

CHAPTER 2

A REVIEW OF CONCEPTS, THEORETICAL PERSPECTIVES AND EMPIRICAL EVIDENCES

2.1 INTRODUCTION

This chapter selectively reviews the concepts, the theoretical perspectives and empirical evidences, particularly in SSA, related to the main themes of the investigation. The emphasis of the chapter is on the possible courses of action that rural households and communities could pursue, i.e., rural livelihood strategies, at the local level to ensure their food security on a sustainable base in the context of growing population. Institutional and organisational factors, market conditions, technology and government policies, and socio-economic and socio-cultural factors conditioning livelihood strategies at the grassroots level thereby influencing human welfare and sustainability outcomes of rural livelihoods are equally given due attention.

The chapter starts by clarifying the concept of 'population pressure' in the next section as an organising concept that forms the context of the study. It then turns to a review of the theoretical and empirical literature on the alternative livelihood strategies of rural households in the context of population pressure. These include land use systems, rural livelihood diversification and demographic adjustments. This is followed by a brief discussion of the concept of 'food security' and its relation with rural livelihood strategies. It is assumed that the ultimate goal of the strategies pursued by rural households in SSA is to ensure their members permanent entitlement to sufficient food.

Following the discussion of the concept of food security, a synthesis of the literature review on the interactions between demography and rural livelihood strategies, and welfare and resource outcomes are presented. The next section develops a comprehensive framework for rural livelihoods analysis in the context of population pressure on the basis of the insights provided by the literature review. A summary of the key issues and the basic principles are presented in the final section of the

chapter. The insights gained from this chapter would inform the analyses of specific rural livelihood strategies in the subsequent chapters.

2.2 THE CONCEPT OF POPULATION PRESSURE

Though 'population pressure' is among the most frequently used concepts in the rural development literature, its clear definition is rarely given. Grigg (1980) reviewed the limited attempts made to define population pressure precisely by agricultural economists and identified the following three alternative definitions of what he calls 'overpopulation'.

The first definition is derived from the famous work of Malthus entitled 'An Essay on the Principles of Population' first published in 1798. According to this definition, overpopulation is said to exist when output per head declines and mortality level increases to the extent that population of the country in question ceases to grow. This definition is refuted due to its disregard for technological change and the assertion that a rise in per capita food production or income would necessarily lead to population growth and the re-creation of poverty.

The second alternative definition uses the concept of 'optimum population' (see also Nurkse, 1953). When the population of a given country is below the optimum level OP (Figure 2.1) that country cannot benefit from economies of scale. Specialisation is difficult, fixed overheads are divided among few people and some factors of production cannot be used at an economically optimum scale. At this stage, subsequent increase in population increases average product since marginal product is greater than the average product until the level OP is reached. As the population grows beyond OP, both average product and marginal product decline though total product still rise. In the optimum theory, therefore, a country with a population size of less than OP is said 'underpopulated' and a country with a population size of more than OP is said 'overpopulated'.

Although the 'optimum population' theory is conceptually appealing, its assumptions are unrealistic. It assumes all factors of production to be constant. It recognises neither the possibility of increasing area under cultivation through technological advances nor the possibility of change in the capital stock of a country.

Output

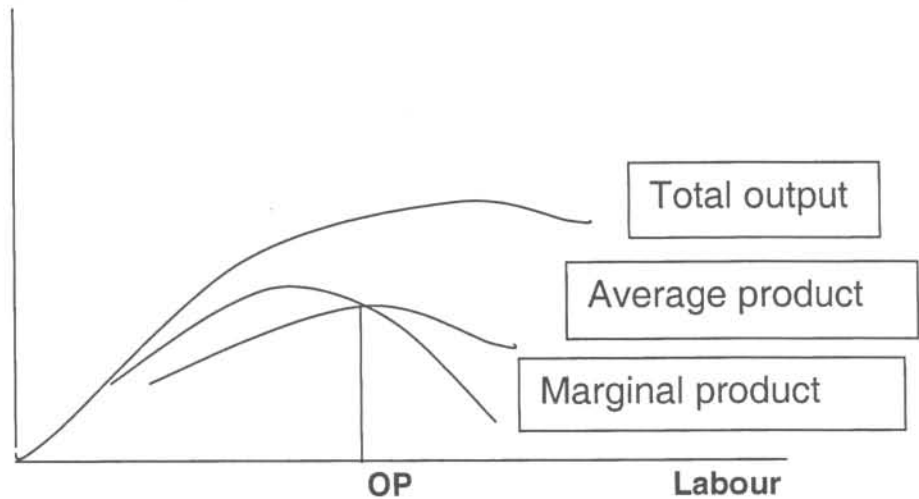


Figure 2.1: Labour force, output growth and 'optimum' population

The third definition related to the optimum population theory is the concept of the 'marginal productivity of labour'. Over population is said to occur when an additional unit of labour practically produces nothing, and rather reduces the total product. Many development economists believe that surplus labour exists in developing countries' agricultural sector and can be transferred to industry or service sectors without affecting the total agricultural product (Lewis, 1954; Fei and Ranis, 1961). However, this conclusion based on the common dualistic model (agriculture and urban non-agriculture) is misleading since it neglects the third sector, rural non-agricultural production (Grabowski, 1995).

According to Warriner (1964), overpopulation is said to exist in a country if wage rates fall due to faster growth of agricultural labour force relative to other resources, land and capital in particular. Although labour-based intensification could postpone unemployment where land is scarce, Warriner argues, the limit will soon reach in the absence of capital to augment the productivity of land, making the decline in output per head inevitable.

Limited attempts were also made to empirically measure population pressure in some countries. Two approaches were commonly used: the production approach and the consumption approach. The former approach starts with estimating the labour force required for agricultural activities of a given area and then compares this with the available actual labour force to assess the degree of unemployment and/or underemployment. The latter approach starts with establishing acceptable level of standard of living (or poverty line) either in terms of income or consumption. Then, it estimates the number of persons that can be supported by the available agricultural resource and technology at the living standard considered acceptable.

Binswanger and Pingali (1988, cited in Pingali, 1990) used the concept of 'agro climatic population density' as a standard population density measure: the number of people per million kilocalories (kcal) of production potential at a given technology level. They observed that this procedure dramatically changes the ranking order based on the commonly used simple population density (the number of persons per square kilometre of land/agricultural land).

'Population pressure index' was used in Nepal to empirically identify over-populated and under-populated districts (Shrestha *et al.*, 1999). The total rural population of each district, total land area of each district and the carrying capacity of each district were used to drive population pressure index (PPI). The carrying capacity of the districts was estimated based on gross value of district level outputs (crop, livestock and forestry) and national per capita income. Carrying capacity (P1) is equal to gross value of primary products divided by national per capita income. The value of the population pressure index can be negative, zero or positive to indicate underpopulation, optimum population or overpopulation, respectively. Population pressure index (PPI) per square kilometre of a rural area is defined as follows:

$$PPI = \frac{P - P1}{A}$$

where: P: is the total rural population of a district
P1: is the estimated number of rural inhabitant
in a district who can be supported
(carrying capacity of each district)
A: is the total land area of each district

Finally, the concept of 'minimum size' was used in the HHs (Adnew and Storck, 1991) to estimate the extent of population pressure. There are two alternative assumptions that could be used to determine the minimum size of agricultural land required by an average household to meet its minimum calories requirement, cash needs for basic goods and services, and limited investment (Haile Gebrial, 2000). These are: 1) level of income that can be generated given the actual activities in which the households engaged; and 2) calories that can be produced assuming all the available agricultural land are allocated to grain production. Adnew and Storck (1991) adopted the first assumption, which is in fact more realistic in the context of the HHs. Then, they concluded that two-third and three-fifth of the sample households cultivated less than the assumed minimum land size required for subsistence, respectively, under existed and assumed improvement in technology (10 % increase in yield).

Table 2.1: Comparison of actual average size and minimum size of cultivated land required (ha)

	E. Hararghe	W. Hararghe	East & West
Actual holding size per household	1.13	0.88	0.99
Actual holding size per adult equivalent	0.23	0.17	0.20
Minimum size required per AE	0.25	0.23	0.23
Percentage of holdings less than the minimum size	62.5%	76.9%	67.7%
Percentage of holdings less than minimum size under IT*	56.9%	68.7%	60.6%

* IT stands for improved technology Source: Adnew and Storck, 1991

According to Grigg (1980) both the production and consumption approaches have drawbacks to measure the extent of population pressure. The production approach neglects issue of land use, differences in quality of labour in terms of education and health status and peak season labour requirement in the context of rainfed agriculture. It is also possible that labour required to produce the essential non-market goods and services are neglected in the calculation. In the consumption approach, the standard of living considered 'adequate' is static and subjective and does not account for the status of income distribution.

Due to the practical limitations of both the production and consumption approaches, Grigg (1980) suggested the use of proxy indicators instead of attempting to measure population pressure quantitatively. The indirect indicators suggested by him are: level of landlessness, increased land rent or increased land related conflict where land market is 'thin' or 'missing', shortage of grazing land and increased intensity of land use. These symptoms of population pressure have been observed in the study area since the early 1980s as indicated in the introductory chapter.

To sum up, the sheer number of persons per square kilometre, the most frequently used simple population density, does not really tell anything important about the degree of population pressure in a country or a village. The other advanced methods based on the production or the consumption approach are not without problem too. Yet, we have to try to approximate the extent of population pressure for policy and monitoring purposes. The 'population pressure' concept is a relative and a dynamic concept the extent of which at a given point in time is determined by taking into account endowment of natural resource, human's capability, cropping systems and production technologies in use and alternative employment / income opportunities within and outside an area which are by themselves subject to change.

2.3 POPULATION PRESSURE AND CHANGE IN THE LAND USE SYSTEMS

The role of population growth in stimulating agricultural intensification, either labour or technology based, is now a solidly established fact (Boserup; 1965; Binswanger and Ruttan, 1978; Grigg, 1980; Hayami and Ruttan, 1985; Simon, 1986; Pingali, 1987; Tiffen *et al.*, 1994). The intensification of production system involves increased frequency of cultivation and increased use of labour and/or purchased input to the same piece of land. Increased subsistence requirement (Boserup, 1965) and changing factor price ratio (Hayami and Ruttan, 1985; Binswanger and Ruttan, 1978) are the fundamental mechanisms through which population pressure stimulates intensification process. Governments' deliberate policy interventions may also induce intensification process (Lele and Stone, 1989).

The population growth and concomitant increase in subsistence requirement necessitates a shift from an extensive farming such as the long fallow to the short fallow and finally to the annual cultivation system (Boserup, 1965; Pingali, 1987). At

an early stage of development, land is abundant and labour is scarce, thus favouring extensification that uses less labour, and perhaps less capital. This situation would be reversed with population growth; labour becomes abundant and land becomes scarce encouraging the substitution of the abundant factor (labour) for the scarce factor (land) (Binswanger and Ruttan, 1978; Hayami and Ruttan, 1985), and/or bringing previously uncultivated land under cultivation through more investment in drainage, terracing, etc..

As the labour-based intensification process is intensified the law of diminishing marginal return starts to operate. The return to labour starts to decline requiring long hours work to maintain per capita food production (Boserup, 1965). Eventually, a stage is reached where fallowing and crop rotation as traditional soil fertility maintenance practices are substantially reduced or totally cease to exist. This would lead to 'soil mining' and decline in per capita output unless significant investment is made in drainage, terracing and most importantly in soil fertility maintenance. At this stage, the increasing shortage of grazing land would reduce livestock population and the quantity of manure available for fertilisation, making the substitution of inorganic fertilisers for organic fertilisers a feasible option.

The population growth could also induce institutional innovations like a movement towards a better-defined property rights (National Research Council, 1986). This could, in turn, bring about land tenure security and encourages investment in soil conservation. However, population pressure is not the only factor that could stimulate intensification. Access to the market does play an important role (Pingali, 1990; Smith et al., 1994). Improved access to the market through improved road networks and communication reduces marketing costs and increases producer prices. Improved access to the export market and higher prices provide an incentive to increase the production of cash crops. Intensification could be achieved by using purchased inputs that augment land productivity.

The total reliance on market incentives may not be sufficient for sustainable intensification of smallholder farms. The availability of external technologies appropriate to the local agro climate and socio-economic situations and improved

smallholder farmers' access to them would be needed to accelerate the intensification process. The government can play a significant role to encourage shifts to the production of higher-yielding and high-value crops. This can be achieved through investment in technology generation and dissemination systems, market infrastructure and through provision of credit service including the 'judicious' use of subsidies. This process has been termed as 'policy-led intensification' (Lele and Stone, 1989).

Employment and income diversification reduces risks associated with innovation and encourages adoption of improved technologies (Grabowski, 1995). Non-farm income can be invested in agriculture (a substitute for formal credit) or may serve as a collateral to facilitate access to credit to accelerate the intensification process (Reardon, Crawford and Kelly, 1994) in circumstances where the insurance and credit markets are 'thin' or 'missing'. However, Low (1986) claims that the availability of higher paying wage employment opportunities and the availability of cheap market consumer goods have contributed to the migration of the male, young and relatively educated members of the indigenous farm households in the southern Africa's settings. This, Low argues, denied the critical labour needed for intensification and commercialisation of the subsistence sector in southern Africa. Whether Low's finding has any relevance to explain agricultural stagnation in the other SSA countries, Ethiopia in particular, is however debatable. It is equally true that factors that increase the return to time spent on farm activities would tend to reduce the motivation to migrate (Demeke, 1996).

A number of empirical studies in SSA have confirmed that declining farm size under population pressure could encourage sustainable intensification (Ramaswamy and Sanders, 1992; Tiffen *et al.*, 1994; Abdoulaye and Lowenberg-DeBoer, 2000; Gray and Kevane, 2001). Nonetheless, these studies reiterated that rural households should have access to external technologies, be well connected to the market under improved transport and communication, be guaranteed land tenure security, and have access to institutional credit for sustainable intensification of smallholder farms to accompany the increasing population pressure in SSA. For instance, one of the recent studies used a panel data in the Mechakos District of Kenya to empirically establish that proximity to urban centres and profit from coffee boom of the 1970s

were as important as higher population density for the smallholder farm transition to productive and sustainable land use practices (Zaal and Oostendorp, 2002).

2.4 POPULATION PRESSURE AND RURAL LIVELIHOOD DIVERSIFICATION

Studies of the rural off-farm/non-farm activities are usually pursued along rural industrialisation, rural labour market and rural livelihoods (Bryceson, 1993, cited in Demeke, 1996). The literature on the rural off-farm/non-farm is vast and touches upon a number of issues such as the function of the rural labour market, farm-non-farm linkages, non-farm and income distribution, demand for and supply of rural non-farm products, whether the rural non-farm persists with development. This section limits itself only to a brief review of the literature related to rural livelihood strategies.

With population growth, labour becomes abundant and agricultural land becomes small in size and fragmented at inheritance making income from farming inadequate for subsistence. Rural households would then like to shift a portion of their labour to off-farm/non-farm activities where the marginal productivity of labour is positive (Grabowski, 1995). This strategy is termed 'livelihood diversification'. According to Ellis (1998), livelihood diversification is more than activity and income diversification. It includes property right, social and kinship network and access to institutional support. *“Livelihood diversification is the process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and to improve standard of living”*. Ellis (1998:1)

The literature argues that livelihood diversification has become a common livelihood strategy among rural households in SSA (von Braun and Pandya-Lorchh, 1992; Reardon *et al.*, 1992; Lipton *et al.*, 1996; Dercon and Kirshnan, 1996; Reardon, 1997; Ellis, 1998; Ashley and Carney, 1999; Reardon *et al.*, 2000; Ellis, 2000). The available empirical evidence further indicates that activity and income diversification is central to rural livelihoods in SSA (Barrett, Reardon and Webb, 2001) and off-farm and non-farm employment already accounts for 40% to 45% of average income of African rural households with increasing importance over-time (Bryceson and Jamal, 1997; Reardon, 1997). An increasing number of rural households in SSA allocate part of their labour and the other livelihood assets to different off-farm and non-farm activities (Reardon, 1997) including:

- a) employment in the rural non-farm labour market;
- b) self-employment in the local non-farm sector;
- c) employment in the migration labour market; and
- d) employment in the farm labour market.

Land scarcity is not necessarily the only reason for rural livelihood diversification. Different households pursue diversification strategy for various reasons. An excellent review of the determinants of income diversification in SSA is found in Reardon (1997) and the most recent one in Ellis (2000a). Ellis summarises reasons for livelihood diversification as seasonality, risk strategy, as response to labour and credit market failure, asset strategies and coping behaviour and adaptation. Although Dercon and Kirshnan (1996) acknowledge the role of risk behaviour in diversification decision, they argue that comparative advantage of rural households in terms of resource and skill endowment has more explanatory power. Barrett and Reardon (2000) found that inter-and-intra household diversity in activity and income source is caused by heterogeneity in endowment of resource and skill lending support to the Dercon and Kirshnan's proposition.

In short, livelihood diversification could come from necessity or choice (Ellis, 2000a) or push and pull factors (Barrett and Reardon, 2000b) or practiced as an asset accumulation strategy or coping mechanism. Some households engage in off-farm and/or non-farm because it is a lucrative activity and others drawn into it because they have little choice (Barrett *et al.*, 2000a). The latter is considered as a 'symptom of poverty', while the former is a desirable outcome of agricultural growth (von Braun, 1990). For Ellis (2000a) livelihood diversification is a survival strategy for most of rural households in precarious economic environment of SSA that makes difference to rural life and hence should receive policy support. In his own words:

“ Livelihood diversification is a pervasive and enduring characteristic of rural survival, reflecting the continuing vulnerability of rural livelihoods. The task of policy is to facilitate rather than inhibit diversity, by improving mobility, providing information, reducing entry barriers, and dismantling controls on private smallscale activities. Diverse livelihood systems are less vulnerable than undiversified ones” (Ellis, 2000a: 298-299)

Whatever the motives behind, we have recently witnessed a growing interest among policy analysts and policymakers in developing countries in rural livelihood diversification. Lanjouw and Lanjouw (2000) have summarised reasons for the renewed interest in the sector from the perspective of national economic interest as follows:

- The sector's perceived potential in absorbing a growing rural labour force and slowing rural-urban migration given limit to arable land.
- Even if the sector does not generate very high labour income, in an environment with seasonal or permanent underemployment, any utilisation of labour can contribute to rising total income.
- The rural off-farm/non-farm sector's distributional role given the high transaction costs involved in taxes and transfers
 - a) given that the sector produces lower quality goods and services more heavily consumed by the poor, good health of this sector has indirect distributional benefits via lowering prices to the poor;
 - b) it is a source of employment for the landless and the near-landless who cannot find sustenance in agriculture;
 - c) diversification into off-farm and non-farm activities is a way of smoothing income and consumption over years and seasons for people with limited risk coping mechanism in terms of saving/credit or insurance; and finally
 - d) growth in the sector can result in a tightened agricultural labour market, rising wages and/or reducing underemployment

2.5 POPULATION PRESSURE AND RURAL DEMOGRAPHIC BEHAVIOUR

Historically, deliberate or spontaneous demographic adjustment had been among the strategies used by agrarian societies of Western Europe in advent of fast population growth and declining arable land size cultivated by households. Demographic adjustment was used in situations where technological advance was inadequate to synchronise growth in food production with the population growth (Grigg, 1980). In this regard, migration and fertility are the two prominent demographic phenomena.

Migration refers to the movement of people in space that may result in change of the place of residence (Oucho and Gould, 1993). The nomadic pastoralists move from

place to place seasonally in search of better pasture and water for their livestock. Farmers may move from densely populated areas to sparsely populated high potential areas as long as the freedom of movement is not restricted by physical, socio-economic or political factors. There are cases where some governments of SSA, Ethiopia for example, made deliberate attempts to resettle people from high density and degraded area to low density area with better agricultural land or vice versa.

Rural – urban migration caused by land shortage and poverty is the most common in SSA. Inequality can be another cause for rural-urban migration. For example, land reform in Iran pushed out those who lost access to land and pulled out those who received land to cities (Mohtadi, 1990). The availability of lucrative non-farm employment opportunities in towns can also act as an incentive for rural-urban migration (Low, 1986).

Rural-urban migration often involves part of members of rural households and creates the phenomena of 'one household, two families' (Weisner, 1972 cited in Oucho and Gould, 1993). Those who migrate usually remit part of the income generated from migratory employment in order to keep family ties and ensure that they are accepted should they return to the homeland (Oucho and Gould, 1993). Rural – urban migration of this type is one of the most common ways of rural livelihood diversification in developing countries (Ellis, 2000a). This type of diversification strategy makes larger family size advantages as it provides enough labour both for diversification into non-farm activities and agricultural tasks where households heavily depend on their own labour supply as witnessed by experience in southern Africa (Low, 1986; Toulmin, 1992, cited in Reardon *et al.*, 2000)

In Western Europe, delayed marriage and the proportion of adults remained unmarried had been a more important demographic adjustment to population pressure than fertility control (Grigg, 1980; Foote, Hill *et al.*, 1993). Rules of family formation in North – Western Europe required the accumulation of property before a person could marry and establish a new family which took too long time during the time of hardship thereby delaying and, in some cases, discouraging marriage (McNicoll and Cain, 1990). The experience of Asia and SSA is different from that of

Western Europe. The joint family system in Asia and the lineage system in SSA encourage early marriage by allowing the accommodation of newly married couples within the existing households (McNicoll and Cain, 1990).

Family size reduction through fertility control within marriage is the other most important aspect of demographic adjustment in the context of population pressure. Theoretically, the diminishing cultivated land size leads to reduction in demand for children labour. However, whether rural households in SSA are willing to control fertility in response to the increasing population pressure and deepening poverty is doubtful. While the mortality rate of children has dramatically declined as a result of improved access to health service, the empirical evidence indicates that fertility rates remain higher in most of the SSA countries (Dasgupta, 2000). As a result, some go to the extent of arguing that mortality and fertility are isolated from economic reality in the SSA (Bengtsson and Gunnarsson, 1994).

A host of socio-cultural and socio-economic factors are contributing to the SSA's paradox. Cultural factors that are heavily influenced by religious belief system encourage and reward higher fertility (Cadwell and Cadwell, 1987). Economically, African parents receive a number of economic benefits from reproduction. Children in Africa are important source of labour during their childhood, a source of support during old age, a substitute for a well-functioning capital and insurance markets or government pension plan (Foote, Hill *et al.*, 1994). Uncertain land rights, as is the case in Ethiopia, may limit the function of land as insurance, biasing households' decisions in favour of large family size (Devany and Sanchez, 1977, cited in Kirsten and Kirsten, 2000). In a situation where there is no effective land policy, large family size is a crucial instrument to convert open-access resource into private property through 'capturing' (Panayotou, 1994).

In addition, cash remittance from children who enter the urban sector can help reduce rural poverty (Bengtsson and Gunnarsson, 1994). Children are means of diversifying skills and social ties that help rural households deal with economic and political hardships (Bledsoe, 1994). Further, the fact that children are considered as the common property of extended families, and the cost of raising them is shared through social networks contribute to the unwillingness of the society to control

fertility in SSA (Bledsoe, 1994). The cost-sharing practice and conformity to accepted norms with regard to the desired family size create externalities in reproductive choice (Dasgupta, 2000).

Last, but not least, due to gender inequality in decision making husband makes fertility decision and may benefit more from children's labour service while the wife shoulders the burden of childbearing and rearing. This situation influences fertility decisions of African households. A high level of gender equity is generally considered as a necessary condition for fertility decline. However, MacDonald (2000), after making distinction between what he calls 'individual-oriented social institutions' and 'family-oriented social institutions', argues that achievement of gender equity in the former and persistence of gender inequity in the latter have resulted in lower fertility rates in developed countries. In other words, retaining gender inequity in the family-oriented institutions encourages rather than discouraging fertility decline.

Nevertheless, as females' education level and their rate of participation in the labour market increase through economic growth and development, fertility tends to decrease as a result of increased value of females' time (Willis, 1994). The expansion of modern education could, however, affect fertility decline negatively in some SSA countries where it leads to the erosion of traditional taboos against premarital sexual practice, immediate (before 3 years) postpartum female sexual practice and a failure to practice total abstinence once a woman has become a grandmother (Dasgupta, 2000). Consumer theory similarly suggests that parents tend to forego quantity for quality as their level of income increases in much the same way as higher income encourages consumers to shift from inferior goods to more expensive goods instead of having more of the same inferior goods (Becker, 1960 cited in Willis, 1994).

Development projects could also induce couples preference for a higher living standard to larger families (Booth and Sundrum, 1984, cited in Lipton, 1990). In a study of economic factors affecting fertility in developing areas of South Africa, Fairlamb (1990) confirmed that mothers respond to economic and social constraints by adjusting fertility to opportunities cost and social benefits of children, and concluded that providing services that parents get from their children such as

drinking water, electricity and better access to pension and social security investment combined with compulsory schooling could reduce demand for children. Rural development project could also induce fertility decline by reducing child mortality through better health and nutrition as both are positively related (Maglad, 1994).

The initial findings of a multi-country (India, South Africa and Botswana) research project seems to point to the possibility of fertility reduction and lessened population pressure on soil and water resources through the redistribution of agricultural land and other assets in favour of the rural poor and increased efficiency in resource use (Rwelamira *et al.*, 2001). An extensive and critical review of the empirical studies in this area similarly concluded that as rural income increases through redistribution of resources and/or efficient use of available resources, family size approximately follows an inverted u-shape, i.e., first rises and then falls (Kirsten and Kirsten, 2000). The reason is that improvement in the living situation, particularly nutrition, increases natural fertility and reduces child mortality in the short-run. Effective demand for fertility control can only be created in the long-run when sustained effort is made to reduce child mortality and to increase females' level of education and rate of participation in the labour market (Lipton, 1990).

Finally, the role of family planning program in inducing fertility transition should not be overlooked. Increased contraceptive use through effective family planning program adopted and pursued at higher levels of government played a key role in accelerating fertility decline in poorest countries such as Bangladesh amidst high child mortality rate (Cleland *et al.*, 1994, cited in Caldwell, 1999).

Both the theoretical arguments and empirical works show that social development policies can effectively be engineered to decrease the demand for children and increase the costs of rearing children and thereby induce fertility transition that facilitates the desired demographic transition in SSA to reduce pressure on soil, water, pasture and forest resource. Demographic transition gives Africans a 'breathing space' to accumulate capital needed for commercialisation of agricultural production and development of industrial and service sectors, i.e., structural transformation of the economy, to use the jargon of development economics.

2.6 RURAL LIVELIHOOD STRATEGIES AND ENTITLEMENT TO FOOD

In this study, it is assumed that the ultimate goal of a rural household's livelihood strategy is primarily to ensure food security of its members. Food security at a household level is defined as *a permanent access of households to nutritionally adequate food for active and healthy life* (World Bank, 1986: 1). A household's food security is said ensured when everyone has access to food, the access is permanent and the amount is adequate or meets the minimum nutrition requirement of all members. This means that food security at household level does not automatically translate into food and nutritional security for all members of the household unless equality of intra-household allocation of food is ensured and individuals have the ability to take enough food and convert it into energy. Conversely, food insecurity at household level refers to either a household's temporary failure to acquire enough food (transitory food insecurity) or permanent failure to acquire enough food (chronic food insecurity) or cyclical food shortage (cyclical food insecurity) caused by factors such as weather (Maxwell and Frankenberger, 1992).

If ensuring food security of members is accepted as the ultimate goal of livelihood strategies of a rural household, it is then logical to assess success and failure of livelihood strategies of a given rural household in terms of its contribution to the household's income and food consumption on a sustainable basis. Food security is not necessarily the same as food self-sufficiency (Sen, 1981). Intensification of subsistence crop production enhances households' direct entitlement to food while cash crop production and livelihood diversification enhance households' income-based entitlement to food. Revenue generated from cash crop sales can, however, enhance households' direct entitlement to food if it is reinvested in farming and used for external input based intensification of subsistence crop production.

Rural households' livelihood strategies and food security are not only affected by households' human and non-human resource endowments, but also by the physical, social and policy environment (Hoddinott, 2001). Physical environment determines the ranges of economically viable livelihood options. Social networks determine households' access to crucial livelihood assets, the ranges of livelihood options and access to social insurance during the time of hardship. Besides, effectiveness of popular participation, collective action and benefit sharing are affected by local social

dynamics. The food security of households is further influenced by government policies such as land, marketing and pricing policies. Risks such as natural risk (e.g. drought), market risk (e.g. price), risk caused by action of the state (e.g. removal of input subsidies) and social risk (e.g. conflict) affect households' food security and can limit the sustainability of rural livelihoods. An increase in the level of adversity and frequency of occurrence of these risks could gradually lead to the erosion of livelihood assets that would, in turn, lead to reduced resilience of rural livelihoods to seasonal and cyclical shocks.

Rural households could pursue livelihood strategies that are effective both in addressing food security and ensuring the sustainability of NRM. Alternatively, rural households' food security strategies could undermine the sustainability of NRM and exacerbate the poverty-degradation cycle. Rural livelihood strategies, food security and the sustainability of NRM are inextricable phenomena in agrarian societies such as Ethiopia. Hence, they should be looked into simultaneously, not despite the complexity involved.

2.7 POPULATION, RURAL LIVELIHOODS AND SUSTAINABILITY: A SYNTHESIS

Understanding the HHs rural households' livelihood strategies in the context of population pressure and determining human welfare outcome and highlighting sustainability implications of livelihood strategies pursued by households are the essential tasks of this investigation. In this study, sustainability refers to the use of soil, water, pasture and forest resource in a way that enhances or at least maintains their quantity as well as quality in the long-term. As a summary of review of the literature, a simple schematic representation of the processes through which population pressure and rural livelihood strategies could be positively related to sustainable natural resource management is developed and presented (Figure 2.2).

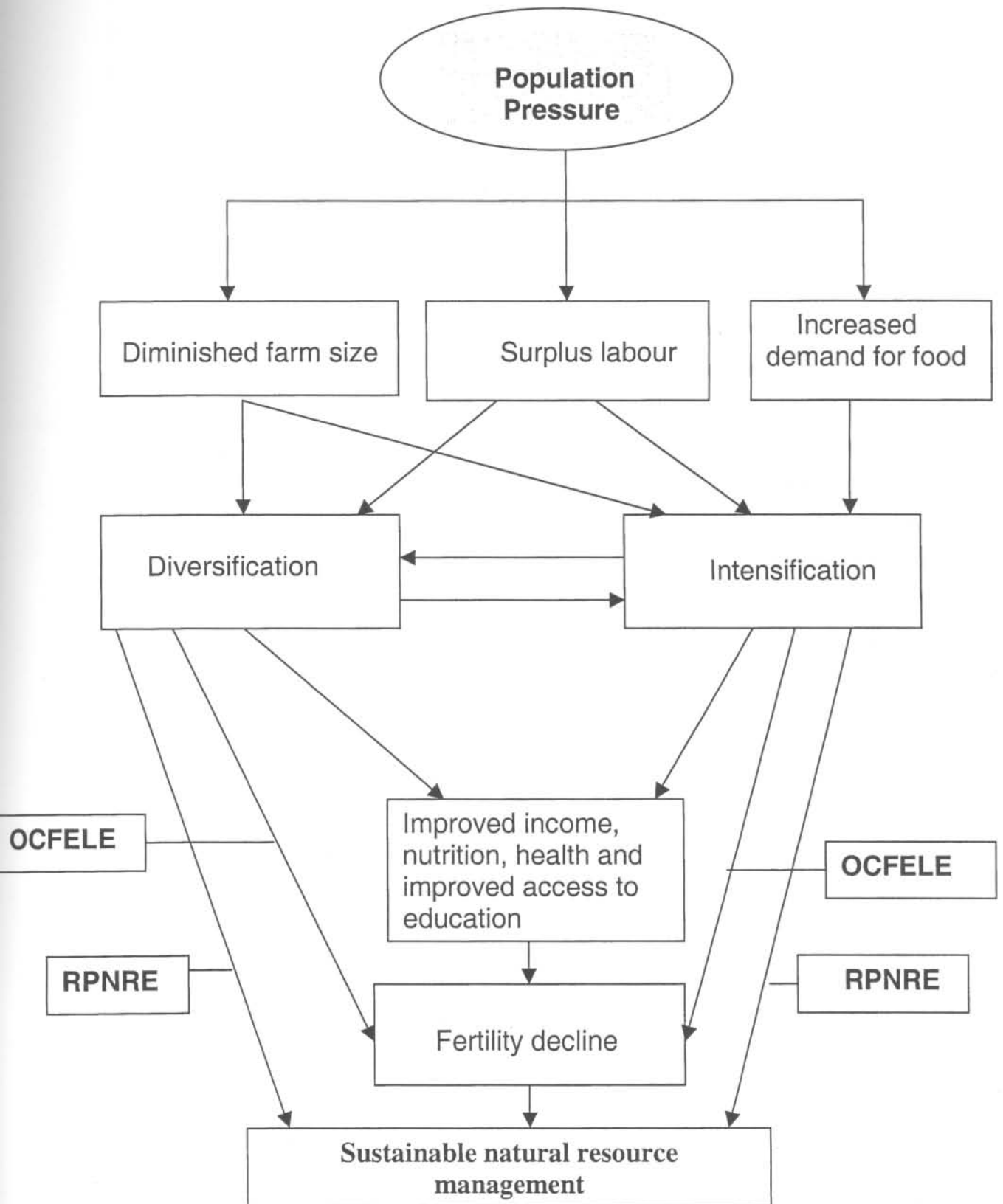


Figure: 2.2: Positive effect of population pressure on rural livelihood and natural resource.

Population pressure leads to the intensification of production system through increased demand for food - Boserup effect (Boserup, 1965), and/or change in factor price ratio- Hayami, Ruttan and Binswanger effect (Binswanger and Ruttan, 1978; Hayami and Ruttan, 1985) and also through deliberate government intervention called policy-led intensification (Lele and Stone, 1989). Diminished farm size and concomitant decline in return to labour in farming under population pressure may encourage rural households to diversify their livelihoods in order to ensure their food security (Grabowski, 1995).

Intensification and diversification are related to each other in a complex and dynamic way. They are not only competing with each other for resources but also complement each other in a number of ways. The existence of high wage employment opportunities in the non-agricultural sectors along side subsistence agriculture, as in southern Africa (Low, 1986), could attract quality labour from rural area to the detriment of the latter. Conversely, high return to labour in farming as a result of increased productivity and favourable pricing policy discourages diversification into off-farm and non-farm activities (Demeke, 1996).

The intensification of production system stimulates rural non-farm production through forward, backward and consumption linkages (Haggblade, Hazell and Brown, 1987). Linkages could also run from the rural non-farm to agriculture. Rains identified three such linkages: demand, supply and motivation related (Rains, 1990, cited in Grabowski, 1995). The expansion of rural non-farm activities increase the demand for farm output, supply inputs needed for agricultural intensification and availability of non-farm goods, in turn, motivates farmers to increase production to raise cash needed to purchase the newly available consumer goods. Non-farm income can be invested in agriculture (a substitute for formal credit) or used as a collateral to facilitate access to credit that accelerates the intensification process (Reardon, Crawford and Kelly, 1994). Livelihood diversification reduces risks associated with innovation encouraging adoption of improved technologies (Grabowski, 1995).

Successful intensification and diversification could together lead to improvement in the households' level of income, nutrition, health and access to education. This, in turn, leads to fertility decline through improved access to information, delayed

marriage, decreased child mortality and increased opportunities cost of female labour (opportunities cost of female labour effect (OCFELE). Technological progress increases productivity of land, decreasing the size of land required for subsistence production and releasing land for high-value crops production. The increased productivity as a result of technological progress reduces the pressure on the soil and water resource (reduced pressure on natural resource effect (RPNRE)) and shifts to the production of high-value crops provide resources for investment in soil conservation. When diversification involves rural-urban migration or participation in non-natural resource based non-farm activities such as trade, it also takes some pressure off the natural resource (RPNRE). Finally, the fertility decline coupled with reduced pressure on the natural resource could potentially lead to sustainable use of soil, water, forest and pasture resource.

Nevertheless, the flow diagram (Figure 2.2) depicts only the optimistic view. No such a simple and straightforward relationship exists between demographic change, human welfare and the quality of NRM as implications of demographics for human welfare and the natural resource management are more complex and influenced by a host of policy, institutional, technological and agro climatic factors. These so-called “mediating” or “conditioning” factors, superimposed on the interaction, ultimately dictate the cumulative effect of the complex interaction, be it positive or negative and hence, deserve careful deliberation.

First, there is a need for land tenure security in order to induce sustainable intensification of smallholder production system. Land tenure and land use policy determine the behaviour of people in using the natural resource. Land ownership security on its part has significant impact on land value, investment, input use, and output (Reyna and Downs, 1988 cited in Adal, 1999), and even influences fertility decisions as mentioned earlier. According to economic theory, land tenure security creates an incentive to invest in conservation and land improvement because people are assured of reaping the benefits. Land tenure security is said to improve access to institutional credit required for investment in land conservation and improvement through its function as collateral especially for medium-and long-term loans. Land tenure security and ownership title are believed to reduce asymmetric information

about land ownership and quality and thereby land transaction costs (Deininger and Binswanger, 1999). This then leads to an efficient allocation of resource by facilitating the land market that encourages transfer of land from the less efficient to the more efficient users.

Feder and Onchan (1987) found that in Thailand farmers with secured access to land received a significantly higher amount of institutional credit; the probability of investing in land improvement is significantly higher on titled plot; and possession of land title is related to higher capital formation and higher capital land ratio. Similarly, Moor and Nieuwoudt (1998) confirmed, in their study of Zimbabwe, that farmers with more exclusive and assured property right to land are more likely to invest in land improvement and complementary inputs; and productivity and gross income is higher on farms with more secure access to land in the southern African context.

However, Gray and Kevane (2001) claimed that in Southwestern Burkina Faso investment is used both as 'a soil-building and 'a tenure-building strategy' in the context of population pressure and increasing uncertainty in land right. Brasselle *et al.* (2002) provided additional empirical evidence that the causality could run from investment to tenure security and also argue that basic use rights are sufficient to induce farmers to make land-specific investment without necessitating their holding of many transfer rights based on their work in Burkina Faso.

Equally important is that land tenure security should not necessarily be equated with the private ownership of land. The fact that communal land tenure systems in most part of SSA are flexible, dynamic, and guarantee more security than the conventional wisdom derived from experience of the Western Europe persuades us to believe (Rukuni, 2002). Customary tenure rights could evolve towards more inalienable individual right under demographic pressure and increasing commercialisation of agriculture (Bruce *et al.*, 1993). Superimposing alien land tenure systems without the sufficient understanding of the indigenous ones has created more insecurity and alienation of certain groups, such as women, from the land over which they had traditional use rights in many countries (see Brautigam, 1992 for the case of The Gambia and Sierra Leone).

In the second place, unlike in the past, Boserup's autonomous technical innovation solely based on market incentives is no longer sufficient to prevent the Malthusian crisis to happen in SSA at the current rate of population growth and growing land scarcity. The experience of some SSA countries with growing population pressure without gains in agricultural productivity has demonstrated the insufficiency of Boserup's type response. Lele and Stone (1989) showed that per capita food production growth rate coincided with population growth rate in SSA in countries where governments made heavy investment in research, extension and infrastructure. The labour-based and 'capital-deficient' intensification will ultimately lead to a diminishing return per unit of successive labour input and 'soil mining' unless supplemented by technology and capital to augment land productivity.

Indeed the development of the modern public agricultural research and extension system is a demand-driven institutional innovation in the context of population pressure (Binswanger and Ruttan. 1978) to achieve a quantum leap in the increase of production and productivity. It was this successful institutional innovation and the technologies generated and disseminated by the research and extension systems that freed hundreds of millions of people from poverty (IFAD, 2001). Nonetheless, the mere existence of research and extension system cannot guarantee desirable benefit. Research and extension organisations should have organisational capacity, technical capability and right attitude to respond to the complex and changing needs of smallholder farmers. A sustained political support is paramount important since research and extension system cannot deliver the expected results overnight. For example, it took almost hundred years for the US research and extension to develop and make significant impact on agricultural production and productivity (Borlaug, 1988). However, the time required for developing agricultural technologies like improved cultivars could be reduced substantially with the advent of biotechnology in the new millennium.

Thirdly, an improved access to the markets must be ensured to reduce marketing costs and increase producers' prices that act as an incentive to increase production through sustainable intensification. Improved rural infrastructure increases adoption of improved technologies, productivity, wage and income. In Bangladesh, improved rural infrastructure increased agricultural production by 32%, households' income by

about 33 % and wage income by 92 % (Ahemed, 1994). In Malawi, the higher percentage of farmers near main roads used oxen, fertilisers, and ploughs compared to farmers farther a way from main roads (Devres International, 1980 cited in Ahmed, 1994). In Africa, villages with better infrastructure had fertilisers cost 14 % lower, wage 12 % higher and crop production 32 % higher than villages with poor infrastructure (IFPRI, 1990 cited in IFAD, 2001). In addition, reducing transport costs could improve food security status of rural households by reducing costs of obtaining consumption goods including food (Hoddinott, 2001).

Rural roads encourage diversification in villages' economies by opening up markets for labour, artisan products and agricultural produces (IFAD, 2001). In Tigray, northern Ethiopia, rural roads development had contributed to the commercialisation of agricultural production, reduced burning of dung fuel, increased yields and increased food availability, and improvement in the quality of grazing land and water (Jabbar *et al.*, 2000).

Last, but not least, rural development strategies of governments have a significant role in converting population pressure to positive outcomes. Sustainable intensification of smallholder farming must be supported deliberately and on a sustained basis through improved access to inputs, credit and favourable pricing policy (Lele and Stones, 1989). Also very important, deliberate and sustained effort must be made to improve women's decision-making power and their access to education, productive employment, health and family planning service in order to create demand for limiting births within marriage and accelerate the urgently needed demographic transition in SSA.

2.8 A FRAMEWORK FOR ANALYSING RURAL LIVELIHOOD STRATEGIES IN THE CONTEXT OF POPULATION PRESSURE

Analysing livelihood behaviours of rural households and the underlying causes of their behaviour is a daunting task. A framework is needed to break the complex human behaviour into its constituent parts so that the human mind can effectively and systematically deal with it. It is the analytical framework that guides the investigation, which should determine the nature of data required, and the method of

acquiring the necessary data. An analytical framework also serves as a 'lens' through which a researcher looks into and interprets behaviours.

As indicated earlier, the population and development literature predicts a regressive as well as a progressive role of rural population growth. The role of institutional arrangements in mediating the interaction between demography and rural development is equally emphasised. The empirical literature further claims that welfare and resource outcome of rural population growth vary across countries, in different agrarian systems and among different households. Moreover, rural livelihoods involve a number of activities, other than farming. Rural livelihood strategies encompass different economic activities including diversification into off-farm/non-farm, investment strategies, reproductive choice, choice of place of work and residence (migration).

A number of alternative conceptual and analytical frameworks to analyse rural livelihoods in general and the effect of population growth in particular have been suggested in the literature. Nevertheless, the frameworks either concentrated on agriculture and natural resources and do not explicitly account for the possibility of diversification into off-farm/non-farm or neglect the importance of demographic adjustments such as delayed marriage, fertility control within marriage and migration (e.g. Templeton and Scherr, 1997).

The only exception to the above is probably the 'sustainable rural livelihood framework' suggested by the Department for International Development (DFID, 1999) and subsequently improved by Ellis (2000). However, the framework is static, de-emphasises permanent migration; and neither the analytical framework nor the empirical analysis does include fertility behaviour as an aspect of rural livelihood strategies despite the inclusion of 'reproductive choice' in the definition of rural livelihood strategies. Furthermore, if application of the SRLF is attempted in the research context without any adaptation, it makes the research agenda open-ended and the research costly and unmanageable. The theoretical background and analytical skills required to understand all aspects of rural life simultaneously is such that it likely results in superficial analysis and violates the principle of 'optimal ignorance'. A package of policy recommendations without means for prioritising and

sequencing them is also the likely outcome of research guided by such an open-ended framework.

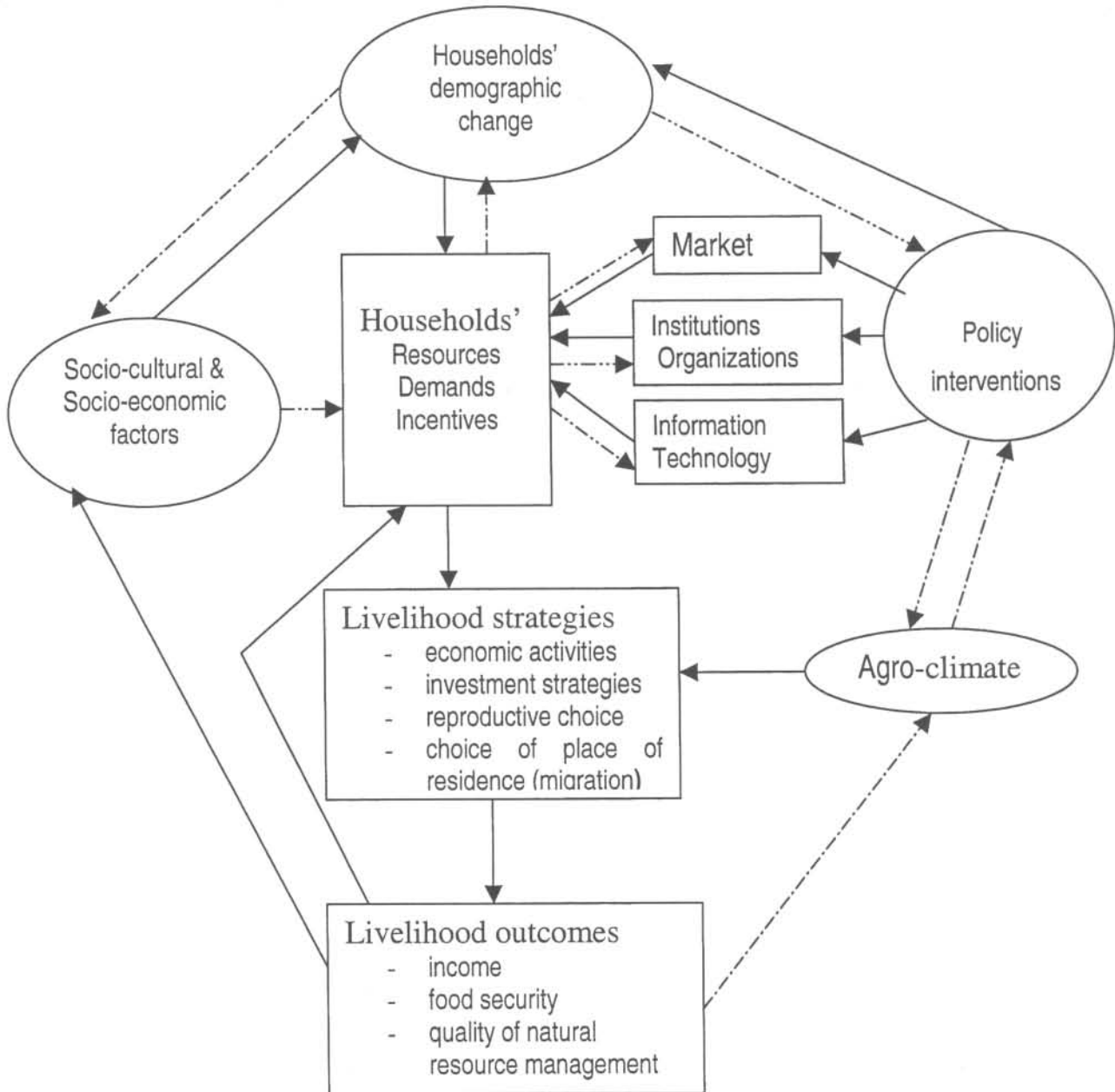


Figure 2.3: A framework for analysing rural livelihood strategies in the context of population pressure.

There is thus a need for a specific, but comprehensive framework that can accommodate all the contesting paradigms and all aspects of rural livelihood strategies under demographic pressure. This alternative framework must explicitly account for the macro and micro socio-economic factors that influence households' livelihood behaviour at the grassroots level and shouldn't assume the final outcome a priori. Despite their shortcomings, the rural livelihood framework (Scoones, 1998; Ashley and Carney, 1999; Ellis, 2000), the microeconomic conceptual framework for hilly land management (Templeton and Scherr, 1997) and the framework suggested by von Braun *et al.* (1991) to analyse commercialisation of agriculture under population growth have informed the current framework (Figure 2.3). The latter has the following 'unique' characteristics that make it more relevant and appropriate for the purpose of this research:

- it does not assume the welfare and resource outcome of rural livelihood strategies a priori; hence it embraces all the contesting paradigms;
- it is a comprehensive framework, i.e., it accommodates all aspects of rural livelihood strategies (farming, non-farm, reproductive choice and migration). It is also comprehensive in a sense that it accounts for all the so-called 'mediating' or 'conditioning' factors; and
- it is dynamic as, for example, shown by the feed back mechanisms.
- further, the framework can be applied at household or higher level and it can even be used for analysing the effects of rural depopulation as well.

2.9 SUMMARY AND CONCLUSION

Rural households pursue different livelihood strategies to ensure food security of their members in the circumstance of diminishing availability of agricultural land under population pressure. Agricultural strategies could include cropland expansion, labour-based intensification and capital and technology based intensification. Rural livelihoods may also involve employment and income diversification through temporary and seasonal migration, wage labour, crafts and trades. Delayed marriage, migration and an attempt to control fertility through limitation of births within marriage constitute another aspects of rural livelihood strategies.

Whilst most livelihood decisions, including land use, employment and income diversification and, migration and reproductive choices are made at household or

community level, they are influenced by macro level factors – institutions, national policy, organisations, social relations and agro-climate. It is only when we have a better grasp of these ‘mediating’ or ‘conditioning’ factors that we can be able to understand and explain local livelihoods behaviour and association, if not causation, between rural demographics, welfare and the quality of NRM.

Local livelihood strategies may be effective to improve food security status of rural households on a sustainable base or the strategies households pursue may focus on the satisfaction of their immediate needs at the expense of natural resources, the very base of their livelihood, risking both the long-term sustainability of NRM and their own livelihoods. Rural livelihood strategies, food security and the sustainability of NRM are inextricable phenomena in agrarian societies such as Ethiopia. Hence, they should be looked into simultaneously. The suggested comprehensive framework for analysing rural livelihoods in the context of population pressure would help to investigate the complex livelihood behaviours and the underlying causes in an effective and a systematic way.