

CHAPTER-I

INTRODUCTION

Background of the Study

Indigenous knowledge (hereafter IK) as an accumulated knowledge, skill and technology acquired by particular community or group through direct interaction with given environment for their adaptation. That knowledge is gained through trial and error and passed from one generation to next in an oral way.

Local people have developed different kinds of knowledge and practices to adopt in their environment. That is called IK by anthropologists. In this regards, Posey (1990) called IK as a wealth of human beings gain from hundred and thousands year experiences. Therefore, local people have vast knowledge in different sectors such as medical plants, natural insecticide, fertility regulating drugs, climate change, plant genetic, soil types, seed selection and management, agricultural management, forest, pasture, water resources management etc.

Until now, agriculture is a backbone of Nepali economy. However, majority of the farmer are still depended upon subsistence and indigenous farming system. They have developed different forms of farming such as crop dominated farming, horticulture dominated farming, livestock dominated farming and mixed or integrated farming for their livelihood. It is mainly limited by the environment such as physical as well as socio-cultural and economic of the particular localities.

In the context of Nepal, farmers have a long experience, knowledge and practices regarding farming. One of the most salient features of farming

system is crop diversity in time and place. Such crop diversity is expressed through the use of multiple cropping system or poly-culture. These multiple cropping systems have been the basis for stable source of seeds.

In the rural area of Nepal majority of farmers keep seed themselves from their own production for next crop season. There is no other source of seeds rather than selecting from their own farm. However, farmers have long experience and vast knowledge regarding the seed selection and its protection from harmful insects. In another words, farmers apply their own knowledge, methods and practices related to seed management system for centuries. However, the management of agricultural seed is varied from one community to another community, one society to another society. Moreover, the seeds selection and its storage are integrated within the agronomic and socio-cultural practices of farming communities. However, the seed management practices have been changing gradually due to the various cause in Nepali society.

The present study is mainly explored the IK on seeds management particularly seeds selection and their storage in Chauki village, a small and remote hilly village located at Bahuniplung Village Development Committee (VDC) of Sindhuli district where majority of people are depended upon subsistence farming. This study is especially concentrated to find out an existing IK in relation to seeds selection and its storage practices and change that took place and taking place regarding the seed management in the study area.

Problem and Research Questions

The management of seeds for new crops is not new phenomenon in the context of human history. It started at the beginning of Neolithic age (Burkitt 1963, Ember and Ember, 1994) when people gradually started agricultural life for survival. However, there was no evidence how those people manage the seeds for next season. But some scholars argued that they kept seeds in the storage pit made by stone or clay pot for next season (Ibid.).

There is large number of literature related to IK (Gurung, 1987, Gill, 1993, Tamang, 1993, Chhetri, 1996, Uprety, 2007 and Chhetri, 2007). However, it was become popular among scholars after 1980s when various literatures blamed that the local people are the destroyer of nature or environment (See, Hardin, 1968). Thereafter many scholars like anthropologists and sociologists concentrated them to study about indigenous system of resource management in the world including Nepal. Some of these literature focus on role of IK on forest resource management (Chhetri 1996, Chhetri and Pandey, 1992). Similarly, some of the scholar concentrated to the study of pasture land management (Gurung, 1987) whereas other in water resource management system (Uprety, 2007, Chhetri, 2007). Moreover, some scholars have focused on the indigenous farming system. However, there are very few studies concentrated to the indigenous seeds management system (Timsina, 2000, Subba, 2002, Sharma, 2003,). Despite these studies, IK on seed management is still interesting and investigating subject matter for sociological point of view.

Indigenous knowledge and practices on seeds management are a century old practices in Nepalese agriculture which are not only establishing food

security but also maintaining genetic diversity (Upreti and Ghale, 1999). The management of seeds is the first and foremost aspect of agricultural cycle because its cycle begins from the selection of seed and its storage. Without seeds agriculture can not be continued. However, farmers have developed different types of method and practices for management of seeds for next season. In this sense, the present study also focuses on exploring an existing IK relating to the management and conservation of seeds among the farmer of Chauki village of Bahuntipung.

There are no homogenous and similar practices regarding the seeds management in Nepali society. It is varied from one society to another, one geographical locality to another, one cultural group to another, even though from one family to another. Based on these arguments it is argued that farmers of Chauki village have developed their own system of seeds management to cope with their distinct ecological setting. As a student of sociology, it is essential and indispensable to understand and document the IK relating to seeds management system in a study area.

The changes in socio-cultural phenomena are so rapidly in many societies including Nepali society that young people no longer learn the method by which their ancestors maintained their livelihood in their surroundings (Posey 1990). In this sense, the knowledge and practices related to seeds management are also gradually changing in many societies including Chauki village of Bahuntipung due to availability of modern variety of seeds and technologies. Thus, it is essential to document the cause of change in IK regarding seeds management in the study area.

In the above mentioned contexts, the present study attempts to seek the answers of the following research questions.

-) What is the existing knowledge regarding the seed selection?
-) How do the people select the seeds?
-) How do they storage the selected seed for next season?
-) How do the farmers gain knowledge regarding selection of seeds and its storage practices?
-) Are there noticeable differences in selection of seeds and their storage practices according to caste/ethnic variation?
-) What are the main causes behind to replace the traditional system of seed management?

Objectives of the Study

The general objective of this study is to document the IK of seeds management practices among framers of Chauki village at Bahuntipung VDC of Sindhuli district of central hilly region of Nepal. However, the specific objectives of the study are as follows:

-) To document the existing indigenous knowledge in relation to seeds selection.
-) To find out the existing practices knowledge regarding the seeds storage.
-) To find out change that took place and taking places in IK regarding the seeds management.

Rationale of the Study Area

Indigenous knowledge is an important subject matter for sociological study. In this sense, this research study is theoretically and methodologically important. This study is oriented to document the IK regarding the seeds management among farmers of Chauki village at

Bahuntilpung VDC. The study has focused on indigenous knowledge on seeds management practices with ‘cultural’ contexts and has described changing aspects of local knowledge. I have already mentioned that there are very few sociological studies on IK regarding seed selection and their storage practices. This encouraged me to conduct the study for describing IK in a heterogeneous society. Therefore, this study will be supplementary source of information to understand the IK relating to selection of seeds and their storage practices. In this sense, I hope that this study may be able to investigate the document of the existing indigenous knowledge in relation to seeds selection and their storage practices among framers of Chauki. Moreover, this study may also be able to find out the change that took place or taking place in IK regarding the seeds management.

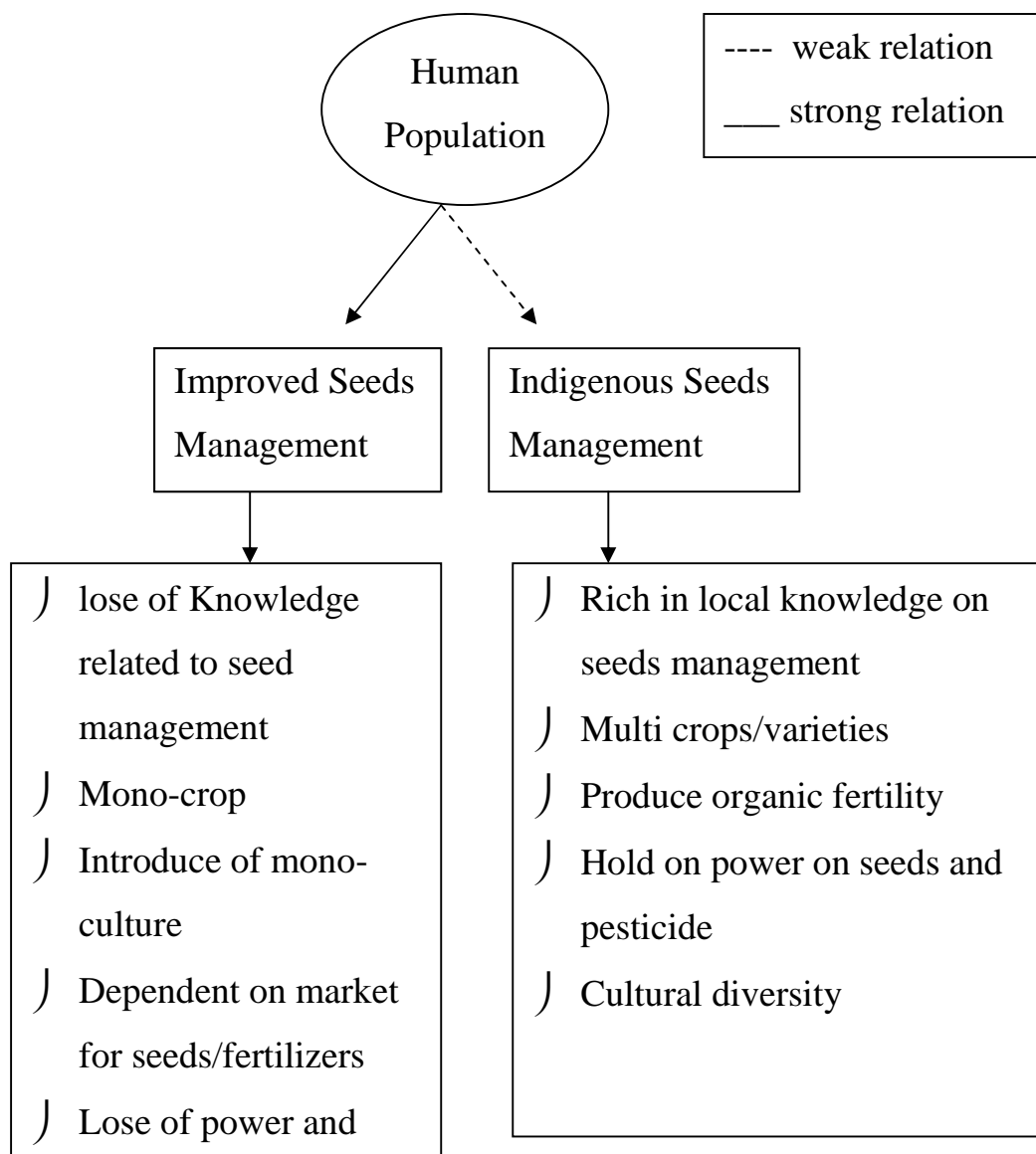
To some extent, this research will attempt to find out the IK regarding seed selection and their storage system among the farmers of central hilly region of Nepal that may be helpful to planners, policy makers and others who are interested and responsible to solve the problem related to this issue. Similarly, this study will also open the debate and pave the path for future researchers and readers who are interested in this field.

Conceptual Framework

In this research, the researcher has developed a conceptual framework to understand the indigenous seeds management practice at Bahuntilpung VDC of Sindhuli district. The conceptual framework shows the interrelation between human population and their knowledge regarding the seeds management. Moreover the framework also shows the changes in seed management practices due to intervention of development activities like (high yielding crops, market expansions and government

agriculture development program) or other factors like population growth, social pressure. Those factors have seen adverse effect to the knowledge of farmers in the study area as well as some position consequences. As a result the local people were gradually losing the knowledge associated with seed management which they gain through their older generation. Moreover, they were also gradually depending on market for seeds and chemical fertilizer. Consequently, the young generation has been losing their knowledge as well as their power and property right upon seeds.

Conceptual Framework 1: Relation of human population with IK on seed management and improved seed management and their consequences.



1.6 Limitation of the Study

Research is a scientific and systematic investigation about new facts. However, this study is not totally perfect at all. I have tried to make this research more scientific and systematic. Although, due to the lack of perfect knowledge, constraint of time, money and other resources the research was limited within a certain geographical locality and certain issues. The main limitations of the study were as follows:

-) This research is conducted only for the partial fulfillment of the Masters Degree in sociology. Therefore, it has no wider application.
-) The findings are based on the information collected from the Bahuntulpung people of Sindhuli district. Therefore, the findings cannot be generalized in wider area or another locality.
-) Similarly the findings are based on the information collected in a specific time period. Therefore, its findings may not be applicable in all time but the conclusion drawn from the communities may be applicable only to the communities with similar geographical, historical and socio-cultural settings.

CHAPTER-II

REVIEW OF LITERATURE

Review of literature is an essential part of a social research. It provides a guideline and some theoretical and methodological knowledge to the researchers that help them to meet the goal of the research. This chapter deals the theoretical approach of this research from the sociological perspective. There are several published and unpublished literatures are available related to the indigenous knowledge on seeds management practices. This chapter includes those literatures only that are relevant to this research.

2.1 Indigenous Knowledge

Indigenous knowledge is the systematic body of knowledge acquired by local people through the accumulation of experience, informal experiment and intimate understanding of the environment in a given culture (Rajaskaran, et al. 1991). It is used at the local level by communities in developing countries as the basis for decision-making pertaining to food security, human and animal health, natural resources management and other vital activities. Indigenous knowledge is also dynamic, new knowledge is continuously added (Warren, 1991).

Indigenous knowledge can also be defined as the actual knowledge of people in a specific area. Such knowledge is the reflection of the experiences based on their tradition (Haverkort 1995). Indigenous knowledge systems are adaptive to local people that are usually desired from many years of experience, experiment and used. Indigenous knowledge system have been defined as system of knowledge and

practice developed over generations in a particular field of sociological study and as such unique to a specific culture or region. Sometimes referred to as system of local knowledge traditional knowledge or even common sense knowledge these systems have evolved outside in contrast with western oriented scientific or modern system of knowledge and technology generated through universities, research, institutes and industries. IK has formed the basis for local level decision making in sectors of the society such human and animal health, agriculture and food production natural resources management and fisheries (Warren et al. 1995).

Indigenous knowledge is dynamic change though indigenous mechanisms of creativity innovativeness as well as through contact with other local and international knowledge system (Ibid, 1995). Gill sums that “Indigenous refers to the point of origin of the source of initiation. Indigenous system may incorporate elements and processes from the outside world, provided the initiative for their incorporation is local (Gill, 1993: 24). The resources poor farmer in most of the third world country possesses valuable knowledge which had often been neglected by the researcher and social scientist in the past. Now increasingly the development practioner and other social scientists seem to have a rested interest in the realms of the indigenous knowledge (Slikkerveer, 1995).

2.2 Indigenous Knowledge vs Scientific Knowledge (SK)

IK is the knowledge of local people who apply and develop their ethno cognition experiment and necessity. Scientific knowledge is often universal knowledge as well as its called western knowledge. This knowledge has been disseminated over the world on different fields.

(Agrawal, 1995: 421) has shown the difference between IK and SK into three grounds.

Table 1: Distinction between IK and SK

	IK	SK
Contextual difference	Exist in a local context, anchored to a particular social group in a particular setting at a particular time.	Divorced from an epistemic framework in search for universal validity.
Substantive ground difference	a) Concerned with immediate and concrete necessities of people's daily livelihood.	a) Attempts to construct general explanations and is one step removed from the daily lives of people.
	b) Non technical insights, wisdom, ideas, perceptions and innovative capabilities.	b) Technical insights
	c) No definite history.	c) Have definite history.
Methods logical and epistemological differences	a) Non-systematic, holistic rather than analytical.	a) Systematic, specific, analytical
	b) Without an overall conceptual framework	b) Having an overall framework
	c) No deductive logic	c) Deductive logic

Source: Agrawal, 1995

The knowledge are different in three grounds however western knowledge does not practice independently by farmers. Scientific knowledge is continuously interviewing to indigenous knowledge accusing as irrational and obstacle for development. On the other hand indigenous knowledge is assumed as sustainable and feasible to the majority of people.

2.3 Academic and Developmental Perspective of IK

In academic sphere, it is developed as ethno-science and human ecology. Ethno-science is a set of ethnographic methodologies used to record the knowledge systems of a given community from an emic perspective. It first gained popularity among cognitive anthropologists in the early 1960s as a way of referring to the knowledge system of a community as well as means of explaining cultural behaviour from an emic perspective. (Barfield, 1997 cited in Warner and Schoepfle, 1987)

The roots of ethno-science can be traced to anthropologists such as Boas, Malinowski and Whorf, who attempted to understand culture from the insider perspective and who explored the interrelationships among language, culture and cognition (Ibid, 1997). Three phases of developmental ethno-science has shown by Barfield. The first focused on the development of a set of methodologies and techniques that allowed the ethnographers to record from an emic perspective various domains of knowledge within community and at the second phase focused an ethnological ethno-science comparative analysis seeking to identify apparent universal cognitive traits, such as the range of types of scientific relationship expressed through a language (Barfield, 1997). The third phase which has emerged science 1980, is the interest in the role of indigenous knowledge systems in facilitating sustainable approaches to

development emerging from development or applied anthropology, the term “indigenous knowledge” was used to differentiate community based knowledge system from their counter part global system (Warren et al., 1995). The knowledge develops in the process of long term environmental interaction at a particular geographical area what Stewards (1955) arguments is that in a particular environment particular culture evolve in the process of environmental interaction.

For the present study indigenous knowledge denotes the unique knowledge practicing by the communities at a particular geographical area. It is generated within communities, location and culture specific basis for decision making and survival strategies which is dynamic based on innovation, adoption and experimentation as well as oral and rural in nature.

2.4 Importance of Indigenous Knowledge on Agriculture Sector

Indigenous knowledge and system of managing agriculture and other natural resources have existed in Nepal for centuries. Rural people possess an invaluable fund of knowledge about the environments in which they live and the management of natural resources based on which their livelihoods depend (Gill 1993). Farmers have successfully maintained their indigenous varieties over the years as a result of keeping household seeds stocks, obtaining seeds through traditional family and community networks (Soleri and Cleaveland, 1993).

Indigenous knowledge of farmers retains economic value which make farmer self-reliant. Exchange of required seed from farmer to farmer is their strategy to solve the scarcity of seed in plantation period. There is a

common image among development profit essentials that portrays farmers on passive dependent on external agencies such as research, extension and commercial enterprises for ideas and innovations (Harverkort 1995). But there is strong empirical evidence that farmers are actually quite active experimenters and self-dependent. Indeed, experimentation is a common phenomenon in small scale agriculture in developing countries.

Today indigenous knowledge about the crop genetic resources accumulated by long period of experiences and handed down over a series of generations are dying out. Introduction of new crop for cultivation (e.g. rice, wheat, maize and potatoes) and increasing distributions of chemical based medicine and the opening of markets to the production of western capitalist goods improvement of the general economic situation, and western oriented knowledge are harmfully effecting the traditional crops. Most of the beliefs and practices on indigenous knowledge are based on locally specific natural and social environment.

In Rana period Chandra Sumsher invited a Japanese agricultural expert to advice the government of improving the agricultural situation of the Kathmandu valley. The Japanese expert visited different places and studied Kathmandu agriculture for three months before submitting his report. According to the report Japan had nothing to teach the Nepalese farmers about agriculture, rather the recommended the Japanese come to Nepal to learn local agriculture (Chitrakar, 1990).

Shrestha (1998) in his states that seeds the planting materials used for the production of subsequent crops have been the continuous course of crop diversity in all farming system for generations. They carry life in all its

diversity as it is built into the genetic structure of individual species and form a bridge between one generation and another. The diversity of seeds supplies however is increasingly being influenced.

Indigenous agricultural knowledge system hold important potentials for improving agriculture in development counties, it is equally important to know that not all aspects of such knowledge system will be functionally relevant. It is therefore important that we understand the dynamics of the systems before recommending changes that are likely to have positive effects on local conditions.

For a developing country like Nepal, indigenous knowledge can play vital role in the sustainable development and prosperity of people. In our country due to the physical, climatic and vegetative variations, it is impossible to have a standard set of management resources.

Tamang (1996) highlights the facts that farmers have collectively and individually devised, decided upon, designed, constructed, planned, implemented, maintained and improved indigenous system for the management of natural resources through many centuries.

In this research, the researcher also pointed out the importance of the indigenous knowledge on seeds management practices among the Bahuntipung people of Sinduli district which they acquired during the course of adaptation in their surrounding through trial and error. However, that knowledge was gradually disappearing along with introduce of high yielding crops, market extension, establishment of agricultural service center, population growth, and lack of irrigation facilities.

CHAPTER-III

RESEARCH METHODOLOGY

This chapter mainly concerns with the research methodology which was applied the researcher to collect the information to obtain the answers of the research questions. This chapter deals with the rationale for the selection of study area, research design, universe and sampling procedure. The chapter also deals about the various tools and techniques which were applied by the researcher for collecting primary and secondary information from the field and its presentation.

3.1 Rationale of the Selection of the Study Area

The study was conducted in Bahuntipung VDC of Sindhuli district located at hilly region of Central Nepal. The selected site for the study on indigenous knowledge on seeds management was suitable by several reasons. Firstly, the farmers of this area were traditionally depending upon agriculture for their survival for the age. In this sense, they mostly select seeds of varieties of crops and vegetables from their own field for next season and storage in their own way. Thus, this site is suitable to find out the IK regarding the selection of seeds and their storage practices that was common in the region.

The social, economic, cultural and physical environments of the study area were not same. The upper part of the study area was quite sloppy and no access of irrigation where people mostly cultivated maize, millet and buckwheat where as the lower part was quite flat as well as access of irrigation facilities as a result people produced paddy and wheat. In this sense, there was a variation in farming system as well as seeds selection

and their storage practices according to the variation of cultivation of crops in different physical structure of the area.

The study area was heterogeneous in terms of caste/ethnic variation. There were Brahmin, Chhetri, Magar, Kami and Sarki. In this sense, this area was suitable for the researcher to find out variation in IK regarding the seeds selection and its storage practices in terms of caste and ethnic variation in the study area.

In the study area, the government has established an Agricultural Service Center (ASC) in 1994/5 for providing the improved seeds to the farmers. Thereafter, people gradually started to bring seeds from the ASC to produce large quantity of crops. Therefore, this site was appropriate to find out the affect of modernization on IK relating to selection of seeds and their storage in the study area.

3.2 Research Design

The present study was based on exploratory and descriptive research design. Indigenous knowledge on conservation of crop resources has been systematically described. The research also described physical and socio-cultural environment of the study area.

Besides the relation between indigenous knowledge and culture was explored in the context of seeds selection, storage and management practices. The exploratory research design was chosen to explore the knowledge system of local people, such as their agriculture practices, traditional technologies, impact of modern variety, and its consequences or local seeds management.

3.3 Universe and Sampling

The main objective of research was to find out the indigenous knowledge on seeds management practices in agrarian society. Therefore, the researcher selected the Sidhuli district as study site which was predominantly an agrarian society to obtain the answers of research questions. However, it was impossible to carry the detail study of whole district due to constraints of methods and tools (census survey on household, and observation) which researcher applied to carry out the study. Thus, the researcher selected the Bahuntilpung VDC of Sindhuli district as a universe. It was selected purposively for the detail study because all the people were depended upon agriculture for livelihood. In this research, the researcher tried to conduct census survey to find out the socio-cultural, demographic and economic characteristics of the studied population. Therefore, the researcher selected Ward no. 3 of the same VDC for detail study by using the sample random sampling methods. There were 40 households in the ward. The researcher was carried out census survey from total 40 households.

3.4 Nature and Source of Data

The nature of data of this study was qualitative and quantitative. They were gathered from both primary and secondary sources. The primary data such as demographic components (caste, sex, age, marital status, education status, and family structure), house pattern and access to physical facilities, land holding size, number of animals, primary and secondary occupations of households, was collected from the field by using various sociological tools and techniques such as household survey, interview, observation, and group discussion. Secondary data was

collected through the published and unpublished documents related to the present study.

3.5 Technique of Data Collection

3.5.1 Household Survey

In this study the researcher applied a household survey to obtain the detail information about social and economic characteristics such as caste/ethnic composition, religion, sex, age, marital status, education status, family structure, house pattern, land holding size, major crop they produced in their agricultural field, numbers and types of livestock were collected.

3.5.2 Interviews

Interview is a frequently use technique in sociological research. As a sociological study, the researcher also applied semi structured interview to gather the information from the field. As a small number of households in the study area, the researcher took interview with a single member of the family who were generally head of the family. Similarly, key informant interview was also carried out in the field during course of study. It was done with elder members of community who directly or indirectly involved in farming. Interview was done to gain information about the seed selection system, seed stores, strategy applied for the prevention of disease and post management knowledge about the germination.

3.5.3. Observation

Observation is a very useful and effective tool of research for understanding the lifestyle and overall situations of the study area. The

researcher especially observe the production system i.e. what type of production they produce, who involved in the agricultural work, which method they apply to storage and selection management system. The field work was done in November and December 2008. These months were the period of harvesting of winter paddy. Thus the researcher especially observed the division of labour in agriculture activities such as harvesting of winter paddy and ploughing the agricultural field. Similarly, the researcher was also observed the exchange system of their products such as paddy, maize and wheat.

3.5.4. Focused Group Discussion

Focused group discussion was conducted among the farmers. It was focused to understand an indigenous knowledge, technologies used for framing as well as storage of seeds and seed selection system. This tool was also used to collect information about the history of seed management practices. Similarly, it was used to collect the information about the past and present activities such as production, consumption and distribution practices of this area. During the course of field work the researcher had arranged two informal group discussions. One was conducted in the gatherings of farmers' community meeting and another was conducted in farmers gathering in teashops. Focused group discussion was very useful for the verification and validation of information collected from individuals.

3.6 Data Presentation and Analysis

The collected information was presented and analyzed in systematic and scientific way. However the presentation of data was determined by its nature. Therefore, the qualitative data which was collected in the form of words, were presented in a systematic way to strengthen the arguments

and analysis them in logical ways based on obtain information. Similarly, quantitative data which was collected in the form of numbers, were classified on the basis of the its nature and presented in tables, bars and diagrams and show them in percentage and ratio. After presentation of data, they were analyzed and interpretation in the logical way based on the facts.

CHAPTER-IV

THE SETTING OF THE STUDY AREA

This chapter deals with the physical and social setting of the study area. Physical environment socio-cultural and economic environments are closely interrelated to agricultural practices especially seeds selection and storage practices.

4.1 The Physical Setting

Bahuntilpung VDC is located at the east north part of Sindhulimadi, headquarter of Sindhuli district. There are 53 VDCs in Sindhuli district. Out of these VDCs, Bahuntilpung is one which is situated between 26⁰,55' to 27⁰,21' latitude and 85⁰, 24' to 86⁰.22' longitude. The climate is tropical and subtropical is maximum 27.2c and minimum 6.2c. The VDC is surrounded by Khalagou VDCs in the east, Jarayotar and Lampantar VDCs in south, Tosramkhola VDCs in west and Pokhari VDCs in North Part of the study area. The VDCs is situated approximately 18 kosh east north side from district headquarter. Waksu khola is the main resources for irrigation in the lower of belt whereas farmers depend on rainfall for production in the upper belt of the VDC.

Tilpung is the study site that is located at ward no.3 of Bahuntipung VDCs. In the study area, 56% land was arable *khet*, 21% land was *bari* and 23% land is *Kharbari* (Source, VDC, Report, 2004). Paddy, wheat and maize were major crops production in the arable land (*khet*). Similarly, they produced millet, buck wheat, maize and mustard seeds in the *bari* land. They also produced several varieties of vegetable and species such as cauliflower, cabbage, potato, onion, jack-fruit, bean, egg-

plant, taro, cassava, leaf vegetables, etc. in both khet and bari land. The researcher observed that villagers had planted banana, lemon, Junar, mango, orange, jack fruit, sugarcane in the surrounding of the household as well as bari land.

The villagers exploited their irrigated land two times a year in a rotational basis. The farmer categorized the agricultural seasons into two categories i.e. winter season (*Hiude Samaya*), and rainy season (*Barkhe Samaya*). They planted maize, wheat, mustard oil in *Hiude-samaya* and paddy, millet in *Barkhe-samaya*. They planted wheat and mustard oil in November and December and maize in the February whereas paddy in June/July and millet in August/September (see detail in next chapter).

4.2 Natural Resources

Natural resources are the essential for the human beings for their survival and well beings. In the study area, the researcher found two types of natural resources- renewable (forest and water) and non-renewable (land, soil, sand, gravel, stone and boulder). The researcher went to discuss on these resources one by one.

4.2.1 Forest and Forest Products

Located at the Mahabharat range, the study area lied on sub-tropical zone. The old informants informed the researcher that the forest was managed by government until the last 10 year. The villagers did not take interest to manage that forest due to the lack of ownership after nationalization of the forest. Thereafter, the forest gradually degraded due to the different activities as well as over exploitation of the villagers like grazing, collecting firewood, fodder, timber. As a result, the local people felt scarce of forest product and they converted the forest into the community

forest with the support of District Forest Office. At the study period, the researcher found only community forest in Bahuntilpung.

The villagers informed that forest was mixed where several varieties of forest plants like *Chilaune*, Chestnut, Alder forest, *Bhepari*, *Pipiri*, *Titepati*, *Banmara*, *Rudilo*, *Patmero*, *Khaneu*, etc were available in the forest. Generally, the villagers used *Chilaune* and *Dhalne* for timber, *Khaneu* and *Dhalne* for fodder, *Pipiri* and *Bepari* firewood, *Dhalne* leaf-litter. Similarly, the villagers also collected forest products like *Niguro*, *Sisnu*, *Tarul* and *Tama* foods and vegetables, *Pipal*, *Bar* leaf for using religious ceremony, *Rudripuja*, *Saptaha*.

4.2.2 Water

Many torrential streams and rivers were available in the Bahuntilpung which were the source of water for villagers. Among them, the Waksu, Thada-khola, the Baj-khola and Seti stream were major ones. Villagers informed me that the inhabitants of the northern parts of study area used water form Seti stream for irrigation but it was not sufficient for them. Therefore, they used man-made pond for collecting water in rainy seasons as well as winter seasons. The southern part of the study area was somehow flat as compared with northern part. Moreover, this part was located below the rivers. Thus, they used the water form these rivers for irrigation.

There was no problem of drinking water in the study area. In the past, villager used to spring water for drinking. But now, they used the pipe water for drinking. The people of Tilpung Chauki where 16 households were located used the water form Beparigairo, Khorbhanjang, where 15 household located used the water form Bungbuge-khola for drinking,

and Sombare and Jimaldanda where 9 household located used water form Kaminigairo. The water were used for household activites like cooking, washing, bathing, livestock watering as well as kitchen garden.

4.2.3 Land and Soil

Land is the main source of livelihood for people depends on agriculture. On the basis of land structure and texture, the nature of soil varies from place to place. Generally, the soil of arable land in Bahuntilpung is sandy and silty but black and red in color. Silty soil is available in the riverbanks. Sandy soil is found everywhere of the VDC. According to local people, silty soil is more fertile than sandy soil. Therefore, farmers prefer the silty land for paddy, maize, wheat, buckwheat, millet, green vegetables, potatoes, lentils, and other production.

Colorful soil is also found in the area which is used for house smearing and coloring. Mostly, the villagers used red soil to smear house yard and kitchen in various rituals like *Ausi* (a fortnight day), *Purnima* (a full moon day), and *Shraddha* (ancestor worshipping day). Almost all the houses are colored by white, black and red soils during Dashain and Tihar festivals (two great festivals of Hindus fall in Autumn season).

4.2.4 Sand and Gravel

Sand and gravel were also found in the study area. The main source of the sand and gravel were banks of rivers and streams of the study area. The sand and gravel were used for toilet, bridges, taps, and temples construction. In the study area most of houses were made by wooden pillars and walls were made either by wood or stone with mud in the study area. In the field observation, the researcher found that very few houses were made with stone wall with cement and sand.

4.2.5 Stone and Boulder

In Bahuntilpung, varieties of stone and boulder are found in the rivers, streams and public land. Stone and boulders were used for houses, bridges, culverts, and taps construction. In the study area, most of houses were roofed with stone slate and very few houses were by corrugated iron sheet in the study area. The villagers collected the stone slate from the area of community forest land. Therefore, now-a-days these stones had become the main source of income of community forest.

4.3 Socio-Cultural and Demographic Composition

Socio-cultural and economic profile of the certain area is the very important and essential aspect of research. Therefore, the researcher also described the socio-cultural and economic characteristics such as caste/ethnic composition, age and sex composition, marital status, educational status and economic conditions of the households of framers of the study area.

4.3.1 Population Structure

During the course of study period, there were 40 households in the study area consisting of 190 populations. Out of the total population, 96 were female and 94 male.

The social structure of the study area was not homogeneous in terms of caste and ethnic composition. There was Brahmin, Chhetri, Giri, Newar, Sarki, and Kami. The dominant group was Brahmin whose social position was also taken as superior in the society as found in other Hindu caste based society. Traditionally, Sarki were involved in leather work in the

study area. However, at present they could not to fulfill their annual food demand by working their tradition work. As result, some of them were also found to involve in agriculture for their livelihood. The table 2 shows the distribution of caste/ethnic composition of population in the study area.

Table 2: Caste-Ethnic Composition of Bahuntilpung

Caste/Ethnic Group	No. of H.H.	Male	Female	Total	%
Brahmin	19	45	47	92	48.42%
Chhetri	7	19	16	35	18.42
Newar	6	12	13	25	13.16
Bhujel	3	6	8	14	7.37
Giri	3	6	5	11	5.79
Sarki	2	8	5	13	6.84
Total	40	96	94	190	100.00

Source: Field Survey, 2008

The table 2 clears that the population of Brahmin is dominant population (48 %) in the study area where as Bhujal, Giri and Sarki are minority groups. In the study area, all households identified themselves as farmers. However, in my observation, the researcher found that Sarki, Bhujel and Giri households mostly involved in agricultural activities like in their own agricultural field as well as wage labour whereas other caste and ethnic groups only involved in their own agricultural field.

4.3.2 Age-Sex Composition

Age and sex are important demographic characteristics playing an important role in agricultural analysis. The age and sex composition of a

population has significant implications for the productive potential, manpower supply. In this sense age sex composition shows the situation of active and inactive population in agricultural practices in the study area. Furthermore, age composition is essential element in while studying the IK regarding agricultural activities like seed management practices. The table 3 shows the age and sex composition of population in the study area.

Table 3: Age-Sex Composition of the Study Area

Age group	Male		Female		Total		Sex Ratio
	No.	%	No.	%	No.	%	
0-4	6	6.25	8	8.51	14	7.36	75
5-9	12	12.5	8	8.51	20	10.53	150
10-14	15	15.63	12	12.77	27	19.21	125
15-19	4	4.16	9	9.58	13	6.58	44.44
20-24	11	11.46	8	8.51	19	10.00	137.5
25-29	8	8.33	8	8.51	16	8.42	100
30-34	7	7.30	9	9.58	16	8.42	77.77
35-39	6	6.25	3	3.19	9	4.74	200
40-44	6	6.25	6	6.38	12	6.31	100
45-49	3	3.12	5	5.31	8	4.21	60
50-54	3	3.12	4	4.25	7	3.69	75
55-59	4	4.16	8	8.52	12	6.31	50
60+	11	11.46	6	6.32	17	8.95	183.33
Total	96	100.00	94	100.00	190	100.00	102.12

Source: Field Survey, 2008

The table 3 shows that out of the total population of male and female, the population of age group 10-14 (19.21%) is higher in the study area as compared to age groups of 5-9 and 0-4. It clearly suggests that the population growth rate is gradually reducing in the study area. However, the population of age group 0-14 is quite higher (37.1%) in the study area in the study area. It clearly indicates that population growth rate was still higher in the study area.

In Nepal, generally the population under the age of 14 years and above 60 years is supposed to be inactive. Believing in this argument, there was 46.05 % population was inactive population in the study area. However in my observation, the researcher found that between the ages of 10-14 years were also found to be involved in agricultural activities directly and indirectly such as transplanting paddy, millet seeds, weeding maize and paddy, harvesting crops, threshing, caring and collecting leaf-litter, fodder, grazing animals.

Similarly the researcher also observed that male above the age of 60 were also involved in livestock caring, clearing the shed, milking buffaloes and cows, preparing agricultural equipments, ploughing the field, digging the field, selecting the seed, storage the seeds, broadcasting the seed etc. Likewise, female were found to involve in household activities like cooking, cleaning, washing as well as transplanting seeds, weeding crops, harvesting, selecting seeds, storage the seeds (see detail in next chapter).

4.4 Educational Status

The education is not a matter of an individual. It is measured as a social prestige of an individual within a family or society. Those individual who have higher education have higher social status then the uneducated

person in the society. Moreover, it is an important means of adaptation of individual with the modern cultural environment. In the study side, those individuals who were educated, willing to improve the traditional farming system. They used improved seeds, technologies, organic fertilizer in their agricultural practices. It brought positive impacts upon other farmers also.

4.4.1 Distribution of Population by their Educational Status and Level of Education

Table 4 Distribution of Population by their Educational Status and Level of Education

Literacy Status	Male		Female		Total	
	No.	%	No.	%	No.	%
Illiterate#	9	9.4	19	20.2	28	14.7
Literate	87	90.6	75	79.8	162	85.3
Total	96	100.00	94	100		
Levels of education						
Primary	29	33.3	32	42.7	61	37.7
L. Secondary	11	12.6	19	25.3	30	18.5
Secondary	26	29.9	13	17.3	39	24.1
P.C.L.	15	17.2	10	13.3	25	15.4
B.A.	4	4.6	1	1.3	5	3.2
M.A.	2	2.3	-	-	2	1.2
Total	87	100.00	75	100.000	162	

Source: Field Survey, 2008

Those who cannot read and write.

Under the age of 5 were not included in this table.

Table 4 shows that out of total 190 household majority (85.3) of them were literate and remaining others 14.7 percent were illiterate. According the literacy stats by sex male literate were more than female literate for instances, out of the total 96 male population, 90.6 percentage were literate on the other hand out of total 94 female population 79.8 percent were literate. Similarly male education percentage is higher than female in the study area in all levels. Similarly the table also shows that secondary and higher level of education are found lower girls in comparison with boys. According to the villagers, girls have to assist their parents and learn household chores in the age. Therefore the girls are dropping out from the school in this age. Generally 14-19 is considered marriage able age of girls in the community. Some of the respondent informed that if suitable boy comes to purpose for their daughter, then they will give their daughter to that boy. That means the villagers have still given priority to the marriage of daughter than education in the study area.

4.4.2 Development Infrastructure

In the study area, there was a *kacchi* motrable road which linked Bahuntilpung VDC with Sindhulimadi, district headquarters. The vehicles run over in this road in the winter season. The modern education was introduced in the study area along with the establishment of a government school Benketshwor Higher Secondary School. The school was established in 2015 B.S. as Primary school and upgraded in Secondary School in 2046 B.S. and again upgraded in Higher Secondary School in 2058. Similarly, there was a campus named Tripureswor Education Campus established in 2064.

There was the facility of modern treatment in the study area. It was possible with the establishment of Health Post in 2038 B.S. and Ayurvedic Health Center in 2042 B.S.

There was also a veterinary and agricultural extension service center. In that center local people were having facilities and services like improved seeds of crops, vegetables etc. It had provided technological education about animal farming and agricultural. The center had mobilized local farmers in their related fields by forming. Different groups like *Mahila Samuha*, *Aguwa Krishak Samuha*, *Bakhra Palan Samuha*, *Vainsi Palan Samuha* etc. and support them giving improved seeds, training, counseling about the agricultural and veterinary related field.

4.4.3 Market

In the study area subsistence level of economy is prevalent. Farmers produce for household consumption using family labour. Farmers sold surplus grain in their local market located at the VDCs. Sometimes they also sold their surplus grain to 'Chakmake Bazaar' that was nearly to ours walking from villager where they also bought essential goods like salt, kerosene, clothes etc. Every Friday there was hat Bazaar held in Chakmake in which different local produce were sold like vegetables, fruits, meat etc. *Sarki* and *Bhujel* generally carried goods from Chakmake and Dakaha Bazaar for the local market.

Livestock raising is another dominant economy in the study area. They sold their cocks, and he-goats in the local market. Generally he buffaloes were sold in Chakmake Bazaar.

4.5 Land: Source of Livelihood

Land is taken as a major source of wealth in the study area. A household is considered economically stable and secure if it has sufficient land to produce the annual food grains. In the study area all household have at least a small piece of land. Most of the household have no other sources of income except agriculture. Some of the respondents informed that land was permanent property and could assure security of livelihood for the future. Other sources of livelihood such as service, foreign employment, and wage labour have no guarantee for the future.

Table 5: Size of Land

Size of land in <i>ropani</i>	No. of household	Percentage
1 - 5	4	10%
6 -10	9	22%
11 - 15	12	30%
16 - 20	8	20%
21 - 24	4	10%
25 above	3	7.5%
Total	40	100.00%

Source: Field Survey, 2008

The table 5 shows that more than 50% household have less than 15 ropani cultivated land. The land is not only secure and stable source of economy but also a symbol of higher social status in the society. In the study area, those people who have a lot of land, have a higher social status than the lower ones. In the study area, all households are cultivating their land by themselves. Cultivating land is divided into two categories: *khet* (irrigated

land) and *Bari* (unirrigated lands). In addition, other types of land were also found in the study which was called *Kharbari*. In the past that land was used for production of thatch grass but now almost all house were either roofed with slate or corrugated iron sheet. After that, people began to use *Kharbari* as Pasture land. The table shows the types of land in the study area.

Table 6: Types of land in the Study Area

Types of land	Area (in ropani)	Percentage
Khet	448	54.7%
Bari	210	25.7%
Kharbari	162	19.8%
Total	820	100%

Source: Field Survey, 2008

The table 6 shows that most of the land in the study area was irrigated land, which denotes 'khet' having 54.7% of total area. It is good land for cultivation. This land is irrigated by Waksu Khola, Thada-Khola and Baj-khola. It is highly valuable because of high productivity due to the facility of irrigation where they can produce food grain and cash crops twice in a year. Bari was less productive than khet, however farmers cultivated it for maize, millet, buck-wheat, barley and vegetables.

In the study area, people were converting bari land into khet due to its more productive capacity. So, the people use to give more propriety to khet. Although, one of the respondent from Dalit family says that, Bari is also a useful land, because millet, barley and maize can grow in generous quantity what they use to make alcohol. It was an integral part of their life. They used it to offer their gods/goddesses, guest. Moreover, they

also frequently drink it. He also says that maize and millet give more strength to them to do any kinds of works.

It was found that paddy is most important among other crops from cultural point of view because only paddy is allowed to use in different religious ceremony and festivals such as *Saptaha (puran)*, *Shradha* , *Chandipuja*, *Rudri puja*, *Dashain*, *Tihar* etc.

4.6 Food Sufficiency Condition

In the study area food sufficiency is determined by land holding size, productivity and size of family. Some households have found a large plot of land but not fertile or less fertile land as compared with others and have larger family size. As a result, those families could not produce enough food grains to fulfill their annual consumption.

Table 7: Months of Food Sufficiency

Months	No. of households	Percentage
<3	4	10%
4-6	6	15%
7-9	9	22.5%
10-12	13	32.5%
12>	8	20%
Total	40	100%

Source: Field Survey, 2008

In the study area almost 13 households suffers food deficit for about 10-12 months in a year. Only 8 households have fulfill food sufficiency from their own production. Four households have only two months sufficiency. It shows that majority of the households depend upon other farmers near their village.

4.7 Gender Role in Farming

Agriculture is highly labour intensive occupation. It has impossible to carry out agricultural activities by an individual only. In the study area, all the members of the family, besides old below the age of 10 years and physically disable, are found to involve in agricultural activity. There are some specific tasks for male and female in agricultural activities. Digging and ploughing are considered as culturally male sphere and transplanting is female. It is generally believed that the draught occur if female plough the field. Besides these tasks, both of them are found to involve in weeding, harvesting, and threshing.

In the agricultural peak season, some households are participating in labour exchange among relatives. This kind of labour exchange is known as Parma among the migrants. It is normally done for transplanting of paddy, plowing and digging field, weeding and harvesting the crops. Similarly, they economically sound family hire labourer for farming activities.

4.8 Livestock

Livestock comprises one of the main components of subsistence production system of the village. In the study the farmer kept different varieties of animals for different purposes, cow, ox, goat, pig and buffalo. The table 8 shows the types of livestock or their number in study area.

Table 8: No. of Livestock

Types of livestock	Number	Percentage
Cows	58	18.7
Buffaloes	86	27.7
Goat	111	35.8
Ox	52	16.8
Pig	3	1.00
Total	310	100

Source: Field Survey, 2008

Table 8 shows that, goat raising percentage is high because of their income benefits. The income came from selling of goat was remarkably support to the farmers. The villager also informed it is easy to keep goats because of sufficient availability of grass to feed them. In the field observation it was found that buffaloes were another remarkable source of cash income for the villagers. They used to sell milk, ghee in the local markets called Chauki and Cakmake. In the study area, villager did not used male buffaloes for ploughing the field as well as pulling the cart as did in the Tarai region due to the sloppy environmental structure. The high caste people, Brahmin, Chheti and Giri, considered buff as a polluted food from religious point of view did not eat buff. Therefore, they sold the small male buffalo to the other ethnic group like Magar, Sarki, Tamang, Newar and Kami who consumed buff.

Cows are less in number in comparison to buffalo in the study area. the villagers informed me that it gave less quantity of milk which was less fatty as compared with the buffalo. However, cow was important form cultural point of view in the study area. All caste and ethnic groups in the study area followed the Hindu religion. As a result, they used cow urine

to purify themselves from the pollution like death pollution, birth pollution, and menstruation pollution. Similarly, they also used the cow-urine in different rituals to purify themselves before arranging rituals. It was believed that the cow-urine purified them from pollution. Similarly, it was also found that villagers donated the cow and calf to the Hindu priest during the death ritual in the name of deceased person. It was believed that the donation of cow and calf helped to reach in heaven to deceased person. Similarly, villagers used oxen for ploughing the field which was produced by the cow in the study area.

In the study, it was also found that livestock were important for the agricultural point of view. Oxen were used for ploughing the field and the manure were used for fertilizer the agricultural field. Villagers informed me that they still did not use chemical fertilizer for increase the productivity in the farming land. Therefore, the number and types of animals were essential for the villagers to increase the productivity of the land. The big and large numbers of livestock could produce large amount of compost which could enhance the productivity of the land.

4.9 Gender Role in Livestock Management

Livestock is highly labour required occupation. Normally, one can not leave home who have livestock. In the study area, all the members of a family are found to involve in livestock management. Generally, males engaged in animal feeding, grazing the livestock and milking the cow and buffalo. Female and children collected ground grass, prepared fodder, cleaning sheds, collection leaf-litter for animal bed. In the study area, the researcher found that old male and children were found to involve in grazing and watering livestock. In the study area, the household head decides regarding exchange or selling and buying of livestock where as

women decided to sell the small animal like hen, chicken as well as their private animal which is gain form their natal family which was called *pewa* in that community.

4.10 Labor Organization and Exchange System

In Bahuntippung, the researcher found different kinds of labor organizations such as *parma*, *sagaune* and *guhardine* are existed. *Parma* is a reciprocal labor exchange system common among the Nepali villagers (Gurung, V. 9) Messermidt, 1981, Caplan, 1994) which was also existed in Bahuntipung village. The villagers informed that they were busy in rice and millet planting, ploughing the field in summer season whereas in winter they involved in harvesting and threshing of paddy, carrying manure and weeding of maize. In this situation, the villagers fulfilled the demand of labour by obtaining the assistance from neighbors. In the study area, it was found that *perma* is determined by the specific task and sex. The host is responsible for providing *Khaja* (break fast) in the middle of the day in *parma* laboring.

In the study area, other kinds of labour exchange were commonly practiced among the villagers. The villagers generally helped to their neighbour by providing labour during the time of crisis like death period, natural calamities period (burning of house by fire, destruction of house by landslide or flood). Those helps were known as *Sagaune* and *guhardine*. In *sagaune* and *guhardine* laboring host provides breakfast, lunch and local brew to the laborers. But the higher caste groups do not provide liquor.

4.11 Off Farming Activities

4.11.1 Wage Laboring

Wage laboring is a common practice among the landless and small farmers in Bahuntilpung area. Most of them sell their labor to the landlord of the village. The wage labour was high during the agricultural peak period like ploughing, transplanting, weeding, carrying manure and harvesting. At that time the large land holder hired the labour from the economically poor household to fulfill the demand of labour in agriculture. According to the interest of labor, employer pays him/her cash or grain. Wage rate was found varied in the study area. Male got from Rs. 125 to 200 and female got 125 to 150 which was determined by the physical capacity of workers.

In the study area, the members from poor household were found to involve in carrying goods like grocery items, house construction items, clothes etc from the Chakmake and Dakaha nearby by markets of Bahuntilpung. The porter got Rs 7 and Rs 15 per Dharni (2 and half kg) for carrying goods from Chakmake and Dakaha respectively. In the study area, majority of the Sarki, Magar and Newar were found to involve as porter in the study area.

4.11.2 Service or Employment

Service or employment in different organizations was not a new phenomenon for inhabitants of Bahuntilpung. Thirteen people were employed as teachers in a local primary school and secondary school. An three people were involved in health post and 4 in post office.

4.11.3 Small Business

The study area was the market place of the VDC. During the course of study period, there were 16 shops including groceries, small hotel, medical and cloth shop which supply essential items like rice, lentil, oil, kerosene, spices, tea, salt, soap, cosmetic items, cloth, medicine etc. to the local people. Among them, two Newar families were totally relied on the occupation for their livelihood. Other households were equally involved in agriculture for their survival along with business. A Brahmin household had established a water rice and oil mill in Bahuntipung.

4.11.4 Handy Crafts

In the study area, some of the household were taken as weaving as their secondary occupation. They knit sweaters and shocks and sold these items in local market.

4.11.5 Iron work

In Bahuntipung village there is two Kami households who were involved in iron work. These household make the agricultural equipments and provided to the farmers in exchange with iron equipments with food grain. They got one *mori* (60 kg) food grains like paddy, maize and millet. They also got food grains and vegetable in different Hindu ritual practices. This food grains was called *Bhag*. At present, Kami households began to exchange the agricultural iron equipments with cash.

CHAPTER-V

INDIGENOUS KNOWLEDGE ON SEEDS MANAGEMENT SYSTEM

5. Indigenous Knowledge on Seeds Management

This chapter deals about the practices of seed selection and their storages. Moreover the chapter also describes the major crops the farmers cultivated in their farming land and their seed selection practices as well as storage method in the study area.

Indigenous knowledge as seeds management knowledge is very useful knowledge on agricultural system, particularly seeds conservation. Storage and selection has been important part of the whole agriculture process. Therefore this chapter clarifies the system of seeds selection storages practices of the Bahuntilpung farmers.

5.1 Seed Selection Process

Seed selection is essential part in farming. It was found that farmers of Bahuntilpung were conscious on seed selection which was the integral part of their agricultural life. It was the first and foremost step of agricultural activities and end with the storage of the seed for next production. The villagers have developed IK regarding the selection, protection and storage of the varieties of local as well as indigenous seeds along with the history of settlement in the study area.

In the study area, all farmers give first priority to seed selection for production. They select the varieties of seed, which were needed for the next year, were in their own farm land as far as possible. The villagers

followed alternative sources like borrowed from other farmers when their crops were infected by insects or disease. One of the respondents informed me that they saved seeds during the famine period without feeding their hungry children. It clears that villagers gave more priority to seeds than their children in the study area.

5.2 Major Crops and their Selection Practices

Bahuntipung is the agrarian society. Thus, all people, except two Newar households, were depended upon agriculture for their livelihood. The villagers produced different varieties of crops like cereal and cash crops in study area. Paddy, maize, barley, millet, buckwheat were the staple cereal crops and garlic, onion, potato and other green vegetable as well as junar, orange and lemon were the dominant cash crops in the study area. The villagers themselves managed the seeds of these crops for the next season which are discussed below:

5.2.1 Paddy

Paddy is a major crop grown in the irrigated land. *Aute, Bhumali, Pokherali, Gudure, Bahatare, Himali, Chhote, Basmati, Ghaiya* were traditional and indigenous varieties grown by the villagers. Similarly, villagers introduced hybrid paddy like *Radha-bahra, Makawanpure, Thima, Manemure, Sabitri, Radha-char, Kanchhi-mansuli, Rampure-yellow, Tichin, Biji, Khuma* with the establishment of Agriculture Extension Center at Bahuntipung in 1994/95.

In the study area, seeds were generally selected and harvested by the villagers themselves whether those were traditional/indigenous varieties or improved varieties. In the field observation the researcher found that the farmers selected the seeds of paddy before the harvesting of paddy.

The healthy, good and well ripe bunches of paddy were collected from the field before harvesting the paddy. Similarly, villagers also selected the healthy and good bunches of paddy from the bundle of paddy during the time of threshing paddy. Selected bunches of paddy were kept separately in the harvesting site (*khalo*) and threshed manually before threshing other paddy for food grain. This process is called *Jhatne*. Then the seeds are winnowed and dried well in the sun and stored. It was done for the protection of seeds by mixing with other varieties of paddy. The mixed of other varieties produced *Thimaha*. Villagers perceived that it could not high yield.

In this field observation, farmers generally adopted the following strategies for the selection of paddy seeds;

- i) It shall be healthy and good in yield.
- ii) It is selected from fertile part of the field grains must be well ripened.
- iii) Paddy selected for seed should be homogenous in variety.
- iv) If the paddy does not meet above criteria than they either borrow from others or select paddy from other fields.

5.2.2 Maize

Maize is another major crop in the study area. It is planted both *Khet* and *Bari* lands. Farmers began to prepare field for maize from last week of December and sowed seeds of maize from the last week of February in *Khet* and first week of March in *Bari*. During the course of preparing the field, they fertilized the land mixed with dung and green leaves to support the crops.

Maize is harvested in the field and brought immediately into the house. Among the collected maize bigger and healthy cobs are selected and are tied together with their cover. It was called *Jhutta* (bunch) and stored for seed for next season.

In the time of plantation, the cover of the maize is removed. The villager informed me that they removed the unhealthy and destroyed cobs from the healthy and well cobs. They only used healthy cobs for seeds. However, all the seeds from the healthy and good cobs were not used for seeds. It was informed that cobs of middle part of cobs were separated from the rest (top and bottom). That means cobs of middle part of cobs were used for seeds and cobs of mouth and ends of cobs were used for food or fodder.

In the study area, villagers began to remove the covers from the cobs and stored them in mattress made by bamboo and kept above the heart. In the plantation period, farmer selected the same size of cobs from the pile of cobs for the seeds and rest were used for food for human and fodder for livestock.

5.2.3 Millet

Millet was another staple crop of the study area. It was generally produced by farmers who had have unirrigated as well as sloppy land. They began to prepare bed for millet nursery from the last week of June and remained till last week of July. The preparation of field for transplanting the nursery was done from the last week of July and last of August.

In the field observation, the researcher found the variation in the selection of seed of millet in Bahuntipung. Some farmers collected healthy with

good yield bunch of millet, called *Bala*, directly from the field before the harvesting. On the other hand, some of the villagers selected and separated seeds from the pile of healthy millet during the threshing period.

5.2.4 Wheat

In the study area, the researcher found that wheat was secondary food grain product in the khetland. There were two types of wheat i.e., *sano-gauhn* (small wheat) and *thulo-gauhu* (big wheat). The villagers generally themselves managed the seeds in the own house for next season rather than bought from the market. The villagers informed me that they harvested wheat after well ripen in the field. Then they threshed white with the use of human energy and grains were separated from the husk by winnowing and the required amount of wheat seeds, which were bigger and homogeneous in size, were separated from the pile of grains.

5.2.5 Pulses and Oil Seeds

In the study area, the researcher found that pulses and oil crops are stocked in threshing site for some days to dry the crop after harvesting from the field. In the case of Bahuntipung, there were two method of threshing the oil seeds. Firstly, if the quantity of the oil seeds were in large amount than they used herd of bullocks called *dahi*. On the other hand, if the quantity was small than they used stick for separating the oil seeds from the bushes. In the case of pulses, villagers used stick for threshing.

In the field observation, the researcher found the quite dissimilarity in the selection of seed of oil seeds and pulses in the study area. Some farmers collected healthy with good yield and ripen bunch of oil seeds and pulses

from the field for the seeds. Similarly, some of the respondents informed me that they selected and separated seeds from the pile of healthy pulses and oil seeds during the threshing period.

5.2.6 Vegetables

In the study area, the researcher found that villagers normally did not buy vegetables from the market for their consumption. But they sold their product to broker in local markets like Chakmake and Chauki bazaar. For the production of vegetables, villagers needed seeds. In this regard the researcher asked the question to the villagers regarding the management of the seeds especially selection of the seeds. In the response of the question, villagers informed me that some varieties of vegetables' seeds like cauliflower, cabbage, egg-plant, radish and other improved and hybrid varieties of vegetables were brought from Agriculture Extension Services Center and local market. On the other hand, some local varieties of vegetables seeds such as local potato, beans, spanish, cucumber, pumpkin, squash and chili were selected from their own products. In the case of cucumber, pumpkin, beans, chili, squash the biggest with good ripen fruit were selected for seeds. In the case of potato medium size were selected for seeds because it covers big area of field. Similarly, in the case of *Rayo* (mustard) robustly grown, healthy, good looking and having broad leaves was kept for seed purpose without pluck the leaves.

5.3 Gender Role in Seed Selection

Traditionally, seed selection activities were dominantly performed by female. In the present time, it has been changing with external linkages. At natural habitat both gender have common decision to select seed.

Table 9: Gender Role on Seed Selection

Male	Female	Both	Total
2	41	37	80
2.5%	51.25%	46.25%	100%

Source: Field Study, 2008

The table shows that female have dominant role on seeds selection. 51.25% were engaged in seed selection practices which is higher than male (2.5%) in number.

5.4 Method of Seed Storage Practices

Seed storage is a necessary factor in seed management. From the very beginning of the human civilization, knowledge of seed conservation has been given the continuation in agriculture. Therefore method of seed storage plays vital role on the seed germination. In the study area, farmers have their own indigenous method of seed storage methods.

In my observation, the researcher found some similarities as well as dissimilarities to save the seeds form the insects or diseases. The people of Bahuntipung practices both indigenous and modern methods and materials for the protection of seeds from insects and diseases. In the case of indigenous methods and materials they dry the seeds in the front day and used locally available plants such as *Neem* leaves, *Titepati*, *Timur* and ash to save the seed from insects during storage. In the case of modern methods, they used chemical pesticides like Malathine powder, Metasistock, kapur, Sulphate tablet during the storage of seed inside the sack. Market pesticides are in use since the introduction of new varieties and getting popular among farmers. The methods of storage of seeds of

different varieties of crops in Bahuntilpung were discussed below in detail.

5.4.1 Paddy

Farmers stored the seed after completely drying the grain. Before storing they assess the moisture required out of seed. In the study area, the researcher found the diversity in the storage practices of paddy seeds among the farmers in the study area. Some of the farmers found to store paddy seeds in an earthen pot specially designed for seed storage. It was called *Ghampa*. The paddy seed is kept inside the *Ghampa* and the mouth of the *Ghampa* is covered with a lid. Similarly, some of the farmers had found to use *Bhakari*, specially made from bamboo as well as straw mat. After that they smeared the mat with cow dung. It is believed that cow dung helped to protect the seeds from the harmful insects and diseases. The villagers also informed that they began to use paddy seed in plastic sacks along with it introduced in the study area. The farmers also informed me that it was easy to keep seed in plastic sack than *Ghampa* and *Bhakari*.

5.4.2 Maize

In the study area, the researcher found quite different practices for the storage of maize seeds. Commonly, farmer stored maize's cobs with its cover (called *Khosta* in Bahuntilpung). In some household, the researcher observed that they made bunch of cob tie together and were hanging in the bamboo or wooden poles above the hearth. It is believed that smoke coming out from the hearth protect the seeds from the insects and diseases. Similarly, some of household hanged bunches of maize in the

beam of veranda. Some of the households stood the pole in the courtyard and kept cobs of maize making pile which is locally called *Thangra*.

5.4.3 Millet

The researcher has already mentioned that millet was another stable cereal crop grown in the sloppy land in Bahuntilpung. Unlike Brahmin and Chhetri, other caste and ethnic groups used it for making local brew which was the integral part of their life. That means they used it to offer to their gods and goddesses in different rituals and festivals. Moreover, they also consumed it and also served to their guest. The villager not only planted and consumed it but also managed it seed for next season. In Bahuntilpung, villagers had their own method for storing the seeds of millet. I found two methods for storing the seeds of millet. After selecting of seeds, villagers properly removed its moisture through sunlight about 2 to 3 days. After that, they stored in seeds in the earthen pot and mouth of the pot was covered by clothes. It is believed that cloths covers helped to block the entry of air inside the pot and no damage of seed. Similarly, some of the informant informed me that they hanged the seeds of millet in beams and pillars of ceiling making bundles by clothes.

5.4.4 Wheat

In the researcher's observation, farmers stored the wheat seed using pesticides in plastic sack with mixed of malathin powder. Some of the household do not used malathin powder in the sack of wheat's seeds. They informed that they hit the seed into the sun from time to time, particularly in the *Aushi* period. It is believed that if some one hit the seeds and other food grain during the *Aushi* period there was less chance of damaging the seeds or food grains by insects. Some of the villagers

informed that they mixed locally available pesticides like leaves of *neem*, *titepati*, *ausro* while storing the seeds of wheat. Some of the informants informed me that they used kerosene drum to store seed in which pesticides were not needed.

5.4.5 Pulses and Oil Seed

In the study area, generally selected pulses and oil seeds were stored without using pesticides. In many cases, the researcher found that pulses and oil seeds kept within small sack, plastic bags and small pots made of bamboo or clay pot. The villagers kept the seeds of pulses mixing with ash, leaf of locally available pesticides. During the field observation, the researcher found that some of villagers were keeping the pulses seeds with pods and hung on outside of the house or cow shed. It was believed that insect did not make harm the seed if it would keep with pod.

5.4.6 Vegetables

The researcher found that, some local vegetables like cucumber, pumpkin, rayo and chilli seeds were stored on small pieces of cloth hanging in the beam above the hearth. Garlic seeds were hung up with its leaves corner of the house. Similarly, potato seeds were stored in cool and dry place. Some of the household also used *perungo* (bamboo basket with hole) made by bamboo for keeping the seeds of potato. It was believed that in cool and dry places as well as *perungo* air would easily passed which protect the seeds form rotten

5.5 Methods and Materials for the Seeds Protection

In Bahuntilpung, villagers had developed and practices different methods and materials for the seeds protection. The methods and materials were

varied according to the varieties of crops or knowledge associated with the people. The researcher has discussed the major methods and materials which were widely practiced among the people of Bahuntilpung under the following headings.

5.5.1 Drying of Seeds on Fortnight or the Dark Moon Period

One of the traditional methods practiced by farmer in Bahuntilpung to minimize the loss of stored legumes is the harvesting of crops' seeds like cereal and vegetables during the dark moon period. It was believed that seeds harvested and drying at the day of fortnight was comparatively less damaged by diseases than those harvested during the full moon period.

5.5.2 Use of Ash

In the field observation, some of the farmers were using ash from wood, rice husk, straw and other farm yard products for protecting the crops especially vegetables like cowpea, cabbage, cauliflower, beans from the harmful insects like aphids. Similarly, some of the elderly female informant informed me that they mixed ash while keeping the seeds of vegetable and black-gram for protecting the seeds from the diseases. Some of the informants informed me that they used the ash on the top of the storage seeds for protecting the seeds from diseases.

5.5.3 Use of Urine

In the study area, some of the farmers informed me that they used cow urine to protect seeds from the diseases. They mixed the cow urine with the seeds of crops and make them dry by heating on the sun. Generally, they dried on the light of sun till the seeds not became completely dry. After that, they stored the seeds for next year.

5.5.4 Use of Storage Near by the Kitchen

The majority of farmers in study area had developed and practiced a traditional package hanging on the poll above the oven in kitchen. Cereals and other food grains are stored in places where enough carbon dioxide (CO₂) and Carbon monoxide (CO) gases produced in the smoke of burning fuel woods enter. These gases suppress the infestation of insect pests in seeds. Farmers have observed that places or rooms where these gases do not penetrate are vulnerable to pest infestation.

5.5.5 Keep with Kusaro

In Bahuntilpung, the farmers used to keep the seeds of black-gram with *Kusaro*. It was the natural pesticide common among the villagers. In the study area, the researcher found that almost all the household had hanging the seeds of black-gram with *Kusaro* on the cowshed or house which were far from the reach of water and animals. It was believed that storing of seeds of black-gram with *Kusaro* helped to protect it form from attacks by bruchids.

5.5.6 Use of Millet with Other Crops

In the Bahuntilpung, it was found that some of the farmers were using the millet to protect the seeds form diseases. The millet seeds are placed on top of other cereal grains and legume seeds, or mixed with them, to protect from heavy losses during storage. During the planting time, they used a winow-fan with small hole to separate the seeds from the finger millet seeds.

5.5.7 Use of Oil

The mustard oil was used on the seeds of legume, mungbean, blackgram and cowpea to protect them from pests. It was believed that oil helped to reduce pest build-up in stored grains as it chokes insects resulting in successful pest control.

5.5.8 Use of pesticide plants

In Bahuntilpung, different varieties of pesticide plants like *Timur*, *neems*, *bakaino*, *titepati*, *asuro* were used for the protection of seeds from the pest. The seeds of *timur* are often used by farmers in Bahuntilpung to protect cereal seeds and legume grains from stored grain pests. The oil from the seed is most effective, followed by the whole seeds and then the crushed seeds. Similarly, some of the villagers informed me that dried leaves, stems and fruits *neem* and *bakaino* used against pests.

Similarly, dried leaves of *asuro* were sometimes used on top of stored food grains to protect them from infestation by pests. Likewise, dried leaves of *tetepati* (*Artemisia vulgaris*) are generally kept in top of stored potatoes to protect against tuber moths.

CHAPTER-VI

CHANGE IN INDIGENOUS KNOWLEDGE ON SEED MANAGEMENT PRACTICES

The chapter deals with the change in IK on seed management practices. The chapter mainly focus on the change in seed management practices, impact of modern varieties of seeds and factors of adapting improved varieties. The term change generally refers to the condition that existed in the past is not remain same at the present and also will be same in the future. Every thing in the world has been changing over time. It is the rule of nature. In this sense the seed management practices is not static all the time. It is changing over time in the case of Bahuntilpung.

Farmers of Bahuntilpung have been adapting new idea and new knowledge on agricultural through modernization, innovation and intervention of new technology and development intervention. The varieties of crops, system of seeds selection and storages practices have also changed. Improved seeds displaced in the traditional seed. It is available in the local market as well as agricultural extension office established by the government. Along with the availability of hybrid crops' seed at local market as well as AEO, farmers have been gradually giving up traditional and indigenous crops varieties as well as seed management practices. The table shows 10 the local and improved varieties of crops grown at Bahuntilpung.

Table No. 10: Local and Improved Varieties of Seeds Resources

Crops	Local varieties	Improved varieties
Paddy	Aute, Vuimali, Pokhereli, Gudure, Bahatare, Himali, Chote, , Basmati, Ghaiya	Hybrid, Makawanpure, Thimaha, Manemure, Sabitri, Kanchhi mansuli, Rampure Pahelo, Tichin, Biji, Khumal, Radha-barha
Maize	Ghaite, Phadire, Ghare pahelo	Rampure, Arun pahelo, Bikasi Pahelo, Bikasi Seto. Sathiya,
Millet	Thungee, Nangkota, Chamali, Kalo kodo, Rato Kodo	Balee, Baulaha, Lahure
Wheat	Sanogaun	Thulogaun
Black wheat	Tite, Mithe, kali phaper	Satiya
Oil seeds	Mustard, lineseed, sesame	
Pulses	Lentils Black, Rice Bean, Soyabean, Broad bean	Lentils white
Vegetables	Garlic, Reddish, Bitter gourd, Ash gourd, Brinjal, Vegetable marrow, Velvet flower, colocosia, yam	Cabbage, Cauliflower, Coriander, Tomato big, onion

Source: Field Survey, 2008

In the field observation, the researcher found that both local as well as improved varieties of crops have been planting by the farmers. However, in the field reality, some of the local varieties of paddy crops (like *Aute*, *Vuimali*, *Gudure*, *Bahatare*, *Himali*, *Chote*, *Ghaiya*), maize crops (like *Ghaite*, *Phadire*, *Ghare pahelo*), wheat crops (like *sano-gahu*), buck

wheat (like *tite* and *Kali Phapar*) were in the state of disappearing and some were totally disappeared from the Bahuntilpung. Farmers gave more priority to hybrid crops varieties and gave importance to conserve these varieties than local varieties. The villagers informed me that the local varieties of crops gave good taste than the improved varieties but did not give more yielding. The improved varieties gave good production. In the field observation, it was found that Khumal rice has widely been planted at study side due to the higher productivities. On the other hand it's straw also good because of long plant, mat can be made of it.

6.1 Change in Seed Management Practices

Indigenous knowledge and practices on seed management is a century old practice in Bahuntilpung. One of the informants informed me that their ancestor has began to manage the seed along with the arrival of that area but he did not say the exact arrival period of their ancestor. In this sense, Ghale and Upreti (1999) said that indigenous knowledge on seed management are not only establishing food security but also maintaining genetic diversity.

In the field observation, the researcher found a popular Nepali proverb among the old generation - "*Anikal ma biu jogaunu, hulmul ma jiu jogaunu*", literally means, save seed in the starvation and save oneself in the crowd. This proverb clears that villagers gave more importance to the seed and its protection. However, the managing of the seeds by the villagers themselves was gradually losing in the study area. An old woman explained about the trend in seed management system for the last 20 years. She said before 20 years, we used to keep seeds of all crops and vegetables that needed for domestic use. We made small packet and keep some of them above the kitchen in house and some are packed in small

vessels of clay or tin. We could have our seeds in time to grow and were delicious to eat. But now the local seed saving practices is disappeared. Almost entire villagers more or less have been depending on market for the seed. Initially, it seems easy to bring from market than to keep in our own house. Slowly, we have been accustomed by the market that if the seeds are not available in market, we could not grow vegetables in our kitchen garden.

Similarly, another informant Rek Raj Adhikari, at the age of 44 also reported that the local varieties of seeds were disappearing from Bahuntilpung along with the extension of improved and hybrid seeds in the local market. Before 10 years, we used to grow 5 different varieties of rice *Aute, Pokhereli, Himali, Chote and Khumal*. At least there were different 3-4 small heaps in our field while harvesting. But now we grow only two varieties of rice as *Thima, Manemure*. They were provided by agriculture office. We harvested good yield in the first year, but from second year the yield started to decline slowly and now we are not able to produce good yield and even we are not in the position to keep seeds in our home for next season. We have to buy seed from the market. We lost all our local varieties. If market will be unable to provide the seeds, we can not imagine what will happen in our food production. We buy most of the vegetable seeds that we grow in our field from the market. I generally prefer to grow local varieties which are cheap and delicious to eat. But it is very difficult to find seed.

6.2 Change in Cropping Pattern

Farmers have a wealth knowledge pertaining to their own environment; and have developed specific skills designed to make the best use of that

environment. Hence, cropping system is a system developed by farmers for the better use of their resources for agriculture.

Now, with the use of modern varieties, the local cropping pattern is changing. In this system different crop varieties cannot be grown in the same parcel of land at the same time.

The modern varieties have changed the agriculture system of local farmers. For instance, in Bahuntipung, farmers abandoned the maize cultivation ever since the modern paddy came to their field. They mentioned that, before the use of new paddy they often grew maize but now they can't grow it or else the yield will be poor even if they try to grow it. It has happened so, because of the given priority of new paddy. They also constructed the edge of the terraces higher than before so that they could manage sufficient water for new paddy. But this edge didn't favored maize. The irrigated land is not suitable for maize production. Thus the farmers almost left growing maize in the favour of modern paddy.

6.2.1 Extensive Use of Chemical Fertilizer and Lose of Land Productivity

In the study area the farmers are increasingly using chemical fertilizer as for higher productivity of crops. In the study area, some of the farmers had negative perception on chemical fertilizer. As they experienced, production goes amazingly high for some period after applying chemical fertilizer but after few years, it started to go down even when they still applied fertilizer in their field. Along this, the soil acidity increased which caused plants to get dried and finally died without giving any harvest.

Soil got clotted and even harder. New pest and diseases started appearing both on the plants as well as in human bodies.

The farmers of Bahuntilpung, the villagers had realized the problem soon after they used fertilizer and now they have almost left using such fertilizer, except some exceptional cases. Like mentioned above, the farmers are still using chemical fertilizer in sandy land. According to the local farmers since ten years they are intensively using chemical fertilizers and the natural soil fertility had decreased to the extent that they cannot produce anything until they use chemical fertilizer. And the other thing is that due to the lack of easy transportation they don't get fertilizer at the required time when they need it and so they rely on natural resources to make compost and use it as a fertilizer.

6.2.2 Increasing in the Use of Pesticides

In the study area, along with the arrival of new varieties of crops many new diseases and pest have increased. This has made farmers to use market pesticides to control the diseases and pests, which are all highly toxic. The villagers informed that they used chemical pesticides more than 3 times between the period of planting to harvesting for vegetables. Sometimes it reached more than 5 times. Similarly, in the case of paddy, the diseases easily attacked to the improved crops than local varieties and the demand of chemical pesticide was also more. One of the respondent informed that use of chemical pesticide is not only increasing the economic burden but also increasing a serious health problem to the local people.

6.3 Impact of Improved Varieties

6.3.1 Increasing Wild Plants in Agricultural Field

The villager informed that wild plants have been increased in the agricultural field after the used of improved crops as well as chemical fertilizers. The wild plants damaged crops by consuming the nutrients of soil which was required for crops. Therefore, the farmers have developed various control mechanisms to overcome weeds like use of chemical for destroying the wild plants or use of human labour for weeding.

During the time of field observation, some farmers used the chemical before planting the crops in the field for reducing or killing the regeneration power of grasses in the field.

6.3.2 Lose of Knowledge on Crops, Seed Management as Well as Pest

During the field observation, the researcher want to know the knowledge regarding the crops varieties, seed management and local pesticide and its use practices. The researcher asked questions to the elder persons as well as young generations. The old generations gave the name of more than dozen of local varieties of crops and nearly same numbers of local pesticide as well as their using method for killing harmful disease and seed management practices. However, I also asked the same question to the youth, but they gave very few names of local varieties of crops, and pesticide but no one gave the using method of local pesticides. This clearly indicates that the knowledge regarding local varieties, seed management as well as name of local pesticide as well as their using method was gradually disappearing from the young generation in the study area. The young generation was gradually losing the knowledge

which their ancestor developed during the course of adaptation in the environment (Posey, 1990, Poudel, 2008).

6.3.3 Change in Weeding Period

The weeding of crops is determined by the varieties of plant/crops they planted in the field. The villagers generally weeded maize, paddy, millet, in the study area. However, the duration and space of weeding of crops was found varied in the study. Generally, the local varieties of crops like paddy, maize and millet were weeded once a time during their cropping period. However, the improved varieties of crops like paddy and maize were weeded more than two or three times in the cropping period.

In the study area, the researcher found two types of weeding practices regarding the maize. The people who have plants maize in a large plot of land, they generally plough the field by protecting the planting one time during the maize-planting period. They informed that it was difficult to weed the plants by using spade due to the demand of the large number of agricultural labour. However, those farmers who had small flat of maize field used spade to weed the plant two times during crops cycle.

6.3.4 Change in Social Relation

In the field observation, the use of modern varieties of crops not only reduce the local and indigenous seed management practices but also change in the social relation between the rich and poor farmer in the study area. The change in social relation could not be attributed solely to the use of the improved or modern seeds but are, somehow linked with it. Some subsistence farmers with small landholding of Bahuntipung mentioned that, they were highly depended upon the landlords for seed and food during the time of scarcity while they planted indigenous and

local varieties of crops in the field. Along with the introduction of improved seeds they were less dependent upon the well-off farmers or big landlords for seeds and food. The improved varieties of crops gave more production than the local varieties of crops and seeds were also easily available to the local market during the sowing period. As a result, a social network between farmers particularly between big-farmers and small farmers for seed exchange has been gradually breaking down in Bahuntilpung.

6.4 Factors of Adopting Improved Varieties

Many of the local varieties of cereal crops have been replaced by new crop varieties in the study area. Farmers are growing multiple varieties of improved/modern varieties. The local farmers attribute the following factors behind the use of modern varieties.

6.4.1 Population Growth

Population growth is considered as one of the reasons behind the popular acceptance of modern varieties. In the field observation, one of the elderly informants informed me that "*Khane Mukha dherai Huna Thalyo: Jamin Chaina, Anna le Pukdaina*". Literally, "population has increased, there is no land and production is not enough". In the case of Bahuntilpung, the population was rapidly increasing due to the birth as well as migration from outside. The land was fragmentation among the brothers. As a result, each brother shared the land of father which decreased with each generation. In such situation, the productivity of the land is not enough and farmers looked for alternative ways of securing food security. They came to know about the high productive capacity of modern varieties from radio, local agriculture extension workers and

other farmers. The subsistence farmers throughout modern varieties would produce more to feed themselves and to meet the growing needs of their family members and started replacing their indigenous seeds with modern one.

6.4.2 High Yielding

Majority of the local farmers said that the new varieties give more yields within shorter period of time. New varieties provide higher production than the local variety. In the field observation, one informant informed that 1 ½ *moris* (90 kg) paddy could be produced in a *Ropani* land while planting local variety. In the same land, we could produce more than 3 *moris* (180 kg) paddy while cropping improved varieties.

Similarly, agricultural extension workers always inspired the farmers about the good qualities of modern varieties. Sometime they hear it in the radio's program or by other farmers who cultivated modern varieties. In the market, seeds of modern varieties were sold with displayed in colorful, and attractive posters and packet. And after the use of the modern varieties, farmers also seem to have preferred some of the good traits of the modern seeds. The local farmers of Bahuntipung mentioned that higher yields, early maturing, softness, weight, good looking and higher market value than local varieties of crops motivated the villagers towards modern seeds. The villagers also pointed out the some positive points of local varieties during the course of study. They were good taste, stable production at local inputs, softness, good for animal fodder and local item preparation, capacity of pest and disease resistant, adaptive to local condition and natural hazards of their environment, food of local varieties are sustainable to satisfy for long time. However, the farmers also pointed out the dislikeness of the local varieties of crops. They were

low productivity, late maturing, need of excess water and depending upon the rainfall.

6.4.3 Social Pressure

Farming is an integral part of the social, cultural and political milieu. Farming is embedded in the local social processes of conflict, competition, coordination, etc. These processes also influence the introduction and adoptions of modern varieties.

Farmers are often allured towards the modern varieties because of social pressure. In the case of study area, small-scale farmers mentioned that prior to dissemination of modern varieties they had a compulsion to depend upon rich farmers to manage their food and seed. Because of the late maturing and poor yields they often had to face food scarcity. Furthermore, they were more unable to store grain till the next harvesting period, thus it compelled them to depend upon landlords. And they had to pay it back in higher rate of interest. For this reason they always felt inferior in front of well-off farmers. As they mentioned, now they don't need to depend upon landlords or rich for food grain and seeds. Their production is sufficient in some cases. And modern seeds are easily available in the markets. These cases do not represent the entire poor farmers. Some farmers only reported in this way that there are lots of resources for farmers, who are still depending upon the rich and landlords.

6.4.4 Protect from Wild Animals and Birds

Early maturing is the main characteristics of the modern variety. This often advantages small farmers. They do not have to wait for long period for harvesting. On the other hand, in some cases if they grow the local

variety, it would take long time to mature. If other farmers are growing modern crops, they will harvest soon and low period for protecting crops from wild animals like monkey, squirrels, deer etc and birds like parrot, dove, sparrow etc. Thus to protect harvest from the wild animals and birds farmers are using the modern varieties.

6.4.5 Lack of Irrigation

Local varieties of paddy need sufficient water from the time of planting till harvesting period but the modern varieties do not demand water to the extent in comparison to local and thus it is suitable to grow on the land even when there is proper means of irrigation lacking. But it requires more chemical fertilizer. This might be the reason; most of the farmers of the study sites are adopting modern varieties. Since last 8 years, farmers of Bahuntipung, who are residing at the upper part of village, started planting modern variety of paddy named *Manemure*.

6.4.6 Market Expansions

Market is another factor, which encouraged farmers to grow modern variety. Market is considered as the source of remunerative prices of farm production. Market access encourages farmers towards out of season vegetable farming. They can obtain money any time if they have something to sell. In the study area as found there is one small market. The farmers used to buy seeds of vegetables in the local market. Most of the farmers, exchanged the seeds of crops within the neighbours. Even though market are seen as an indicator of development which nexus between global world and local people. It plays the role of grassroots level agent which help to diffuse modern scientific technologies of advanced industrial countries. It brings gradual change within the local

community which is always viewed from positive aspect, but at the same time, it makes local people more dependent with the outsider.

6.4.7 Government of Agricultural Development Programme

The Government of Nepal established ASC in Bahuntipung on 1994/5 at Bahuntipung which played the important role for the extension of modern seeds and technology formally within the farmers in the name of *Bikase Bii* for higher yield. Some of the varieties were developed by the office in different place of the country where as some were achieved from developed countries as a form of an aid and distributed to the farmers. In the initial period farmers got such varieties for free of cost but after few years, they have to pay for same varieties because they can't save such seed themselves, if they try to keep it on their own, it doesn't give the good yield. Moreover, modern one has already replaced farmers' varieties. In this way, the government is making farmers depend upon international seed companies and upon technically advanced developed countries.

CHAPTER-VII

CONCLUSION AND RECOMMENDATION

7.1 Conclusion

The main objectives of the research was to understand the indigios knowledge on seeds management system of the Bahuntilpung people of Sindhuli district. It has also attempted to explore the changing patterns of seeds management system.

Based on the findings it is concluded that majority of the farmers have been maintaining their subsistence system through traditional farming practices. Despite the low productivity of crops, farmers have been conserving local seeds. In the study area, crop management practices, specially the land preparation, seed selection, seed storage and crop rotation, manuring and pest-disease control techniques are mostly traditional. Only a few farmers adopted new varieties of crops, chemical fertilizer and chemical pesticides and insecticides. Farmers have been managing seeds requirements through the informal seeds supply system. Most of the farmers have been providing seeds for major crops themselves or exchanging with their neighbors. Indigenous knowledge of seed selection, storage and use of pesticides is very rich among the farmers of old generation. Farmers have been cultivating local land races of major crops since generation and farmers have still observed traditional criteria for seed selection, processing and storage. Grain produced on the farm are selected and stored for planting for the next cropping season by method of manual selection and threshing. Farmers remove rough plants slightly before harvesting in order to avoid admixtures and also to maintain the genetic purity of a particular variety of crop. In Bahuntilpung, farmers removes Thimaha (crossbreed) and sama (rice like weed) for paddy field every year before harvesting the

crop. For the seed and grain produced they have been using locally made storages such as Bhakari, Thangra, clay pots, wooden pots, cloth sacks and so on. In the study site all of the household were drying seed for couple of days under the shade of sun before storage.

The cropping methods and application of fertilizer and chemicals by those who used them are still traditional. Farmers have been facing difficulties in adopting improved technologies. The existing IK and traditional crop management practices is not sufficient to lessen the food deficiency in the area. Once introduced *Bikase* maize seeds decades before have not been replaced since its introduction. The practice has already been leading to deterioration of the quality of seeds and decrease in productivity, that might be leading to food deficiency. The case for this is due to the indiscriminate introduction of improved variety.

During the study the researcher found that local farmers have also started to use improved seeds along with the intervention of development, population growth, social pressure, lack of irrigation, market expansion and agricultural development programme of the government which gradually replacing the process. In the study area, as a result, the knowledge which was given by the farmer through the hundred and thousand years of experience was a gradually loosing from the country.

7.2 Recommendations

As a student research and due to the limited resources and time the researcher could not investigate into numerous other activities related with seeds management practices. Details of livestock rearing, compost preparation methods and irrigation management have not been investigated due to time and resource constraints. The further researches should focus to address these issues as well.

REFERENCES

- Adhikari, J.1996. *The Beginnings of Agrarian Change: A Case Study in Central Nepal* TM Publication, Kathmandu, Nepal.
- Adhikari, R., N. Belbase and Y. Ghale 2000. *Seed of Monoplogy: Impact of TRIPs Agreement in Nepal*. Pro Public/Action Aid Nepal.
- Agrawal, A. (1995), "Dismantling the Divide between Indigenous and Scientific Knowledge" *In Development of Change Journal* 26 (3) 413-439.
- Burkitt, M.C. 1963. *The Old Stone Age: A Study of Palaeolithic Times*. The Bodley Head Limited, London.
- Caplan, L. 1970. *Land and Social and Change in East Nepal: A Study of Hindu – Tribal Relations*. Routledge and Kegann Paul, London.
- CBS, 2003, *Population Monograph of Nepal*. Kathmandu Nepal.
- Chhetri, R. B. 1996. "Indigenous Protection and Management System of Forest in the Far-Western Region of Nepal." In Tamang, Devika, Gerard, J.Gilla and Ganesh B. Thapa (eds) *Indigenous Management of Natural Resources in Nepal*. Winrock International, Kathmandu Nepal.
- Chhetri, R.B. 2007. *Culturally Embedder Knowledge in Irrigation: People's Ways of Thriving in a Himalayan Village* in P. Pradhan et. al (ed) *Irrigation in Transition: Interacting with Internal and External Factors and Setting the Strategic Action*. Proceedings of the 14th International Seminar held on 6-7. Nov. 2006, Kathmandu, Nepal.

- Chhetri, R.B. and Pandey T.R. 1992. *User Group Forestry in the Far-Western Region of Nepal: Case Studies from Baitadi and Acchham*. ICIMOD, Kathmandu, Nepal.
- Chitrakar, P.L. 1990. "Planning, Agriculture and Farmers Strategy for Nepal.
- Ember C.R. and M. Ember 1994. *Anthropology*. Prentice Hall of India. New Delhi (7th Ed.)
- Escobar, A 1997. "Anthropology and Development." In *International Social Science Journal* 154 (4), 497-515.
- Escobar, A. 1998. "Whose Knowledge Whose Nature, Bio-diversity Conservation and The Political Ecology of Social Movement". In *Journal of Political Ecology*- 15.
- Flavier, J. M., A. Jesus and C. S. Navarro 1995. "The Regional Program for the Promotion of Indigenous Knowledge in Asia (REPPIKA)." In Warren, D. Michael, L. Jan Slikkerveer, and D. Brokensha (eds) *The cultural dimension of Development: Indigenous Knowledge System*. Intermediate Technology Publications, London.
- Gautam, K.H. 1991. *Indigenous Forest Management System in Hills of Nepal*. Msc. Thesis Submitted to the Australian National University, Australia.
- Geertz, C. 1963. *Agriculture Innovation: The Process of Ecological Changes of Indonesia*. Berkeley University of California Press.

- Gill J. 1996. *Indigenous Systems in Agriculture and Resources Management: The Policy Dimension in Tamang, Devika*, Gerard J. Gill and Ganesh Thapa (eds) *Indigenous Management of Natural Resources in Nepal*, Winrock International, Kathmandu Nepal.
- Gill, G.J. 1993. "Indigenous System in Agriculture and Natural Resource Management: The Policy Dimension". In Devika Tamang, Gerard, J. Gill and Ganesh B. Thapa (eds) *Indigenous Management of Natural Resources of Nepal*. HMG, Ministry of Agriculture/ Winrock International, Kathmandu.
- Gurung, H.B. 1998. *A Rapid Marketing Appraisal Study on Vegetable Seed Marketing Practices in Nepalese Market Centres along the Indo-Nepal Boarder Agro Enterprise Centre*.
- Gurung, J.B. and A. Vaidya 1989. *The Benefits to Agrobiodiversity of the Wide Range of Food Cultures in Nepal* in Pratap, Tej and Bhuwan Sthapit (eds) *Managing Agro Biodiversity*, ICIMOD, Kathmandu.
- Gurung, O.P. 1987. *Native Strategies for Resource Management* in J.F. Fisher, (ed). Occasional Paper in Sociology/Anthropology Vol. Central Department of Sociology/Anthropology, T.U. Nepal.
- Gyawali, B.K., 1993. "Integrated Pest Management (IPM) Through Indigenous Techniques in Nepal". – pp. 126-138.
- Gyawali, K.K. 1998. *Review of Vegetables Seed Marketing Policies, Strategies and Programmes in the 9th Plan and Recommendations for Improvement Proceedings of the National Seminar on Fruit and Vegetable Marketing in Nepal*. 15-16 Sept. 1998. Support to a New Kalimati Project. Kathmandu.

- Hagen, T. 2000. "Agriculture without Farmers? A Challenge for the Next Century." In Jha, P.K. S.B. Karmacharya, and S.R. Baral (eds) *Environment and Agriculture*, Ecos, Nepal.
- Hardin, G. 1968. "Tragedy of Commons. In *Science* 126 (3859) 1243-1248 Washington: American Association of Advancement of Science.
- Harverkort, B. 1995. "Agricultural Development with Focus on Local Resources ILETAs view of Indigenous Knowledge." In Warren. D. Michael, L. Jan Slikkerveer, and D. Brokenshe (eds) *The Cultural Dimension of Development: Indigenous Knowledge System*. Intermediate Technology Publications, London.
- K.C., D. and Pradhan U. 1996. *Indigenous Knowledge and Organizational Process: Experiences and Lessons from Local Nepal Irrigation Systems* in Tamang, Devika, Gerard J. Gilla and Ganesh B. Thapa (eds) *Indigenous Management of Natural Resources in Nepal*, Winrock International, Kathmandu, Nepal.
- Messerchmidt, Donald A. 1992. "The Uses of Anthropology in Agro-Forestry Research and Development: Approaches to Anthropological Forestry." In W.R. Brush and J.K. Parker (eds) *Social Science Application in Asians Agro-Forestry*. South Asia Books/Winrock International. Columbus, Missouri.
- Pandey, I. R. 1996. *Some Indigenous Practices of Vegetables Production by Jyapu Farmers Around the Kathmandu Valley* in Tamang, Devika, Gerard J. Gill and Ganesh B. Thapa (eds) *Indigenous Management of Natural Resources in Nepal*, Winrock International, Kathmandu, Nepal.

- Posey, D. 1990. "Intellectual Property Right; and Just Compensation for Intellectual Knowledge". In *Anthropology Today*, Volume, Issue. 44. pp. 13-16.
- Poudel, J.M. 2008. *Population Pressure on Non-Timber Forest Products and Its Impact on Indigenous Knowledge: A Study from Eastern Nepal*. In SASS Journal Vol. II. Pp. 47-58. Central Department of Sociology/Anthropology, T.U. Kirtipur.
- Rai, J. 1996. *Indigenous Knowledge of Kulun Rais on the Use of Allo: An Anthropological Case Study of Tamku VDC of Sankhwasabha District*. An Unpublished Master Degree Dissertation Submitted to Central Department of Sociology/Anthropology, T.U. Nepal.
- Rajaskaran, B.D., M. Warren and S.C. Babu 1991. "Indigenous Natural Resource Management System for Sustainable Agricultural Development. A Global Perspective." In *Journal of International Development*.
- Rappaport, R. 1979. *Ecology Meaning and Religion*. North Altantic Books, University of Michigan, California.
- Reijnties, C., B. Haverkort and A. Waers – Bayer, 1992. "An Introduction to Low External Input and Sustainable Agriculture "Farming for the Future, London.
- Reijnties, C.B., Havekort and A Waters-Bayer, 1992. *An Introduction to Low External Input and Sustainable Agriculture Farming for the Future*, London.
- Sharma, Hament (2003). *Indigenous Knowledge and Practices on Crop Management System: An Anthropological Study of Siwa VDC*,

Panchthar, District. An Master's Degree Dissertation Submitted to the Central Department of Sociology/Anthropology, T.U. Nepal.

Shrestha, P.K. 1998. "Gene, Gender and Generation: Role of Traditional Seed Supply System in the Maintenance of Agrobiodiversity in Nepal" In T. Pratap and B. Sthapit (eds.) *Managing the Agrobiodiversity of the Hindu Kush – Himalayan Region: Farmers' Changing Perspectives and Institutional Responses in the Hindu Kush-Himalayan Region*. Kathmandu: ICIMOD.

Sillitoe, P.1998. "The Development of Indigenous Knowledge" In *Current Anthropology* 39 (2): 223-252.

Soleri, D. and D. Cleaveland. 1993. "Seeds of Strength for Hopis and Junis Seeds of Strenght, <File://A;1004-190html>.

Steward, J. 1955. *Theory of Culture Change*. University of Illinois Press, USA.

Subba, Khushiyali, (2001). *Indigenous Knowledge on Conservation of Local Land Races: A Case Study from Jalpa VDC of Khotang and Daulatpur VDC of Saptari District*. An Master's Degree Dissertation Submitted to the Central Department of Sociology/Anthropology, T.U. Nepal.

Tamang, Mukta S. (1996) *Indigenous Knowledge System and Development: An Ethnoecological Case Study of Mewahang Rai from Arun Valley*, Unpublished Master Degree Dissertation Submitted to the Central Department of Sociology/Anthropology, T.U. Nepal.

- Thapa. D. 1993. *Challenges and Opportunities in Farm and Community Resource Management in Nepal*. pp. 13-23.
- Timsina N. , 2000, *Seed Management System in Nepal; Where Does it Stand! An Assessment of Existing Seed Situation and Related Policies in Nepal*. Action Aid of Nepal, Kathmandu.
- Upreti, B.R. and Y. Ghale 1999. *Sustainability and Self Reliance of Hill Farming System: Experiences from Nepal*. A Paper submitted to 16th Symposium of the International Farming System Association, 27-29 Nov. 2000 going to be organized in Santiago, Chile.
- Uprety, L.P. 2007. *Problems of Participation and Issues of Sustainability in the Public Irrigation System in the Context of Management Transfer: Sociological observations from Eastern Terai, Nepal*. In P. Pradhan et. al (ed) *Irrigation in Transition: Interacting with Internal and External Factors and Setting the Strategic Action*. Proceedings of the 14th International Seminar held on 6-7. Nov. 2006, Kathmandu, Nepal.
- Vandana S. 1995. *Bio-diversity: A Third World Perspective*. The Third World Network Publication, Malaysia.
- Warren, D. M. , L. Jan Slikkervveer, and D. Brokensha 1995. *The Cultural Dimension of Development: Ingenious Knowledge Systems*. Intermediate Technology Publications, London.

INDIGENOUS KNOWLEDGE ON SEED MANAGEMENT PRACTICES AMONG THE BAHUNTILPUNG PEOPLE OF CENTRAL REGION OF NEPAL: A SOCIOLOGICAL STUDY

Pramod Timalina

M.A. in Sociology

Background of the Study

Indigenous knowledge (hereafter IK) as an accumulated knowledge, skill and technology acquired by particular community or group through direct interaction with given environment for their adaptation. That knowledge is gained through trial and error and passed from one generation to next in an oral way.

Local people have developed different kinds of knowledge and practices to adopt in their environment. That is called IK by anthropologists. In this regards, Posey (1990) called IK as a wealth of human beings gain from hundred and thousands year experiences. Therefore, local people have vast knowledge in different sectors such as medical plants, natural insecticide, fertility regulating drugs, climate change, plant genetic, soil types, seed selection and management, agricultural management, forest, pasture, water resources management etc.

In the rural area of Nepal majority of farmers keep seed themselves from their own production for next crop season. There is no other source of seeds rather than selecting from their own farm. However, farmers have long experience and vast knowledge regarding the seed selection and its protection from harmful insects. In another words, farmers apply their own knowledge, methods and practices related to seed management system for centuries. However, the management of agricultural seed is varied from one community to another community, one society to another society. Moreover, the seeds selection and its storage are integrated within the agronomic and socio-cultural practices of farming communities. However, the seed management practices have been changing gradually due to the various cause in Nepali society.

The present study is mainly explored the IK on seeds management particularly seeds selection and their storage in Chauki village, a small and remote hilly village located at Bahuntiplung Village Development Committed (VDC) of Sindhuli district where majority of people are depended upon subsistence farming. This study especially concentrated to find out an existing IK in relation to seeds selection and its storage practices and change that took place and taking place regarding the seed management in the study area.

Problem and Research Questions

-) What is the existing knowledge regarding the seed selection?
-) How do the people select the seeds?
-) How do they storage the selected seed for next season?

-) How do the farmers gain knowledge regarding selection of seeds and its storage practices?
-) Are there noticeable differentiate in selection of seeds and their storage practices according to caste/ethnic variation?
-) What are the main causes behind to replace the traditional system of seed management?

Objectives of the Study

The general objective of this study is to document the IK of seeds management practices among framers of Chauki village at Bahuntipung VDC of Sindhuli district of central hilly region of Nepal. However the specific objectives of the study are as follows:

-) To document the existing indigenous knowledge in relation to seeds selection.
-) To find out the existing practices knowledge regarding the seeds storage.
-) To find out change that took place and taking places in IK regarding the seeds management.

Rationale of the Study Area

This study was supplementary source of information to understand the IK relating to selection of seeds and their storage practices. In this sense, I hope that this study may be able to investigate the document the existing indigenous knowledge in relation to seeds selection and their storage practices among framers of Chauki. Moreover, this study may also be able to find out the change that took place or taking place in IK regarding the seeds management. This study will also open the debate and pave the way for future researchers and readers who are interested in this field.

Limitation of the Study

- 1) This research is conducted only for the partial fulfillment of the Masters Degree in sociology. Therefore, it has no wider application.
- 2) The findings are based on the information collected from the Bahuntipung people of Sindhuli district. Therefore the findings cannot be generalized in wider area or another locality.
- 3) Similarly the findings are based on the information collected in a specific time period. Therefore, its findings may not be applicable in all time but the conclusion drawn from the communities may be applicable only to the communities with similar geographical historical and socio-cultural settings.

Rationale for the Selection of Study Area

The study was conducted in Bahuntipung VDC of Sindhuli district located at hilly region of Central Nepal. The selected site for the study on indigenous knowledge on seeds management was suitable by several reasons. Firstly, the farmers of this area were traditionally depending upon agriculture for their survival for the age. In this sense, they mostly select seeds of varieties of crops and vegetables from their own field for next season and storage in their own way. Thus, this site is suitable to find

out the IK regarding the selection of seeds and their storage practices that was common in the region.

The study area was heterogeneous in terms of caste/ethnic variation. There was Brahmin, Chhetri, Magar, Kami and Sarki. In this sense, this area was suitable for the researcher to find out variation in IK regarding the seeds selection and its storage practices in terms of caste and ethnic variation in the study area.

In the study area, the government was established an Agricultural Research Station (ARS) in 1994/5 for providing the improved seeds to the farmers. Thereafter, people gradually started to bring seeds from the ARS to produce large quantity of crops. Therefore, this site was appropriate to find out the affect of modernization on IK relating to selection of seeds and their storage in the study area.

Research Design

This research design of this study were descriptive and explorative.

Universe and Sampling

All the local farmers of Bahuntipung VDC Ward No.-3 of Sindhuli district were the universe. All 40 households were selected sample unit for detail study.

The unit of the analysis was household.

Nature and Sources of data

Both qualitative and quantitative data were used which were collected from primary and secondary sources.

Tools and techniques of data collection

The researcher had used triangular methods to verify the information obtain by respondents such as household survey, interview, observation and focused group discussion.

Data Presentation and Analysis

In this study, simple tabulation was used for analysis the data. Similarly, I have also presented some qualitative data in words in systematic way to make the data more clear to understand the readers. The acquired data from computer software had analyzed using simple statistical tools and tabulation.

Conclusion

The main objectives of the research was to understand the indigios knowledge on seeds management system of the Bahuntilpung people of Sindhuli district. It has also attempted to explore the changing patterns of seeds management system.

Based on the findings it is concluded that majority of the farmers have been maintaining their subsistence system through traditional farming practices. Despite the low productivity of crops, farmers have been conserving local seeds. In the study area, crop management practices, specially the land preparation, seed selection seed storage and crop rotation, manuring and pest-disease control techniques are mostly traditional. Only a few farmers adopted new varieties of crops, chemical fertilizer and chemical pesticides and insecticides. Farmers have been managing seeds requirements through the informal seeds supply system. Most of the farmers have been providing seeds for major crops themselves or exchanging with their neighbors. Indigenous knowledge of seed selection, storage and pesticides is very rich among the farmers of old generation. Farmers have been cultivating local land races of major crops since generation and farmers have still observed traditional criteria for seed selection, processing and storage. Grain produced on the farm are selected and stored for planting for the next cropping season by method of manual selection and threshing. Farmers remove rough plants slightly before harvesting in order to avoid admixtures and also to maintain the genetic purity of a particular variety of crop. In Bahuntilpung, farmers removes Thimaha (crossbreed) and sama (rice like weed) for paddy field every year before harvesting the crop. For the seed and grain produced they have been using locally made storages such as Bhakari, Thangra, clay pots, wooden pots cloth sacks and so on. In the study site all of the household were drying seed for couple of days under the shade of sun before storage.

The cropping methods and application of fertilizer and chemicals by those who used them are still traditional. Farmers have been facing difficulties in adopting improved technologies. The existing IK and traditional crop management practices is not sufficient to lesson the food deficiency in the area. Once introduced Bikase maize seeds decades before have not been replaced since its introduction. The practice has already been leading to deterioration of the quality of seeds and decrease in productivity, that might be leading to food deficiency. The case for this is due to the indiscriminate introduction of improved variety.

During the study I found that local farmers have also started to use improved seeds along with the intervention of development, population growth, social pressure, lack of irrigation, market expansion and agricultural development programme of the government which gradually replacing the process. In the study area as a result, the knowledge which was given by the farmer through the hundred and thousand year experience was a gradually loosing from the country.

