

CHAPTER 7

HUMAN RESOURCES

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7.1 Demography

In general, as a country develops economically, a phenomenon referred to as demography transition occurs whereby population trends shift from a higher birth-rate and higher mortality rate to a lower birth-rate and lower mortality rate. This process passes through several historic stages beginning with a significant drop in the mortality rate while birth-rate remains steady, then moving to a phase where the birth-rate drops accompanied by an even further drop in the mortality rate.

At the pre-industrialized stage of economic development, natural environmental factors including land area, soil fertility, etc. define population capacity. A balanced condition is present where a high birth-rate and high mortality rate are seen, and an average life expectancy is short. With advances in medicine and technology, epidemic disease is brought under control, and improved agricultural productivity and movement of resources and produce through improved transportation serve to increase food supply and eliminate famine. Under such conditions, the birth-rate remains initially the same while the mortality rate drops. Consequently, population increases with the pressure of such an increase released through emigration, in the case of Europe for example, to North and South America and Australia.

As time elapses, industrialization progresses and at a certain point the mortality rate further decreases but is accompanied by a corresponding decrease in the birth-rate. The drop in the mortality rate is attributed to improved health conditions, improved nutrition from increased income, as well as improved medical care.

The decline in the birth-rate is attributed to the increased burden of raising children brought on by urbanization increasing this tendency with a growing affluence to postpone having a family in order to enjoy other aspects of life, satisfaction with fewer number of children due to a drop in the child mortality rate, and improved birth-control methods.

As economic development progresses even further, a drop in the birth-rate accelerates beyond the drop in the mortality rate with a corresponding decrease in the natural population and an increase in the average age in the society. This phenomenon is seen in the developed countries.

The above described demographic transition is expected to appear in developing countries also. However, there are important differences:

- (1) Following World War II, WHO and other international agencies have through various assistance programs brought about a revolution in medicine and public health in developing countries which otherwise would not have occurred until these societies had reached a more mature level of development.
- (2) The birth-rates and mortality rates in third world countries are higher than those in Europe for example when it was on the eve of industrial revolution. The birth-rate for Europe at that time was 30 - 35 per million and the mortality rate was 25 - 30 per million. In contrast, the same rates today in developing countries are much higher at 35 - 45 per million for the birth-rate and 30 - 40 per million for the mortality rate. Accordingly, a sharp drop in the mortality rate would combine with the high birth-rate to induce an explosion in the population.
- (3) Increased population pressure cannot be relieved through emigration as was the case with Europe. Rather, emigration that does occur from developing countries is generally by those people with specialized training like doctors, engineers, etc. In other words, precisely those people whose absence retards development.
- (4) Population in the developing countries accounts for approximately 80% of the total world population. Thus, the collective demographic transition in these nations implies a huge and sudden world population increase.

If employment opportunities fail to keep pace with the population

increase resulting in a large number of unemployed and disguised unemployed, the economic burden placed on the government intensifies promoting social instability. Nevertheless, under certain circumstances this population pressure can provide the dynamism for social change resulting in spurred modernization.

If the economy is composed of a traditional sector centered on agriculture and a modern sector centered on industry, and there is present in the traditional sector a certain degree of disguised unemployment for which the marginal productivity of labor is zero, this disguised unemployment will continue to remain in the traditional sector if conditions are such that the labor supply is in excess of demand in the modern sector thereby suppressing wages. Because this disguised labor makes no contribution to production, if it is removed from agriculture and employed on capital forming works such as dams, roads and irrigation facilities construction with the rural community continuing as in the past to bear living costs, then the society as a whole would experience saving and investment growth as the consumption on the part of this disguised unemployment would remain the same as before. In other words, the population growth increment can be a valuable resource. In the case of Japan during the 1970's where conditions of high growth and increasing labor demand were present, the proportion of productive population (15 - 64 year olds) increased with the greater portion of the population employed. This in turn accelerated economic production.

In the case of Oman, the nation is in a process of rapid modernization. Shortages of skilled and unskilled labor required for this effort have been serious and numerous foreigners have been brought into the country to work.

However, as economic development continues and Omanization intensifies, the demand for Omani labor will increase. The population increment will readily be able to find employment.

Diversification of the economy will also create new employment opportunities, potentially accelerating economic development. However, moving away from an economy dependent on oil production will not be easy

as can be seen in the case of other Gulf countries. Therefore, it is important that the country adopt a conservative population policy for the foreseeable future, given factors of the difficulty of diversifying the economy away from oil. Fluctuating oil prices tend to destabilize the economy.

7.2 Demography in Oman

The government has not as yet implemented a population census at the national level. Various government agencies and international organizations, however, have carried out independent estimations. According to World Bank Report No. 6899-OM, the population of the Sultanate is estimated as follows:

| | |
|--------------------------|-----------|
| Omani | 1,200,000 |
| Employable population | 298,000 |
| Employed population | 288,000 |
| Non-Omanis | 400,000 |
| Total population | 1,600,000 |
| Employable population | |
| as % of total population | 24.8% |
| Unemployment | 3.5% |

According to the World Development Report, 1988 published by the World Bank, the population growth rate from 1980 - 1987 was estimated at 4.6 %. This is a 1 % increase over the growth rate for 1965 - 1980 which was estimated in the same report. This increase in the growth rate is mainly attributed to rapid modernization and high economic growth sustained by oil income, occurring over the 20-year period subsequent to 1970, resulting in increased labor demand met by the importation of personnel from abroad.

Conventionally, foreign capital plays a major role in the initial stages of modernization of the economy. In the case of Oman, reliance on outside labor (engineers, academics, etc.) rather than outside capital is a special feature.

The Development Council of the government puts population at 1.5 million as of 1989. The council sees the need for development planning to take into account population increase, and Omanization of the labor force as key issues.

On the basis of assumptions by the Development Council, and the reference data and criteria set out below, sex and age of the population, and breakdowns of Omani and non-Omani work-force were estimated for 1990, 1995 and 2000.

(1) Reference Data

(a) World Bank Report No. 6899-OM

(b) Planning Committee for Environment and Development in the Southern Region:

Southern Region Development Plan

(c) Ministry of Housing:

Muscat Regional Development Plan

Batinah Regional Development Plan

Dakhliya Regional Development Plan

Dhahira Regional Development Plan

Sharqiya Regional Development Plan

(d) Statistical Yearbook 1988

(2) Criteria

(a) Total population estimated (including Omani and non-Omani for 1990, 1995 and 2000; assume a population of 1.5 million in 1989, and 3.5 % growth rate for each year thereafter).

(b) Increase in the rate for non-Omani labor is assumed at zero for 1988 - 1990, and 1 % for 1991 - 2000. Total non-Omani population (including non-Omanis in the government and their families) is 1.2 times the non-Omani work-force.

(c) Figure for Omani population is obtained by subtracting the non-

Omani population from the total population.

(d) Calculation of Omani labor is made as follows:

- (i) The non-working population is assumed at 53.4 % of the total population. 51.0 % of this is accounted for by the 0 - 14 age group, and 2.4 % by the over 65 age group.
- (ii) Of the employable work force of 46.6 %, females comprise 46.8 %. Employed females are assumed at 10 % of the total employable females. Accordingly, the female population not participating in the labor market is calculated at 19.7 % of the total population.
- (iii) Of the remaining employable labor force of 26.9 % (total employable labor population minus the female component in (ii) above assumed not to participate in the labor market), a further 2.5 % is disregarded as currently students in institutions of higher learning. Thus, the realistic employable population (economically active population) is estimated at 24.4 % of the total population.

(e) Population by region is as follows (Development Council, 1989):

| | |
|----------|-----------|
| Muscat | : 22.19 % |
| Batinah | : 29.05 % |
| Dakhliya | : 12.67 % |
| Dhahira | : 9.03 % |
| Sharqiya | : 14.52 % |
| Janubiya | : 10.95 % |
| Musandam | : 1.59 % |

Results of the calculations from the above are shown in Tables 7.1 - 7.2. The population pyramid is indicated in Figure 7.1.

Table 7.1 Estimated Population Structure in 1990, 1995 and 2000

(1) AGE-SEX STRUCTURE IN 1990

| AGE | MALE POPULATION | | FEMALE POPULATION | | TOTAL | | SEX COMPONENT | |
|-------|-----------------|-------|-------------------|-------|------------|-------|---------------|-----------|
| | POPULATION | % | POPULATION | % | POPULATION | % | MALE(%) | FEMALE(%) |
| 0-4 | 131,578 | 21.2 | 126,957 | 21.2 | 258,535 | 21.2 | 50.9 | 49.1 |
| 5-9 | 104,060 | 16.8 | 97,268 | 16.3 | 201,328 | 16.5 | 51.7 | 48.3 |
| 10-14 | 82,987 | 13.4 | 78,473 | 13.1 | 161,460 | 13.3 | 51.4 | 48.6 |
| 15-19 | 67,493 | 10.9 | 59,678 | 10.0 | 127,171 | 10.4 | 53.1 | 46.9 |
| 20-24 | 48,962 | 7.9 | 45,372 | 7.6 | 94,334 | 7.7 | 51.9 | 48.1 |
| 25-29 | 37,744 | 6.1 | 38,428 | 6.4 | 76,172 | 6.3 | 49.6 | 50.4 |
| 30-34 | 30,927 | 5.0 | 32,502 | 5.4 | 63,429 | 5.2 | 48.8 | 51.2 |
| 35-39 | 26,030 | 4.2 | 27,002 | 4.5 | 53,032 | 4.4 | 49.1 | 50.9 |
| 40-44 | 21,506 | 3.5 | 21,788 | 3.6 | 43,294 | 3.6 | 49.7 | 50.3 |
| 45-49 | 18,779 | 3.0 | 18,137 | 3.0 | 36,916 | 3.0 | 50.9 | 49.1 |
| 50-54 | 15,804 | 2.6 | 15,024 | 2.5 | 30,828 | 2.5 | 51.3 | 48.7 |
| 55-59 | 11,776 | 1.9 | 11,852 | 2.0 | 23,627 | 1.9 | 49.8 | 50.2 |
| 60-64 | 9,049 | 1.5 | 10,295 | 1.7 | 19,344 | 1.6 | 46.8 | 53.2 |
| 65-69 | 5,764 | 0.9 | 6,884 | 1.2 | 12,647 | 1.0 | 45.6 | 54.4 |
| 70-74 | 3,595 | 0.6 | 4,549 | 0.8 | 8,144 | 0.7 | 44.1 | 55.9 |
| 75-79 | 2,231 | 0.4 | 2,813 | 0.5 | 5,044 | 0.4 | 44.2 | 55.8 |
| 80-84 | 1,054 | 0.2 | 1,257 | 0.2 | 2,311 | 0.2 | 45.6 | 54.4 |
| 85- | 434 | 0.1 | 299 | 0.1 | 733 | 0.1 | 59.2 | 40.8 |
| TOTAL | 619,772 | 100.0 | 598,578 | 100.0 | 1,218,344 | 100.0 | 50.9 | 49.1 |

(2) AGE-SEX STRUCTURE IN 1995

| AGE | MALE POPULATION | | FEMALE POPULATION | | TOTAL | | SEX COMPONENT | |
|-------|-----------------|------|-------------------|------|------------|------|---------------|-----------|
| | POPULATION | % | POPULATION | % | POPULATION | % | MALE(%) | FEMALE(%) |
| 0-4 | 160,911 | 21.3 | 156,177 | 21.2 | 317,088 | 21.2 | 50.7 | 49.3 |
| 5-9 | 124,591 | 16.5 | 121,930 | 16.5 | 246,521 | 16.5 | 50.5 | 49.5 |
| 10-14 | 101,712 | 13.5 | 96,024 | 13.0 | 197,735 | 13.3 | 51.4 | 48.6 |
| 15-19 | 79,738 | 10.6 | 76,096 | 10.3 | 155,834 | 10.4 | 51.2 | 48.8 |
| 20-24 | 61,238 | 8.1 | 54,396 | 7.4 | 115,634 | 7.7 | 53.0 | 47.0 |
| 25-29 | 47,949 | 6.4 | 45,392 | 6.2 | 93,340 | 6.3 | 51.4 | 48.6 |
| 30-34 | 38,283 | 5.1 | 39,487 | 5.4 | 77,770 | 5.2 | 49.2 | 50.8 |
| 35-39 | 31,488 | 4.2 | 33,509 | 4.5 | 64,996 | 4.4 | 48.4 | 51.6 |
| 40-44 | 25,749 | 3.4 | 27,309 | 3.7 | 53,058 | 3.6 | 48.5 | 51.5 |
| 45-49 | 22,351 | 3.0 | 22,954 | 3.1 | 45,305 | 3.0 | 49.3 | 50.7 |
| 50-54 | 19,028 | 2.5 | 18,821 | 2.6 | 37,849 | 2.5 | 50.3 | 49.7 |
| 55-59 | 14,724 | 2.0 | 14,245 | 1.9 | 28,969 | 1.9 | 50.8 | 49.2 |
| 60-64 | 11,628 | 1.5 | 12,104 | 1.6 | 23,733 | 1.6 | 49.0 | 51.0 |
| 65-69 | 7,098 | 0.9 | 8,414 | 1.1 | 15,512 | 1.0 | 45.8 | 54.2 |
| 70-74 | 4,380 | 0.6 | 5,609 | 0.8 | 9,989 | 0.7 | 43.8 | 56.2 |
| 75-79 | 2,643 | 0.4 | 3,543 | 0.5 | 6,186 | 0.4 | 42.7 | 57.3 |

(3) AGE-SEX STRUCTURE IN 2000

| AGE | MALE POPULATION | | FEMALE POPULATION | | TOTAL | | SEX COMPONENT | |
|-------|-----------------|-------|-------------------|-------|------------|-------|---------------|-----------|
| | POPULATION | % | POPULATION | % | POPULATION | % | MALE(%) | FEMALE(%) |
| 0-4 | 197,333 | 21.3 | 189,166 | 21.2 | 386,499 | 21.2 | 51.1 | 48.9 |
| 5-9 | 153,327 | 16.6 | 147,487 | 16.5 | 300,814 | 16.5 | 51.0 | 49.0 |
| 10-14 | 122,662 | 13.2 | 118,598 | 13.3 | 241,259 | 13.3 | 50.8 | 49.2 |
| 15-19 | 98,296 | 10.6 | 91,676 | 10.3 | 189,972 | 10.4 | 51.7 | 48.3 |
| 20-24 | 72,633 | 7.8 | 68,332 | 7.6 | 140,966 | 7.7 | 51.5 | 48.5 |
| 25-29 | 60,590 | 6.5 | 53,217 | 6.0 | 113,806 | 6.3 | 53.2 | 46.8 |
| 30-34 | 49,380 | 5.3 | 45,525 | 5.1 | 94,905 | 5.2 | 52.0 | 48.0 |
| 35-39 | 39,096 | 4.2 | 40,159 | 4.5 | 79,255 | 4.4 | 49.3 | 50.7 |
| 40-44 | 31,314 | 3.4 | 33,361 | 3.7 | 64,675 | 3.6 | 48.4 | 51.6 |
| 45-49 | 26,867 | 2.9 | 28,263 | 3.2 | 55,130 | 3.0 | 48.7 | 51.3 |
| 50-54 | 22,698 | 2.5 | 23,344 | 2.6 | 46,042 | 2.5 | 49.3 | 50.7 |
| 55-59 | 17,788 | 1.9 | 17,530 | 2.0 | 35,318 | 1.9 | 50.4 | 49.6 |
| 60-64 | 14,638 | 1.6 | 14,310 | 1.6 | 28,948 | 1.6 | 50.6 | 49.4 |
| 65-69 | 9,172 | 1.0 | 9,749 | 1.1 | 18,921 | 1.0 | 48.5 | 51.5 |
| 70-74 | 5,559 | 0.6 | 6,708 | 0.8 | 12,267 | 0.7 | 45.3 | 54.7 |
| 75-79 | 3,243 | 0.4 | 4,293 | 0.5 | 7,536 | 0.4 | 43.0 | 57.0 |
| 80-84 | 1,390 | 0.2 | 2,057 | 0.2 | 3,447 | 0.2 | 40.3 | 59.7 |
| 85- | 463 | 0.1 | 626 | 0.1 | 1,089 | 0.1 | 42.5 | 57.5 |
| TOTAL | 926,447 | 100.0 | 894,401 | 100.0 | 1,820,848 | 100.0 | 50.9 | 49.1 |

Table 7.2 Regional Population Structure in 1990, 1995 and 2000

(1) HUMAN RESOURCES (1990)

| REGION | WILAYAT | VILLIGE | REGIONAL SHARES | POPU 1990 | OMANI POPULATION | OMANI LABOUR | NON-OMANI LABOUR | TOTAL LABOUR |
|--------------|---------|---------|-----------------|-----------|------------------|--------------|------------------|--------------|
| MUSCAT | 2 | 139 | 0.2219 | 344,500 | 158,763 | 38,738 | 138,360 | 175,742 |
| AL-JANUBIAH | 1 | 64 | 0.1095 | 169,999 | 125,361 | 30,588 | 33,270 | 62,788 |
| AL-DAKHILIAH | 9 | 255 | 0.1267 | 196,702 | 183,345 | 44,736 | 9,950 | 53,120 |
| AL-SHARQIAH | 11 | 371 | 0.1452 | 225,423 | 203,606 | 49,680 | 16,261 | 64,202 |
| AL-BATINAH | 12 | 594 | 0.2905 | 451,001 | 406,202 | 99,113 | 33,375 | 129,019 |
| AL-DHAHIRAH | 5 | 302 | 0.0903 | 140,191 | 118,413 | 28,893 | 16,228 | 44,110 |
| MUSANDAM | 4 | 172 | 0.0159 | 24,685 | 22,654 | 5,528 | 1,485 | 6,819 |
| TOTAL | 44 | 1897 | 1.0000 | 1,552,500 | 1,218,343 | 297,276 | 248,929 | 533,800 |

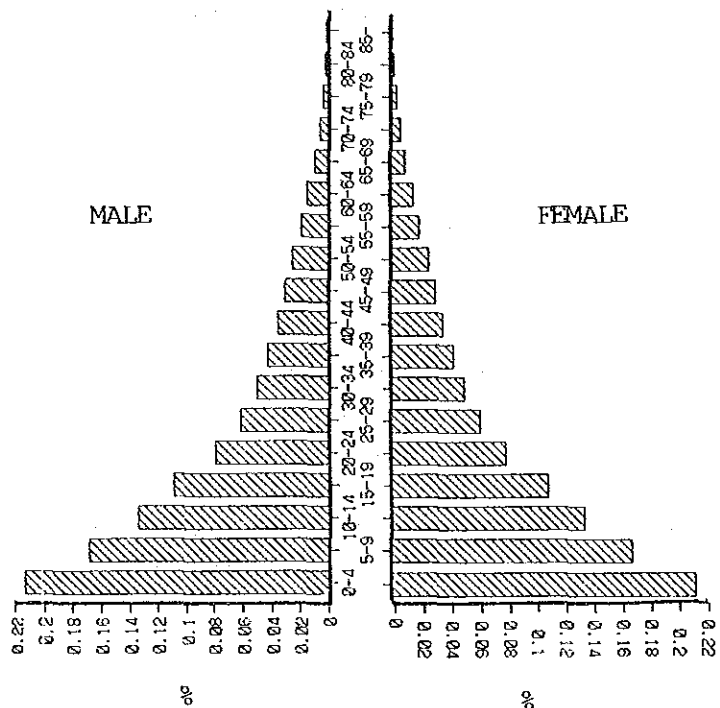
(2) HUMAN RESOURCES (1995)

| REGION | WILAYAT | VILLIGE | REGIONAL SHARES | POPU 1995 | OMANI POPULATION | OMANI LABOUR | NON-OMANI LABOUR | TOTAL LABOUR |
|--------------|---------|---------|-----------------|-----------|------------------|--------------|------------------|--------------|
| MUSCAT | 2 | 139 | 0.2219 | 409,266 | 214,037 | 52,230 | 149,416 | 195,818 |
| AL-JANUBIAH | 1 | 64 | 0.1095 | 201,959 | 155,045 | 37,831 | 34,967 | 71,474 |
| AL-DAKHILIAH | 9 | 255 | 0.1267 | 233,682 | 219,644 | 53,593 | 10,457 | 62,174 |
| AL-SHARQIAH | 11 | 371 | 0.1452 | 267,803 | 244,373 | 59,749 | 17,090 | 74,748 |
| AL-BATINAH | 12 | 594 | 0.2905 | 535,789 | 488,705 | 119,244 | 35,077 | 150,147 |
| AL-DHAHIRAH | 5 | 302 | 0.0903 | 166,547 | 143,658 | 35,053 | 17,056 | 50,882 |
| MUSANDAM | 4 | 172 | 0.0159 | 29,325 | 27,190 | 6,634 | 1,561 | 7,963 |
| TOTAL | 44 | 1897 | 1.0000 | 1,844,370 | 1,493,172 | 364,334 | 261,624 | 613,207 |

(3) HUMAN RESOURCES (2000)

| REGION | WILAYAT | VILLIGE | REGIONAL SHARES | POPU 2000 | OMANI POPULATION | OMANI LABOUR | NON-OMANI LABOUR | TOTAL LABOUR |
|--------------|---------|---------|-----------------|-----------|------------------|--------------|------------------|--------------|
| MUSCAT | 2 | 139 | 0.2219 | 486,036 | 280,872 | 68,533 | 152,832 | 218,966 |
| AL-JANUBIAH | 1 | 64 | 0.1095 | 239,174 | 190,407 | 46,459 | 36,750 | 81,583 |
| AL-DAKHILIAH | 9 | 255 | 0.1267 | 277,409 | 262,656 | 64,088 | 10,990 | 72,835 |
| AL-SHARQIAH | 11 | 371 | 0.1452 | 317,980 | 293,880 | 71,707 | 17,962 | 87,159 |
| AL-BATINAH | 12 | 594 | 0.2905 | 636,394 | 586,908 | 143,206 | 36,866 | 175,059 |
| AL-DHAHIRAH | 5 | 302 | 0.0903 | 197,687 | 173,631 | 42,366 | 17,926 | 58,809 |
| MUSANDAM | 4 | 172 | 0.0159 | 34,737 | 32,493 | 7,928 | 1,641 | 9,292 |
| TOTAL | 44 | 1897 | 1.0000 | 2,189,957 | 1,820,848 | 444,287 | 274,967 | 703,704 |

Figure 7.1 Population Pyramid by Sex and Age



7.3 Agricultural Labor Population

On the basis of estimates in the foregoing section, the regional agricultural labor population was estimated. The percentage that the agricultural labor population occupies in the total labor force is estimated as per below on a regional basis (based on data from the Planning Committee for Environment and Development in the Southern Region and MH).

| | | |
|----------|---|--------|
| Muscat | : | 2.0 % |
| Batinah | : | 25.0 % |
| Dakhliya | : | 42.0 % |
| Dhahira | : | 45.0 % |
| Sharqiya | : | 40.0 % |
| Janubiya | : | 11.0 % |
| Musandam | : | 45.0 % |

The above percentages are assumed not to change through to the year 2000. Also, *non-Omanis* are included in the above agricultural labor percentages and must be subtracted to compute the purely Omani agricultural labor force.

Computational results for regional agricultural labor are indicated in Table 7.3. According to these, the Omani agricultural labor population is estimated at 100,148 in 1990, and will increase to 138,455 by 2000. The 1990 figure closely corresponds to the estimate by the World Bank, and is considered appropriate.

7.4 Generation of Agricultural Employment in the 10-year Master Plan

The preliminary estimation of employment to be generated in the agricultural sector under the 10-year Master Plan was made on the basis of the following criteria.

Table 7.3 Supply of Agricultural Labor in 1990, 1995 and 2000

(1) HUMAN RESOURCES (1990)

| REGION | WILAYAT | VILLIGE | REGIONAL SHARES | POPU 1990 | TOTAL LABOUR | AGRICULTURE LABOUR'S | | OMANI |
|--------------|---------|---------|-----------------|-----------|--------------|----------------------|---------|--------|
| | | | | | | SHARES | LABOUR | |
| MUSCAT | 2 | 139 | 0.2219 | 344,500 | 175,742 | 0.02 | 3,515 | 1,518 |
| AL-JANUBIAH | 1 | 64 | 0.1095 | 159,999 | 62,788 | 0.11 | 6,969 | 1,507 |
| AL-DAKHILIAH | 9 | 255 | 0.1267 | 196,702 | 53,120 | 0.42 | 22,364 | 1,270 |
| AL-SHARQIAH | 11 | 371 | 0.1452 | 225,423 | 64,202 | 0.40 | 25,552 | 1,295 |
| AL-BATINAH | 12 | 594 | 0.2905 | 451,001 | 129,019 | 0.25 | 32,513 | 4,308 |
| AL-DHAHIRAH | 5 | 302 | 0.0903 | 140,191 | 44,110 | 0.45 | 19,938 | 3,768 |
| MUSANDAM | 4 | 172 | 0.0159 | 24,685 | 6,819 | 0.45 | 3,069 | 105 |
| TOTAL | 44 | 1897 | 1.0000 | 1,552,500 | 535,800 | | 113,919 | 13,771 |

(2) HUMAN RESOURCES (1995)

| REGION | WILAYAT | VILLIGE | REGIONAL SHARES | POPU 1995 | TOTAL LABOUR | AGRICULTURE LABOUR'S | | OMANI |
|--------------|---------|---------|-----------------|-----------|--------------|----------------------|---------|--------|
| | | | | | | SHARES | LABOUR | |
| MUSCAT | 2 | 139 | 0.2219 | 409,266 | 195,818 | 0.02 | 3,916 | 1,595 |
| AL-JANUBIAH | 1 | 64 | 0.1095 | 201,959 | 71,474 | 0.11 | 7,934 | 1,584 |
| AL-DAKHILIAH | 9 | 255 | 0.1267 | 233,682 | 62,174 | 0.42 | 26,175 | 1,335 |
| AL-SHARQIAH | 11 | 371 | 0.1452 | 267,803 | 74,748 | 0.40 | 29,750 | 1,361 |
| AL-BATINAH | 12 | 594 | 0.2905 | 535,789 | 150,147 | 0.25 | 37,837 | 4,528 |
| AL-DHAHIRAH | 5 | 302 | 0.0903 | 166,547 | 50,882 | 0.45 | 22,999 | 3,960 |
| MUSANDAM | 4 | 172 | 0.0159 | 29,325 | 7,963 | 0.45 | 3,583 | 110 |
| TOTAL | 44 | 1897 | 1.0000 | 1,844,370 | 613,207 | | 132,194 | 14,473 |

(3) HUMAN RESOURCES (2000)

| REGION | WILAYAT | VILLIGE | REGIONAL SHARES | POPU 2000 | TOTAL LABOUR | AGRICULTURE LABOUR'S | | OMANI |
|--------------|---------|---------|-----------------|-----------|--------------|----------------------|---------|--------|
| | | | | | | SHARES | LABOUR | |
| MUSCAT | 2 | 139 | 0.2219 | 486,036 | 218,966 | 0.02 | 4,379 | 1,676 |
| AL-JANUBIAH | 1 | 64 | 0.1095 | 239,714 | 81,583 | 0.11 | 9,056 | 1,665 |
| AL-DAKHILIAH | 9 | 255 | 0.1267 | 277,409 | 72,835 | 0.42 | 30,664 | 1,403 |
| AL-SHARQIAH | 11 | 371 | 0.1452 | 317,980 | 87,159 | 0.40 | 34,689 | 1,430 |
| AL-BATINAH | 12 | 594 | 0.2905 | 636,394 | 175,059 | 0.25 | 44,115 | 4,759 |
| AL-DHAHIRAH | 5 | 302 | 0.0903 | 197,687 | 58,809 | 0.45 | 26,582 | 4,162 |
| MUSANDAM | 4 | 172 | 0.0159 | 34,737 | 9,292 | 0.45 | 4,181 | 116 |
| TOTAL | 44 | 1897 | 1.0000 | 2,189,957 | 703,704 | | 153,666 | 15,211 |

(1) Labor Demand

Unit labor input necessary to produce 1 ton of farm produce is estimated as follows:

| | | |
|---------------|------|--------------|
| - Feed crops | 0.05 | man-year/ton |
| - Fruit | 0.30 | man-year/ton |
| - Field crops | 0.25 | man-year/ton |
| - Vegetables | 0.35 | man-year/ton |
| - Milk | 0.05 | man-year/ton |
| - Mutton | 2.00 | man-year/ton |
| - Beef | 1.00 | man-year/ton |
| - Chicken | 0.30 | man-year/ton |
| - Table eggs | 0.30 | man-year/ton |

(2) Correction Coefficient

Labor productivity increases with time. The correction coefficient for the base year 1988 is assumed to be 0.75, which is subsequently factored by 0.9 for 1995 and 2000 to yield correction coefficients of 0.67 and 0.60, respectively to be applied to the unit labor inputs in (1). The correction coefficient 0.75 for 1990 has been determined to correlate with the agricultural labor population as estimated for 1990 in section 7.3.

(3) Agricultural Labor Demand

To compute demand for agricultural labor, estimated farm productions for 1988, 1995 and 2000 are multiplied by the corrected unit labor inputs. Details of the forecast for agricultural production increases resulting in the 10-year Master Plan are continued in volume 5, chapter 2, "Prospects for Demand and Production of Agricultural Products".

Computational results for the above are indicated in Table 7.4. According to these, increased agricultural production will create labor demand in 2000 for 161,090 workers. Of this, 145,144 are estimated to be

Table 7.4 Demand for Agricultural Labor in 10-Year Plan

| Product | Value Man/zt | | Weight | | Coeff. | | Production | | Labor Demand | |
|-----------|--------------|------|--------|------|--------|------|------------|-----------|--------------|---------|
| | 1988 | 2000 | 1988 | 2000 | 1988 | 2000 | 1988 | 2000 | 1988 | 2000 |
| Seed | 0.05 | 0.75 | 0.67 | 0.60 | 0.04 | 0.03 | 488.352 | 626.221 | 18,191 | 23,006 |
| Fruit | 0.30 | 0.75 | 0.67 | 0.60 | 0.22 | 0.20 | 186.462 | 248.769 | 41,674 | 50,040 |
| Field | 0.25 | 0.75 | 0.67 | 0.60 | 0.19 | 0.17 | 702 | 1,020 | 131 | 171 |
| Vegetable | 0.35 | 0.75 | 0.67 | 0.60 | 0.26 | 0.23 | 139,244 | 202,620 | 36,308 | 49,645 |
| Milk | 0.05 | 0.75 | 0.67 | 0.60 | 0.04 | 0.03 | 41,638 | 44,562 | 1,551 | 1,494 |
| Butter | 2.00 | 0.75 | 0.67 | 0.60 | 1.49 | 1.21 | 3,799 | 7,391 | 5,661 | 9,911 |
| Beef | 1.00 | 0.75 | 0.67 | 0.60 | 0.75 | 0.60 | 2,750 | 4,957 | 2,049 | 3,324 |
| Chicken | 0.30 | 0.75 | 0.67 | 0.60 | 0.22 | 0.20 | 1,500 | 27,294 | 353 | 5,490 |
| Egg | 0.30 | 0.75 | 0.67 | 0.60 | 0.22 | 0.20 | 1,950 | 10,300 | 436 | 2,172 |
| Total | | | | | | | 866,477 | 1,233,634 | 106,353 | 143,158 |
| Omani | | | | | | | | | 93,497 | 127,484 |
| Foreigner | | | | | | | | | 12,856 | 15,673 |

Omani. As a result, it can be seen that the agricultural labor market will readily be able to absorb, in 2000, the estimated agricultural labor population of 138,455.

In order to achieve the goals under the 10-year Master Plan, human resources must be deployed in a variety of sectors, including agriculture, livestock, irrigation and dams, etc. This will generate labor demand in addition to that discussed above. In particular, specialists will be needed to strengthen research and extension, agricultural statistics surveys, livestock health and disease control, plant quarantine, etc. Specialists will include various engineers, experts, veterinarians, and government technocrats. PAMAP staff will need to be reinforced to promote the expansion of the farm product distribution system and the establishment of wholesale markets. Management personnel and labor will also be needed in the area of processing of agricultural products.

Demand for the specialists and experts mentioned above can be broken down as follows:

(1) Irrigation and Dam Sector

(a) Irrigation engineers: increase of 147 (10 at the Irrigation Systems Section of the Directorate General of Agriculture, 119 for the centrally controlled water distribution system and 18 for hydrological monitoring)

(2) Agricultural Sector

(a) Agricultural research: increase of 226 (53 research experts, 89 assistants, 84 technicians)

(b) Extension: increase of 368 (20 extension supervisors, 89 extension officers, 215 officer assistants, 44 subject matter specialists)

- (c) Development Support
Communication Center: increase of 30 (3 experts, 19 engineers,
8 technicians)
- (d) Statistical: increase of 83 (13 specialists, 14
statisticians, 56 enumerators)
- (e) Plant Quarantine: increase of 45 (20 engineers, 2
assistants, 23 technicians)
- (3) Livestock Sector
 - (a) Extension: increase of 201 (41 subject matter
specialists, 40 extension officers, 120
assistants)
 - (b) Livestock Health
and Disease Control: increase of 123 (21 veterinarians, 46
assistants, 56 nurses)
 - (c) Animal quarantine: increase of 41 (17 doctors, 7
assistants, 17 nurses)
 - (d) Animal Health and
Disease Control Project: increase of 205 (15 specialists, 142
assistants, 2 veterinarians)
 - (e) Livestock Marketing
Improvement Project: increase of 34 (20 specialists, 12
assistants, 2 veterinarians)
 - (f) Livestock Input Company: increase of 41 (22 specialists, 17
assistants)
- (4) Agricultural Product Distribution Sector
 - (a) PAMAP: increase of 462 (9 special grade, 73
first grade, 18 second grade, 362 third
grade)
- (5) Agricultural Product Processing Sector
 - (a) increase of more than 300 (including labor)

(6) Inter-sectoral Projects

- (a) Integrated Agricultural Development for Nejd Region: 18 (experts in agriculture, irrigation, extension, etc.)

Total increase in MAF related professional jobs is 1,487 (excluding distribution and agro-industrial sectors as well as livestock marketing and Livestock Input Company). In addition, various support staff such as experimental farm workers, drivers, secretaries, etc. will be increased.

7.5 Upgrading Human Resources

In order to achieve the high priority policy of Omanization, training of the Omani labor force is necessary. An outline of the training program envisaged under the 10-year Master Plan is as follows:

(1) Farmer Training

In addition to training to be provided by the Agricultural Technology Information Units to be attached to each extension office, a practical introduction of agricultural practices will be performed at the demonstration fields of the key farmers. Audio-visual teaching media to be developed at the Development Support Communication Center, will also be utilized.

3,000 key farmers are targeted for the first 5-year period, and another 3,000 in the second 5-year period.

Extension officers will be deployed in the first 5-year period at a ratio of 1:250 farmers.

In the case of livestock holders, training aimed at 6,500 farmers will be conducted through a combination of subsidy (Small Holder Poultry Production Project and Intensive Livestock Production Project) and extension through demonstration units. Through the Grazing Control Project, 1,000 livestock holders in the Jabal Region

will be instructed in rangeland management techniques.

(2) Staff Training

Research, extension and statistical survey staff will be trained at the training centers to be established at Rumais and Salalah. Selected extension officers will also receive training outside Oman. During the 10-years of the agricultural development plan, 100 research staff, 2,000 extension staff, and 500 statistical staff would be expected to receive training through the above training centers. Also, the 80 extension officers would be dispatched overseas to study.

The 2,000 extension officers in the livestock sector would receive training in modern livestock husbandry techniques, including health and disease control, artificial insemination, rangeland management guidance, effective feeding methods, etc. This would also be performed at the centers at Rumais and Salalah.

ANNEX

Annex Table 4.3.1 Estimated Nutrient Requirement of Each Livestock in 2000 (DM ton)

| | Rangeland Pasture | | Cultivated Residues | | Concentrate and Others | | TOTAL |
|-----------------------|-------------------|---------|---------------------|--------|------------------------|--------------|-----------|
| | | | | | Dry-Fish | Banana Dates | |
| (Southern Region) | | | | | | | |
| Cattle | | | | | | | |
| Exotic | | 4,478 | 4,478 | | 6,717 | | 6,717 |
| Cross-bred | | 2,567 | 2,567 | | 1,753 | | 1,753 |
| Local | 144,282 | 5,187 | 149,468 | 62 | 22,658 | 3,719 | 175,845 |
| Fattening(Local) | | 5,733 | 5,733 | | 17,288 | | 22,934 |
| Fattening(Imported) | | 0 | 0 | | 0 | | 0 |
| Goats | | 0 | 0 | | 0 | | 0 |
| NEW | | 0 | 0 | | 0 | | 0 |
| Local | 27,337 | 3,987 | 31,324 | 62 | 535 | 1,200 | 5,785 |
| Fattening(Cross-bred) | | 3,037 | 30,375 | | 5,368 | | 35,735 |
| Fattening(Imported) | | 0 | 0 | | 0 | | 0 |
| Sheep | | 0 | 0 | | 0 | | 0 |
| Cross-bred | | 1,227 | 1,227 | | 526 | | 1,753 |
| Fattening(Cross-bred) | | 81 | 81 | | 243 | | 324 |
| Fattening(Imported) | | 0 | 0 | | 0 | | 0 |
| Camels | | 4,080 | 4,080 | | 7,199 | | 11,279 |
| Poultry | | 0 | 0 | | 0 | | 0 |
| Broiler | | 0 | 0 | | 0 | | 0 |
| Layer | | 0 | 0 | | 22,341 | | 22,341 |
| South Total | 0 | 208,336 | 30,377 | 124 | 95,067 | 3,719 | 338,823 |
| (Northern Region) | | | | | | | |
| Cattle | | | | | | | |
| Exotic | | 1,866 | 1,866 | | 2,799 | | 4,664 |
| Cross-bred | | 6,145 | 7,230 | | 3,183 | | 10,413 |
| Local | | 35,880 | 40,488 | 1,084 | 11,021 | 1,717 | 57,840 |
| Fattening(Local) | | 4,196 | 5,656 | 5,428 | 3,110 | 4,598 | 17,352 |
| Fattening(Imported) | | 0 | 0 | 1,500 | 0 | 2,000 | 3,500 |
| Goats | | 0 | 0 | | 0 | | 0 |
| NEW | | 0 | 0 | | 0 | | 0 |
| Local | 90,529 | 135,190 | 153,879 | 13,669 | 54,592 | 11,356 | 219,827 |
| Fattening(New) | | 11,316 | 113,161 | 11,316 | 28,290 | | 141,451 |
| Sheep | | 5,957 | 5,957 | | 17,870 | | 23,826 |
| Fattening(Cross-bred) | | 0 | 0 | | 0 | | 0 |
| Fattening(Imported) | | 45,594 | 58,298 | 12,714 | 24,985 | | 83,282 |
| Camels | 12,789 | 3,848 | 3,849 | | 6,262 | 5,284 | 15,395 |
| Poultry | | 0 | 0 | | 0 | | 0 |
| Broiler | | 8,533 | 21,332 | | 3,125 | 2,207 | 26,665 |
| Layer | | 0 | 0 | | 0 | | 0 |
| North Total | 103,328 | 0 | 257,695 | 50,731 | 319,528 | 11,156 | 768,179 |
| ALL TOTAL | 103,328 | 208,336 | 288,072 | 50,855 | 414,595 | 14,874 | 1,099,001 |

Annex Table 4.3.2 Estimate of Required Cultivated Land for Feed Crops
in 2000

| (South) | Yields | Ha | Existing |
|-----------|---------|--------|----------|
| Rohdes | 120t/ha | 1,222 | 402 |
| Alfalfa | 72t/ha | 160 | 320 |
| Others | | | 48 |
| Sub-total | | 1,382 | 770 |
| (North) | | | |
| Rohdes | 120t/ha | 8,650 | 370 |
| Alfalfa | 72t/ha | 4,225 | 8,450 |
| Others | | | 584 |
| Sub-total | | 12,875 | 9,404 |
| Total | | 14,257 | 10,174 |

Annex Table 4.3.3 Estimate of Required DM Amount in 2000

| (South) | Yields | Ha | DMton |
|-----------|---------|--------|---------|
| Rohdes | 120t/ha | 1,222 | 28,166 |
| Alfalfa | 72t/ha | 160 | 2,212 |
| Sub-total | | 1,382 | 30,378 |
| (North) | | | |
| Rohdes | 120t/ha | 8,650 | 199,289 |
| Alfalfa | 72t/ha | 4,225 | 58,406 |
| Sub-total | | 12,875 | 257,695 |
| TOTAL | | 14,257 | 288,073 |

Annex Table 4.3.4 Total Feed Requirement in Oman in the year 1988
and 2000

| | (tons) | |
|-----------------|--------|---------|
| YEAR | 1988 | 2000 |
| Layer Grower | 1,023 | 10,399 |
| Layer Layer | 7,091 | 56,127 |
| Sub Total | 8,114 | 66,526 |
| Broiler | 4,657 | 126,665 |
| Broiler Breeder | | |
| Grower | 87 | 3,964 |
| Layer | 229 | 10,473 |
| Sub Total | 316 | 14,438 |
| Total | 13,087 | 207,628 |

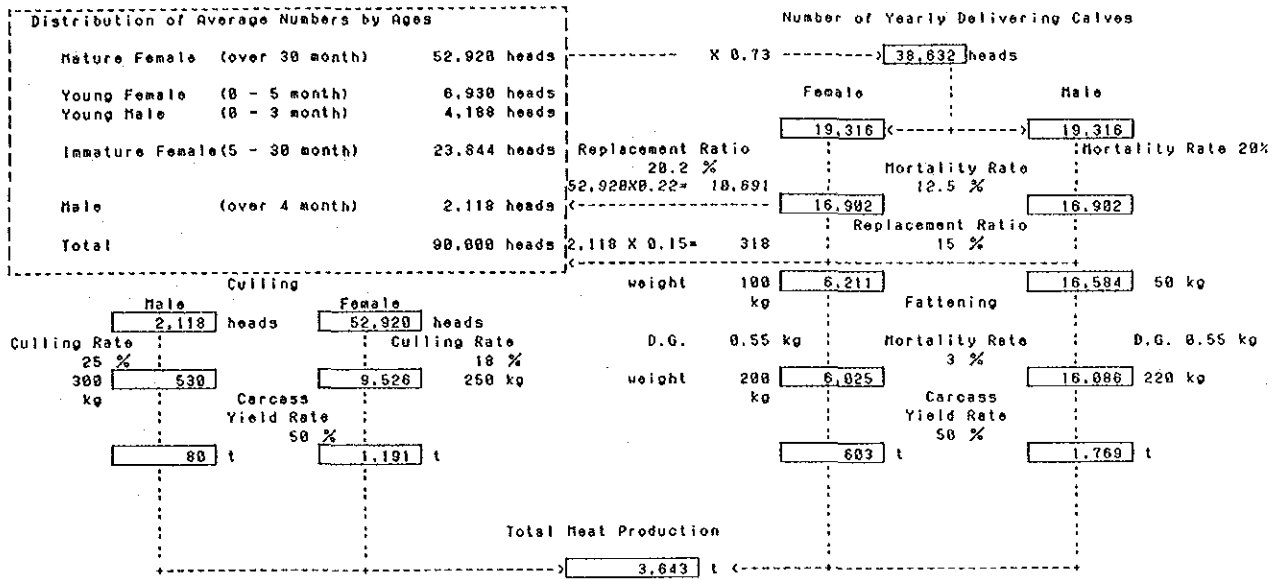
Source : Feasibility Study for Establishment of
Poultry Projects in SULTANATE OF OMAN
- G.R.M. International Pty. Ltd., 1988.

Annex Table 4.3.5 Estimate of Slaughtered Head of Each Livestock
in 2000

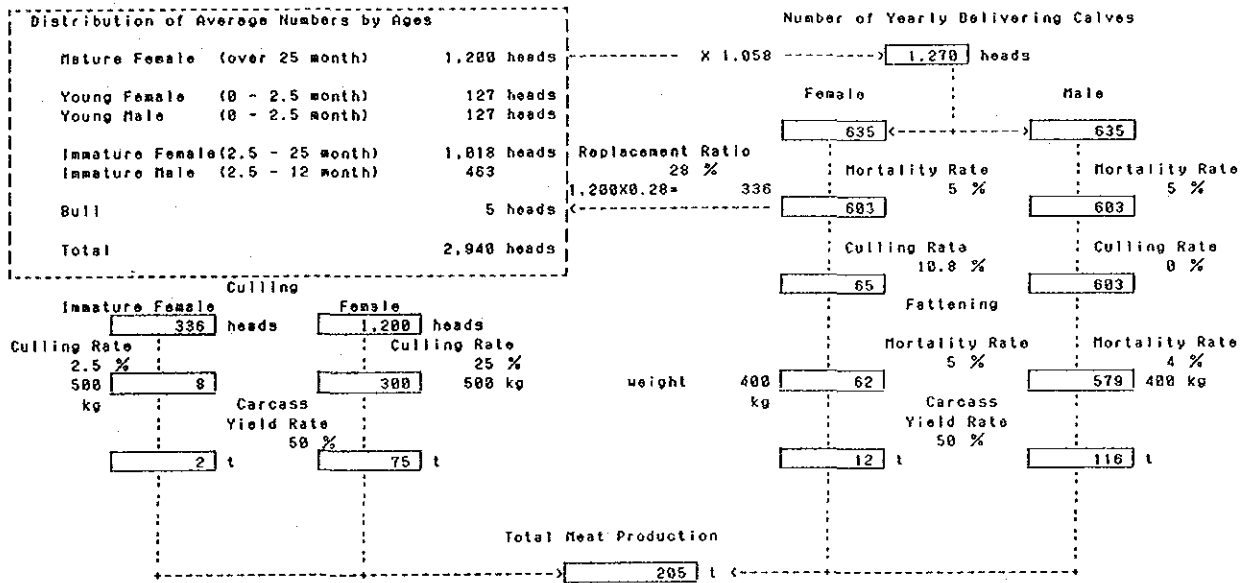
| Item | Slaughter heads | | Remark |
|-----------------------|-----------------|-----------|-------------|
| | Year | heads/day | |
| (Southern Region) | | | |
| Cattle | | | |
| Exotic | 950 | 4 | |
| Cross-bred | 785 | 3 | |
| Local | 10,059 | 40 | |
| Fattening(Local) | 22,129 | 89 | |
| Fattening(Imported) | 0 | 0 | |
| Goats | 0 | 0 | |
| NEW | 10,317 | 41 | |
| Local | 23,558 | 94 | |
| Fattening(Cross-bred) | 0 | 0 | |
| Sheep | 0 | 0 | |
| Cross-bred | 2,667 | 11 | |
| Fattening(Cross-bred) | 728 | 3 | |
| Fattening(Imported) | 0 | 0 | |
| Camels | 5,554 | 22 | |
| Poultry | 0 | 0 | |
| Broiler | 7,304,500 | 29,218 | |
| Layer | 53,333,333 | 213,333 | million nos |
| | 0 | 0 | |
| South Total | | 0 | |
| (Northern Region) | | 0 | |
| Cattle | | 0 | |
| Exotic | 396 | 2 | |
| Cross-bred | 2,158 | 9 | |
| Local | 15,356 | 61 | |
| Fattening(Local) | 8,064 | 32 | |
| Fattening(Imported) | 0 | 0 | |
| Goats | 0 | 0 | |
| NEW | 196,032 | 784 | |
| Local | 111,902 | 448 | |
| Fattening(New) | 196,032 | 784 | |
| Sheep | 0 | 0 | |
| Cross-bred | 21,436 | 86 | |
| Fattening(Cross-bred) | 99,969 | 400 | |
| Fattening(Imported) | 0 | 0 | |
| Camels | 3,086 | 12 | |
| Poultry | 0 | 0 | |
| Broiler | 36,522,500 | 146,090 | |
| Layer | 266,666,666 | 1,066,667 | |

Annex Figure 4.3.1 Meat Production in Southern Region in 2000

1. Local Cattle

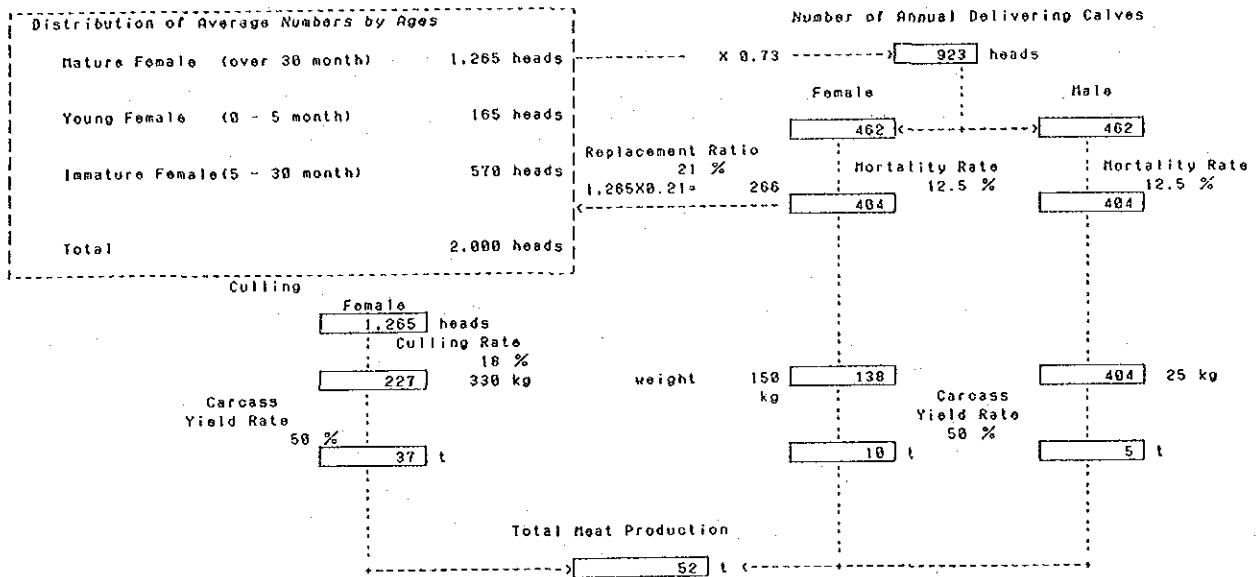


2. Exotic Dairy Cows

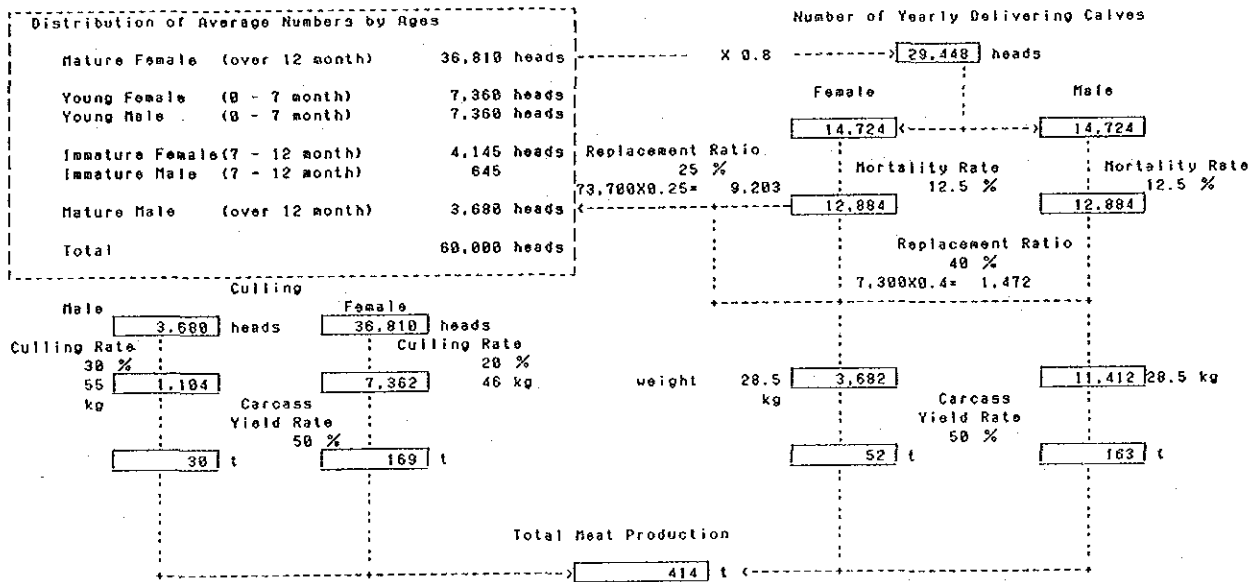


Annex Figure 4.3.1 Meat Production in Southern Region in 2000 (continued)

3. Cross-bred

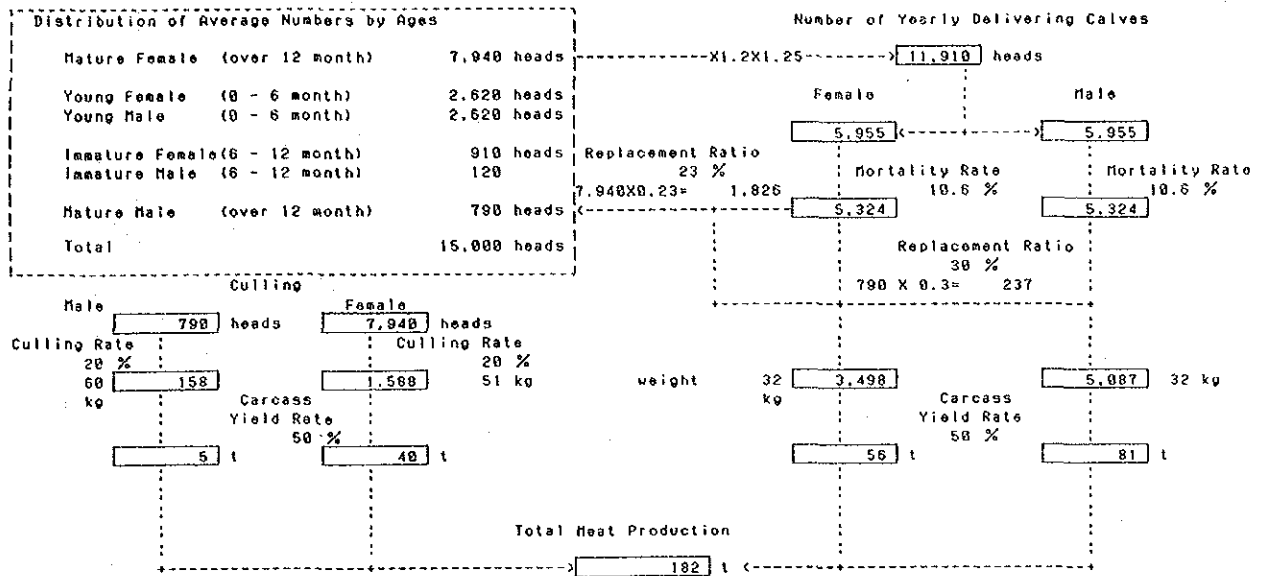


4. Local Goats

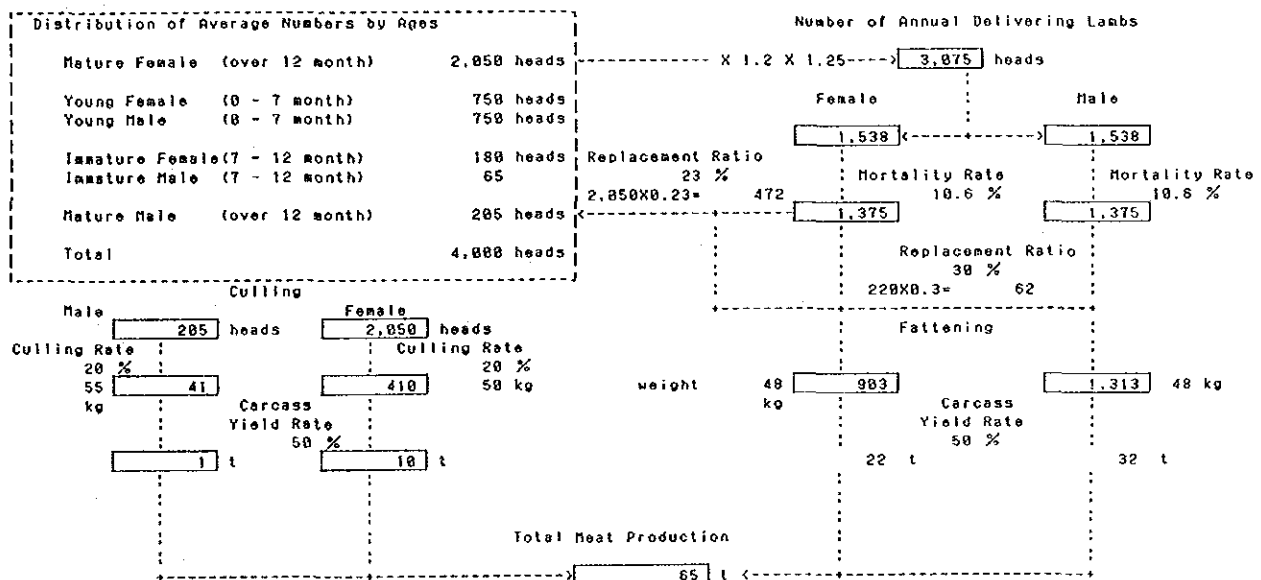


Annex Figure 4.3.1 Meat Production in Southern Region in 2000 (continued)

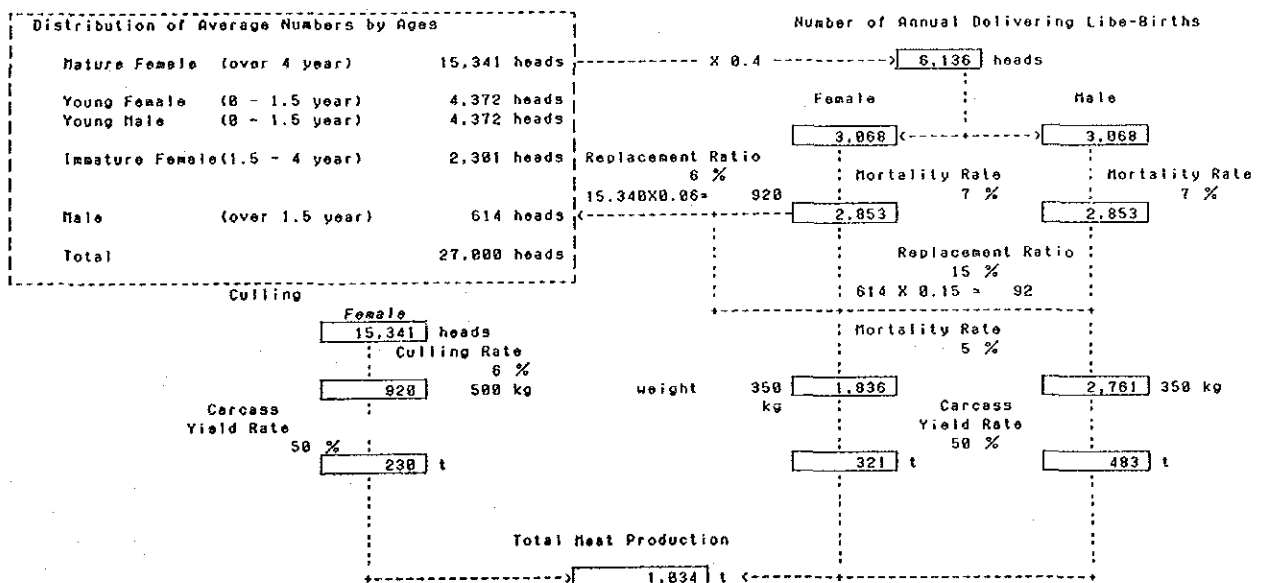
5. New Local Goats



6. Cross-bred Sheep

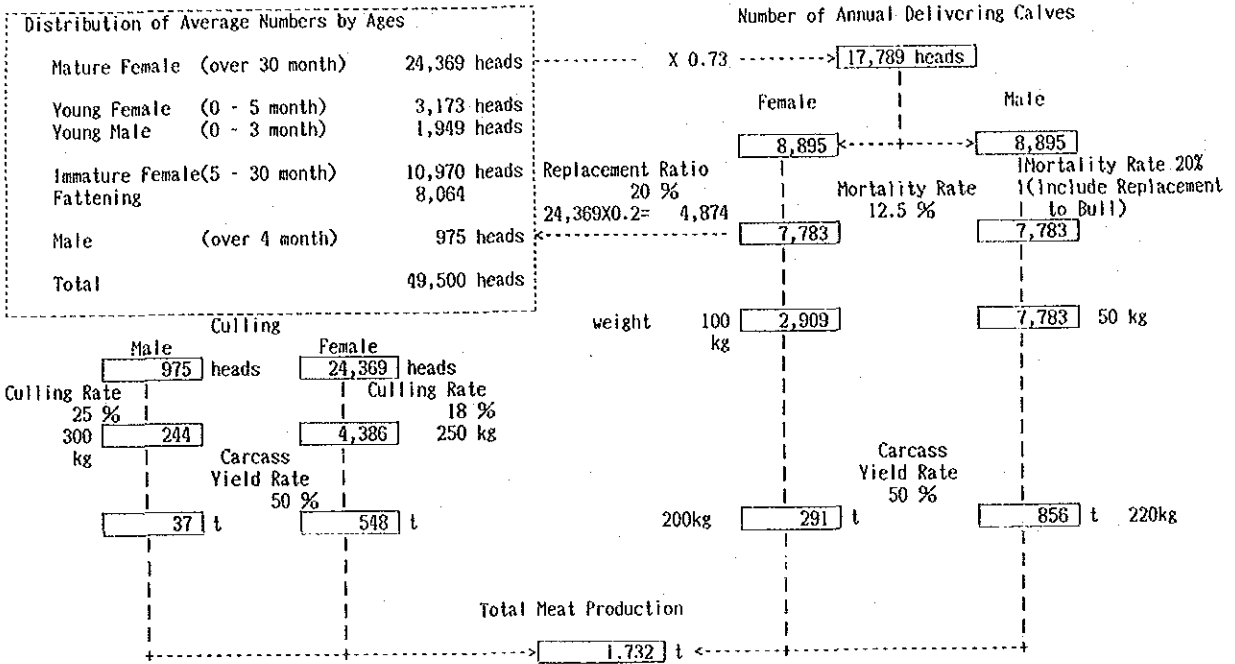


7. Camel

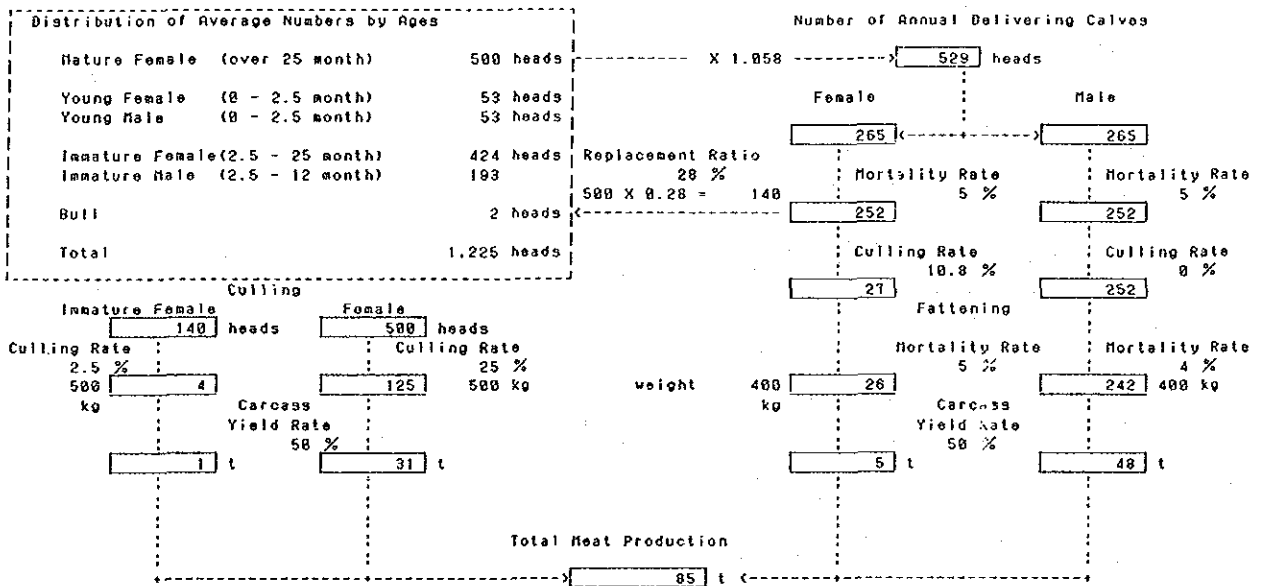


Annex Figure 4.3.2 Meat Production in Northern Region in 2000

1. Local Cattle

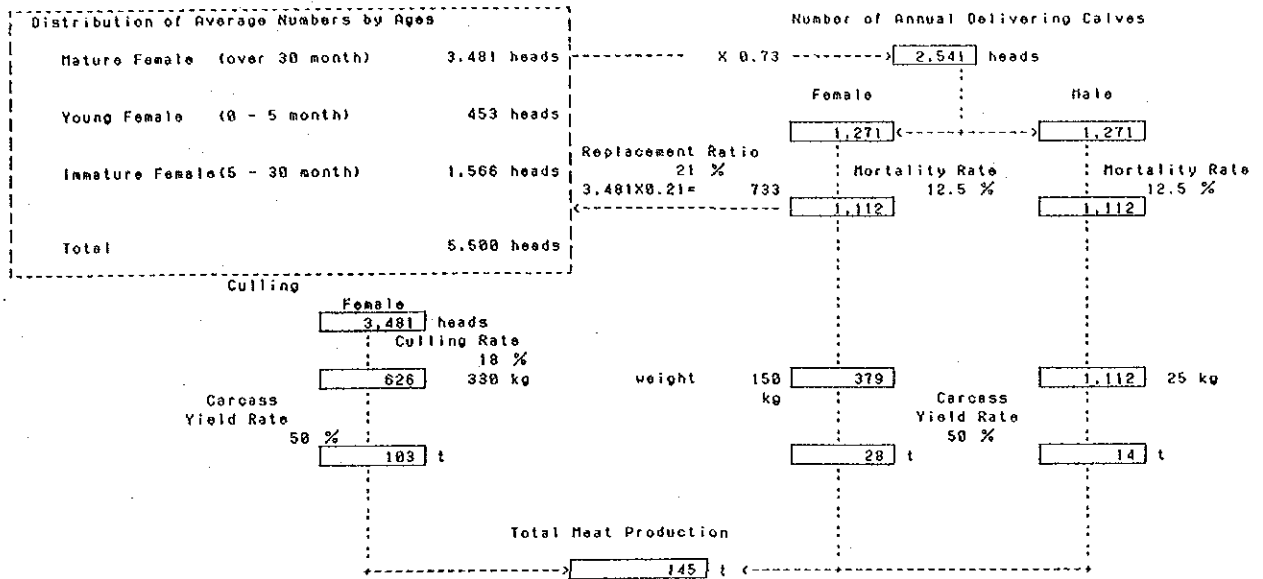


2. Exotic Dairy Cows

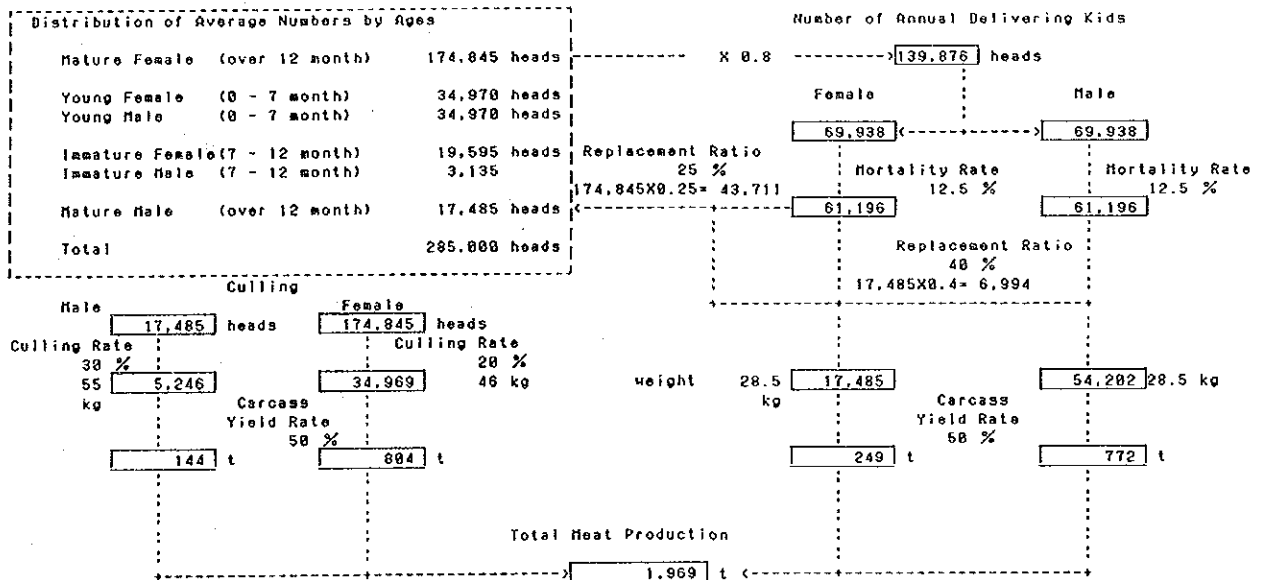


Annex Figure 4.3.2 Meat Production in Northern Region in 2000
(continued)

3. Cross-bred

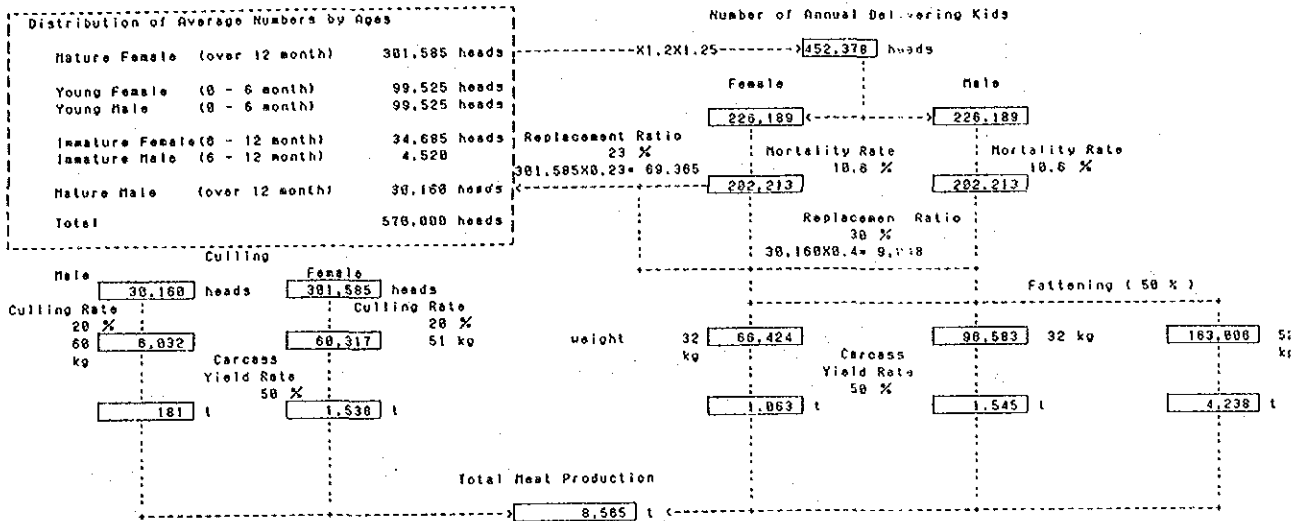


4. Local Goats

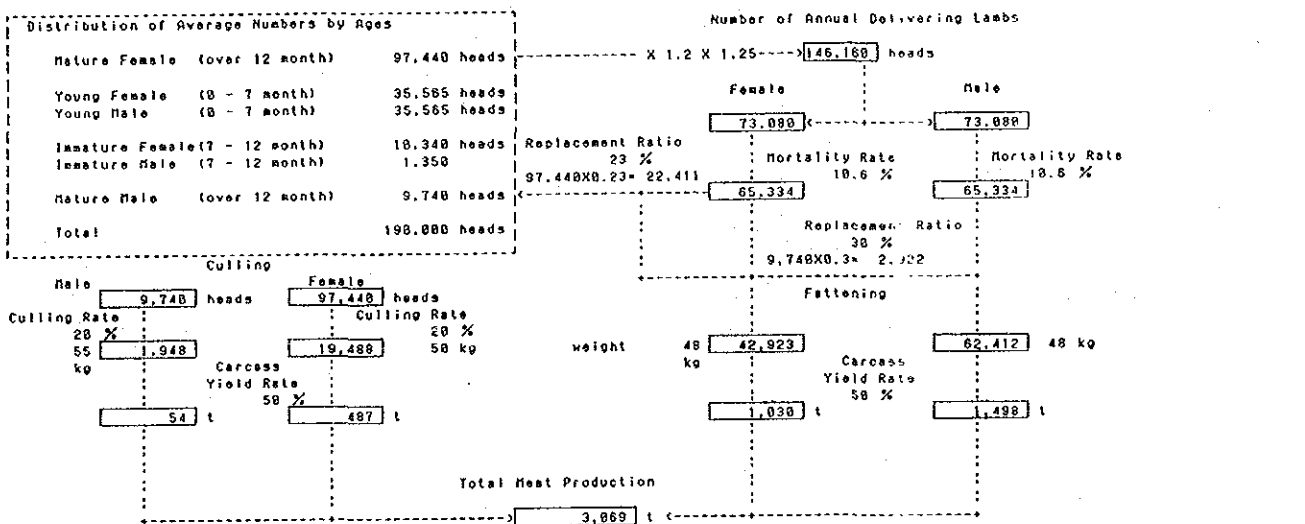


Annex Figure 4.3.2 Meat Production in Northern Region in 2000
(continued)

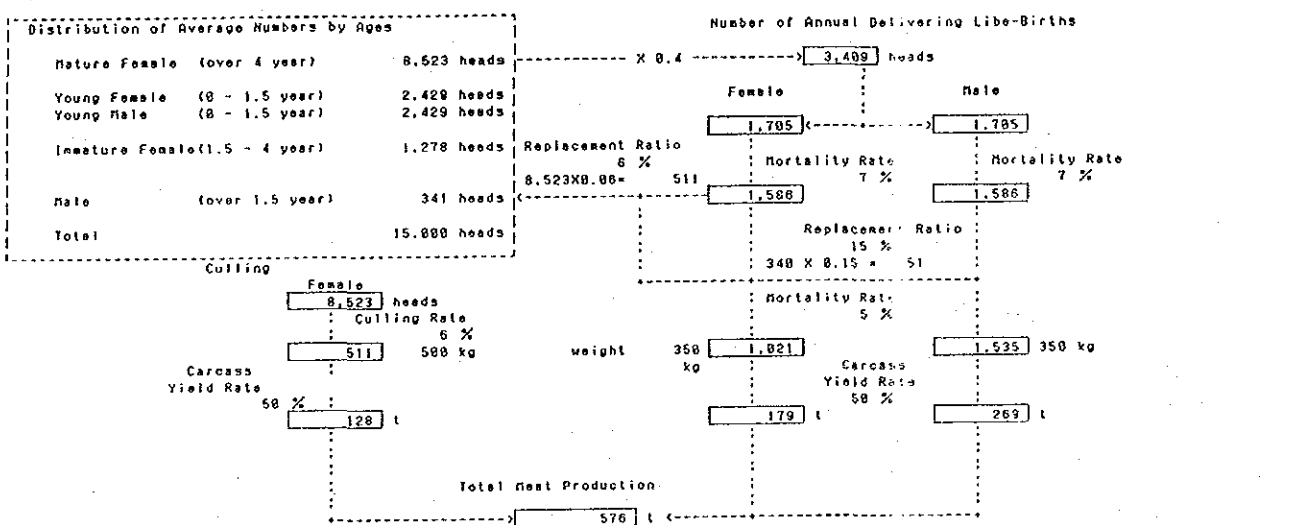
5. New Local Goats



6. Cross-bred Sheep



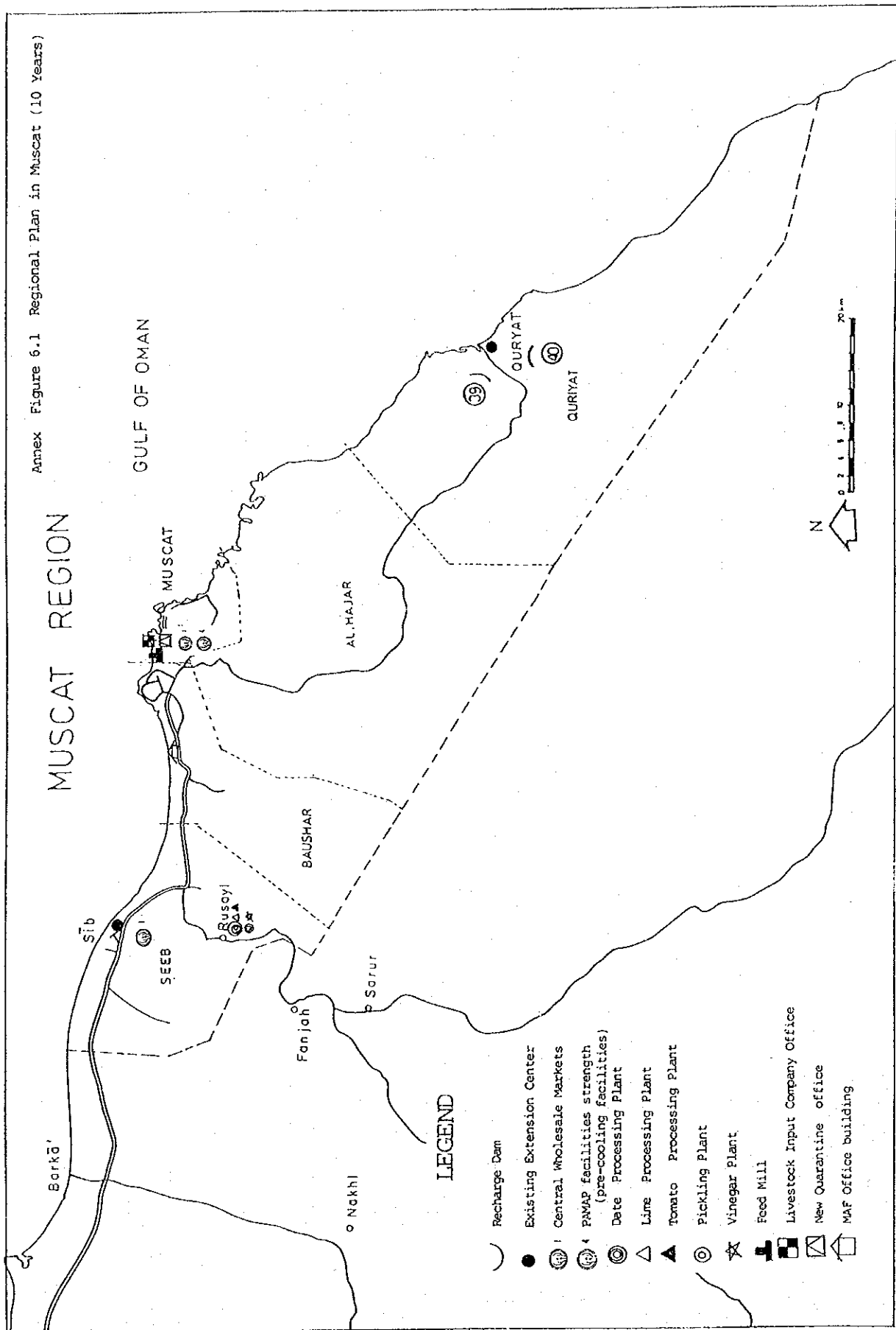
7. Camel



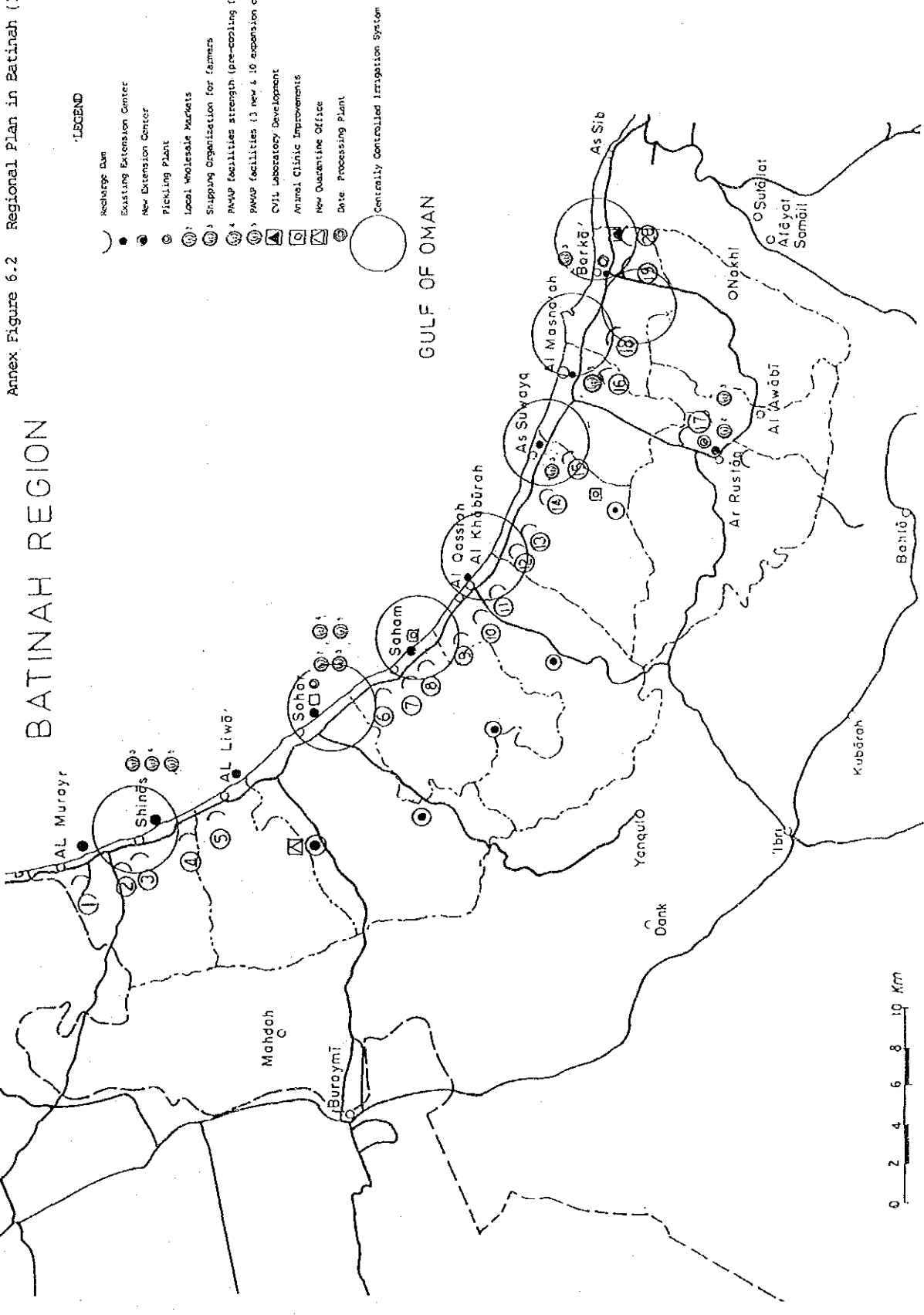
Annex Figure 4.3.3 Flow Chart in of Poultry Industry in the Future

| FLOW CHART OF POULTRY (LAYER) INDUSTRY | | FLOW CHART OF POULTRY (BROILER) INDUSTRY | |
|--|---|--|---|
| 1995 | | 1995 | |
| 2000 | | 2000 | |
| Total Demand for Eggs | 269 millions | Total Demand for Poultry Meat (tons) | 36,901 t/year |
| | 320 | | 43,827 |
| Self-Sufficiency | 90 % | Self-Sufficiency | 90 % |
| | 100 | | 100 |
| Production of Eggs (Small-holders) (Proposed Commercial) (Existing Farms) | 242 millions 74 @ 150 eggs/layer/year 32 @ 220 eggs/layer/year 136 @ 220 eggs/layer/year | Production of Poultry Meat (tons) (Small-holders) (Proposed Commercial) (Existing Farms) (Layer Farms) | 33,207 8,200 7,141 17,316 550 |
| | 320 96 88 136 | | 43,823 10,957 14,687 17,316 863 |
| No. of layers ('000) (Small-holders) (Proposed Commercial) (Existing Farms) | 1,258 493 147 618 | No. of Broiler ('000) | 31,102 t (@ 1.05 kg/broiler) |
| | 1,657 639 399 618 | | 40,914 |
| Required Chicks ('000) (Small-holders) (Proposed Commercial) (Existing Farms) | 1,139 509 121 510 | Required chicks ('000) (Local Production) (Import) | 32,739 25,262 9,114 |
| | 1,498 659 329 510 | | 43,068 36,107 9,114 |
| Feed Requirement (tons) (Layer Grower) (Layer:Small-holders) (Layer:Commercial) | 50,414 7,976 11,840 30,597 | Feed Requirement (tons) | 95,926 t (@ 2.93 kg/chick) |
| | 66,529 10,488 15,347 40,693 | | 126,188 |
| | | Required Eggs for Local Production ('000) | 31,285 |
| | | | (Chicks/0.95/0.85) |
| | | | 44,715 |
| | | Required Breeder Layer for Local Production (Breeder Grower) | 155,839 |
| | | | (Eggs/0.55) |
| | | | 222,738 |
| | | Feed Requirement (tons) (Grower) (Layer) | 10,097 2,772 7,324 |
| | | | t/year |
| | | | @ 13 kg/grower |
| | | | @ 47 kg/year |
| | | | 14,431 3,962 10,469 |

Annex Figure 6.1 Regional Plan in Muscat (10 Years)



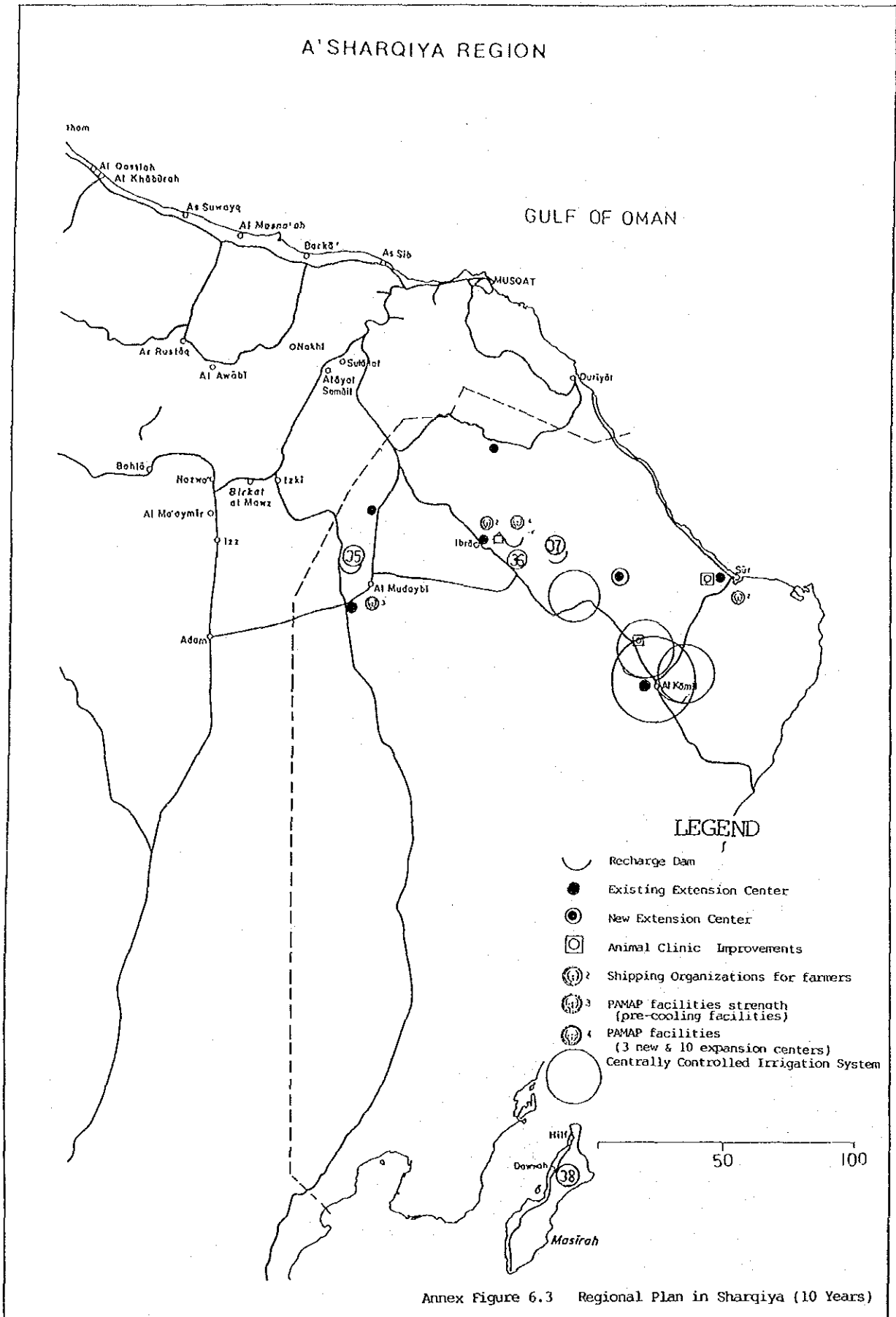
Annex Figure 6.2 Regional Plan in Batinah (10 Years)



- LEGEND**
- Recharge Dam
 - Existing Extension Center
 - New Extension Center
 - Pickling Plant
 - Local Wholesale Markets
 - Shipping Organization for Farmers
 - FWAP facilities strength (pre-cooling facilities)
 - FWAP facilities (3 new & 10 expansion centers)
 - Civil Laboratory Developments
 - Animal Clinic Improvements
 - New Quarantine Office
 - Dair Processing Plant
 - Centrally Controlled Irrigation System

0 2 4 6 8 10 Km

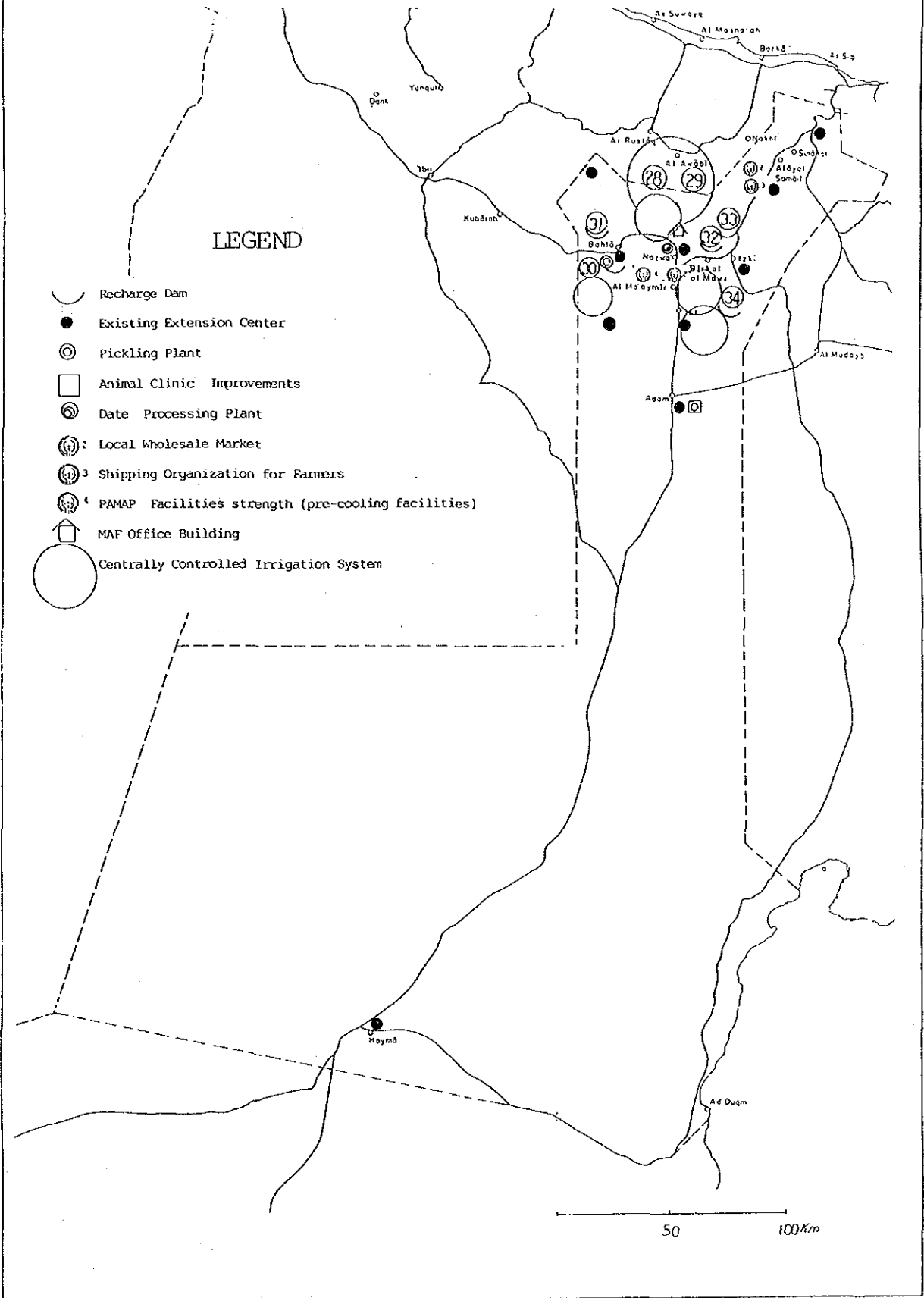
A'SHARQIYA REGION



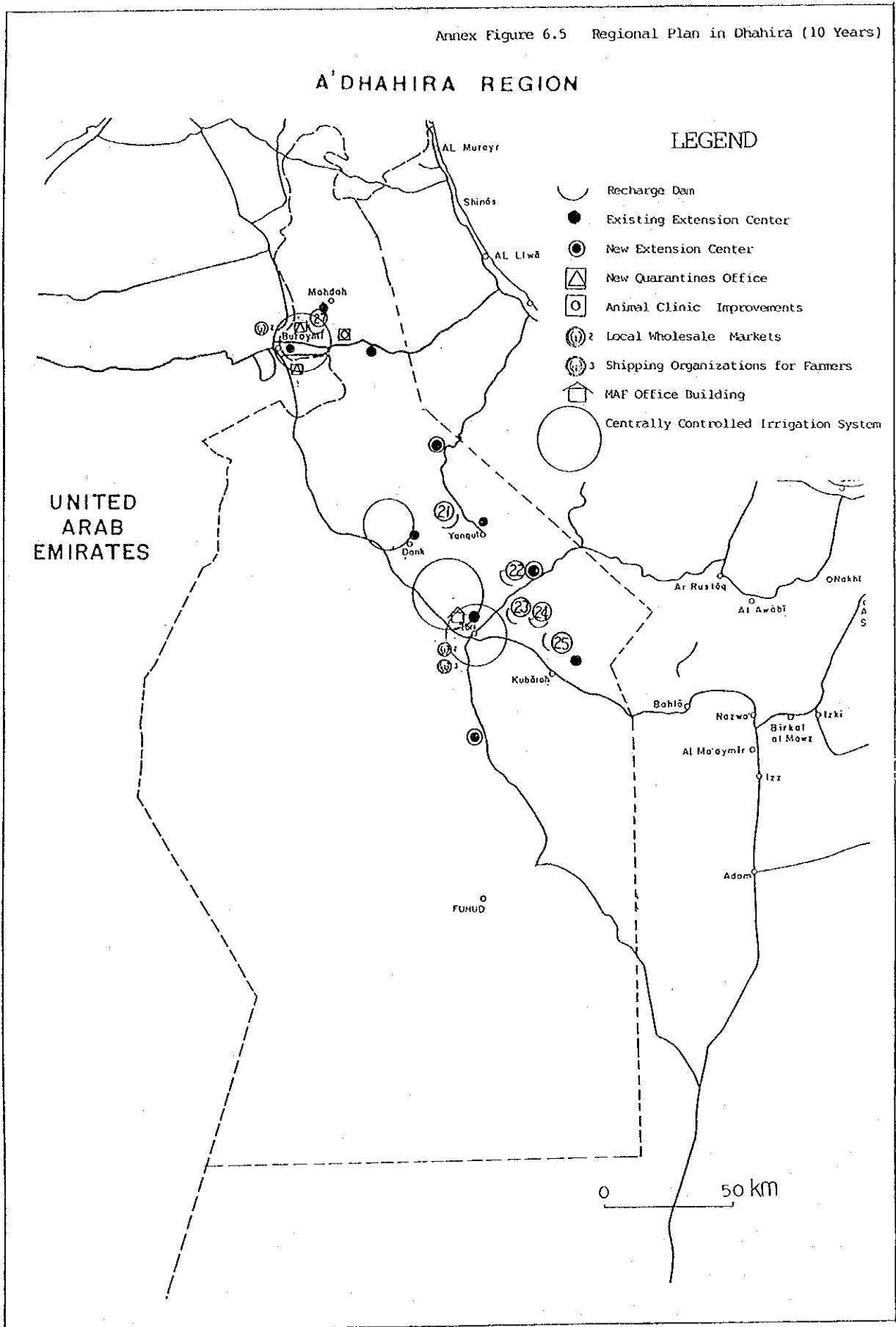
Annex Figure 6.3 Regional Plan in Sharqiya (10 Years)

Annex Figure 6.4 Regional Plan in Dakhliya (10 Years)

A'DAKHLIYA REGION

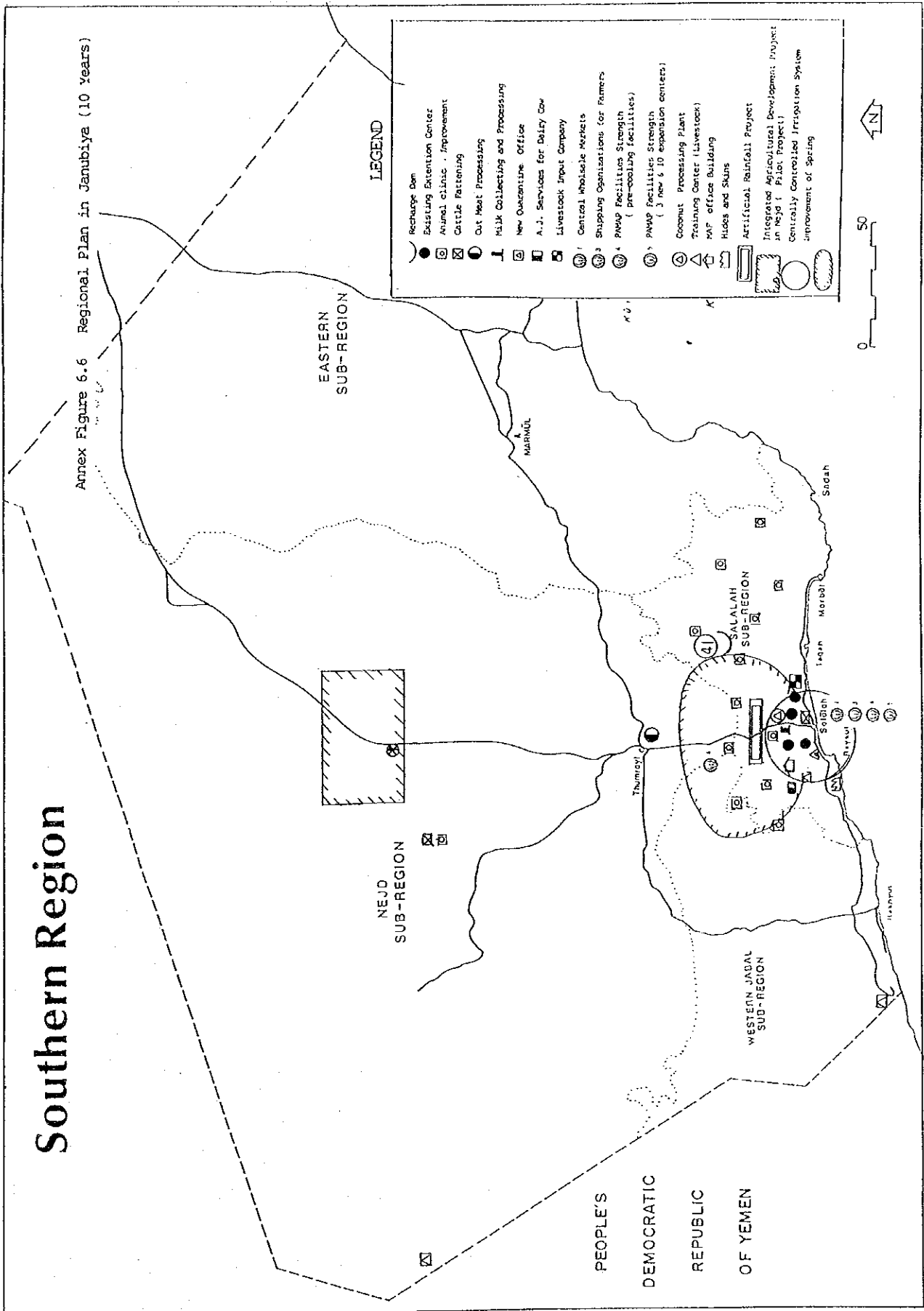


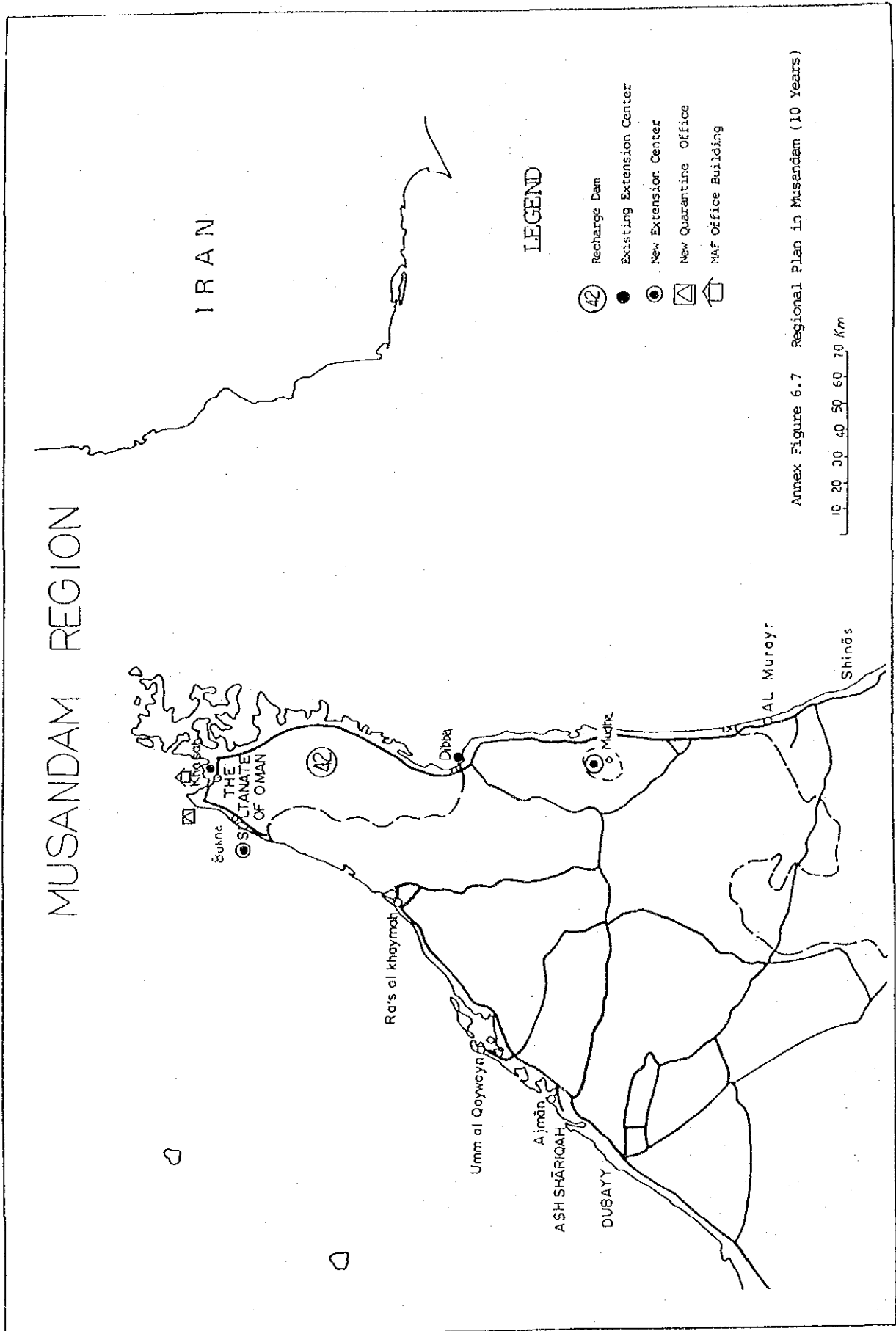
Annex Figure 6.5 Regional Plan in Dhahira (10 Years)



Southern Region

Annex Figure 6.6 Regional Plan in Janubiya (10 Years)





Annex Figure 6.7 Regional Plan in Musandam (10 Years)

