

V. Lessons from Past Experiences

Indicators of Change and Causes of Change

This paper has discussed the general features of agricultural development, population growth, and their interactions in Lhasa District from 1958 to 1984. A review of the indicators shows that many changes have taken place in the development process. The major indicators of change and their implications are listed in Table 22.

Looking at the changing process of agricultural production and population, it has been noted that the impact of agricultural development has exceeded population growth. The important features are that the living standards of the

people improved e.g., the per capita income of the rural population increased from 125 *yuan* per annum in 1971 to 384 *yuan* per annum in 1984 at 1980 constant prices, the productivity of the labour force increased, and the availability of grain per capita improved. At the same time, some problems, such as the decline of arable land per capita, became more and more critical.

Lhasa District, the economic centre of Tibet, faces problems of economic and environmental sustainability. In the past, the district was not a self-sufficient area. Since the agricultural sector dominated the district economy, the growing population, and their increasing needs depended

Table 22: Agriculture-Population Interaction: Indicators of Change and Causative Factors (1958-1984)

Indicators	Causative Factors
1. Grain availability per capita (improved)	Arable land increased, production level improved, input increased
2. Grain supply and demand (shortage in supply) <ul style="list-style-type: none"> . present situation . tendency 	Limited resources, limited scope for intensive use of land, population pressure on land, unstable increase in productivity
3. Average landholding (decreased) <ul style="list-style-type: none"> . land cultivated per capita . land cultivated per labourer . grazing land per sheep unit . grazing land per labourer 	Faster increase in population, limited land for cultivation and grazing, domination of land-restricted activities
4. Livestock output per capita (relatively low)	High ratio of load-carrying livestock, limited transport and storage facilities, insufficient marketing channels
5. Output capability of labour (improved) <ul style="list-style-type: none"> . output productivity . output value 	Productive techniques improved, intensive land use
6. Agricultural income per capita (increased)	Increase in production, diversified source of income (after 1980)
7. Burden of population on agriculture (increased) <ul style="list-style-type: none"> . urban/rural ratio . age structure 	Urban population and young population increased the demand on agricultural production

heavily upon agricultural development. In future, the main emphasis will continue to be on the improvement of agriculture which will be the main economic resource for some time to come.

Reviewing the experiences in Lhasa District, we can say that agricultural development has been restricted by the prevailing environmental conditions. Improvement of agricultural production should rely more on the integration of agricultural and environmental management of agriculture and of the environment.

Sustainability Assessment

Although agricultural development in Lhasa District has significantly improved, it has not been able to sustain the needs of its population. The problem of sustainable agriculture is evident from the four aspects discussed below.

First productivity -- both the labour available and the area of land have not kept pace with the population growth and increasing needs. Increases in the productivity of agricultural labour permit agricultural incomes to grow quite rapidly. But it is not easy. One reason why is that the increasing labour force has not had enough opportunity to engage in non-agricultural activities. Farmers are bound to the limited land base from generation to generation. Intensive land use with more labour inputs has not improved labour productivity. Another reason is that the technology level and management level have not changed basically in the past three decades. Extensive cultivation, poor irrigation systems, and the simple implements used have not improved the function of labour in production. Increase in land productivity depends upon land availability. Experiences from Lhasa District show that marginal land reclamation has been a failure. Reasonable land use needs alternative uses to maximise land productivity.

Secondly, there is an increasing instability in agricultural production. The production fluctuated sharply during certain years. Natural hazards, pests, and mono-production are the main factors in instability. In Lhasa District, the major hazards have proved to be gales, droughts, and frosts. Gales occur frequently from February to April (6 days a month on average). They often damage winter crops and grasses and

cause the inter-monsoon drought to affect the productivity of rainfed farming. More than 40 per cent of the croplands are still covered by irrigation schemes. Almost every year, frost causes a decrease in crop yields from high croplands (above 3,900 masl) and the current forecast and prevention measures are far from sufficient. Controlling diseases (both plant and animal) and insect pests is not an easy task because of the shortage of agricultural technicians and the limitations of agricultural support services. In addition, mono-cropping sometimes results in a very sharp decline in productivity. The introduction of "Fei Mai" (a species of wheat), which brought about a sharp decline in productivity due to widespread transmission of disease (1979), is a very good example. It shows that diversified farming is a necessary condition to mountain agriculture.

Thirdly, a balanced sectoral development within agriculture has not been achieved. One reason is that different sectors in the farming system are unevenly developed. Before 1979 the policy stressed "grain crops as the key link", following which large areas of marginal land and high altitude land were cultivated. Although grain production increased to some extent, the other agricultural sectors improved very slowly. Consequently, over-reclamation caused land degradation, and this further constrained the development of other sectors.

Another reason for unbalanced development in agriculture is related to geographical differences. Following the introduction of economic reforms (1980), horticultural development (fruit, vegetables) in the valley area led to a rapid increase in rural incomes. Increases in the prices of livestock products benefitted herdsmen in highland areas. Recently, the discrepancies in rural incomes between different regions has widened. Midland areas, namely the Maizho, Nyemo, and Lhunzhub counties, have been left behind. These areas need production readjustment in order to improve their income levels.

Fourthly, over-exploitation of natural resources has resulted in the deterioration of the ecology and the environment. Soil erosion and grassland degradation are extensive in Lhasa District. Because of the high demand for food, croplands were cultivated year after year and this resulted in coarser soil texture (wind erosion) and a decline in the natural fertility of the soil. More manures

and fertilisers are needed to maintain the productivity level. Because of the increase in livestock and hardly any improvement in livestock management, both the productivity and the quality of grassland worsened. Energy shortage is one of the key problems. In relatively populous areas, especially around Lhasa City, soil erosion increased more seriously. As shrubs were cut for firewood many valley slopes quickly changed into barren land and this process moved higher and higher up the slopes as time passed. Grass roots in the meadows are uprooted for fuel purposes. Ecological conservation is not a simple task, alternatives must be found to solve the basic demands of the population.

Issues in Development

At present, Lhasa District is not self-sufficient in basic food supplies. The district economy has benefitted from the 'no-taxes in agriculture' and the high-subsidy policies of the Central Government. Can the district economy be managed to bring about sustainable development in the future? Some issues should be considered in this context.

As Lhasa District is a minority area, the population policy will continue to be flexible in future. Although family planning has been encouraged, the population growth will definitely exceed the proposed target (1.5% per annum) set by the Government. Therefore, the economic development of the district cannot depend upon a decrease in the population growth and must concentrate on rational management of the existing natural resources and their development potential.

The economic capacity of a region can be seen from two aspects. One is the self-sustaining capacity and the other is the export capability. Lhasa District is relatively weak in the first aspect, but it is even worse in the second. This is mainly because of the biased policies imposed on areas with fragile mountain resources; policies that did not consider their many potentials.

At present, the policy of the Tibetan Government calls for "developing animal husbandry first, coordinating animal husbandry, agriculture, and forestry, corresponding to local

conditions, and promoting multi-enterprises and cash crops" (Zhang Rongzu 1989). In the case of Lhasa District, there is no doubt that animal husbandry has potential, but some problems might be worth considering in light of the policy call to "put animal husbandry as the first priority".

- Compared to land-based production, animal husbandry depends upon natural conditions. The improvement of vast rangelands in the mountain terrain, e.g., through mobilising irrigation and increasing fertiliser use, is not easy and has not progressed very far.
- So far, animal husbandry is prevalent in the highland areas, while most of the population are living in the lower areas, especially in the valley basin areas. The relationship between population distribution and labour availability for animal husbandry needs to be studied carefully.
- Crop production is unable to meet the basic needs of the population. The foodgrain consumption of Lhasa District has depended heavily upon subsidies. If animal husbandry is prevalent in the valley basin areas, the big demand for fodder will compete with crops for land use.
- The development of animal husbandry is closely linked to the socioeconomic situation. Changing sociocultural practices and improving marketing systems and transportation are not easy. They require effort, time, and heavy investment.

The many constraints in the recent research and extension system are discussed below.

Shortage of Manpower

Researchers and technicians (1985) account for only 0.4 per cent of the population in Lhasa District; lower than the average for China as a whole (0.64%). Among the researchers and technicians who are in Lhasa District, only 15.4 per cent are involved in agriculture (Ren Gueling 1986), and they including 107 veterinarians, four grassland researchers, and 64 technicians. The technical manpower in fields other than agriculture is even more limited.

Lack of Continued Support

During the period of the people's commune, agricultural extension stations were established in each county. With changes in the production system, these extension institutions did not operate because of lack of financial support. They shifted their functions from extension to their own production. Neglect of agricultural extension will hamper agricultural development in the long run.

Inadequate Communication

Because illiteracy is prevalent in the rural areas, there is a need for widespread demonstration and easily understood instruction programmes to encourage farmers to adopt new techniques of production and management.

Under the Responsibility System, farmers have a strong incentive to make more efficient use of inputs for agricultural production. At present, the marketing system in Lhasa District is inadequate in terms of input. The major constraints in this respect are discussed below.

- The input supply has been administratively managed by the State market through planned allocation. Because of limitations in the input demand assessment and distribution system, farmers are unable to purchase the required amount of inputs.
- At present the open market (free market system) is in operation at the subcounty level. It mainly markets consumer goods, not input supplies. Collective or individual trade in agricultural inputs could contribute to household agriculture, provided that quality control can be ensured.
- Household production also faces difficulties regarding access to markets. In filling the gaps in input supply, the village cooperatives could play an important role. Household management in agriculture needs information and appropriate assistance through intermediate institutions.

To sum up, the past successes and failures provide lessons for future development in Lhasa District. The past achievements are encouraging, but much more effort is

necessary in many fields of activity. In formulating future development strategies, the three aspects listed below are very important.

1. Development policies and programmes should be linked to different sectors. Integrated development is likely to be more sustainable in the district economy.
2. Development objectives should match the potentials, and diversified approaches need to be adopted in view of the extensive degradation of the environment.
3. Public interventions should be strengthened, new institutions in research and extension need to be established, and technological assistance, and marketing systems need to be strongly supported.

Conclusions

The farming systems in Lhasa District are dominated by agro-pastoral farming systems. This paper focusses on the interaction of agriculture and population in Lhasa District during the period from 1958 to 1984. The paper reviews the experiences in agricultural development and population growth, identifies major interactions between agriculture and population, and addresses some of the issues raised by population-agricultural interactions in the context of sustainable agricultural development in mountain areas.

Lhasa District is the centre of Tibet not only in terms of geographical location but also in the context of politics, economics, culture, communications, and commerce. The physical conditions in Lhasa District are characterised by high elevation, a vast mountain terrain, and a semi-arid and temperate climate. The land use pattern of the district is limited by the physical environment. Crop cultivation prevails in areas below 4,200 masl and animal husbandry is prevalent in areas above this. Land involved in agriculture occupies 92.6 per cent of the total area of the district. The economic situation of Lhasa District is relatively better than in other parts of Tibet because its level of economic development is higher. This is, however, not a cause for satisfaction because it is not

yet economically self-reliant. Heavy subsidies from the Central Government are needed every year.

Agriculture plays an extremely important role in the district economy. Since the 1950s, four distinct periods, a slave society - democratic reform - cultural revolution - readjustment, can be distinguished. These social transformations had a strong influence on agricultural development.

The components of agriculture in Lhasa District cover various sectors, including crop production, animal husbandry, forest-based activities, and fisheries. Among these, crop production and animal husbandry are obviously the most important.

The cropland in Lhasa District accounts for 0.9 per cent of the total land and the predominant crops are cereals. From 1958 to 1984 the output of cereal crops increased 3.2 times, mainly because of (i) increases in arable land (from 25 thousand ha to 28 thousand ha), (ii) growth in yield per unit area (about 1 ton per ha to 2.5 tons per ha), (iii) changes in cropping patterns (wheat, replacing pulses, became the second most important crop), and (iv) changes in the distribution pattern of crops (crop production increased more rapidly in the lower reaches of the Lhasa Valley). The increase in crop productivity has made a significant contribution to improvement in overall production.

Animal husbandry, characterised mainly by semi-nomadic herding, is the established tradition of the district. About 26,600 sq.km. of rangeland were used to support 1.46 million head of animals in 1984. In moving from the valley floors to the high mountain lands, the significance of pastoralism increases. From 1958 to 1984, the livestock increased by 68 per cent, at the rate of two per cent per annum. Cattle (yak) represent the highest proportion of animals and the number of sheep is increasing rapidly. At present, the density of livestock is higher in the lower reaches of the Lhasa Valley than in highland areas.

The population of Lhasa District, in 1984, totalled 285,591 persons, with an average density of 9.8 persons per km². The urban-rural population distribution was 37 and 63 per

cent respectively. From 1958 to 1984, the rural population increased by more than 50 per cent, at the rate of 1.6 per cent per annum. The labour force involved in agriculture accounted for about 50 per cent of the rural population in 1984. The growth in labour force was slower than in the rural population, reflecting an increasing burden of dependency. Increases in the number of herdsmen were greater than the number of crop farmers.

Lhasa District is not yet self-sufficient in terms of agricultural production. The increase in food production has not kept pace with the demands of the increasing population. Import of foodgrains has been necessary. If the annual increment in grain production (about 1,700 tons/per annum) is maintained and the growth of population slightly lowered (1.5% per annum), in future the crop production in Lhasa District will not be able to sustain the demands of the total population, but could, however, be sufficient to meet the needs of the rural population.

The current land-food-population relationship reveals four types of area - grain surplus area, grain self-sufficient area, grain shortage area, and grain dependency area. The future agricultural strategies for each of these areas should be different.

The productivity per capita from animal husbandry in Lhasa District was higher than in China as a whole but lower than Tibet as a whole. Meat and dairy products are traditional components of the local people's diet. Livestock production has further potentials for development. The transformation from traditional management to commercialised production will be important for achieving higher productivity.

The increasing pressure on the limited land base is the major agricultural problem in Lhasa. Continuous growth in the population brought about a decline in the agricultural land per capita. During 1958 to 1984, the contribution per labourer increased by about 150 per cent in crop production and 75 per cent in animal husbandry. The future prospects for agricultural production will also depend largely upon the improvement in labour productivity.

Reviewing the experiences in agricultural development and population growth in Lhasa District from 1958 to

1984, the impact of agricultural improvement has exceeded that of population increase. However, certain problems have also become increasingly serious.

The sustainability aspect of the development process in Lhasa District is weak mainly because (i) productivity,

both in terms of labour and area of land, did not keep up with the population growth and the increasing needs, (ii) agricultural production is unstable, (iii) balanced sectoral development, within agriculture, has not been given sufficient attention, and (iv) the ecology and environment is becoming more fragile.



APROSC. Integrator of Population with Agriculture.



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