analyzed on the basis of transformational agents. Later on, the technological factors plus perception of changing farming system together types of farming applied, considered the transformational agents. The relationship of economic factors, physical factors and psycho social factors with TA was analyzed.

The result of the study is based on single field survey with quantitative techniques of research carried out in Arva VDC Kaski representing mid hills (780- 1340 masl.) of Nepal. A total of 148 Household at least engaged in agricultural activities, were selected for the interview on the basis of purposively random sampling.

To analyze the situation the theories proposed by Schultz and Mellors were overviewed, the cases of developed and developing nations, Asian countries and the empirical studies made in Nepal, Kaski and the Arva VDC itself by different institutions and scholars were discussed.

The Household having main occupation was agriculture over four fifths (86.5%) which was very near to NPC 2001AD report of Arva VDC (83.36%) and significantly more than the national account (65%) of economically active population.

The illiteracy rate (31.8%) was less than the national figure. The main source of income was agro farming (95.9%) fooled by animal husbandry 62.8%, Service 43.9%, foreign service 33.1% and trade and business 12.8%.Area of land ranged from 0.5-52 ropanies (0.025ha.-2.64 ha.) with one to 24 parcels. Most of the Household having three ropani (0.15ha.) with two parcels 7.7 ropani (0.39ha.) land in average. Over half of the Household (52.7%) was facing the problem of food insufficiency. Very less Household (9.5%) sold the produces, among them only 71.4% made the profit. Where, almost all Household (98.6%) did not save any amount of money. Out of profit makers only five persons kept the agricultural accounting. Almost all household (92.86%) who made profit sold their produces directly to the customer by carrying in *Doko/ Dalo.*

Female members of household were significantly contributed for farming activities such as land preparation, using manure fertilizer, using chemical fertilizer, buying seeds, spreading seeds and harvesting products.

The government, NGO / INGOs had not significant roles for providing subsidies, and relief package during the disaster. One third of the respondents had taken at least training with respondents themselves (29.1%), spouses and children (5.8%) in which respondents. Over one fourth household (26.4%) had got at least some information about commercial farming. Over half household (50.7%) did not consult with any farming related organizations. About two fifths household (39.9%) consulted with agro vet followed by JT/JTA (14.9%) and two percent with DADO. About two third household (64.2%) were satisfied and 11.5 percent were highly satisfied where as about one fourth (24.3%) were not satisfied from farming. Only one fourth (25.7%) had seen future security from farming. Two third (67.6%) had thought that they were employed, 16.2 percent had got nothing where as 6.8 percent received money and two percent got everything from the farming. About one third Household (31.8%) had networking with agricultural groups. Two third household (66.2%) had perceived that they had adopted modern farming system. About two fifths household (39.05%) used agents of transformation. Although 48.6 percent household had stagnant on their production and 48 percent had increased on their production. About two third Household (62.8%) had changed the farming system than the parents where as only 16.9 percent had innovated new system according to their perception.

Those household owning own land were positively changed the farming system than the parents. Mean time who acquired more agricultural land and number of parcels were significantly used cold storage. None of the physical factors had negative significant with the transformational agents. None of the physical factors had neither positively significant nor negatively significant with technique of farming, improved seed, chemical fertilizer, insecticides and JT / JTA. Training, information, award, had highly positively significant in changing in farming system. At the mean time subsidies and network had positively significant relationship. Where as not visiting any service providing organization had negatively significant in changing in farming system. Training and visiting agro vet had highly positive significant with technique of farming. But not visiting service providing organization had negatively significant relationship. Information about commercial farming had highly positive significant with improved seeds and training had positively significant. None of the transformational agents had negatively significant with improved seeds. Visiting agro vet had highly significant with chemical fertilizer, ridiculously consult ting JT / JTA and networking had highly negative relation ship with it. Visiting agro vet had highly significant with insecticides, mean time networking not visiting service providing organizations had highly negative significant. Food sufficiency and information had highly significant with cold storage, award and family size had positively significant, but education had negatively significant. Award and visiting DADO had highly positive significance with JT / JTA and networking and training had significantly positive relation. None of the psycho social factors had negative significant relation with improved seed, cold storage and JT / JTA.

Profit earning had positive significant relation with changing in farming system and none of the economic factors had negatively significant with transformational agents. Profit earning had positive significant relation with technique of farming and none of the economic factors had negatively significant. Getting rational amount of produces had highly significant relationship with improved seeds and profit earning had positive significant, none of the economic factors had negatively significant with it. Availability of farm labor had significant relationship with chemical fertilizer and none of the economic factors had negatively significant. None of the economic factors had neither positive nor negatively significant with insecticides. Main source of income agriculture had highly negative significant relation ship with cold storage and JT / JTA; and availability of farm labor had highly negative significant relation ship

JT / JTA. It was identified more than half household (54.7%) had adopted modern farming technique and categorized as high level of adoption of transformational agents. Even though household had adopted transformational agents in farming system there was identified the significant relationship with particular transformational agents and hence the full system of farming was transformed into commercialization. This finding how ever consistent to Schultz hypothesis of combined used of the modern inputs.

This study assumed the farming system in the study area as commercial with an advanced modernization process, where most farm products were sold in the market but the assumption become failed as the dominant farmers focused themselves for the food security which is the major characteristics of subsistence farming. Very less household made surplus in food and only surplus products was sold. This result is because of the typical Brahmin castes that had comparatively more land holdings and were satisfied with only the sufficiency for their livelihood.

The agricultural status of the study area is not transformed into fully commercialization because physically the parcels of land is high; economically there is less food sufficiency, less profit, less saving; technically the use of modern technology is comparatively less and from the socio-psychological aspect farmers were not satisfied with their profession, their perception is negative towards future security through farming. Though farmers have acquired good education, received trainings, known the technological aspects, having transportation facilities, communication facilities, situated near from the big Pokhara market and having adequate number of farm labors there is great potentialities of transforming the subsistence based farming into commercial. It is in semi-subsistence in nature. On the basis of result and discussion of the study the following major findings were derived.

- The rural setting is typical with all the household followed Hinduism; consisting over four-fifths population were Brahmin, having relatively a small family size.
- The illiteracy rate (31.8%) of the study area low and much lower than the national rate.
- The average time provided by individual Household was 15.36 hours, where male contributed 5.05 hrs. and female significantly contributed 10.31 hrs. per day for farming activities.

- The main source of income was agro-farming (95.9%) followed by animal husbandry 62.8%, service 43.9%, foreign service 33.1% and trade and business 12.8%
- Area of land ranged from 0.5-52 ropanies (0.025ha.-2.64 ha.) with one to twenty four parcels. Most of the Household owned three ropani (0.15ha.) land with two parcels, 7.7 ropani (0.39ha.) land in average.
- Almost all the Household (98%) performed cereal farming, with vegetable (93.2%), horticulture (70.3%) and herbs (6.1%) respectively.
- Three-fourth of the Household owned *plain Khet* and over half (50.7%) of them owned *Pakho bari* and *tari Khet*. Out of which Household 88.5%had owned their own land 16.9% were cultivated in share cropping land with on the contracted and rented land. None of the Household had *bandhaki* land.
- Over half of the Household (52.7%) faced the problem of food insufficiency.
- Very less household (9.5%) sold the products, among them only 71.4% made the profit. A large number household (98.6%) not saved. Out of profit makers only five persons kept the agricultural accounting.
- Almost all household (92.86%) who made profit sold their products directly to the customer by carrying in *Doko/ Dalo.*
- One-fifth Household (20.3%) took loan for farming out of them over half (53.33%) took loan from the cooperatives followed by bank (30%), only 16 percent household took loan from neighbors and villagers, (62%) Household did not, because need not, difficulties and higher interest rate.
- Female members of household significantly contributed for farming activities such as land preparation, using manure fertilizer, using chemical fertilizer, buying seeds, spreading seeds and harvesting products.
- The government, NGO / INGOs had no significant roles for providing subsidies, and relief package during the disaster.
- One-third of the respondents (29.1%) took at least training by themselves, spouses and children (5.8%) in which respondents.

- Over one-fourth household (26.4%) got at least some information about commercial farming.
- Over half household (50.7%) not consulted with any farming related organizations. About two-fifths household (39.9%) consulted with agro vet followed by JT/JTA (14.9%) and two percent with DADO.
- About two-third household (64.2%) satisfied being farmers and 11.5 percent highly satisfied where as about one-fourth (24.3%) not satisfied from farming. Only one-fourth (25.7%) saw future security from farming. Two-third (67.6%) employed, 16.2 percent got nothing where as 6.8 percent received money and two percent got everything from the farming.
- Nine out of ten household perceived medium status in their community.
- About one third household (31.8%) enrolled in network of agricultural groups.
- Two-third household (66.2%) perceived adopting modern farming system.
- Exact half of the Household informed about TA (improved seeds, chemical fertilizer, insecticides, machinery, cold storage and JT / JTA).
- About two-fifths household (39.05%) used agents of transformation. Although about half were stagnant, about the same increased production.
- About two-third household (62.8%) changed the farming system than the parents whereas only 16.9% innovated new system according to their perception.
- Household owning own land positively significantly changed the farming system than their parents. Mean time who acquired more agricultural land and number of parcels significantly used cold storage. None of the physical factors had negative significant with the transformational agents.
- None of the physical factors, neither positively nor negatively significant with technique of farming, improved seed, chemical fertilizer, insecticides and JT / JTA used.
- Training, information and award, highly positively significant in changing in farming system. At the mean time subsidies and network had positively significant relationship. Whereas not visiting any service providing organization negatively significant in changing in farming system.

- Training and visiting agro-vet highly positive significant with technique of farming. But not visiting service providing organization had negatively significant relationship.
- Information about commercial farming highly positive significant with improved seeds, positively significant with training. None of the TA negatively significant with improved seeds.
- Visiting agro-vet highly significant with chemical fertilizer, ridiculously consulting JT / JTA and networking highly negatively related.
- Visiting agro-vet highly significant with insecticides, mean time network and not visiting service providing organizations highly negative significant.
- Food sufficiency and information highly significant with cold storage; award and family size positively significant, but education was negatively significant.
- Award and visiting DADO highly positive significant with JT / JTA, networking and training positively significant.
- None of the psycho-social factors had negative significant relation with improved seed, cold storage and JT / JTA.
- Profit earning, positive significantly related with changing in farming system and none of the economic factors negatively significant.
- Profit earning, positive significant relation with technique of farming and none of the economic factors negatively significant.
- Getting rational amount of produces highly significantly related with improved seeds and profit earning related positively significant, none of the economic factors negatively significant with it.
- Main source of income is agriculture, highly negative significant relationship with cold storage and JT / JTA and availability of farm labor highly negative significant relationship JT / JTA.
- Lack of improved seeds, tools, fertilizer, insecticides, transportation, soil appropriateness, absence of JT / JTA, selecting quality seeds found major hindering elements under the technological factors.

- Lack of trainings, encouragement, awareness, security, instable government, incentives, concern of DADO, found the hindering elements under psycho-social factors.
- Physiographic condition, sloppy land, natural disaster, epidemic, wildlife and small parcels found the physical hindering factors.
- Lacks of economic support, small land holdings, lack of agricultural market, expensive tools were the hindering elements in economic factors.
- None of the farmers fount that they were Agronomist, Technician, administrator, Manager, PR man, trader and innovator at a time for farming.

7.2 Conclusion

This study was carried out with the objective to identify the factors affecting on transformation of subsistence farming to commercial farming with the four major factors as economic factors, physical factors, psycho social factors and technological factors. Commercializing process was analyzed on the basis of transformational agents. Later on, the technological factors plus perception of changing farming system together types of farming applied, considered the transformational agents. The relationship of economic factors, physical factors and psycho-social factors with transformational agents was analyzed.

About the physical factors the result showed that positive relationship among own land, area of agricultural land, number of parcels to the transformational agents. Which is contradictory to Schultz hypothesis, there is no correlation between the farm size and productivity, small and large farm size may be equally efficient or inefficient in different situations ignoring the situational analysis.

About the psycho-social factors the result revealed that training, information, visiting service providing organizations, award, subsidies, networking and family size had positive significant relation with transformational agents. Whereas, not visiting service providing organizations and education had negative significant relation. This result support the hypothesis, farmers having high level of education were not difference in commercializing their farming to the farmers having low level of education. The trainings had positively significant relation where as the education had

negatively significant. There was significantly distinct difference between education and training. And again this is coincide Mellor's assumptions of providing trainings for the technologically dynamic agriculture.

As profit earning, getting rational amount of products and availability of farm labors of economic factors had positive significant with transformational agents and none others components of economic factors had not significant relationship, which rejected the hypothesis, there is not significant relation between transformational agents and profit earnings of farmers.

This study assumed the farming system in the study area as commercial with an advanced modernization process, where most farm produces were sold in the market but the assumption become failed as the dominant farmers focused themselves for the food security which is the major characteristics of subsistence farming. Very less household made surplus in food and only surplus produces was sold. This result is because of the typical Brahmin castes that had comparatively more land holdings and were satisfied with only the sufficiency for their livelihood. Except cold storage none of the transformational agents had significant relation with food sufficiency, which reveled the rejection of hypothesis the farmers using transformational agents are not difference in food security than the farmers' not using transformational agents.

As none of the household had received subsidies from the GOs / NGOs / INGOs there is the hypothesis, there is not significant relation ship with subsidies and commercialization is impossible to analyze. This is against to Schultz view providing incentives and rewards to farmers for transformation and knowledge.

Technological factors, psycho-social factors, physical factors and economical factors were the consecutive hindrance factors on transformation of subsistence farming into commercial. None of the farmers found that they were Agronomist, Technician, Administrator, Manager, PR man, Trader and Innovator at a time for farming so the farming system is not transformed.

7.3 Recommendations

On the basis of the study, the following recommendations have been given to the different authorities.

For the forth coming researchers:

- Time series data analysis regarding the study area is recommended.
- Study under the very specific title regarding commercialization process (vegetable production, enhancing the niche market, horticulture production, mono cropping) is recommended.

For the farmers of study area:

- Farmers are suggested to integrated mobilization and use of transformational agents especially JT/JTA.
- The educated individual/community is suggested to use their knowledge in the field commercial farming.

For the agricultural concern authorities:

- It is recommended to provide the training related to commercialization, use of modern inputs, high yielding varieties, machinery and market with linkage process for modern farming techniques.
- The incentive and subsidies are required in the beginning for seeds fertilizer and machinery etc.
- For the psychological encouragement the exhibition related to produces, agro-biodiversity, animal husbandry etc. inter and intra village/ pocket area is recommended.

For any individuals:

- Let us respect and secure social prestige of farmers for their devotion to feed the people.

REFERENCES

ABPSD (Agro Business Promotion and Statistics Division), (2003); *Statistical Information on Nepalese Agriculture-2002/2003*, MOAC, Nepal

Adhikari, J. (1996); The *beginnings of agrarian change:* A case study in central Nepal (PhD Thesis Submitted to Australian University) TM publication Kathmandu.

Adhikari, R. (2006); *Women in Commercial Vegetable Farming*, Unpublished MA Thesis, Submitted to Department of Sociology and Anthropology, PN campus.

Adhikari, R.C, S.K Adhikari, P.K Yadev, (2005); *"Environmental Aspect of Potato Production: The Basis of food Security and Sustainability"*. MOAC, Agriculture and Environment, Gender Equity and Environment Division Kathmandu, Nepal

Anya Mc Guirk, Yair Mundlak. (1991); Incentives *and Constraints in the Transformation of Punjab Agriculture*, Research Report 87

APP (2005); Monitoring *and Evaluation System Report*, Submitted by Gaurav Integrated Development Associates, New Baneswor , Kathmandu

APROSC and J.M Association (1995); *Nepal Agriculture Perspective Plan*, National Planning Commission, HMG, Kathmandu Nepal

Chourisea, R.R. and V.M .Singh (1972); *Economics of Local and High Yielding Varities of Paddy and Wheat in Pantanagar Village of Madha Pradesh*, Indian Journal of Agricultural Extension, vol.27

DADO (2061/62 B.S); *Barsik Krishi Bikash Karyakram Tatha Thayank* Kaski, Nepal, (A Text in Nepali) Kaski. Nepal: DADO

DADO (2062/63 B.S); *Barsik Krishi Bikash Karyakram Tatha Thayank* Kaski, Nepal, (A Text in Nepali) Kaski. Nepal: DADO

Dahal Madan Kumar (2004); *"Nepalese Economy Towards Building a Strong Economic Nation State"*. Madan Kumar Dahal(ed), Nepalese Economy

Dichhit Ajaya (2002); *Basic Water Science*, Nepal Water Conservation Foundation KTM

Evenson, Robert, E. Pray, Carl E. Rosegrant, W. Mark <http:/www.blackwellsynergy.com>[2008, August 8]

FWLD (2003); *Special Measures for Women and Their Impact*. Publication No. 62. Kathmandu: FWLD

Gauchan, Vinod (1998); *Nature of the Agriculture in the Western Hill Economy* unpublished Thesis for MA Economics

Hornby A.S (1996); Oxford *Advanced Learner's Dictionary of Current English Oxford*, University Press,

Jha , R. K. (1998); *Effectiveness of IPM Farmers Field School in Mahottari Editor* Jha PK , SB Karmacharya (Ecological Society Nepal).

Kantipur Daily National News Paper, Year 16. Vol.35: (Editorial). Katmandu, Nepal Wolf H.K. and Panta P.R(2005); *Social Science Research and Thesis writing*

KDDC Brochure (2006); *"An Introduction to Kaski District."* Kaski District Development Committee, Pokhara Nepal

Lama, Ngima Gyalgen (2002); *The land Holding Patterns and Efficiency*, Buddha Academic Publishers and Distributors, Kathmandu Nepal.

Marc N, V. Stephen & B. Wesley (1996); *Adoption of Modern Technology in Brazil*, Research Report 104.

MOAC, (2005) *Agriculture and Environment*, Gender Equity and Environment Division Kathmandu, Nepal

Vendors: Experience from Kohoma .Nagaland,India

".<http://www.encyclopedia.com/doc/1G1-21262650.html, 2009 January 1]

National Planning Commission. (1992); *The Eighth Plan* (1992-1997). Kathmandu

National Planning Commission. (1996); *The Ninth Plan* (1997-2002). Kathmandu

National Planning Commission. (2001); *The Interim Plan* (2008-2010). Kathmandu <http://www.npc.org.np> [2009 January 1]

National Planning Commission. (2001); *The Tenth Plan* (2002-2007). Kathmandu

NCA 2001/02, CBS Kathmandu Nepal

Nakro and Kikhi (2006); "*Strengthening Market Linkage for Women Vegetable of Agricultural production in the Hills of Nepal:* From the Perspective of Households Categories Based on Food Availability Status. An unpublished PhD thesis Submitted to Faculty of Agriculture, Kyushu University, Japan.

Pal, Nabendu and Sahadev Sarker (2005); *Statistics Concepts and Applications. Prentice Hall of India,* New Delhi.

Pant, G.D & S Joshi (2006*); Nepalese Economy, Statistics and Mathematics,* NabinPublication, Ktm.

Peek, Petter (1978); *" Family Composition and Married Women Employment*: A Case of Chile, Case Study number 4. Adhikari, R. 2006; Women in Commercial Vegetable Farming,

Pokheral N.R., & K. R. Sapkota (2003); *Sociology of agriculture and environment*. Chhitis Publication Ktm.

Poudel, S. K. (2007), *Changing Pattern of Nepalese Farming System;* An Unpublished Thesis Submitted to Department of Sociology and Anthropology, PN campus.

Prevost. P (1997); *Fundamental of Modern Agriculture;* Oxford & IBH Publishing Co. Pvt. Ltd, New Dehli.

Sadhu, A.N. & A. Sing (1988); Fundamental *of agricultural Economics*,, Himalayan Publishing House , Bombay ,India.

Sapkota T.B. K.P. Aryal B.B Tamang and B.R Regmi (2005); *Findings of the BaseLine study in Kaski and Tahnahu Districts, Nepal*, Local initiatives for Biodiversity, Research and Development (LI-BIRD) Pokhara Nepal / The Development Fund , Oslo, Norway.

Schultz, T. W., (1964); *Transforming the Traditional Agriculture* , Yale University Press London,UK

Sharma Govinda. Kantipur Daily National News Paper Year 16 Vol.76

Sharma, H R. (1996); *Mountain Agricultural Development Process and Sustainability*, Micro Level Evidence from Himanchal Pradesh in Indian Himalayas, ICIMOD, Kathmandu, Nepal.

Sutawan, N. (1979); *Production and Income Distribution affect HYV Rice varieties in Java, Indonesia*. A PhD Thesis, UPLB, Philippines

The fate of Family Farming ,United Kingdom <http://www.farming.co.uk>Jager, [2004, March 8]

Tiwari, I.P (1998); *Employment Creation and Income Generation in Rural Regions: Peoples, Places, Activities and Interventions in Nepal*, Center for Rural and Urban Studies and Transfiguration Lekhanath Nepal

Todaro, M.P. and Smith C.S (2004); *Economic Development*, Pearson Education, (Singapore) Indian Branch Delhi, India.

Towards Building a Strong Economic Nation State, Central Department of Economics, Tribhuwan University and New Hira Books Enterprises.

Tripathi, Y.R (2006); *Youth Issues in Communities and Solutions*: Manabiya Sroth Bikash Kendra Pokhara Nepal.

U.S. Census Bureau

Upadhya, Vawana (2004); *Gender Aspect of Smallholder Irrigation Technology Insights from Nepal*. InJournal of Applied Irrigation Science, Vol. 39. No 2/2004, http:// www.vi-irrigation.org % sakia.org.

Uprety, Laya Prasad (2004); "*Gender and Development: A Micro Level Sociological Study of the Intuitional Effort for Gender Mainstreaming in the Agriculture sector Development in Nepal*" In Parajuli B.K. (ed). Himalayan Journal of Sociology and Anthropology. Vol 1 Pokhara, Nepal: Department of Sociology and Anthropology PNC (T.U).

Vyas, A. K. (2004); *An Introduction to Agriculture*, Sunil Kumar Jain for JainBothers Publication, New Dehli. India.

Washington. Report No 3906- TH

WECD (1987); *Our common future*, Oxford University Press

Weitz, R. (1971); From *Peasant to Farmer: A revolutionary Strategy for Development.* Columbia University Press, New York

World Bank. (1983); *Growth and Employment in rural Thailand*.

World Resources, New York: 1996-97.

<http://www.blackwellsynergy.com> [2008, June 5]

<http://www.npc.com> [2008, November 5]

<http:// www.uscensusbureau.com> [2008, July 11]

<http://www.wikipedia.com> [2008, March 12]

Appendix 1

Interview Schedule

Interview Schedule

Researcher

Date:-

Time:-

Sample Code:-

General information

101. Name of the household head:-

102. Occupation:-

103. Religion:-

104. Age:-

105. Sex:-

106. Caste:-

107. Total Family size

II) 108. Family Description

SN	Relation with HH	Age	Qualification	Occupation	Time provided for farming
1					
2					
3					
4					
5					
6					
7					

Q.N	Question	Answer	Code	Remarks
109	What are your main income sources?	Farming	0	
		Animal Husbandry	1	
		Service	2	
		Foreign service	3	
		Trade and business	4	
		Others	5	

110. How much your area of land? ..... ropani / parcels ……..

Q.N	Question	Answer	Code	Remarks
111	Mention your own type of land.	*Tari Khet*		
		Slanted *Pakho*		
		Plain *Phant*		
112	How much do you cultivate in *Pakho Bari* ?	12 months		
		8 months		
		4 months		
113	For how much time irrigation facility is provided in *Pakho Bari* ?	12 months		
		8 months		
		4 months		
		Rain fed		

114	How much do you cultivate in plain *Phant Khet*?	12 months		
		8 months		
		4 months		
	For how much time irrigation facility is provided in *Phant Khet*?	12 months		
		8 months		
		4 months		
		Rain fed		
116	How much do you cultivate in *Tari Khet*?	12 months		
		8 months		
		4 months		
	For how much time irrigation facility is provided in *Tari Khet*?	12 months		
		8 months		
		4 months		
		Rain fed		
118	What type of land are you cultivating?	Self		
		Shared		
		Thekka		
		Rented		
		Bandhaki		
119	Are you doing animal husbandry ?	Yes		
		No		
120	If yes, mention the type of animals with number.	Cow		
		Buffalo		
		Ox		
		Goat		
		Duck		
		Hen		
		Pigeon		
		Others		
121	What type of yield do you cultivate in your farm?	Grains		
		Fruits		
		Vegetables		
		Medicinal herbs		
		others		
122	Tick the goods that you keep in your home.	Television		
		Radio		
		Computer		
		Refrigerator		
		Mobile		
		Cycle		
		Motorcycle		
123	What is your situation of production? (If just sufficient for a year go to the question no139.) (If more than your need go to question no 126)	Insufficient (cannot not feed whole year)		
		Just sufficient		
		More than necessity		
124	If less than necessity, how many months is it sufficient?	Less than 4 months		
		4-8 months		
		More than 8 months		
125	If insufficient why? (Now Go to the Q.N 139)	Less land for farming		
		Less production		
		Not cultivating		
		Insufficiency of fertilizer		
		Lack of labor		
		Not using modern techniques		
		Others		
126	If production is more than sufficient, do you sale?	Yes		
		No		
127	Is there availability of transportation services for selling protucts?	Yes		
		No		

128	If you sale the produces, what is the yearly income?	Less than NRs 5000		
		5-10 thousand		
		10-20 thausand		
		20-50 thoudand		
		50 thoudand -1 lakh		
		More than 1 lakh		
129	Where do you sale the products?	Pokhara		
		Village itself		
		Other places		
130	Is there profit?	Yes		
		No		
131	To whom do you sale the products?	Wholesalers		
		Middle man		
		Direct to the customer		
132	Do you think that, you get the rational amount of the products?	Yes		
		No		
133	In which topic do you spend your income?	Health		
		Education		
		Farming		
		Others		
134	Do you save the income from farming?	Yes		
		No		
135	If you have saved? Mention the institute.	At home		
		In cooperatives		
		At bank		
		To neighbors		
		Others		
136	Do you keep the record of income and expenditure?	Yes		
		No		
138	How do you define the cost of products?	According to the production cost		
		According to agricultural market		
		According to customer demand		
139	Have you taken loan for farming? (if not go to Q 142)	Yes		
		No		
140	If yes, from where have you taken loan?	From bank		
		From coopetrative		
		From villagers		
		From neighbours		
141	Do you get the loan easily?	Yes		
		No		
142	Why did not you take loan?	Not required		
		Difficulties		
		High interest rate		

143	Is it easy to get farm labor (*Khetala*)?	Yes		
		No		
144	Why don't you hire farm labor?	Expensive wages		
		Not getting labor easily		
		No body is interested to work as farm labor		
145	What is the wage of male labor?	Less than non farm works		
		More than non farm works		
		Equal to others		
146	What is the wage of female labor?	Less than non farm works		
		More than non farm works		
		Equal to others		
147	Who prepared the farm land?	Husband		
		Wife		
		Children		
		Husband and Wife		
		All members		
		Hired labors		
148	Who carries and spreads the compost manure?	Husband		
		Wife		
		Children		
		Husband and Wife		
		All members		
		Hired labors		
149	Who uses the chemical fertilizer?	Husband		
		Wife		
		Children		
		Husband and Wife		
		All members		
		Hired labors		
150	Who spreads the seeds?	Husband		
		Wife		
		Children		
		Husband and Wife		
		All members		
		Hired labors		
151	Who planted the saplings ?	Husband		
		Wife		
		Children		
		Husband and Wife		
		All members		
		Hired labors		
152	Who worked for the harvesting?	Husband		
		Wife		
		Children		
		Husband and Wife		
		All members		
		Hired labors		
153	Have you got the subsidies? If not go to q 156	Yes		
		No		
154	What subsidies have you got from NGOs/INGOs?	In tools		
		In chemical fertilizer		
		In insecticides		
		In seeds		
		In cold storage		
155	What subsidies have you got from Government?	In tools		
		In chemical fertilizer		
		In insecticides		
		In seeds		
		In cold storage		

156	Have you done insurance of crops?	Yes		
		No		
157	Have you got the relief package during natural calamities / epidemic?	Yes		
		No		
158	If yes , from where?	Government		
		NGO /INGOs		
159	Have you participated any training regarding farming, (if not go to Q 161)	Yes		
		No		
160	If yes, how many trainings have you participated?	One		
		Two		
		Three		
		More than three		
161	If not, who had participated?	Spouse		
		Children		
		None		
162	Have you received any information about commercial farming?	Yes		
		No		
163	If yes, From where?	Neighbors		
		Relatives		
		Agro –vet		
		JTA		
		Agricultural news paper		
		Radio		
		Television		
		Others		
164	During the farming season in which organizations do you visit?	JT/JTA		
		DADO		
		NGO/INGO		
		Agro vet		
		None		
165	Have you got award being farmer?	Yes		
		No		
166	If yes, mention.			
167	Are you satisfied being farmer?	Highly satisfied		
		Satisfied for some extent		
		Not satisfied		
168	Have you thought whether there is future security being a farmer?	Yes		
		No		
		Can't say		
169	What is your perception you have received being farmer?	Prestige		
		Money		
		Employment		
		Nothing		
170	What is the perception of your relatives and community members on you?	Positive		
		Neutral		
		Negative		
171	What is your image in community being farmer?	High		
		Medium		
		Low		
172	Are you member of any agricultural organizations?	Yes		
		No		
173	If you are, mention the name and post in the org.			
174	What is the technique of farming you have applied?	Traditional		
		Modern		
175	What agents of transformations of farming you have known?	Improved seeds		
		Chemical fertilizer		
		Insecticides used		
		Machinery		
		Cold storage		
		JT/JTA		
		others		

176	During the plantation and harvesting time in which institutions do you used?	Improved seeds		
		Chemical fertilizer		
		Machinery		
		Cold storage		
		JT/JTA		
		Insecticides		
		others		
177	How do you use chemical fertilizer and insecticides your farm?	According to JT/JTA		
		According to Agro-vet		
		In own experience		
178	If you used modern technology/ what is the production status?	Increased		
		Stagnant		
		Decreased		
179	What types of farming have you applied?	Single cropping		
		Mixed cropping		
		Inter cropping		
180	Have you changed in farming system than your parents?	Yes		
		No		
181	If yes mention			
182	Have you innovated any new technique in farming?	Yes		
		No		

183. Give arguments for acceptance and rejection

SN		Highly Agreed	Agreed	Not agreed
i	Production is affected because of land slide			
ii	Production is affected because of hailstone			
Iii	Production is affected because of draught			
iv	Production is affected because of heavy rain fall			
v	Productivity is affected because of sloppy land			
vi	It is difficult to used modern machinery because of sloppy land			
vii	Productivity is decreased because of land fragmentation			

184 List the hindrance of commercial farming.

185. Do you think that your farming is according to soil structure and environment? Yes No

186. Would you like to give any suggestions to researcher?

Thank you for cooperation.

Ends at……

Annex 2

Checklist for Focus Group Discussion

1. Holding size and commercial farming.
2. Advantages of mono farming and drawback of present multi-farming.
3. Present status of inputs in farming and the inputs required for commercial farming.
4. Agricultural economics of Arva VDC
5. Relation between the modern technologies and commercial farming, drawbacks of using modern technologies in farming.
6. Strength of agricultural education in farming.
7. Human resource involved in farming.
8. Scio-psychology of farmers.
9. Government policies in enhance farmers. And dissemination of agricultural information's.
10. Socio-culture of Arva and farming.
11. Farming and livelihood.
12. Challenges of Nepalese farmers.
13. Future of Nepalese farmers.

Annex 3

Checklist for the Key Informants Interview

1. Farming system in Nepal.
2. Leading feature of Nepalese farming.
3. Brief description of commercial farming.
4. Existing farming patron is suitable physically. (ie. Seasonal crops in irrigated sloppy land)
5. Role of technicians to shift the subsistence farming to commercial.
6. Government policies and availability of modern tools in farming time.
7. Key factors for the stagnation of farming system.
8. Socio economic status and farming.
9. Human resource involved in farming.
10. Multi farming vs commercial farming.
11. Psychology of farmers.

Annex 4

Observation check List

- Cropping pattern.
- Tools and technologies.
- Modern technologies.
- Crops productivity.
- Farmer’s livelihood and overall status.

Annex 5

Name of the Key Informants

1.	Narayan Prasad Baral	Arva 2	Politician
2.	Tekenath Baral	Arva 5	Leading Farmer
3.	Durga Sigdel	Arva 4	Women Representative
4.	Sita Devi Lamicnnane (JT)	Krishi	Upakendra Arva Kalika
5.	Krishna Prasad Baral	Arva 2	Ex Headmaster of Ratanpandey School

Annex 6

Participants of FGD

	Group A		Group B
1.	Tek Nath Baral	1.	Pritam Sunar
2.	Hari Prasad Baral	2.	Bishnu Devkota
3.	Ram Bahadur Bishwokarma	3.	Santosh Ranabhat
4.	Parbati Paudel	4.	Sailendra Sigdel
5.	Parbati Sapkota	5.	Prabin Tripathi
6.	Tara Sapkota	6.	Purnakhar Baral
7.	Jagannath Tiwari	7.	Devi Baral
8.	Guru Prasad Dhakal	8.	Saraswati Adhikari
9.	Maiya Shrestha	9.	Krishna Baral
10.	Kopila Baral	10.	Narayan Baral
11.	Indra Baral	11.	Badanta Baral
12.	Thule Gurung	12.	Fanendra Devkota

Annex 7

AnnexTable 1: Sex wise distribution of economically active people in Arva VDC

	Male	Female	Total
Economically active	791	1112	1903
Economically Inactive	467	351	817
Total	**1257**	**1463**	**2720**

Source; CBS, 2001

Annex Table 2: Time of Cultivation

Land Type	***Pakho Bari***		**plain *Khet***		***Tari Khet***	
Time of Cultivation ì	**N**	**%**	**N**	**%**	**N**	**%**
12 Months	64	69	11	9.9	35	47.3
8 Months	14	17.3	67	60.4	25	33.8
4 Months	3	3.7	32	28.8	13	17.6

Source: Field survey 2008

Annex Table 3: Period of irrigation in different type of land.

Land Type Time of irrigation	***Pakho Bari***		**plain *Khet***		***Tari Khet***	
	N	**%**	**N**	**%**	**N**	**%**
12 Months	2	2.5	10	9.1	22	29.7
8 Months	2	2.5	64	58.2	9	12.2
4 Months	2	2.5	34	30.9	1	1.4
Rain fed	75	92	2	1.8	42	56.8

Source: Field survey 2008

Annex Table 4A Statistics of Family size, Age, Daily time providing on farming

		Family size	Age of respondent	Respondents	All female member	All male member	All house hold member
N	Valid	148	148	148	148	148	148
	Missing	0	0	0	0	0	0
Mean		5.64	54.82	3.86	10.31	5.05	15.36
Std. Error of Mean		.187	1.013	.252	.473	.360	.682
Median		5.00	55.00	3.00	8.50	4.00	13.50
Mode		5	50	8	8	0	8(a)
Std. Deviation		2.280	12.322	3.068	5.751	4.384	8.300
Variance		5.199	151.837	9.415	33.073	19.222	68.884
Skewness		1.018	-.064	.305	2.477	.835	1.662
Std. Error of Skewness		.199	.199	.199	.199	.199	.199
Kurtosis		2.427	-.781	-1.121	12.142	.103	6.379
Std. Error of Kurtosis		.396	.396	.396	.396	.396	.396
Range		15	49	12	48	18	62
Minimum		1	31	0	0	0	1
Maximum		16	80	12	48	18	63
Sum		834	8113	571	1526	748	2273

Source: Field survey 2008

Annex 4B Table Statistics of Number of Parcels and Sex wise Wages of Labor

		Area of agricultural land	Number of parcels	Wage of male labor	Wage of female labor
N	Valid	148	148	148	148
	Missing	0	0	0	0
Mean		7.7027	4.51	.42	.18
Std. Error of Mean		.59524	.351	.058	.046
Median		5.0000	3.00	.00	.00
Mode		3.00	2(a)	0	0
Std. Deviation		7.24142	4.272	.700	.560
Variance		52.438	18.252	.490	.313
Skewness		2.330	1.756	1.379	2.864
Std. Error of Skewness		.199	.199	.199	.199
Kurtosis		9.226	3.952	.440	6.492
Std. Error of Kurtosis		.396	.396	.396	.396
Range		52.00	24	2	2
Minimum		.00	0	0	0
Maximum		52.00	24	2	2
Sum		1140.00	667	62	27

a Multiple modes exist. The smallest value is shown

Source: Field survey 2008

Annex Table 4C Distribution of Land by Caste/Ethnicity

Area of Land	Caste and Ethnicity							
	Brahmin		*Chhetri*		*Gurung*		*Dalits*	
	Freq	Per	Freq	Per	Freq	Per	Freq	Per
< 5 Ropani	56	37.8	4	2.7	4	2.7	14	9.5
5-10 Ropani	30	20.3	3	2.0	1	.7	0	0
10-20 Ropani	23	15.5	0	0	0	0	1	.7
20 Ropani and above	12	8.1	0	0	0	0	0	0
Total	121	81.8	7	4.7	5	3.4	15	10.1

Source: Field survey 2008

Annex Table 5: U**se of Chemical Fertilizer and Insecticides**

Directed as JTA		**Directed Shopkeeper**		**Own Experience**	
N	**%**	**N**	**%**	**N**	**%**
9	6.1	50	33.8	101	68.2

Source: Field survey 2008

Annex Table 6: Food sufficiency and Land Holdings

(Food Sufficiency)	Land Holding								Total	
	0-5 ropani		5-10 ropani		10-20 ropani		20 ropani and above		N.	%
	N	%	N	%	N	%	N	%		
Less than 12 months	49	33.1	17	11.5	10	6.8	2	1.4	75	52.7
12 months	26	17.6	14	9.5	14	9.5	5	3.4	59	39.9
More than 12 months	3	2.0	3	2.0	4	2.7	1	7	11	7.4

Source: Field survey 2008

Annex Table 7: Matrix of Economic Factors and TA

	Changing in farming system than parents	Technique of farming	Improved seeds used	Chemical fertilizer used	Insecticides used	Cold storage used	JT/ JTA used
Main source of income is agriculture	-.016	-.096	-.074	-.087	-.036	-.338(**)	-.218(**)
Doing animal husbandry	.002	-.112	-.006	-.122	-.142	.115	.064
Having cows	-.074	.059	-.096	-.030	.005	.042	-.013
Having Buffaloes	-.027	-.113	-.030	-.168(*)	-.212(**)	.021	-.003
Having Ox	.052	.132	-.056	-.130	-.153	.131	.056
Having goats	.073	.088	.049	-.213(**)	-.104	.107	.115
Amount of earning	.000	.000	.283	.200	.200	.129	.365
Getting rationale amount of money for product	.471	.471	.730(**)	.258	.258	.458	-.059
Money expended in health	-.213	-.213	.055	-.389	-.389	-.251	-.284
Money expended in Education	-.059	-.059	.228	-.258	-.258	.417	.059
Money expended in Farming	-.213	-.213	.055	-.389	-.389	.452	.213
Money expended in others	.304	.304	-.189	.244	.244	-.043	-.304
Profit earning	.645(*)	.645(*)	.650(*)	.189	.189	.228	-.194
Taken loan for farming	-.064	.032	-.087	-.030	.019	-.072	-.069
Availability of farm labors	.127	.139	.070	.204(*)	.144	-.148	-.248(**)

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Annex Table 8: Psycho Social Factors and Transformational Agents

	Changing in farming system than parents	Technique of farming	Improved seeds used	Chemical fertilizer used	Insecticides used	Cold storage used	JT/JTA used
Family size	-.111	-.034	-.070	-.130	-.046	.176(*)	.091
Education of respondedent	-.048	.050	-.138	-.090	-.115	-.162(*)	-.015
Food sufficiency	.158	.017	.142	.069	.129	.238(**)	.023
Getting subsidies	.189(*)	.104	.080	-.107	-.075	-.028	-.084
Taking training	.286(**)	.254(**)	.165(*)	-.050	.013	-.012	.178(*)
Getting information about commercial farming	.270(**)	.121	.246(**)	.111	.135	.298(**)	.083
Visiting with JT\JTA	.125	.064	.049	-.229(**)	-.107	-.008	.190(*)
Visiting in DADO	.011	-.016	-.044	-.088	-.072	.053	.343(**)
Visiting on NGO\INGO	.079	.070	-.021	-.038	-.013	-.051	-.068
Visiting on agro-vet	.112	.238(**)	.119	.341(**)	.523(**)	.065	.001
Not visiting on any places	-.164(*)	-.217(**)	-.068	-.136	-.368(**)	-.028	-.050
Awarded as a farmer	.240(**)	.047	.015	-.053	-.093	.168(*)	.224(**)
Satisfied farmer as a farmer	.073	.003	.087	.001	-.024	.012	-.059
Future security as a farmer	-.105	-.057	-.055	-.105	-.001	-.122	.024
Getting as a farmer	-.157	-.008	.086	.112	.126	.030	-.030
Member of agricultural committee	.224(**)	.144	-.083	-.256(**)	-.215(**)	.004	.163(*)

Source: Field survey 2008

Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Annex Table 9: Information and used of TA

		Improved seed	Chemical fertilizer	Insecticides	tractor	Cold storage	JT/JTA
Visiting with JT/JTA	Count	15	13	11	4	2	8
	Col. %	13.9%	11.2%	10.7%	5.9%	7.7%	36.4%
Visiting in DADI	Count	2	1	1	1	1	2
	Col %	1.9%	0.9%	1.0%	1.5%	3.8%	9.1%
Visiting on NGO/INGO	Count	9	6	6	6	1	
	Col %	8.3%	5.2%	5.8%	8.8%	3.8%	
Visiting on agro-vet	Count	56	55	53	32	12	8
	Col %	51.9%	47.4%	51.5%	47.1%	46.2%	36.4%
Not visiting in any places	count	42	53	44	37	14	9
	Col %	38.9%	45.7%	42.7%	54.4%	51.8%	40.9%

Source: Field survey 2008

Annex Table 10: Getting information about Technologies

Improved seed known		Chemical fertilizer known		Insecticides known		Tractor Known		Cold storage known		JT/JTA known	
N	%	N	%	N	%	N	%	N	%	N	%
108	73	116	78.4	103	69.6	68	45.9	26	17.6	22	14.9

Annex Table 11: Types of Land , Irrigation and Cultivation

		Type of agriculture land is *Tari*		Type of agriculture land is Sloppy land		Type of agriculture land is plain	
		No	Yes	No	Yes	No	Yes
Time of cultivation in *Pakho Bari*	12 months	28	8	1	35	12	24
	8 months	6	4	1	9	5	5
	4months		3	1	2	1	2
	nothaving *Pakho Bari*	12	17	28	1	14	15
Time of cultivation in *Phant Khet*	12 months	2	2	1	3	1	3
	8 months	19	7	12	14		26
	4months	10	6	5	11		16
	Do not have *Phant Khet*	15	17	13	19	31	1
Time of cultivation in *Tari Khet*	12 months		17	8	9	7	10
	8 months		8	5	3	5	3
	4months		6	5	1	5	1
	don't have *Tari Khet*	46	1	13	34	15	32

Source: Field survey 2008

Annex Table 12: Sex wise Time distribution statistics

		all female member	all male member	all household member	respondent
N	Valid	148	148	148	148
	Missing	0	0	0	0
Mean		10.31	5.05	15.36	3.86
Median		8.50	4.00	13.50	3.00
Mode		8	0	8(a)	8
Std. Deviation		5.751	4.384	8.300	3.068
Variance		33.073	19.222	68.884	9.415
Range		48	18	62	12
Minimum		0	0	1	0
Maximum		48	18	63	12

a Multiple modes exist. The smallest value is shown

Annex Table 13 Number of parcels and agricultural Land Statistics

		Area of agricultural land	number of parcels
N	Valid	148	148
	Missing	0	0
Mean		7.7027	4.51
Std. Error of Mean		.59524	.351
Median		5.0000	3.00
Mode		3.00	2(a)
Std. Deviation		7.24142	4.272
Variance		52.438	18.252
Skewness		2.330	1.756
Std. Error of Skewness		.199	.199
Kurtosis		9.226	3.952
Std. Error of Kurtosis		.396	.396
Range		52.00	24
Minimum		.00	0
Maximum		52.00	24
Sum		1140.00	667

a Multiple modes exist. The smallest value is shown

Annex Table 14 Areas of Land and Farming

Area of land	cereals farming	horticulture farming	vegetable farming	herbs farming
0-5 ropoani	76	45	72	7
5-10 ropoani	34	29	34	
10-20 ropoani	27	22	25	1
20 ropoani and above	8	8	7	1

Source: Field survey 2008

Annex Table 15 Land holding size and farming

	Cereals farming		Vegetable farming		Herbs farming	
	freq	%	freq	%	freq	%
0-5 ropani	76	51.4%	72	48.6%	7	4.7%
5-10 ropani	34	23.0%	34	23.0%	0	0%
10-20 ropani	27	18.2%	25	16.9%	1	.7%
20 ropani & above	8	5.4%	7	4.7%	1	.7%

Source: Field survey 2008