

## II. Agricultural Development

### Historical Changes in Agricultural Development

From the 1950s onwards, the agricultural pattern of Lhasa District has undergone remarkable changes. The process of change can be intrinsically related to the social transformation. It is widely accepted that four periods can be clearly identified in terms of policy, land ownership, institutions, and production.

Slavery was still prevalent in Lhasa District until 1959. Serf owners controlled every means of production, including cultivated lands, livestock, grassland, and production tools. Seventy per cent of the produce of serfs and slaves was handed over to feudal lords who represented only five per cent of the total population. At that time, agricultural development was very slow.

The period from 1959 to 1965 was characterised by democratic reforms. The most significant change was that, in reallocation of land ownership, slaves became farmers and were given their own land to cultivate. Grasslands became common property. The new policy (declared in 1961 in relation to the documents concerning "policies in rural areas" and "policies in pastoral areas") encouraged land reclamation and agricultural development. The documents declared that there would be no taxes for five years on newly reclaimed land.

In the pastoral areas, the Government provided more and more subsidies to improve the quality of grasslands, to improve management technology, and to control diseases. Meanwhile, the price of livestock products increased. In 1961, the Lhasa Institute of Agricultural Sciences was established. Efforts were expended to introduce and propagate seeds, improve cultivation techniques and irrigation facilities, plant fodder, and so on. As a result, the cultivated land in Lhasa District expanded quickly, livestock numbers increased notably, and the gross value of the

agricultural output increased by 56 per cent (equivalent to a 6.6% increase per annum).

The period from 1966 to 1976 was the period when the "cultural revolution" enveloped the entire country. In Lhasa District, the administrative structure was urged to change into the "people's common" system.

The institutional change led to a shift from individual ownership of land and means of production to public ownership for planned and unified management. The new policies in agriculture over-evaluated past experiences and laid a stress on grain as the only crop and 'cutting off sideline production' regardless of environmental and farming conditions. Agricultural production was guided more by administrative cadres than farmers. This seriously damaged the enthusiasm of the farmers and caused great harm to agricultural development. During this period, the gross output value, however, increased by 41 per cent, with a growth rate of 3.5 per cent per annum, mostly because of technological progress. But the impact of interfering with traditional agriculture was quite evident. Complaints regarding shortages of meat and barley were prevalent.

At the end of 1976, although the "cultural revolution" was over, the negative impact continued for some years. In 1979, when agricultural production fell a great deal because of natural disasters, the weaknesses of the former policies became evident. Agricultural development was in need of readjustment. In 1980, and again in 1982, new policies emphasising a market economy were formulated. The "Responsibility System"\* restored the right to use land and make decisions to the farmers. The increased price of agricultural products encouraged farmers to improve production. Farmers were exempted from agricultural taxes (extending until the year 2000) and the financial subsidy granted by the Central Government was increased. Under these policies, crop production patterns were gradually

\* The "Responsibility System" also known as the "Production Responsibility System" is a managerial system in which the duties and rights of production units and individuals in the production process are clearly defined within the enterprise itself. Payment is task-based and contracted on an output - related basis.

readjusted, the slaughter rate for livestock increased, and 'sideline' activities became one of the important components of agriculture. The gross output value of agricultural production increased by 36 per cent from 1977 to 1984, leading to a 3.9 per cent increase per annum. However, it has been observed that, since the 1980s, the traditional manner of cultivation has been rehabilitated, agricultural mechanisation rejected, and increasing emphasis is now given to the improvement in agricultural technologies in close association with the farmers rather than imposing technologies as in the past.

### Agricultural Components

With regards to the main components of agriculture in Lhasa District, five sectors, namely, crop production, forestry, animal husbandry, sideline activities, and fisheries, are covered. However, their development patterns and levels are different (CAS 1980).

Animal husbandry and crop production constitute the principal agricultural sector (Cheng Hong et al. 1984). The total production value of these two dominates the entire agricultural sector (Table 1). The production of these two sectors is dependant on land. The mean production value of croplands was 418 *yuan* (at constant 1980 prices) per ha in 1958 and 1,100 *yuan* per ha in 1984. The mean production value of grasslands was 3.9 *yuan* per ha in 1958 and 7 *yuan* in 1984.

'Sideline' activities are another component of agriculture. In Lhasa District, six kinds of activity are included in this category: 1) temporary employment for construction and

transportation; 2) collecting fuelwood, cow dung, turf, and fodder and selling them; 3) small-scale side occupations such as charcoal-making, brick-making, and firing quicklime; 4) small-scale processing and handicrafts, e.g., extracting oil, weaving rugs, and knitting woollen goods and as employed craftsmen; 5) hunting; and 6) collecting medicinal plants. These activities used to be organised by the collectives but are now carried out by households.

Production from 'sidelines' is an important source of farmers' income, but it was restricted until the end of the "cultural revolution". Rapid development in this field took place in 1980 and in 1984 its production value reached 15.87 million *yuan* (2.8 times that of 1980), accounting for 20.29 per cent of the gross agricultural product. In the past, its proportions were only 2.3 per cent (in 1960), 6.9 per cent (in 1970), and 8.1 per cent (in 1980), but, recently, 'sideline activities' have started to absorb more and more labourers in off-farm employment.

In Lhasa District there is a lack of natural forests. The temperature conditions below 4,000m are suitable only for certain kinds of trees, provided there is appropriate irrigation and management. Before the 1950s, there were trees such as poplar, willow, pine, and cypress surrounding the temples and yards of the serf-owners. In 1964, a nursery for stock was established and several species were introduced into the district. "Beijing Poplar" grew well and was planted along roads, irrigation channels, river banks, and surrounding crop fields. Several "*Lin Ka*" (small plots of trees) were planted and protected. The new trees partly made up for the shortage of firewood and, what was more important, encouraged the development of forest products. Because of weaknesses in forestry management, extension of the forest area appeared

**Table 1: Proportion of the Value of Crop Production and Animal Husbandry in the Gross Output Value of Agriculture (%)**

	1958	1960	1965	1970	1975	1980	1984
Crop production	41.5	43.0	49.0	44.2	48.6	49.0	38.98
Animal husbandry	56.8	54.6	47.8	48.1	43.7	40.4	39.86
Percentage output to gross value	98.3	97.6	96.8	92.3	92.3	89.4	78.84

difficult. Up to 1984, trees were grown only on an area of 100 ha. The timber production potential of these trees has not yet been exploited. At present, the output from forestry consists mostly of fruit; namely, apples, peaches, pears, and walnuts. The fruit trees are distributed throughout the lower reaches of the Lhasa Valley. In 1984, about 100 tons of fresh fruit and three tons of dried fruit were harvested. Fruit production has great potential for the future but requires relatively high investment and meticulous management.

Fish farming was not the tradition in Lhasa District because the Tibetans were not used to eating fish. Fishing started only in 1960 when a fishing team was organised. Because of the limited fishing resources, the contribution of the fisheries has been extremely marginal (less than one per cent).

### *Development of Crop Production*

Crop production in Lhasa District is severely limited by the climatic conditions and terrain. Single yield cropping is predominant below 4,200 masl, where the mean annual temperature ranges from 5°C to 8.2°C, and the mean annual precipitation is between 300mm to 700mm. The cultivated land, distributed throughout sheltered valleys and on gently sloping terraces, was 27,430 ha (1984), occupying 17 per cent of the valley area or 0.9 per cent of the total land in the district. Dry farming crops consist mainly of winter wheat, spring wheat, highland barley, pulses, buckwheat, rape, potatoes, and some vegetables.

Crop production is an important sector of the district economy. From 1958 to 1984 the grain crop increased 3.2 times (from 21.85 thousand tons in 1958 to 70.14 thousand tons in 1984) and oil seed production increased nearly three times (from 602 tons to 1,792 tons). Vegetable production has recently become an important part of crop production. How have these changes come about? What has caused the increase? Reviewing previous implementation patterns could be helpful in answering the above questions.

Firstly, the arable land of Lhasa District increased from about 25 thousand ha in 1958 to 28 thousand ha in 1984, representing an increment of more than 100 ha per annum. However, the increases were rather uneven. The arable land increased from 1958 to 1967 (from about 25 thousand ha to

28 thousand ha), reached a high level from 1968 to 1979 (about 29.0 thousand ha), and fell to about 28 thousand ha in the 1980s. Three distinct periods of cropland changes are recognised. During the first period (1958-1967), the arable land expanded from the valley plains to the alluvial-diluvial fans and gentle terraces. The reclaimed lands are generally large and fertile, but the new lands lack irrigation. During the second period (1968-1979), because of a mistaken stress on "grain production as the key link", the reclamation shifted to marginal lands such as steep slopes, high altitude areas, and gravel terraces. The result of this has been very low crop productivity, clearly suggesting that available labour could have been better utilised in other activities. At the beginning of the third period (after 1980), with the introduction of the "Production Responsibility System" and other measures of economic reform in Tibet, croplands decreased considerably. Low-yielding lands were generally neglected. The area of cultivated land decreased to the level prevalent at the end of the first period. The changing pattern of arable lands in Lhasa District indicates that a rational increase in arable land took place during the first period and it fluctuated and stabilised in the second and third periods.

Secondly, the growth in yield per unit area also influences the growth of crop production. Table 2 records the productivity of the major crops in Lhasa District. As a whole, the productivity of crops has risen markedly but not uniformly. Among the major crops, wheat is the most productive crop and has had the highest increase (3.28% per annum). Barley and other cereals (mainly buckwheat) have had lower rates of growth (2.74-2.92% per annum).

Pulses and oilseeds are traditional crops in the district, but the rate of growth in their production was comparatively low and unstable.

Thirdly, changes in cropping patterns contributed to the increase of crop production. Table 3 indicates the cropping patterns in terms of sown area and proportion for different crops in Lhasa District over several years. Some unique features that can be identified are listed in the following passage.

1. Grain cultivation accounts for an overwhelming proportion of croplands. However, its share of cultivated land is on the decline.

**Table 2: Productivity of Major Crops in Lhasa District (ton/ha) (1958-1984)**

Year	Barley	Wheat	Pulses	Other cereals	Oilseed	Vegetables
1958	0.98	1.04	0.94	0.87	0.45	-
1960	1.12	1.15	1.09	1.07	0.54	-
1965	1.69	1.71	1.66	1.57	0.77	-
1970	1.40	1.67	1.45	1.51	0.64	-
1975	1.85	2.35	1.702	2.51	1.04	-
1978	2.20	3.24	2.11	2.22	0.81	-
1980	2.34	3.61	2.20	2.24	1.09	9.88
1982	2.46	3.02	2.19	2.25	0.91	8.12
1984	2.86	3.41	1.56	2.38	1.05	16.33
Annual growth rate	2.92	3.28	1.66	2.74	2.33	-

2. Among the grains, barley is the preferred crop. Wheat replaced pulses to become the second most important crop because of its higher productivity. The area and the proportion of land under pulses and other cereal crops have decreased.

3. From 1958 to 1984 there were fluctuations in the size of areas under different crops. Production management, technological improvements, crop productivity, and people's preferences influenced these changes.

4. There has been little change in the cropping pattern of oilseed.

5. Vegetable production is increasing.

When comparing the increases (the figure for 1984 divided by that for 1958) in production, cultivated land, and land productivity of different crops, some features can be identified. The significant components contributing to the growth in crop production were barley and wheat, which have not only had rapid increases in production but have also occupied the major share in both cultivated land and gross output.

Barley is the staple foodgrain of the local people and is the traditional priority in food production. In general, the increase in barley production has been influenced more by productivity-raising issues than by expansion of cultivated lands. In the case of wheat production, a positive change occurred after 1972, i.e., a highly productive crop was sown on a larger proportion of land. At the beginning of the 1960s, a newly-developed species called "*Fei Mai*" (Heine Hvede) was introduced. The productivity of "*Fei Mai*" reached 10 tons per ha in several places, where it had been cultivated on an experimental basis, in the following years. This species was adopted extensively. After 1972, land cultivated with wheat increased rapidly (from 3,600 ha to 10,790 ha in 1979). Meanwhile, production rose from 5,820 tons/annum in 1972 to 34,920 tons/annum in 1978. Wheat production exceeded barley production and became the priority crop from 1977 to 1980. After the shocks of drought and disease in 1979 (Lin Dawu et al. 1985), wheat production readjusted to a lower level. Its production in terms of cultivated area and productivity stabilised gradually after 1981.

Fourthly, the changes in distribution pattern are also an important factor in crop production. Figures 6 and 7 show the gross crop production and production of different crops

**Table 3 : Area (proportion) under Different Crops (ha)**

Year	Barley	(%)	Wheat	(%)	Pulse	(%)	Other Cereals	(%)	Oil-seeds	(%)	Vegetable	(%)
1958	11,113	(46.3)	3,833	(11.8)	6,347	(26.4)	2,400	(10.0)	1,333	(5.5)	-	-
1960	12,160	(46.8)	3,247	(12.50)	6,433	(24.8)	2,593	(10.0)	1,540	(5.9)	-	-
1965	12,980	(47.2)	3,873	(14.1)	6,467	(23.5)	2,840	(10.3)	1,353	(4.9)	-	-
1970	13,967	(48.6)	4,900	(17.0)	5,700	(19.0)	2,513	(8.8)	1,613	(5.6)	-	-
1975	12,946	(45.6)	8,780	(31.0)	3,260	(11.5)	1,613	(5.7)	1,753	(6.2)	-	-
1978	10,500	(38.2)	10,786	(39.3)	3,433	(12.5)	907	(3.3)	1,833	(6.7)	-	-
1980	10,647	(37.5)	10,640	(37.5)	3,660	(12.9)	780	(2.7)	2,047	(7.2)	633	(2.2)
1982	12,847	(45.8)	7,327	(26.1)	3,960	(14.1)	913	(3.3)	2,067	(7.4)	940	(3.3)
1984	12,407	(45.2)	7,380	(26.9)	4,160	(15.2)	1,273	(4.6)	1,713	(6.3)	493	(1.80)

in each county of Lhasa District. In general, the following can be deduced:

- crop production is increasing rapidly throughout the lower reaches, covering Dagze, Lhasa, Doilung, and Quxu counties in the Lhasa Valley, compared to other parts of the District;
- in counties where the major cultivated lands are below 3,800 masl, the contribution of wheat production is greater than that of barley; and
- vegetable cultivation has become a part of crop production in the areas close to Lhasa City. Vegetable production in Lhasa County is becoming increasingly important. The management of animal husbandry was, and is, characterised mainly by semi-nomadic herding on extensive rangelands.

#### *Development of Animal Husbandry*

Animal husbandry is another major land-based activity in Lhasa District. It is not merely an established tradition, but also an important factor in the district economy.

The management of animal husbandry was, and is, characterised mainly by semi-nomadic herding on extensive rangelands. The grasslands in Lhasa District cover about 26,600 square kilometres, accounting for approximately 91.7 per cent of the total area (94 times larger than cultivated lands). The total herds in 1984 numbered 1.46 million head, including 556.8 thousand cattle and yak\*; 33.6 thousand horses, mules, and donkeys; 357.5 thousand head of goats; 505.2 thousand sheep; and 8.4 thousand swine. Most animals were raised on the grasslands.

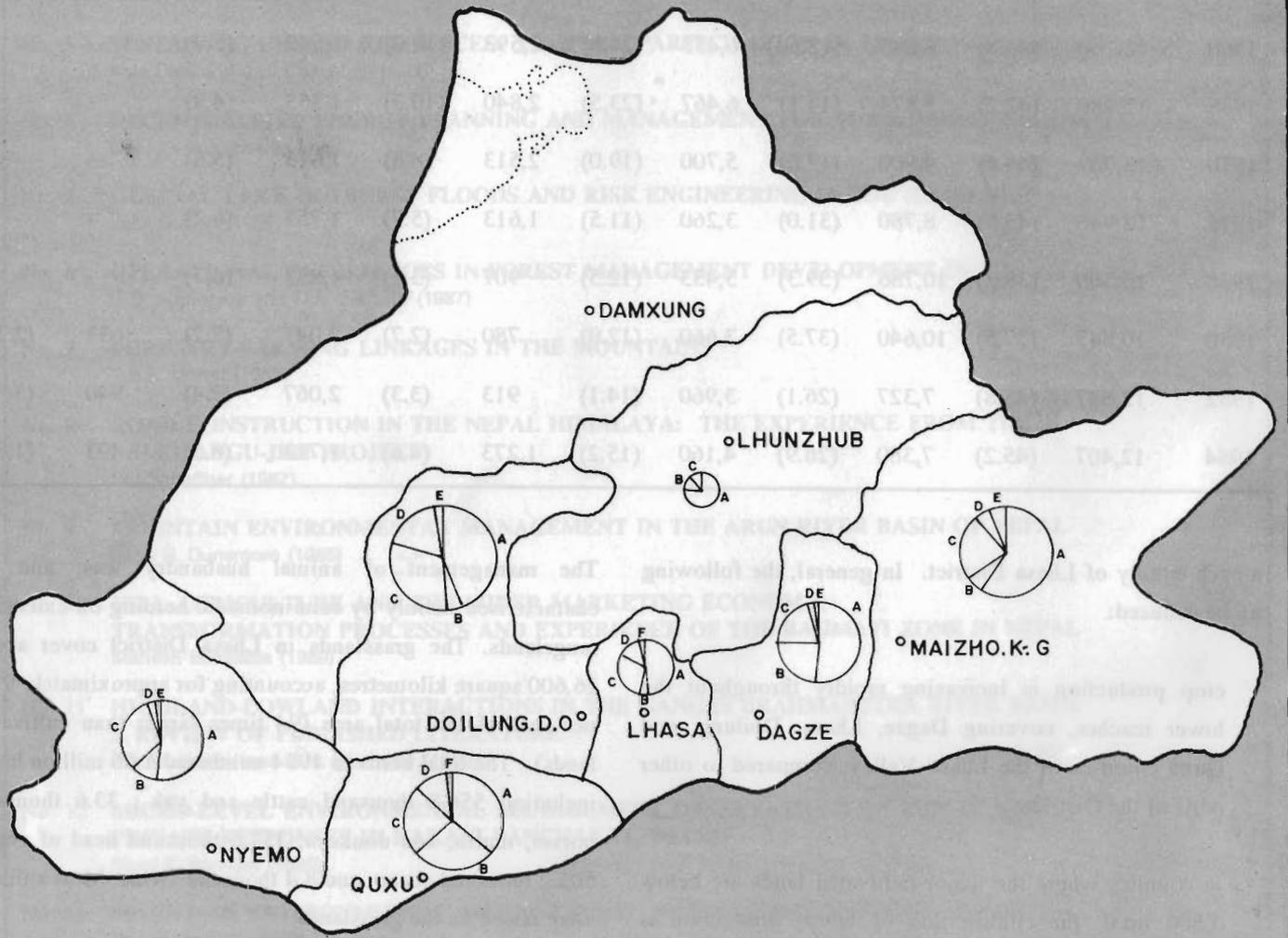
Animal husbandry is prevalent from valley floors to highland areas. Based on the economic importance of animal husbandry to the gross agricultural output value, elevation of the area, and management practices, three types of pastoral system are in operation.

From the Table 4, the following can be deduced.

- The majority, covering 97 per cent, of animals are ruminants (cattle, yak, sheep, goats, etc).
- The numbers of livestock have continued to grow and have decreased in only a few cases.

\* The statistics record cattle and yak together. The official data (1984) record the cattle/yak ratio as 23/7.

Figure 6: Crop Production Distribution Pattern (1958)



- A = BARLEY
- B = WHEAT
- C = PULSE
- D = OTHER CEREALS
- E = OILSEED
- F = VEGETABLES

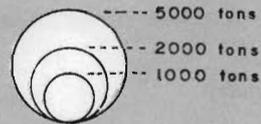
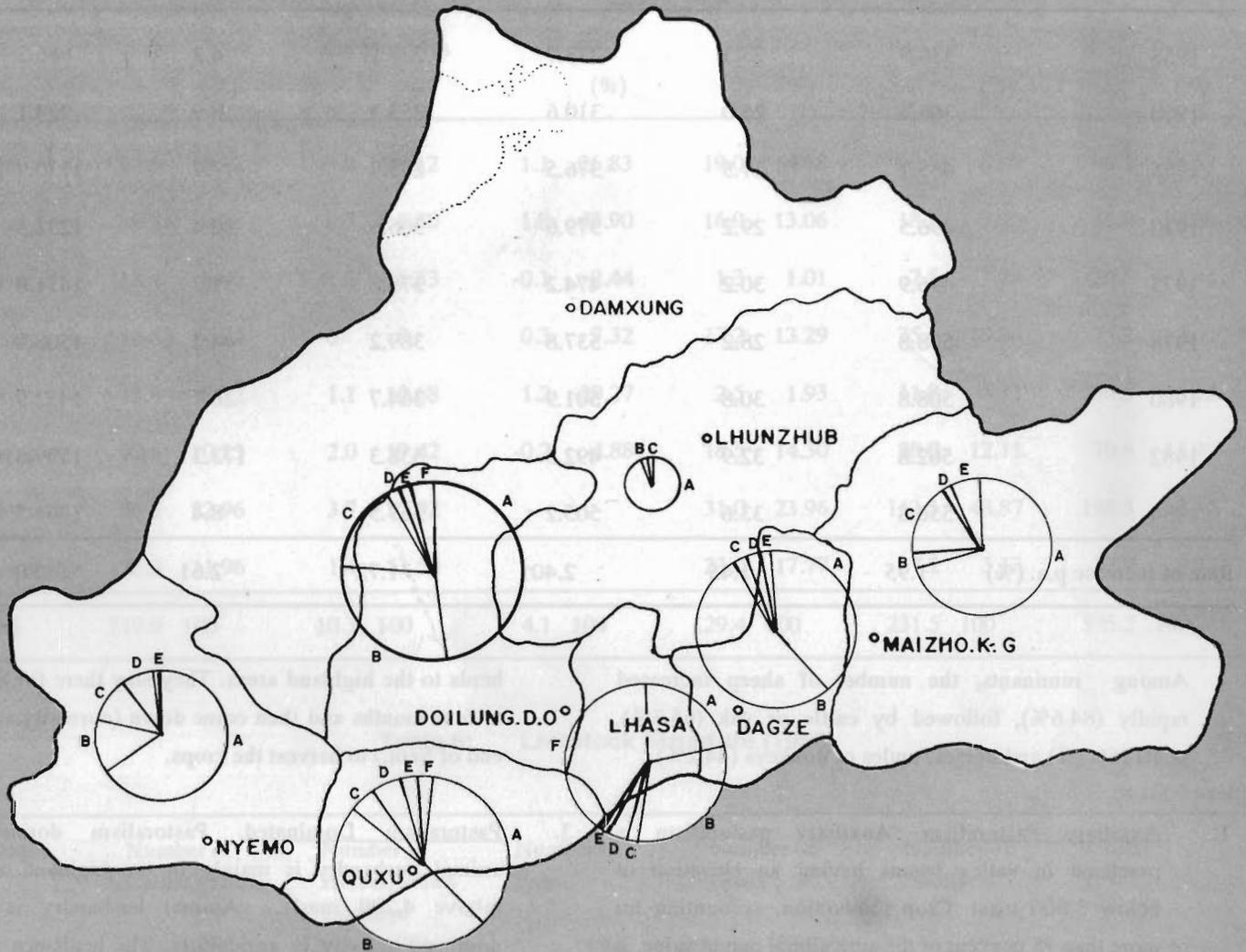
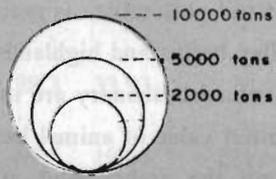


Figure 7: Crop Production Distribution Pattern (1984)



- A = BARLEY
- B = WHEAT
- C = PULSE
- D = OTHER CEREALS
- E = OILSEED
- F = VEGETABLES



**Table 4: Livestock Pattern (1958-1984)**

(x 1000 head)

Year	Cattle/ Yak	Horses/Mules and Donkeys	Sheep	Goats	Swine	Total
1958	336.9	23.3	273.7	228.1	4.3	866.3
1960	366.3	25.0	310.6	253.3	8.9	934.1
1965	485.1	27.5	376.5	263.9	17.9	1170.9
1970	496.5	29.2	379.6	306.6	20.4	1232.3
1975	496.9	30.2	474.2	378.8	31.7	1411.8
1978	508.8	28.2	537.8	389.2	44.2	1508.2
1980	508.8	30.8	501.9	364.7	26.7	1432.9
1982	562.8	32.9	492.3	338.3	173.3	1599.6
1984	556.8	33.6	505.2	357.5	8.4	1461.5
Rate of increase p.a. (%)	1.95	1.45	2.40	1.72	2.61	2.0

Among ruminants, the number of sheep increased rapidly (84.6%), followed by cattle or yak (65.3%), goats (56.7%) and horses, mules or donkeys (44.2%).

1. Auxiliary Pastoralism. Auxiliary pastoralism is practised in valley basins having an elevation of below 3,800 masl. Crop production, accounting for more than 75 per cent of the agricultural output value, is the dominant agricultural component. Livestock, consisting of more cattle than yaks and more goats than sheep, are pastured on fallow lands, basin grasslands, and the surrounding valley slopes close to the farmers' residences. Swine are the prevalent livestock found in this area.
2. Mixed Pastoralism. Mixed pastoralism is practised in areas between the valley basins and highlands. Both crop production and animal husbandry are important in agriculture. The output value of animal husbandry varies depending upon the arable land available, elevation, etc. However, the output value is less than 80 per cent that of agriculture. Seasonal range management is in practice. From the beginning of the warm season in the croplands, the farmers drive their

herds to the highland areas. They stay there for three to four months and then come down (normally at the end of Sept.) to harvest the crops.

3. Pastoralism Dominated. Pastoralism dominated animal husbandry is mainly in the highland areas (above 4,200 masl). Animal husbandry is the dominant activity in agriculture. The herdsmen have permanent settlements in relatively low and wind-sheltered places. The surroundings of their homesteads are used as pastures during winter and spring. As the weather becomes warmer (in May), nomadic pasturing begins. Livestock are sent higher and higher until the weather compels them to move down. The nomadic period lasts at least half a year.

As the management of animal husbandry has changed little since the 1950s, the number of livestock can be taken as a traditional indicator of the changes in production. Table 4 shows the livestock pattern from 1958 to 1984 and Table 5 the distribution pattern of livestock between 1958 and 1984.

The changes in livestock structure and distribution are shown in Tables 6 and 7.

**Table 5: Distribution Pattern of Increased Livestock (1958-1984)**

(base 1000 x) (x1000 head)

County	Increase in Number of Cattle/Horses, Yak		Increase in Number of Pigs, Mules and Donkeys		Increase in Number of Goats		Increase in Number of Sheep		Increase in Number of Total		Total	
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Maize	42.5	19.33	3.0	29.12	1.1	26.83	19.0	14.68	20.5	8.80	86.1	14.47
Dagze	18.2	8.28	0.7	6.80	1.8	43.90	16.9	13.06	18.3	7.90	55.9	9.39
Lhasa	13.4	6.09	-1.6	-15.53	-0.1	-2.44	1.3	1.01	7.5	3.24	20.5	3.44
Doilung	32.6	14.83	0	0	0.3	7.32	17.2	13.29	25.1	10.84	75.2	12.63
Quxu	13.9	6.32	1.1	10.68	1.2	29.27	2.5	1.93	11.8	5.11	30.5	5.12
Nyemo	22.5	10.23	2.0	19.42	-0.2	-4.88	18.5	14.30	28.0	12.11	70.8	11.90
Damxung	50.5	22.96	3.7	35.92	-	-	31.0	23.96	113.1	48.87	198.3	33.32
Lhunzhub	26.3	11.96	1.4	13.59	-	-	23.0	17.77	7.2	3.13	57.9	9.73
<b>Total</b>	<b>219.9</b>	<b>100</b>	<b>10.3</b>	<b>100</b>	<b>4.1</b>	<b>100</b>	<b>129.4</b>	<b>100</b>	<b>231.5</b>	<b>100</b>	<b>595.2</b>	<b>100</b>

**Table 6: Livestock Structure (1958)**

(x 1000 head)

County	Number of Cattle/Yak		Number of Horses/Mules Donkeys		Number of Pigs		Number of Goats		Number of Sheep		Total	
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Maizho	69.0	45.85	3.0	1.99	0.5	0.33	45.5	30.23	32.5	21.60	150.5	17.37 (100.0)
Dagze	21.2	29.78	2.9	4.07	0.7	0.98	19.8	27.81	26.6	37.36	71.2	8.22 (100.0)
Lhasa	4.6	23.59	2.4	12.31	0.6	3.08	6.2	31.79	5.7	29.23	19.5	2.25 (100.0)
Doilung	21.7	28.89	4.7	6.26	0.8	1.07	23.4	31.16	24.5	32.62	75.1	8.67 (100.0)
Quxu	17.1	28.64	3.5	5.86	1.5	2.51	19.2	32.62	18.4	30.82	59.7	8.67 (100.0)
Nyemo	27.0	32.37	1.5	1.80	0.2	0.24	28.3	33.93	26.40	31.66	83.40	9.63 (100.0)
Damxung	152.3	42.58	4.3	1.20	-	0	69.5	19.43	131.6	36.79	357.7	41.29 (100.0)
Lhunzhub	24.0	48.78	1.0	2.03	-	0	16.2	32.93	8.0	16.26	49.2	5.68 (100.0)
<b>Total</b>	<b>336.9</b>	<b>38.89</b>	<b>23.3</b>	<b>2.69</b>	<b>4.3</b>	<b>0.50</b>	<b>228.1</b>	<b>26.33</b>	<b>273.7</b>	<b>31.59</b>	<b>866.3</b>	<b>100</b>

Table 7: Livestock Structure (1984)

(x 1000 head)

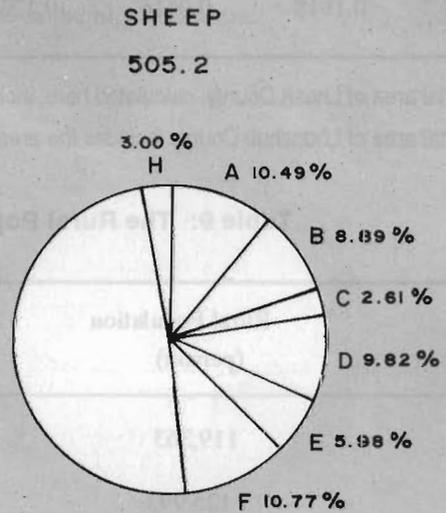
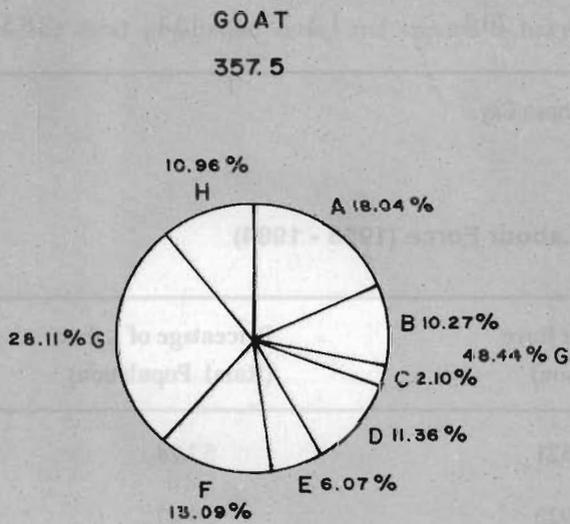
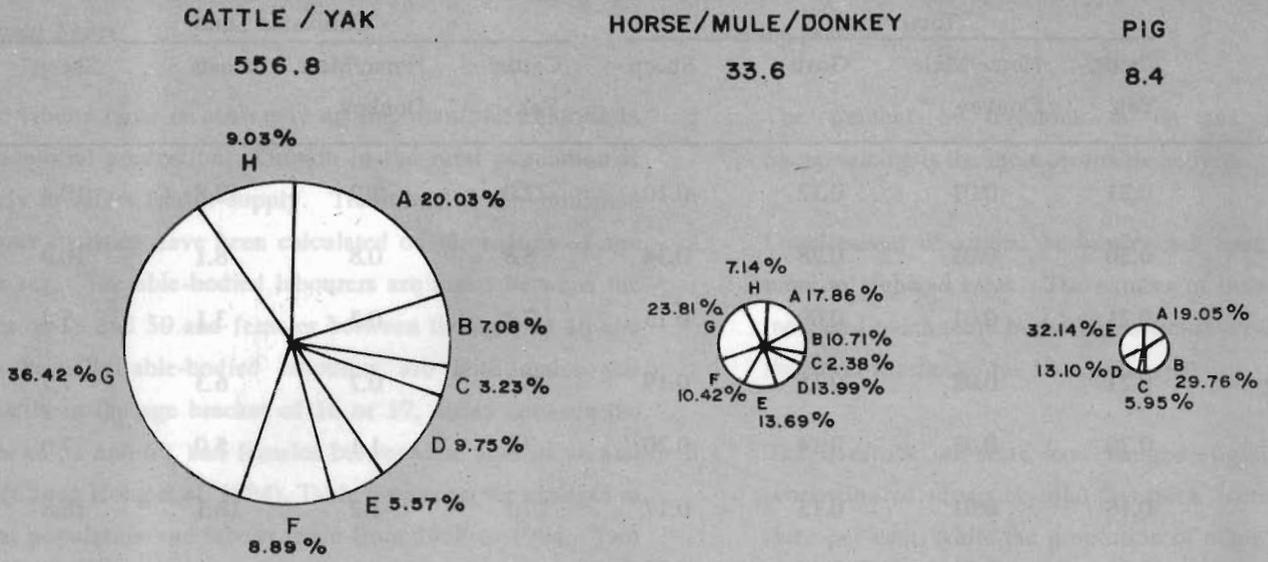
Country	Number of Cattle/yak		Number of Horses/Mules/Donkeys		Number of Pigs		Number of Goats		Number of Sheep		Total	
		(%)		(%)		(%)		(%)		(%)		(%)
Maizho	111.5	47.13	6.0	2.54	1.6	0.68	64.5	27.26	53.0	22.39	236.6	16.19 (100.0)
Dagze	39.4	31.0	3.6	2.83	2.5	1.97	36.7	28.87	44.9	35.33	127.1	8.70 (100.0)
Lhasa	18.0	45.0	0.8	2.0	0.5	1.25	7.5	18.75	13.2	33.0	40.0	2.74 (100.0)
Doilung	54.3	36.13	4.7	3.13	1.1	0.73	40.6	27.01	49.6	33.02	150.3	10.28 (100.0)
Quxu	31.0	34.37	4.6	5.10	2.7	2.99	21.7	24.06	30.2	33.48	90.2	6.17 (100.0)
Nyemo	49.5	32.10	3.5	2.27	-	0	46.8	30.35	54.4	35.28	154.2	10.55 (100.0)
Damxung	202.8	36.47	8.0	1.44	-	0	100.5	18.08	244.7	44.01	556.0	38.04 (100.0)
Lhunzhub	50.3	46.97	2.4	2.24	-	0	39.2	36.60	15.2	14.19	107.1	7.33 (100.0)
<b>Total</b>	<b>556.8</b>	<b>38.10</b>	<b>33.6</b>	<b>2.30</b>	<b>8.4</b>	<b>0.57</b>	<b>357.5</b>	<b>24.46</b>	<b>505.2</b>	<b>34.57</b>	<b>1461.5</b>	<b>100</b>
Birth rate	64.2		2.2		2.9		9.1		40.5			
Breeding animals	186.1		11.2		2.6		154.5		213.2			

In terms of livestock pattern changes from 1958 to 1984, the relative proportions have been maintained, i.e., cattle and yak account for the largest proportion followed by sheep, goats, horses, mules, donkeys, and pigs. But the relative proportional value of each kind of animal differed. The proportion of sheep increased by 2.98 per cent (the number of sheep exceeded cattle and yak during 1977 and 1978), while the proportion of other major animals decreased slightly. In terms of the regional distribution pattern of livestock, Damxung has the largest share (about 40%). Animal husbandry is the most prevalent activity in the county, not only because of the large area it covers but also because of the county concentration on animal husbandry. In this respect, Damxung is followed by Maizho, Nyemo, Doilung, Dagze, Lhunzhub, Quxu, and then Lhasa. From 1958 to 1984 the distributional proportions of livestock in

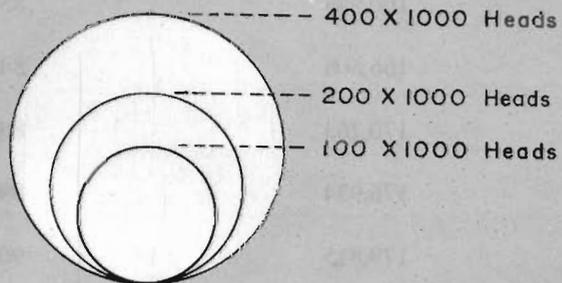
Damxung, Maizho, and Quxu decreased. The distribution of different livestock in 1984 is shown in Figure 8.

The density of livestock (Table 8) is another indicator of livestock development. Based on the data available, Table 8 used the livestock/total area ratio (head/ha) and livestock/cultivated land ratio (head/ha). The former represents the average density and expresses the fodder-providing capacity. It has been noticed that the density of livestock is higher both in the lower reaches of the Lhasa Valley area (Dagze, Lhasa, Doilung, Quxu), where they partly practise auxiliary pastoralism, and in the highland area (Damxung) where pastoralism is prevalent. The area where mixed pastoralism is principally carried out (Maizho, Nyemo, and Lhunzhub) has a lower livestock density. Regarding grasslands in Lhasa District as a whole, the

Figure 8: Livestock Distribution Pattern (1984)



- A = MAIZHO
- B = DAGZE
- C = LHASA
- D = DOILUNG
- E = QUXU
- F = NYEMO
- G = DAMXUNG
- H = LHUNZHUB



**Table 8: Livestock Density (1984)**

(head/ha)

County	Total Area				Cultivated Land			
	Cattle/ Yak	Horse/Mule/ Donkey	Goats	Sheep	Cattle/ Yak	Horse/Mule/ Donkey	Goats	Sheep
Maizho	0.21	0.01	0.12	0.10	22.0	1.2	12.8	10.4
Dagze	0.30	0.03	0.28	0.34	8.8	0.8	8.1	10.0
Lhasa*	0.21	0.01	0.09	0.15	7.4	0.3	3.1	5.4
Doilung	0.21	0.02	0.15	0.19	8.5	0.7	6.3	7.7
Quxu	0.20	0.03	0.14	0.20	7.2	1.1	5.0	7.0
Nyemo	0.16	0.01	0.15	0.17	17.1	1.2	16.1	18.8
Damxung	0.20	0.01	0.10	0.25	-	-	-	-
Lhunzhub*	0.12	0.01	0.09	0.04	29.8	1.4	23.3	9.0
District	0.1918	0.0116	0.1232	0.1741	20.4	1.2	13.1	18.5

\* The total area of Lhasa County, calculated here, includes the area of Lhasa City.

The total area of Lhunzhub County includes the area of State farms.

**Table 9: The Rural Population and Labour Force (1958 - 1984)**

Year	Rural Population (person)	Labour force (person)	Percentage of Labour (Rural Population)
1958	119,363	68321	57.24
1960	125,993	74922	59.47
1965	134,750	79260	58.82
1970	148,853	86450	58.08
1975	160,948	85756	53.28
1978	166,608	84200	50.54
1980	170,263	88318	51.87
1982	176,934	89052	50.33
1984	179,815	90845	50.52
Growth rate per annum (%)	1.6	1.1	-

density of livestock (1984) was 0.21 cattle/yak, 0.013 horses/mules or donkeys, 0.19 sheep, and 0.13 goats per ha.

**Labour Force**

The labour force is obviously an important determinant in agricultural production. Growth in the rural population is likely to effect labour supply. Traditionally, the published labour statistics have been calculated on the indices of age and sex. The able-bodied labourers are males between the ages of 18 and 50 and females between the ages of 18 and 45. Partially able-bodied labourers are both males and females in the age bracket of 16 or 17, males between the ages of 51 and 60, and females between the ages of 46 and 55 (Cheng Hong et al. 1984). Table 9 presents the changes in rural population and labour force from 1958 to 1984. Two notable patterns are revealed from the table. Firstly, the labour force increase was slower than the rural population growth, and this caused a decline in the labour force, affected the rural population ratio, and created a heavier

dependency burden on the labour force. In addition, the numbers of the labour force fluctuated over time. The reasons that partly explain these facts are enumerated in the following passage.

1. The number of livestock is on the increase. Sheep-raising is the most profitable activity.
2. Development of animal husbandry has been shifting more to highland areas. The number of livestock has increased much more in the high altitude areas than in the lower reaches of the Lhasa Valley.
3. The livestock structure has changed slightly. The proportion of sheep to total livestock increased by three per cent, while the proportion of other types of animal decreased.
4. The density of livestock is higher in the lower reaches and in the highland areas.