CHAPTER II

LITERATURE REVIEW

2.1 Concept and definition of food security

Food security is defined by different ways in literature. The concept of food security is wide and complex covering wide ranging aspects from global food balance to nutritional adequacy of an individual. It defines food security as "access by all people at all times to enough food (of good quality) for an active and healthy life" (World Bank, 1986). The World Food Summit (1996) explained that “food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.

2.2 Dimensions of food security

The concept of food security takes different dimensions at various levels. At national level, food security is equated with national food balance. At the household level, food security can be defined as the ability of the family to secure enough food to ensure adequate dietary intake for all of its members. This widely accepted definition of food security by the World Food Summit (1996) points to the following four dimensions of food security that are food availability, food access, utilization and stability which are important for achieving a sustainable food security. Food availability is the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid). Food access is

access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Utilization of food is concerned with consumption and absorption and dietary patterns which reflect adequate diet to reach a state of nutritional well-being where all physiological needs are met. Stability of food supply refers access to adequate food at all times.

2.3 Food security and performance of production system

Reducing poverty and food insecurity involves enhancement of agricultural productivity and production and income generation among producers as well as among those in rural areas who do not work the land (Rivera and Qamar, 2003). In several long term experiments on rice and wheat systems in India and Nepal, grain output is observed to be declining (Byerlee, 1992). The current productivity level of various agricultural enterprises is less than half the potential in Nepal. Hence there is a serious productivity gap (Koirala, 2003). Food insecurity of Nepal manifests itself in terms of: i) insufficient per capita availability of food resulting from own production due to low productivity, bad weather, small size of holding, high proportion of rainfed farmers and sharecropping; ii) insufficient access to food because of lack of purchasing power/poverty; and iii) poor nutrient utilization (Food and Agriculture Organization, 2004). Food insecurity situation in Nepal was severe from 1991 to 1999 because of inadequate domestic production. The production and yield levels of principal crops reveal that there is tremendous annual variation in production and productivity in Nepal.

2.4 Food security and ethnic community

Ethnic issue is an important agenda among the academicians, policy makers and sociologists. In academic discourse, perspectives on ethnicity have in recent years

have been increasingly problematizing and open-ended (Jenkins, 1999). The concept of ethnicity has been used synonymously with such concepts as race, nation, identity, community, culture, society and tribe.

Nepalese people are socially segmented along lines of caste and ethnicity. The caste system, which flows from the Hindu ideology, compartmentalizes people into four rigidly vertical hierarchies. In 1854, the Muluki Ain, or National or Civil Code, put high-caste Hindus at the top of the social structure, followed by non-Hindu hill populations and placed the Hindu "untouchables" at the lowest rung of the social order. According to the caste worldview, a person attains social position by birth, not by merits and qualifications, and it is an unwritten law that the opportunities available in the state are the privileges of those borne to upper castes. The caste system was abolished legally in 1963 and the Constitution of Nepal-1990 prohibits any discrimination on grounds of religion, race, sex, caste, tribe or ideological conviction. Nepal being a multi-ethnic country, the ethnic issues have been coming up mostly after the restoration of democracy in 1990. However, political changes and modernization do not affect majority of Tharus (Sharma, 2006). The principal groups of food insecure people are backward ethnic communities in Nepal. Tharus are termed as 'backward ethnic group' in Nepal.

2.5 Food security and vulnerability

Vulnerability says something about the level of risk for households or communities concerning threats to their lives and livelihood. A household's vulnerability is determined by the ability of a household to cope with risks and shocks such as drought, flooding, government policies, conflict, and the HIV/AIDS crisis.

While poverty and food security are static measures, vulnerability is dynamic among actors in socio ecological networks. Targeting food system vulnerability might involve a combination of macro, meso, and micro scale assessments that would at all times be interlinked (Franklin, 2003). The macro scale assessment allow to identify population density, infrastructure, ecological instability and food and agriculture data where as meso scale assessment for social welfare, community resources, agricultural systems and technology as well as coping strategies and capabilities and micro scale assessment for household economy data, nutritional data, property right data, gender inequality etc. Moser (1996) says that vulnerability is the insecurity of the welfare of individuals, communities or households in the face of a changing environment. It is the risk of, or susceptibility to, food insecurity and can result from either chronic or transitory conditions. Households have a wide range of traditional ways of reducing risk (e.g. by jointly managing soil, water and vegetation in watersheds to prevent flash floods and erosion, and reduce the risk of drought) and vulnerability (by choice of crop, crop combination, crop and livestock enterprises, by increasing assets that can readily be liquidated, diversifying employment etc). More modern ways include the purchase of insurance policies against crop failure, asset loss, or death and ill health.

Food insecurity in Nepal is closely related to poverty. At the household level, the main factors contributing food insecurity include the high dependency on low productivity agriculture, the small size of land holding, low wage rates, low income and social exclusion. Household in Nepal that are most vulnerable to food insecurity have insufficient livelihood assets (human, social, natural, physical and financial) with which to produce enough food and/or earn sufficient income to purchase food

and manage shock and consequently cannot meet their essential food and non-food consumption needs (FAO, 2004)

Four core concepts of food security are common to most: access, security, sufficiency and time where as access is defined as the entitlement to produce, purchase, exchange or receives food, and security as the balance between vulnerability, risk, and insurance (Maxwell and Frankenberger, 1992). Household vulnerability must not be assessed in terms only of immediate access, but also of the stability and sustainability of those channels through which the household mediates its food access. If a household can improve its access to food by disposing of assets or by investing in a riskier or less sustainable activity, its vulnerability is likely to increase as a result of such action.

2.6 Food security and policy

There is no single solution to what needs to be done to serve poor and food insecure population (Rivera and Qamar, 2003). Some experts emphasize growth and greater production. Other experts fear overproduction and price slumps and focus on quality and marketing. Policy needs to take an explicit and realistic view of why particular groups and areas remain marginalized (Farrington *et al*., 2002). Whatever the explicit reasons or combination of reasons, these multidimensional problems results in the vulnerability of the person; they affect the family, the community and ultimately the nation. Their reality also affects the role of agricultural and non agricultural extension (Rivera and Qamar, 2003).

A number of policies and approaches that need to be emphasized in developing countries are applicable and effective depending on the economic

environment and institutional set up. Therefore, in order to achieve sustainable food security and environment, countries need to study and understand these socio economic environments so as to formulate and implement sound policies and policies that are better suited to their localities. In order to address current issues in the agricultural sector of the country, the government has promulgated National Agricultural Policy-2004 to raise the standard living of the people through sustainable agricultural development transferring from the current subsistence oriented farming to a commercial and competitive farming system and ensure food security through increasing agricultural production and productivity by agricultural extension service systems in country. This policy has also intervened special facility programs for special target group like Tharu ethnic farming communities to improve their livelihood and food security.

"Many different sets of data are available, but the challenge is to extract information that can actually be used in policy and planning at national level, too few information systems are able to identify who is vulnerable, where they are and why they are vulnerable." - World Food Summit 2002. The elimination of food and nutritional insecurity in Nepal, and the attainment of Millennium Development Goal 1 to eradicate extreme poverty and hunger, demands a specific, comprehensive and integrated approach focusing on all three dimensions of food security: availability, access, use and utilization. Furthermore, food security and vulnerability need to be tackled at the national, household and individual level. Food security and nutrition are at the forefront of discussions among policy-makers in Nepal, who are incorporating food security and nutrition-related goals and objectives in national strategies and frameworks.

2.7 Food security and resources

The socio-economics characteristics and resources of individual households have been identified as basic factors influencing the food security status of households (Sanusi *et al.,* 2006). Any farmer or agricultural systems with unlimited access to sufficient resources like inputs, knowledge and skills can produce large amount of food. But most farmers in developing countries are not in such position and the poorest generally lack the financial assets to purchase costly inputs and technologies (Pretty, 2003). In this situation, indigenous knowledge and technology with maximum use of internal resources or inputs contributes to stabilize the food security situation in poor resource countries particularly like Nepal. Pretty (1995) suggests that sustainable agricultural production is the production system which maximizes efficiency and effectiveness of use of locally available knowledge and natural resources with reduced external inputs wherein diversity of enterprises within the farm and the linkages and flows between these enterprises are increased in profitable, socially equitable and ecologically sound ways. In this situation, indigenous knowledge and technology with maximum use of internal resources or inputs contributes to stabilize the food security situation in poor resource countries particularly like Nepal.

Nepal is one of the poor resources based countries in the world. Land, water, and forest are the valuable natural resources for the economic development of Nepal. Landless agricultural workers are among the poorest people and have significantly lower incomes than those employed in non-agricultural business. Ownership or access to land in rural areas is a key determinant of poverty. The average size of cultivated landholding has been estimated at about 0.4 ha (Kiff *et al*., 1999). Urban

households are generally better off than rural households and 93 per cent of the very poor live in rural areas. Given these determinants of poverty, projects which target landless households, and in particular female-headed households, should reduce underemployment and raise living standards (World Bank, 1998). Nepal has an estimated 53.1 per cent of the population below the international poverty line (UNDP, 1999).

Nepalese agriculture operates in a semi-feudal framework. Arable land is very scarce in Nepal. It is fragmented and unevenly distributed. Only 20 per cent of the total land area is cultivable, and of the total cultivable land, 69 per cent of the landholdings are less than one hectare in size. The bottom 40 per cent of agricultural households owns only nine per cent of the total agricultural land, while the top six percent occupies more than 33 per cent (NESAC, 1998) and 24.4 per cent households do not own any land (CSRC, 2003), which means over 5.5 million Nepali people are landless. The average household size of Nepal is 5.5 (CBS, 2001). The landless categories are two groups of people: the *sukumbasis*, a name given to the peoples deprived of land over history for various reasons, and the *kamaiyas* having no land of their own, the landless (*sukumbasis*) and land-poor are left at the mercy of big farmers and landlords, often forced to sell their labor for a negligible wage. The surplus so appropriated is diverted to other sectors which do not necessarily support agricultural growth (Acharya, 2003). The Kamaiyas are the landless Tharu people residing in the western Terai area of Nepal.

About 1.45 million households or 35 percent of the population of Nepal is involved in community forestry management program. 14,337 Community Forestry User Groups (CFUGs) have been formed of which 778 are composed of women only

committee members (Department of Forest, 2008). The main forest management strategy of Nepal is based on people's participation in forest management activities to improve the livelihoods of these people. The local people make decisions regarding the forest management, utilization and distribution of benefits from forest resource; they are organized as a Community Forest User Group

2.8 Food security and institutions

A number of constraints have been identified and reported to affect the existing food situation in developing countries. These factors include production and non-production constraints which tend to differ from one country to another depending on the presence of institutions and institutional effectiveness and the adequacy of infrastructure. Factors affecting agricultural productivity other than ecological conditions include use of inefficient technology, such as use of low levels of inputs and poor mechanization (Molnar, 1999; Reardon *et al*., 2001). Non-Production factors affecting agricultural productivity include institutional, economical and demographic factors. Farmers in developing countries lack technical, financial and institutional support. This places them at a disadvantage in transactions with traders (Barkin, 2000). Institutions are the structuring features that command access of people to assets, to voice and to power over their own lives, and that regulate competing claims to limited resources. Agricultural extension programs are needed to reach out to those in rural areas who often enough constitute the majority population (Rivera and Qamar, 2003). It is fundamental for government to address those institutional, governance and politico-economic factors that tend to exclude individuals and population groups from progress.

Managerial skills become more critical as the gap between potential yields and farmer production narrows (Cassman, 1995). The government of Nepal has adopted several approaches to minimize the gap between potential yields and existing yields through the dissemination of new agricultural technologies. Beside these approaches, NGO are using their own approaches on different aspects of agriculture development. But the expected goal could not be achieved due to following problems: low technical competencies of the field level technician; poor delivery network of input, credits and market and lack of appropriate technologies (Khatri-Chhetri, 2003). There is also the lack of managerial skill of farmer to govern efficiency and sustainability of agricultural production due to ineffective agriculture extension system in Nepal. Currently, the Nepalese government has introduced decentralized agricultural promotion and management systems in order to capture and harness ecological and spatial diversity for the promotion and benefit of sustainable indigenous farming practices and local people. As decentralization of agricultural extension system in Nepal, devolution of agricultural extension services has been made by the government to local governance bodies (district and local level) to promote the agricultural sector by formulating and implementing program themselves according to their needs and interest of local people. The governmental and non-governmental organizations play an important role to improve the performance of farming communities through different agriculture approaches. Decentralization can greatly enhance the state's capacity to accelerate local development and reduce poverty, but only if it is effectively designed (UNDP, 2002).

The important steps are also being taken by government organization (GOs), UN agencies, non-governmental organizations and research institutions, among others, to improve access to land, improve and diversify agricultural production, create income-generating opportunities for rural households, rehabilitate infrastructure, increase investments in safe water and sanitation, educate mothers on the importance of appropriate feeding and caring practices, scale-up micronutrient supplementation and food fortification programs, work towards health sector reform, establish social safety nets, and encourage the participation of communities in planning and decision-making processes.

2.9 Food security and calorie requirements

The most recent joint FAO/WHO/UNU Expert Consultation on Energy in Human Nutrition met in October 2001 to review the state of the art of the scientific literature since the 1985 report and to arrive at recommendations for calorie requirement throughout the life cycle (FAO/WHO/UNU, 2004). The calorie requirement was defined as the amount of calorie needed to maintain health, growth and an appropriate level of physical activity. Calorie needs are determined by calorie expenditure, body composition, level of activity and measurement of their mean habitual intake will provide an estimate of their mean expenditure. The largest component of calorie expenditure is the basal metabolic rate (BMR) which can be measured by with accuracy under standard conditions (body size, body composition age and sex). The principle of calculating all components of total expenditure as multiplies of the BMR has been adopted. The relationship of the calorie cost of a given level of physical activity to BMR will be affected by the nature of that activity

whether static and dynamic; by body weight, because of the different values of BMR per kg at different body weight; and by age, because of or age related changes in body weight and BMR (FAO/WHO/UNU, 1985). It is clear that additional more work of any person is needed on the relative costs of different tasks in relation to age, sex, and body weight.

Age of members of the household should be classified in different age ranges to calculate actual calorie need of any household. The aim in selecting these ranges is to reflect the physiological characteristics of men and women including the continual changes in the rate of growth, body composition, and physical activities and patterns of food intake. These changes are particularly rapid at 3 periods; infancy, adolescence and old age. The level of physical activity must clearly be considered in the detail when assessing calorie needs. Some physical activities are most important for the individual and community which can be considered as economic activities for their livelihoods. As an example Tharu farming community's household occupational task is agricultural works in their field.

A number of stages have attempted to assess the possibility of ethnic differences in BMR but these have failed to identify any differences that could not be related to the nutritional state or possibly to climatic conditions. Therefore, all studies have been incorporated into a single data base for developing the equation. As the demographic structure of different population varies, this will affect the nutritional requirements of the population concerned.

The calorie requirements range from 1,250 kilocalories per day for male children between the ages of 0 and 4 years old to 2,700 kilocalories per day for males between the ages of 15 and 19. To convert the physical quantities of household food

consumption from kilograms to kilocalories, a number of different food sources were used. All of the food sources have values for the specific caloric content.

2.11 Food security and its assessment methods

Food security is widely assessed at the macro level using indicators such as food availability, trade balance, per capita income and other socioeconomic indicators. However, these indicators do not adequately reveal the degree of food security at the household level. There are so many chaotic factors and multi-level constructs that make food security assessment as a complex phenomenon especially at household level.

There is no single indicator that best assesses household food security. One common indicator is household calorie adequacy (Habicht and Pelletier, 1990; Maxwell and Frankenberger, 1992; Maxwell, 1996; Chung *et al*., 1997). This assessment captures food sufficiency in terms of quantity but does not address the quality of the diet or issues of vulnerability or sustainable access. Some methods for food security assessments have been used consumption based measures of poverty and food security. The World Food Program (WFP) use this consumption based approach in conducting vulnerability and food security assessment. The major criticisms of this assessments that depends upon income or consumption based poverty lines are that they use single money metric indicator of poverty or food security, they are weak in underlying causes and they fail to account for socio economic dimensions of resource access (Hammer *et al.,* 1999). Several scholars have applied household's perception of its food security status for food security assessment. It does not provide insights into the causes of food insecurity or household strategies. Some of these assessments are highly qualitative using a

combination of key informants, focus groups and interviews which reveals in depth knowledge of local condition and participation behavior, but is not necessarily representative of the broader target groups. Some of other assessments are more quantitative and rely on the application of questionnaires but not the exclusion of informal techniques which is more costly and usually less rich in household condition information. Recently, some researchers have begun to apply both methods for food security and poverty assessment. Garrett and Downen (2000) mentions that quantitative tools can measure the severity of food security using specific indicators such as nutritional status while qualitative tools can measure the household conditions, behaviors and their priorities.

Operationally, FAO indicator is calculated from national energy balance sheets. These balance sheet estimates the total energy available for human consumption nationally by adding total energy produced plus energy imported plus the change in stock minus energy exported, energy wastage and energy used for other than human consumption. The National Planning Commission, Nepal has fixed minimum daily calorie requirements based on WHO guidelines, adjusted for climatic variations and demographic composition. In Nepal, Ministry of Agriculture and Cooperative and their line agencies assess food security with reference to cereal food grains. Food requirement of household is compared with household food availability at the rate of 191 kg per person per year edible cereal grain to assess degree of food security status of people. It does not represent different age ranges and sex categories of population who have different calorie requirement based on their age and sex groups.