

5.7 Livestock

5.7.1 Present Situation

5.7.1.1 Assessment of the Achievements of the Third Five-year Development Plan

With respect to animal wealth, the primary goal of the Third Five-year Development Plan is to increase productivity and profitability in the livestock sector through more efficient utilization of available resources. To attain this goal, each program and project has been established according to the following concrete policies:

- (1) Optimize the livestock farmers' ability to expand supplies of locally-produced meats consistent with national policies on feed resources (described item 2 below),
- (2) Provide relief to the rangeland resource base of Oman through increased availability of feedstuffs using available by-products, irrigated forage production, and imported mixed feed concentrates,
- (3) Continue to maintain the health of the animal resources through modest expansion of the quarantine and animal health system now in place throughout Oman,
- (4) Substantiate research systems and increase the available research information through better management, and expand personnel training. All research information should be translated into usable forms so that it can be extended to livestock farmers through the Extension Offices,
- (5) Review and improve the administrative structure of the animal wealth activities of the ministry for more efficient coordination and accomplishment of these policy parameters.

Assessment of the Third Five-year Development Plan with respect to the above policies is summarized below.

- (1) In order to increase livestock products, particularly meat, the production facilities have recently been constructed and substantiated on the basis of two feasibility studies for livestock

development. The products have been produced mainly by the private sector. The government provides supporting services for production activities, specifically for the construction of facilities to house high-quality breeding females, the experimental artificial insemination facilities for livestock improvement, development of modernized breeding methods and the establishment of demonstration farms for extension purposes. The projects which aim at production increases and consist mainly of the construction of production facilities are assumed to have been implemented as scheduled.

(2) With respect to regeneration of the rangeland particularly in southern jabal, the most precious source of forage in Oman, the following regeneration programs are being implemented:

- (a) Reduction of the number of livestock to alleviate overgrazing, and
- (b) Biological measures by means of aerial seeding with grass and of fertilizer application tests. (in some parts of the area)

Program(a) was initiated in 1984 by the government's purchasing cattle at a subsidized price, and has continued intermittently since then. The number of livestock, however, has not been reduced as expected in the Southern Region. This is mainly due to the following reasons:

- (a) The number of livestock purchased by the government is smaller than the natural increase of the livestock
- (b) The number of livestock sold by jabal people, other than those purchased by government, was very low. Further analysis is worked out in 5.7.2. (4).

In connection with program (b), the increase of grass caused by fertilizer application has been regarded as effective; nevertheless the regeneration of the rangeland has not progressed, mainly because of the following reasons:

- (a) Overgrazing has not been alleviated since the number of grazing livestock has not been reduced

- (b) Aerial seed germination is often prevented by the hard soil prevailing in southern jabal.

Efforts to reduce the number of livestock and enhance biological regeneration of pastureland should be encouraged; although, detailed investigation is required for a concrete methodology to be based upon further experiments and research. A research study named "Establish of a Rangeland Management Programme for the Southern Region", which is being conducted by MAF and UNDP(FAO), started in August 1989. The purpose of this study is to provide institutional buildings to the Directorate General of Agriculture and Fisheries in the Southern Region through the formulation and implementation of a programme on rangeland and forest management and conservation. The results of the study are expected shortly.

Other feed resources such as irrigated forage production and mixed feed concentrates have gradually increased through the efforts made by the government and private sector; however, a concrete program for production increase has not yet been implemented under the Third Five-year Development Plan.

- (3) Regarding animal health: prevention of diseases, and animal hygiene conditions, have improved steadily through various measures such as continuous implementation of the vaccination program since 1982 and construction and improvement of livestock clinics and animal quarantine facilities. Due to the limited budget in the Third Five-year Development Plan, however, the number of such clinics and quarantine facilities proposed was not achieved. They should be built in the next five-year development plan, after reviewing priorities.

The National Disease Survey conducted by the CVIL determined the morbidity rate which is essential as basic data for livestock development; the survey must be conducted regularly.

- (4) As for the training of Omani livestock staff, various training programs have been conducted at livestock related facilities.

However, only 1/4 to 1/5 of the trainees proposed initially participated. Accordingly, the shortage of such experts remains serious.

On the other hand, improvement in the livestock research system began in 1973. In addition to the Animal Research Center (ARC) in Rumais, similar centers in Wadi Quriyat and Salalah will be completed as to their expansion and reconstruction, respectively. Hardware development is thus well under way; although, further effort needs to be concentrated on software development.

Research information, such as (a) a comparative study on livestock productivity between local and imported species and (b) a nutritive value study on feed resources, particularly Rhodes grasses and agricultural by-products, has been accumulated by the center in Rumais. In the next five-year development plan, experiments and research on various themes which have yet to be appropriately allocated to respective research centers, must be increased and promoted, according to the individual role of each center.

- (5) Administrative reform in the livestock sector has not been performed in the Third Five-year development Plan except for the jurisdiction of the subsidy for the government purchase of livestock in southern jabal, which was transferred from MAF to PAMAP in 1988.
- (6) In addition to the above, livestock markets have been constructed in Suwaiq and Buraimi. Those markets, however, are not successfully operated mainly because of inactive buying and selling caused by relatively low demand for local livestock. (Further analysis is worked out and presented in 5.7.2 (4)).

5.7.1.2 Livestock Holding Type

According to a recent announcement issued by MAF (the minister of MAF's statement in the Consultative Council in September 1989), the number of livestock in the country was 1,232 thousand in 1988: 783 thousand

goats, 225 thousand cattle, 153 thousand sheep, and 71 thousand camels.

Present livestock management methods in the country can be classified into four types according to the GRM report (Rangeland and Livestock Survey, 1982). Most livestock owners follow traditional methods of management.

(1) Domestic Holding Type

The livestock holders of this type do not have their own feed resources within their management area so their livestock is mainly dependent upon purchased forage. Almost all of the family income of these owners is derived from the non-agricultural sector. The number of livestock in this type system is estimated at slightly less than 40 percent of all livestock in the country. The holders generally own one to ten livestock and more than 90 percent of holders breed goats for their own consumption as meat and milk.

Approximately 1/3 of holders of this type feed livestock in a shed. Purchased feed such as alfalfa, dates, graminaceous fodder and dried sardines are normally provided. The remaining 2/3 of holders graze their livestock in the vicinity of their houses during the day and feed them in sheds at night. The grazing area is generally limited to within 5km of the house. Again, most of the holders depend mostly on purchased alfalfa, dates, etc. This is because the rangelands, which are gradually degenerating, are unable to provide livestock with vital nutrients. The day-to-day management of these kinds of livestock herds is largely the responsibility of women and young children. The owner is involved in the purchase of feed and in marketing.

(2) Agriculture-based Holding Type

Livestock holders of this type have their own feed resources in their management area, since the majority of them engage in both agriculture (mainly annual crops and feed) and animal husbandry. The number of livestock in this type is estimated at slightly less than 45 percent of the entire livestock in the country.

The holders feed 10 to 15 animals on average and cattle are owned by nearly 65 percent. Although approximately 80 percent of this holding type graze livestock, the majority of required nutrients are provided with hand-fed green fodder, dates, etc. The advantage of this holding type, i.e. the combination of stockholding and cultivation, is that it allows holders to re-use crop wastes or by-products as feed and the manure of livestock as fertilizer. The daily care of livestock herds in this type is the responsibility of women and young children; however, a foreign labor force is sometimes employed if the farm and the number of livestock are large (farm area exceeding 10 feddans or 4.2 ha).

(3) Nomadic and Semi-Nomadic Holding Type

The number of livestock in this type is estimated at a little less than 15 percent of the entire livestock in the country. This type is characterized by its mobility and ability to utilize large areas of the rangeland, from which most necessary nutrients for livestock are obtained. Management size is normally 20 head of livestock or more, and in some cases more than 100 head. Herds consist mainly of goats in the northern area. In southern jabal, livestock traditionally graze in rangelands where abundant grass is available owing to rainfall during the monsoon season in summer. In southern Oman, cattle are also grazed in the daytime and fed in sheds at night, except during outbreaks of biting flies in the monsoon season.

The nutrient supply in the rangelands has declined recently due to the rapid increase in the number of grazing livestock. As a result, a significant increase in purchased feed is a major constraint in livestock management in the southern Oman.

(4) Commercial Holding Type

These are large-scale and commercial livestock businesses in Oman such as the Oman Sun Farm and Modern Poultry in the north; and Dhofar Cattle Feed Company in the south, where dairy cattle and poultry are held. These animals are fed in sheds with green fodder harvested on irrigated

farms and with concentrates. Productivity of the commercial type is much higher than the other three types. Nevertheless, only limited numbers of livestock are classified in this type at present.

In general, livestock breeding in Oman is not very profitable. According to the survey conducted in 1982 by foreign consultants (GRM), the productivity of livestock in this country is generally low. Among the four types, the domestic holding type which is mainly dependent on purchased feed, has been managed with the most significant deficit even after family consumption has been taken into account. Accordingly, it is regarded that the ownership of the livestock itself is more relevant than the management method of this type of holding.

On the other hand, even in the agriculture-based holding type or the nomadic holding type, the larger the share of purchased feed is, the lower the profit. In southern jabal particularly, where the nutrient supply has declined, most of the stock holders have fallen into serious deficit operations due to the considerable increase in purchased feed. This is also mainly due to the high cost of purchased feed in comparison with the market price of livestock products in the country. It is, therefore, essential for livestock holders to minimize the share of purchased feed to the extent possible, unless the price of purchased feed drops markedly.

5.7.1.3 Feed Resources

The following can be considered as major feed resources:

- (1) Rangeland
- (2) Forage produced on irrigated farm land
- (3) Manufactured compound stockfeeds
- (4) Other local resources

(1) Rangeland

The rangeland is the most extensive feed resource in Oman. Its area is approximately 200,000 km². This resource has been reduced by

overgrazing. According to the Rangeland Livestock Survey conducted and prepared by foreign consultants (GRM), the estimated rangeland carrying capacity is 185,600 goats, 14,500 sheep, 12,000 cattle and 4,000 camels. Contrast this to the estimated number of livestock in 1982 i.e. 696,200 goats, 135,700 sheep, 77,900 cattle and 54,400 camels. The proportion of grazing animals within the carrying capacity of rangeland corresponds to only 22 percent, if supplemental feed is not considered.

The number of livestock should be increased by livestock development projects which aim at food self-sufficiency in Oman. The following measures need to be simultaneously promoted in order not to reduce feed resources for the livestock holders who are dependent on rangeland:

- (a) Research on improvement of the vegetation on rangeland, through introduction of fodder trees, cactus etc,
- (b) Restraint of rangeland use by settled holders, and
- (c) Research and development of other feed resources.

(2) Forage Produced on Irrigated Farm

A few feddan of alfalfa are cultivated on most farms with an irrigation system. This alfalfa is supplied to the farmer's livestock, and distributed to the market for sale as a cash crop. Irrigated Rhodes grass, introduced by commercial dairy farms, has increased recently on both large scale farm with center pivot irrigation systems, and on small scale farm with sprinkler systems. Rhodes grass suffers less damage from the harmful white fly than alfalfa and is appropriate for cultivation in the areas with less groundwater since a lower water requirement per yield is allowed than alfalfa.

Forage production on irrigated land is essential for livestock development in the country. Furthermore, the introduction of high yielding, less water-dependent, more salt-tolerant feed crops, and the development of water-saving irrigation techniques are particularly important for feed supply increases in the future.

(3) Manufactured Compound Stockfeeds

There are two feed factories in Oman, one for the Oman Feed Mill in the north, the other for Oman Cattle Feed in the south. The annual production capacity of both factories is 60,000 tons. As is clearly indicated in Table 5.7.1, both factories have been operating to the fullest extent in order to cope with the recent inadequate feed resources.

An increase of concentrate production is a prerequisite for further livestock development aimed at food self-sufficiency for the nation. Oman Feed Mill is now planning to expand its production capacity. However, it can only double its supply capacity because of its limited building site. Particularly regarding the poultry industry, all of the feed depends on concentrate, therefore, the expansion program of the feed mill must commence immediately.

(4) Other Local Resources

Other local resources such as dates and their by-products, dry fish and agricultural residue are utilized, supplementing quantities of feed shortage. However, no precise data regarding the amounts used is available. Among the various kinds of local resources, dry fish, which rots easily, breeds bacteria and causes botulism, etc. often results in serious damage to livestock.

The major constraints on future livestock development are adequate water and feed. In connection with feed, no further marked increase in supply capacity can be expected from rangeland. Also, any significant rise in irrigated forage production is also impossible due to limited underground water resources which must be shared with other irrigated agricultural crops. Furthermore, with respect to manufactured compound stockfeeds, which consist entirely of imported materials, excessive reliance on them is risky from the point of view of national food resources. It is vital for that the expansion of feed resources be promoted by research and by the development of various feeds such as by-products from agricultural processing and fish processing mills, and petrochemical factories.

Table 5.7.1 Annual Production of Animal Feed in Oman

producer/product	annual production (tonnes)			
	1984/5	1985/6	1986/7	1987/8
Oman Flour Mills				
Poultry feeds	6,496	3,552	5,307	—
Non-manufactured (re-sale barley)	—	443	517	—
Ruminant feeds	39,973	50,962	49,702	—
Subtotal	46,469	54,957	55,526	70,000
Dhofar Cattle Feed Co				
Ruminant feeds	21,273	48,920	49,680	56,000
National total	67,742	103,877	105,206	126,000

Source : Draft Report, F/S for the Establishment of a National Company for the Supply of Agriculture Inputs and Services to Farmers in the Sultanate of Oman, R Travers Morgan Ltd., 1988.

Table 5.7.2 Geographical Distribution of Veterinary Clinics and Staff

Region	Clinic	Sub-Clinic	Veterinary Officers	Veterinary Assistants	Veterinary Nurses
North Batinah	Sohar	Khaburah, Liwa, Saham, Shins, Mureir	2	4	3
South Batinah	Darsait, Seeb	Quriyat, Rustaq	2	8	3
	Barka, Misarah	Suwayq			
Middle Region	Samail, Izki	Bid-bid	2	1	2
Interior Oman	Bahla, Nizwa	Marah, Jabal Akhdar, Hamra	3	8	10
	Haima	Adam, Wadi Quriyat			
Dhahira	Ibri, Dhank	Wadi Al Ain, Yanqul	2	—	5
Eastan Region	Ibra, Sinau	Sur, Samad Sham	3	6	10
	Bilad Bani Bu Ali	Kamil, Tiwi			
Musandam	Khasad	Bukha, Bayah	1	3	—
Bureimy	Bureimy	Mordah Sinena	3	—	—
Sub-Total	18	23	18	30	33
Southern Region	Salalah Clinic	Zeak, Al-Saan			
	Salalah Vet. Hospital, Tawi Afta	Hagaif, Gadow	7	8	32
		Madinat Al-Haq, Jafah			
Sub-Total	3	7	7	8	32
Total	21	30	25	38	65

Source : Ministry of Agriculture and Fisheries, Department of Animal Wealth.

5.7.1.4 Animal Hygiene and Prevention of Epidemics

(1) Animal Clinics

Table 5.7.2 outlines the animal clinics and veterinary staff in each region. In northern Oman, each clinic has been established as an annex to the agricultural extension center of the respective area. In southern Oman, the Jabal Qara Plateau is studded with clinics since most livestock is bred by Jaweli (semi-nomadic people). Generally, a foreign veterinary doctor and Omani veterinary assistant provide services in each clinic. The assignment of a veterinary doctor to each clinic is difficult at present because of personnel shortages. In order to supplement this, a number of Omani veterinary assistants are being trained at the Salalah Veterinary Hospital and the Nizwa Agricultural Center, etc. However, only limited applicants are available, partly due to the hard work which is required in veterinary services. Specifically in southern Oman, the training of a number of Jaweli, who hold most of the livestock in the region, is urgently required, since the number of veterinary assistants there is dangerously low.

(2) The Central Veterinary Investigation Laboratory (CVIL)

The laboratory staff in CVIL is listed in Table 5.7.3. As is clearly depicted, two thirds of doctors and technicians are foreigners and the position for a doctor in the biochemistry section is still vacant. Among 5 assistants, 2 are Omani who are trying to obtain further skills through on-the-job training.

The major activities of CVIL can be summarized as follows:

- (a) Diagnosis of pathological samples collected from clinics
- (b) Field survey of livestock diseases
- (c) Training of Omani researchers, and others.

The activity of item (a) above is to inform the clinic and simultaneously report to MAF about results of examinations and diagnoses for pathologic samples collected from the central clinic of each region

Table 5.7.3 Sectional Distribution of Laboratory Staff in CVIL

Section	Doctor (Specialist)	Technician	Asst. Technician	Laboratory Attendant
HEAD OF CVIL	1(O)	-	-	-
PATHOLOGY (Head of CVIL Technicians)	1(E)	1(E)	-	1(O)
VIROLOGY	1(E)	1(O)	1(O)	-
BACTERIOLOGY	1(E)	1(O)	-	1(O)
PARASITOLOGY	1(E)	-	1(E)	1(O)
BIOCHEMISTRY	-	1(E)	1(O)	-
STERILISATION and WASHING	-	-	1(E)	1(O)
LABORATORY ANIMAL UNIT	-	-	1(E)	1(O)
TOTALS(E)	4	2	3	-
(O)	1	2	2	5

(E) Expatriate. (O) Omani.

Table 5.7.4 Distribution of Veterinarians in Quarantines

Name	Veterinary Officer	Veterinary Assirtants	Veterinary Nurses	Capacity			
Quarantine Office							
Port Qaboos.	3	2	—				
Port Raysut	1	—	—				
Seeb Airport	1	3	—				
Wijajah Border	3	—	—				
Hafeet Border	3	1	—				
Quarantine Center				Goat&Sheep	Cattle	Horse	Dog&Cat
Seeb Quarantine	1	2	—	5,000	500	10	20
Raysut Quarantine	1	—	—	5,000	500	10	20
Total	13	8	0	10,000	1,000	20	40

Source : MAF, Department of Animal Wealth

every week. Since most of the efforts in CVIL are spent on these activities, investigation and research into the prevention of livestock epidemics is lagging. Circumstances could be improved by measures such as expansion of facilities as well as increasing the number of veterinary staff, or decentralizing and transferring similar weekly activities to the central clinic in each region.

(3) Animal Quarantine

Since the Animal Disease Control Law was enacted in 1977, the livestock epidemic control system in the country has steadily improved in its ability to conserve domestic livestock. With respect to animal quarantine services, five quarantine offices have been established to inspect animals at borders and ports. There are two quarantine centers equipped with tethering facilities, one at Seeb in northern Oman and the other at Raysut in southern Oman. In addition, a third quarantine center is being constructed at Sur port in northern Oman. Table 5.7.4 outlines the veterinary officers working in quarantine facilities. Figure 5.7.1 illustrates the records of the imported animals from 1977 to 1988. It clearly indicates a sharp increase.

The establishment of more quarantine centers equipped with tethering facilities is needed because the inspection capacity in the two existing quarantine offices has become inadequate due to an increase in imported animals caused by improved inland transportation from the UAE.

(4) Vaccination Program

Economic loss due to serious epidemic damage to livestock, which normally occurs in Oman is significant. In this context, nation-wide vaccination programs divided into 3 stages have been being carried out by a foreign consultant (GRM) from 1982 to 1991. Table 5.7.5 and 5.7.6 reveal the vaccination records for each stage, and in 1988, respectively.

Fifteen teams of vaccinators have been organized for the entire country, to give vaccinations in villages one by one. Each team normally consists of one foreign veterinary surgeon, one Omani trainee and two

Numer of Imported Animals

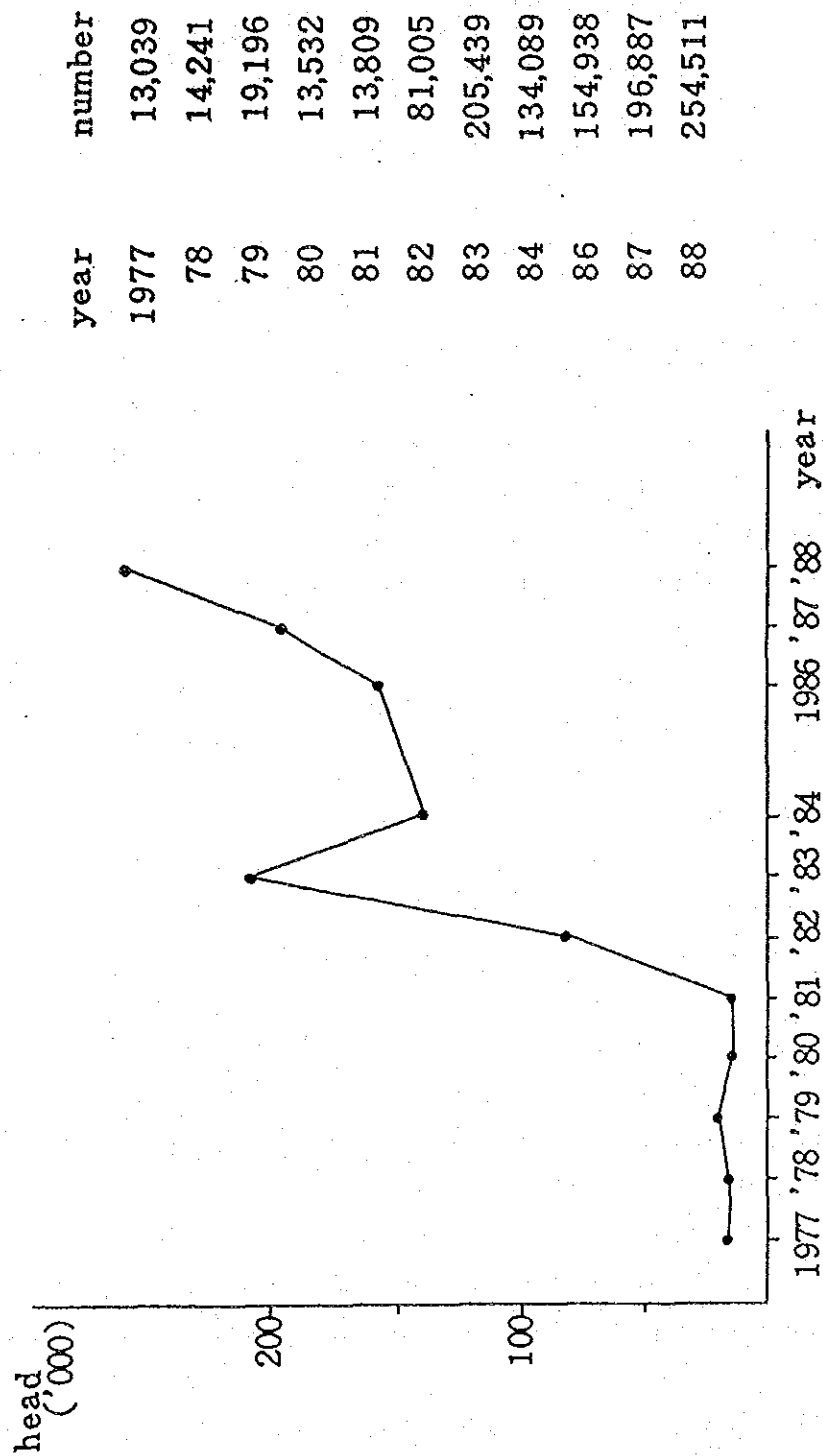


Figure 5.7.1 Number of Imported Animals

Table 5.7.5

Number of Animals Injected
in Each Vaccination Stage

	Cattle	Goats/Sheep
Stage '1'	48,788	404,953
Stage '2'	76,361	697,327
Stage '3'	136,232	1,319,818

Source : G. R. M. International Pty Ltd.

Table 5.7.6

Number of Injected Animals
by Disease in 1988

Disease	Cattle	Goats/Sheep
F. M. D.	63,395	10,087
Rinderpest/P. P. R.	42,194	504,941
Pox	—	248,823
Botulism	248,189	—
Blackquarter	248,189	—
Enterotox aemia	122	42,424
Brucellosis	3,000	4,635

Source : MAF, Dep. of Animal Wealth.

Table 5.7.7 Morbidity of Diseases by Area

Area	FMD	Rinder pest	PPR	Small Pox	CCPP	Orf	Brucell- osis	Botu- lism	Black- leg	Entero- toxigenia	Surra	Gastro Int. Parasites
Muscat	+	+	+++	+	+++	++	+	—	—	+	+	+
Sharqiya	++	—	+++	++	+++	++	+	—	—	+	++	++
Wasta	+	+	+++	+	+++	++	—	—	—	+	+	++
Dakhilia	++	+	+++	+	+++	++	—	—	—	+	++	++
Dhahira	+	+	+++	+	+++	++	—	—	—	+	++	++
S. Batina	+++	+	+++	++	+++	++	++	+	—	+	+++	++
N. Batina	+++	+	+++	++	+++	++	++	+	+	+	+++	++
Buraimi	+++	++	+++	++	+++	++	+	—	—	+	+++	++
Musandam	+	—	++	+	+++	++	+	—	—	+	—	++
Southern	+++	—	+	—	+++	++	+++	+++	++	+	+++	+++

Legend +++ High morbidity
 ++ Medium morbidity
 + Low morbidity
 — Disease not recorded

Source : MAF,
 Dep. of Animal Wealth.

foreign livestock handlers. The team carries out 2 rounds of vaccination per stage.

The number of head of livestock covered by this vaccination program is estimated at about 60 percent of the entire livestock in the country. As a result, the epidemic morbidity has been gradually declining. The promotion of this vaccination program contributes directly to a marked reduction of the economic losses of livestock resources, and contributes greatly toward the training of Omani staff, raising consciousness about the importance of livestock hygiene while obtaining estimates of the number of livestock.

The vaccination program has not been able to inoculate every head of livestock in Oman as it is carried out based on livestock holders' requests, and there are some areas where the team has been unable to contact the holders.

According to Table 5.7.7, epidemic outbreaks spread over the entire country, though minor differences in morbidity can be found between regions. Further promotion of the vaccination program is a prerequisite for future epidemic control.

5.7.1.5 Research and Extension

(1) Research Activity

There are three livestock research centers in Oman, located at Rumais in the Batinah area, Wadi Quriyat in the Oman Interior and Salalah in the Southern Region. This situation is now being considered and expanded to encourage new livestock development in the country. New facilities in the centers at Wadi Quriyat and Salalah will be completed by the end of 1989. Rumais Livestock Center is also scheduled to be renovated and expanded.

(a) Rumais Livestock Center

This center, attached to a nutrition laboratory, carries out

experiments and research in three sectors: dairying, goat production, and fodder production.

In the dairying sector, a comparative study is being carried out on milk productivity among such species as local Balladi cattle from Batinah, Exotic Jersey, and Grauriah cattle. The same productivity study is also being conducted on the cross-breeds of the above species.

In the goat-production sector, the following research is being done:

- (i) Growth and breeding performance of local goats
- (ii) Influence of early weaning for Anglo Nubian in Exotic and 3 local species, namely Batinah, Dhofari and Jabal Akhdar.

In the fodder production sector, using feed farms for Rhodes grass and alfalfa, water requirements and productivity in terms of grass species are being studied.

As a follow-up, efforts will be made to establish support services for small scale holders' milk production at the on-farm level based on the results obtained from the dairying research. The proposal procedure is as follows.

- (i) Execution of on-farm artificial insemination (AI) for the purpose of cross-breeding Jerseys and local cattle at the local holders' farm.
- (ii) Extension of good management methods for feeding and milk production for cross-breeds
- (iii) Provision of the facilities which enable farmers to process milk for the market in the early stages.

The study on cross-breeding of local breeds of goat or sheep with Exotics and on an intensive management system are also proposed for small livestock production. In parallel with such studies, research on the expansion of feed resources, which is the primary base of livestock productivity, through strengthening nutritional studies

and the fodder research program, has been recommended.

(b) Wadi Quriyat Livestock-Improvement Center

In Wadi Quriyat, a facility for selective breeding housing 900 female goats and 40 male goats is now under construction, together with all other necessary facilities such as a fodder farm, clinic and storage areas. These facilities are expected to play a major role as a breeding center which annually supplies 237 and 332 improved, highly reproductive goats to general livestock holders. Selective breeding aims to raise the productivity of the local breeding stock.

(c) Salalah Livestock Research Station

As described before, a new facility is being built at the existing Salalah Research Station. Two thirds of the cattle in the nation are raised in the Southern Region, therefore, this area is believed to possess the largest potential for future livestock development. In this context, the new Salalah Livestock Research Station will aim at the establishment of a complete system with facilities for all the necessary activities for development and research connected with livestock development in southern Oman. In the same area, recent marked increases in the number of livestock has caused a deterioration of rangeland productivity due to over-grazing. Since an optimum livestock development in concert with the natural environment is urgently required, the collection and accumulation of basic data shall be promoted through the investigation of the present condition of livestock and farms. In parallel with such activities, marketable livestock improvements shall also be pursued in line with the necessary research on milk productivity and livestock reproductivity.

Improvement of local livestock has been lagging. Basic data related to breeding, proliferation, and productivity levels of meat and milk have been collected. Selective breeding of local livestock will be one of the major subjects in the future. Consequently, the identification of targets and a methodology for the improvement of

each breed is necessary, with due consideration of the local breeds.

(2) Extension

The extension services for livestock holders are provided by the Agricultural Extension Centers established in each region. The number of livestock experts in the centers is still limited as the on-farm level livestock project started quite recently. From the organizational standpoint, truly effective extension services have not been organized yet. This is mainly due to the shortage of effective extension methods and relevant information from Research Stations, and the interpretation of established husbandry and management principles for local use.

5.7.1.6 Livestock Marketing and Processing

(1) Red Meat

The general marketing flow for cattle, goat and sheep is illustrated in Figure 5.7.2. Local livestock is normally dealt as live, which is to say, the retailer himself brings the animal to the slaughterhouse for slaughtering and sells it as fresh meat. There are some instances where the consumer can purchase a live animal at a farm or market.

As for imported live animals and cut meat, import traders sell these directly to retailers. Most live animals are sold face-to-face but there are a few auction markets exclusively for livestock. Accordingly, an appropriate market price has not yet been formed due to the limited marketing activity for local animals. Those local animals are generally consumed as fresh meat, not processed.

(2) Eggs and Poultry Meat

The marketing route of eggs and poultry meat is illustrated in Figure 5.7.3. It shows that these products are sold directly from farm to retailer in almost the same way as red meat. Local broilers are also sold as live poultry through a similar route. All eggs are consumed as table

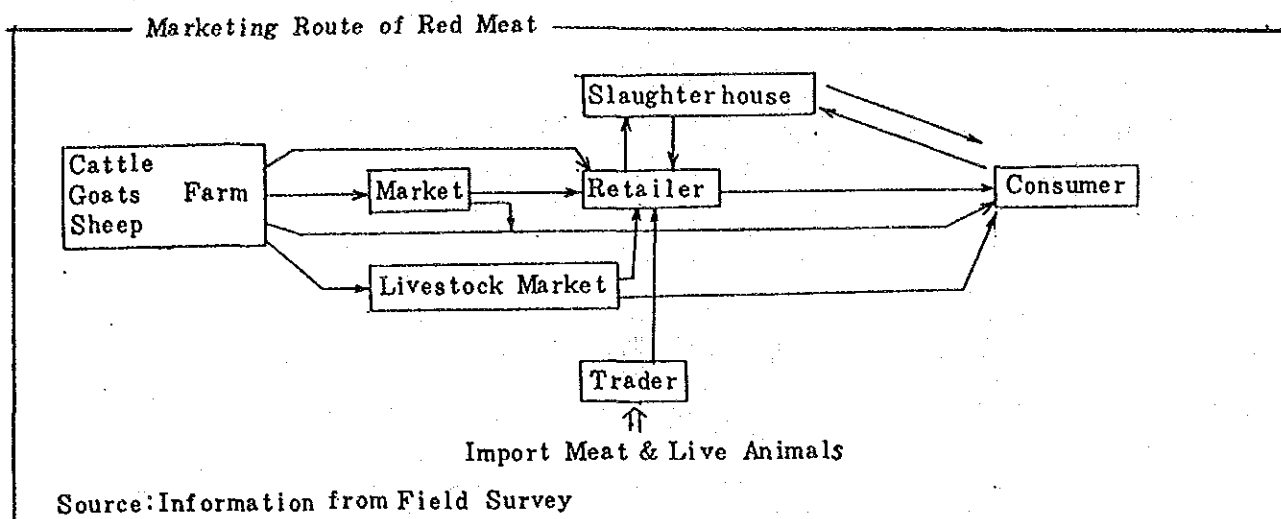


Figure 5.7.2 Marketing Route of Red Meat

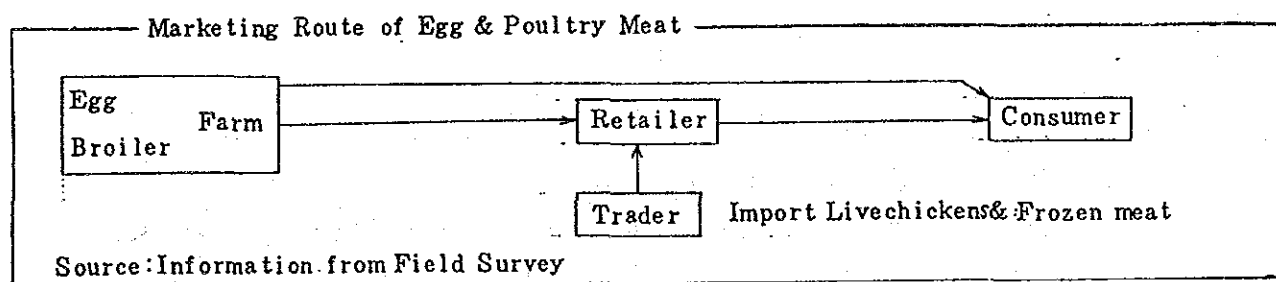


Figure 5.7.3 Marketing Route of Eggs and Poultry Meat

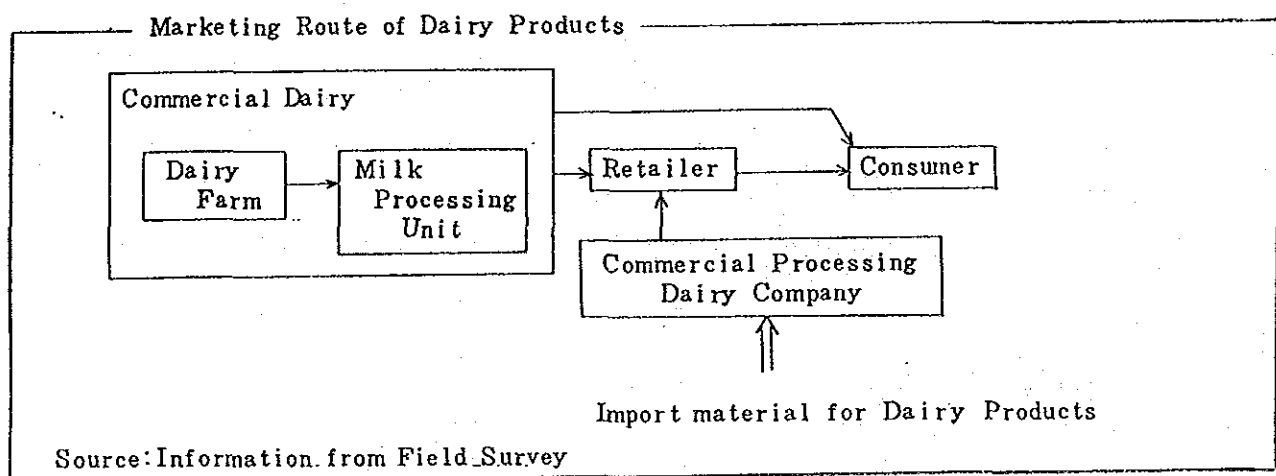


Figure 5.7.4 Marketing Route of Dairy Products

eggs with the only packing process occurring at the farm.

(3) Dairy Products

There are several commercial dairy farms equipped with processing units which can provide consumers with home delivery services of fresh-packed milk and yogurt directly or deliver to retailers (refer to Figure 5.7.4). There are also some dairy companies that import dairy products in the form of fresh milk or skim milk, then sell it after processing into reconstituted milk, etc. at factories in Oman. The milk cows raised by local farmers provide milk for self-sufficiency, therefore, warm milk from there is distributed only to a limited extent.

(4) Estimate of Livestock Consumption Volume

As depicted in Table 5.7.8, the present self-sufficiency rate is low in mutton, table eggs and poultry meat. The self-sufficiency rate of poultry will rise shortly with the recent commencement of operation of a large commercial farm. Mutton consumption has declined lately; although, beef consumption has increased with lowering self-sufficiency. Among dairy products, fresh milk maintains a high self-sufficiency rate, despite a steady increase in consumption.

(5) Marketing Issues on Cattle in the Southern Region

The first nation-wide livestock and rangeland survey was conducted by a foreign consultant in 1982. The excessive numbers of livestock compared with the available gross feed resources in the rangelands was reported in this survey. The details are described in item (3) of sub-section 5.7.1. It was disclosed that the deterioration of the rangelands was in progress.

To resolve the problem, the government initiated a de-stocking program in 1984 in order to protect the rangelands from over-grazing. In this program, the government purchased local cattle from holders at higher prices than the free market price, then covered the difference between the consumer's price and the holder's price with a subsidy. The main purpose of this program was to expedite reduction of the number of

Table 5.7.8 Animal Products Consumption Patterns in Oman
During the Period 1982 - 1988

Year	1982	1983	1984	1985	1986	1987	1988
Red Meat(tonnes)							
Mutton							
Local Production	3,188	3,283	3,382	3,483	3,588	3,695	3,806
Net Imported Live	1,674	2,762	1,771	2,157	1,864	2,746	3,537
Net Imported Meat	9,881	9,559	12,576	12,539	14,146	10,574	9,485
Total	14,742	15,604	17,728	18,179	19,598	17,015	16,828
Self-Sufficient Rate (%)	21.6	21.0	19.1	19.2	18.3	21.7	22.6
Beef(tonnes)							
Local Production	2,448	2,497	2,547	2,598	2,650	2,703	2,757
Net Imported Live	63	127	-5	-7	-60	-26	-34
Net Imported Meat	1,384	1,301	1,896	2,593	2,947	2,507	3,335
Total	3,894	3,924	4,438	5,184	5,537	5,183	6,057
Self-Sufficient Rate (%)	62.9	63.6	57.5	50.3	48.9	52.7	46.1
Table Eggs(millions)							
Local Production	7	40	31	19	19	19	39
Importation	88	105	134	166	192	172	168
Total	95	145	165	185	211	191	207
Self-Sufficient Rate (%)	7.4	27.6	18.8	10.3	9.0	9.9	18.8
Poultry Meat(tonnes)							
Local Production	2,613	1,179	1,048	1,401	1,970	1,580	1,580
Importation	13,987	18,821	24,952	25,099	25,430	22,915	24,863
Total	16,600	20,000	26,000	26,500	27,400	24,495	26,443
Self-Sufficient Rate (%)	15.7	5.9	4.0	5.3	7.2	6.5	6.0
Fresh Milk(tonnes)							
Local Commercial	3,000	3,500	3,500	4,500	5,000	6,638	
Net Imported Milk	561	1,477	1,364	1,037	615	672	
Total	3,561	4,977	4,864	5,537	5,615	7,310	
Self-Sufficient Rate (%)	84.2	70.3	72.0	81.3	89.0	90.8	

Source: Sultanate of Oman, Royal Oman Police, Foreign Trade Statics 1986, 1988
F/S for Establishment of Animal Production in the SULTANATE OF
OMAN, Arab Company for Livestock Development, 1988. F/S for
Establishment of Poultry Projects in SULTANATE OF OMAN, G.R.M.
International Pty. Ltd., 1988.

livestock, especially in the Jabal Plateau. The accomplishments of the program from 1984 to March 1989 are presented in Table 5.7.9.

After five years of implementation, the number of cattle purchased by the government is estimated at 62,000 heads or 11,000 tons (average 177 kg per head). In this program, the initial target, i.e. alleviation of over-grazing, has not been achieved. On the contrary, the number of livestock increased to over 100,000 head in 1988, an estimated 50% increase from 1982. It was decided that the program stimulated livestock holders to increase the number of head with the expectation of a higher market price. It is crucial to reduce the number of cattle head in the Southern Region, where demand is lower due to limited population. Otherwise, the improvement of the distribution flow from southern to northern, where demand is high should be promoted.

5.7.1.7 Present Situation of Each Livestock Group

Table 5.7.10 reveals the estimated number of major livestock groups. Three fourths of the total are small scale ruminants like goat and sheep. Local livestock propagates favorably and adapts itself to severe environmental conditions, although its productivity is low. Local livestock is maintained by owners basically for the consumption of milk and meat. The local holder seldom sells livestock except when he is in urgent need of cash. Accordingly, the holder is not especially concerned with the production of livestock. As a result, reproductivity remains low.

(1) Goats and Sheep

The prevailing types of goat in Oman are categorized by areas as follows:

(a) Northern Oman (3 long hair types)

- (i) Batinah type in the Batinah coast area
- (ii) Desert type along borders with Saudi Arabia and the UAE
- (iii) Mountain type in the mountainous area around Jabal Akhdar

Table 5.7.9 Actual Results of De-stocking Program
Destocking Program of the Jabal Cattle in the Period
1984 - 1989

Year	Purchasing Price	Selling Price	Subsidy rate	Total herd	Total weight
1984	1.5 R.O./kg	0.9 R.O./kg	0.6 R.O./kg	11,361	2,190t
1985	1.5	0.9	0.6	20,563	3,348
1986	1.5	0.9	0.6	17,523	3,072
1988/89	1.1	0.9	0.4 *	12,962	2,462
Total				62,409	11,072

Source: PAMAP. * this figure includes commission

Table 5.7.10 Estimated Livestock Population in Oman
('000)

	Cattle	Goats	Sheep	Camel
North and Interior	5 4	6 6 4	1 4 9	1 7
South	1 7 1	1 1 9	4	5 4
Total	2 2 5	7 8 3	1 5 3	7 1

These figures are estimated by study team with reference to Range and Live-stock Survey, G.R.M. International Pty.Ltd., 1982. and Agricultural Development Efforts in the Sultanate of OMAN, Statement Documents Presented by the Minister of Agriculture and Fisheries to the Consultative Council, 8th October 1989.

(b) Southern Oman (short hair type)

Dhofari goat

The types of sheep in northern and southern Oman are also different from each other. Both local goats and sheep are inferior to exotic ones in terms of their weight and productivities of meat and milk. This comparison, however, is only valid for local goats and sheep bred under present extensive management. The annual kidding number can be expected to increase following improved proliferation capacity under intensive management. Both breeding speed and fattening ability of sheep are superior to those of goats, however, goat meat suits Omani taste. In particular, the meat of Dhofari goats in southern Oman is preferred. Further improvement of goat meat quality will ensure higher market value.

(2) Cattle

Types of local cattle in northern and southern Oman are also different from each other, and they are smaller than imported ones.

The cattle in northern Oman is raised mainly for the owner's milk consumption. Cattle is less appropriate for commercial milk production due to lower milk productivity and the raising location. However, local cattle have adapted themselves to the severe Omani climate, and are expected to increase in market value through the following measures:

- (a) Increase in milk productivity through cross-breeding with imported cattle by artificial insemination
- (b) Intensive raising management to enhance productivity
- (c) Production of fresh milk containing high butterfat rate by means of the improvement of milk quality.

The cattle in southern Oman area perennially grazed on the Jabal Plateau and are important source of milk and beef which are the principle diet of the jabal populace. It is also necessary to enhance the quality of the meat in the jabal cattle.

(3) Poultry

All commercial poultry, i.e. broilers and layers, are imported. Local poultry is raised by farmers for their own consumption. Most of the poultry production is managed by large farmers or on a commercial basis.

(4) Camels

There are approximately 70 thousand camels in Oman. Camels in northern Oman are valuable for racing, and some of them are sold at high prices. On the other hand, camels in southern Oman are valuable as a source of milk for local inhabitants. Camels are seldom retailed as meat due to lower demand, except for consumption by holders themselves.

The camel is more closely linked to the over-grazing problem than are cattle. In order to protect rangeland from deterioration, it is advisable to promote the planting of feed trees or to expedite active de-stocking by increasing family consumption of camel meat, especially young animals.

5.7.1.8 Present Regional Situation

The number of livestock estimated in each region is presented in Table 5.7.11. The northern region contains 84 and 97 percent of all the goats and sheep, respectively, while the southern region has a share of 76 percent of all cattle and camels. As a whole, approximately 70 percent of the livestock is raised in northern Oman. (As no nation-wide statistical survey has been conducted, the number of livestock in the northern region has been estimated by the JICA team from existing information such as the report prepared in 1982 by a foreign consultant, the result of interview surveys conducted by MAF in the southern region, and figures in other publications.)

Table 5.7.12 presents the feed balance except feed for poultry, worked out for 5 areas consisting of the northern region divided into 4 areas, excluding Musandam, and the Southern Region. The figures shown in

Table 5.7.11 Estimated Number of Regional Livestock

Region	Number of each Livestock and Distribution ratio				Total ('000) (%)
	Goats ('000) (%)	Sheep ('000) (%)	Cattle ('000) (%)	Camel ('000) (%)	
(North) Batinah	270.3(35.9)	84.2(56.3)	23.2(10.3)	2.9(4.1)	380.6(31.8)
Buraimi, Dhahira	131.7(17.5)	20.6(13.8)	16.6(4.7)	6.2(8.7)	169.1(14.1)
Interior, Wasta	104.7(13.9)	14.8(9.9)	8.9(4.0)	1.3(1.8)	129.7(10.8)
Sharqiya	127.1(16.9)	25.4(17.0)	10.8(4.8)	6.5(9.1)	169.8(14.2)
Sub total	633.8(84.1)	145.0(97.0)	53.5(23.8)	16.9(23.7)	849.2(70.9)
(South) Southern Region	119.4(15.9)	4.5(3.0)	171.0(76.2)	54.4(76.3)	349.3(29.1)
Total	753.2(100.0)	149.5(100.0)	224.5(100.0)	71.3(100.0)	1,198.5(100.0)

Musandam is excluded

These figure are estimated by study team with reference to previous studies as follows; A Maste Plan for the Development of the Livestock Sector, G.R.M. Int. Pty.Ltd., 1984. Range and Livestock Survey, G. R. M. Int. Pty.Ltd., 1982.

Table 5.7.12 Estimated Regional Feed Balance

Region	Dry Matter Requirement for Livestock	Local Feed Supply by Resources (D. M.)				Deficit	Sufficient
		Range	Cultivated	Other Local	Total		
		Land	Land	Resources			
	('000t)	('000t)	('000t)	('000t)	('000t)	('000t)	Rate
							(%)
(North) Batinah	116.2	10.1	40.0	38.3	88.5	27.7	76
Buraimi, Dhahira	59.6	4.6	12.0	19.7	36.2	23.4	61
Interior, Wasta	40.5	12.7	19.4	13.4	45.4	(4.9)	112
Sharqiya	60.5	6.8	19.0	20.0	45.8	14.7	76
Sub total	276.8	34.2	90.4	91.4	215.9	60.9	78
(South) Southern Region	363.5	45.6	11.5	72.7	129.8	233.8	36
Total	640.4	79.8	101.8	164.1	345.6	294.7	54

Musandam is excluded

Data Sources are the same as table 3.4.11

the Table were obtained from estimates described below.

- (a) Dry matter (DM) requirement was estimated by multiplying average livestock weight by 24 grams/day/unit weight (kg)
- (b) DM supply capacity of rangeland was obtained by dividing GE by DM requirement per goat, where GE is a total goat equivalent converted from regional rangeland carrying capacity estimated in the existing report
- (c) DM supply capacity in cultivated land was estimated as follows:
 - alfalfa; 40 ton/ha (crop yield) by 24% (DM contents)
by regional cropping area collected at
the Statistics Department of MAF
 - Rhodes grass; 100 ton/ha (crop yield) by 24% (DM contents)
by cropping area obtained from on-going Goat Project
farms and dairy farms in northern and southern Oman
- (d) Other local resources (there is no available data regarding these resources) were estimated at 33% of the livestock requirement in northern Oman and 20% in southern Oman, including dates, agricultural residue, dry sardines, etc. because northern Oman has the advantage of other feed resources due to a large date palm base.

The result of the estimates in the table reveals that in most of the country except the Interior, a certain amount of concentrated feed should be supplemented at present. These amounts are: 24% of total feed requirement in Batinah and Sharqiya; 39% in Dhahira, and 64% in the southern region. The total DM shortage in northern Oman amounts to 61,000 tons. This is to be supplemented by the Oman Feed Mill. In northern Oman, especially in Buraimi and Dhahira, both the carrying capacity of rangeland and the cropping area of forage are small, compared to the number of livestock. In southern Oman, the DM shortage was estimated at 230 thousand tons per annum which far exceeds the supply capacity of Oman Cattle Feed in Salalah. Thus, the results suggest that either the estimate of the number of livestock or of the carrying capacity of rangeland was incorrect. On the premise that the above estimate procedure is correct, the number of livestock and the carrying capacity of rangeland are calculated backwards, as described below.

Since the production of the Oman Cattle Feed was 56,000 tons in 1988, the supplied DM amount can be estimated at about 52,000 tons. As a result of backward calculation to estimate carrying capacity of rangeland, 2.6 ton/ha of DM production is obtained from rangeland, given the DM of 52,000 tons of concentrated feed, 70,000 ha of grazing area on the Jabal Plateau and the feed supply deficit shown in Table 5.7.12. DM production can be estimated at 15 tons of green fodder, which is justifiable considering the existing data DM 4 ton/ha of crop, obtained from unit area sampling (from GRM report in 1988). Provided that the number of livestock was overestimated, the number of head fed by 52,000 tons of concentrated feed reduces by 139,000 heads, though it cannot be verified. Since there may be some misunderstanding in these estimation procedures and basic statistical data are insufficient, further investigation of actual conditions is absolutely necessary. At the moment, the feed shortage in the Southern Region is so serious that urgent countermeasures are required.

5.7.2 Development Potential

Present productivity and profitability of the livestock industry are generally low in Oman. From the viewpoint of national food security, it is essential to increase the self-sufficiency ratio, which is only 29 and 19 percent for red meat and table egg, respectively in with regard to their importance as the primary diet of the nation. Considered in other points, it is possible that high potential for further development in the livestock sector can be expected because of the present low productivity and profitability.

Present Constraints on animal husbandry can be summarized as follows.

- (1) Feed resources are insufficient because they have not yet been effectively used, in spite of the fact that they depend fully on the limited water and land resources.
- (2) Because the program for breeding and improvement of livestock has not

been in place, productivity remains low.

- (3) Livestock economic losses are large because animal hygiene and epidemic control systems have not yet been well established. Moreover, efficient breeding management is not practiced due to the low economic awareness of livestock holders in general.
- (4) The distribution system, facilities for marketing livestock, and product processing, etc. have not yet been well developed. Consequently, distribution of products is not smooth, and an enthusiastic increase in animal production is not stimulated.

In an effort to eliminate constraints which hamper the productivity development of the livestock industry in the country, livestock development potential is analyzed here, and the development target is discussed particularly in relation to the following 4 items:

- (1) Securing and developing feed resources
 - (2) Improvement of livestock
 - (3) Improvement of animal hygiene and livestock management
 - (4) Improvement of marketing system
- (1) Securing and development of Feed Resources
 - (a) The potential for securing feed resources

Securing feed resources in the country is severely restricted by the availability of water resources, just as in the agriculture sector. Under such conditions, a significant increase in feed resources cannot be expected unless other crops are converted to feed crops. Thus the feasibility of the following shall be confirmed in order to secure feed resources:

- (i) Development and introduction of productive and profitable

feed crops in irrigated areas

- (ii) Development and introduction of feed crops and plants well-suited to rangeland and which contribute to its conservation.
- (iii) Development and promotion of any available material for feed including agricultural by-products, etc.

With respect to the above (i), the profitability of grass such as Rhodes grass shall be compared with alfalfa which dominates feed crop in irrigated fields. All over Oman, alfalfa was cultivated on 8,770 ha of irrigated fields in 1988. On the other hand, Rhodes grass was only cultivated on about 770 ha of irrigated fields, by commercial dairy farms such as Oman Sun Farm and by farms which took part in the "Goats Project" which was conducted by MAF.

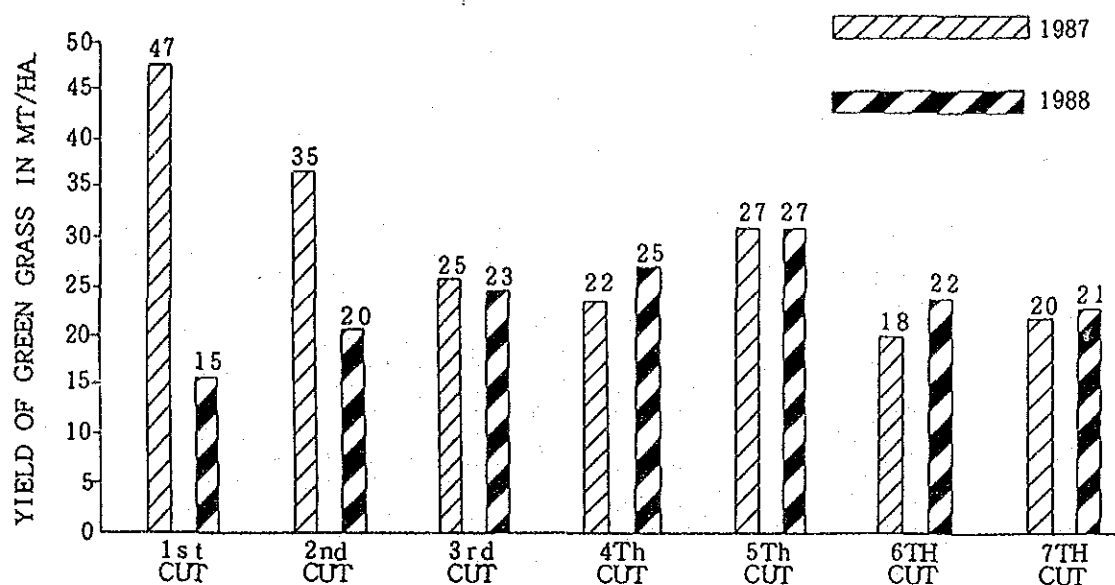
Rhodes grass planting areas are rather small compared to alfalfa planting areas in Oman. However, it could be considered that Rhodes grass is more profitable as an animal feed resource than alfalfa based on the following points:

- 1 Until recently, there has been no accurate data to show the green fodder yield difference's between Rhodes grass and alfalfa under the same conditions. As is shown in Figure 5.7.5 and Table 5.7.13, Rhodes grass yields more green fodder and its nutrient supply is considerable high.
- 2 The water requirement per ha for Rhodes grass and alfalfa is almost the same. It is about $24,000\text{m}^3/\text{ha}/\text{year}$ (Data from Sohar Extension Center). Therefore, with respect to the green fodder yield of each species, irrigation efficiency of Rhodes grass is higher than that of alfalfa.
- 3 In recent years, a plant disease, whereby alfalfa leaves shrivel, is spreading all over Oman. Alfalfa is also sometimes attacked and damaged by other diseases like rust disease. On the other

Figure 5.7.5

ESTIMATION OF YIELD OF RHODES GRASS VARIETY CALLIDE

(DURING THE YEARS 1987 1988.
LIVESTOCK RESEARCH STATION, RUMAIS.)



1 st year 1987 1 9 4 t / ha

2 nd year 1988 1 5 3 t / ha

average 1 7 4 t / ha

Source : Rumais Research Center 1989.

Table 5.7.13 Comparison of Green Grass Yield

(unit : ton/ha)

Species	Rumais R.C.	Oman Sun Farm	Dhofar Cattle Co.	Average of all over Oman
Rhodes Grass	1 7 4	1 5 0*1	120~140*1	
Alfalfa				60 (3 8*2)

Source : *1 Consultant Field Surray

*2 Department of Agriculture and Statistics(MAF) =Semi Dry Matter Yields
Consultant(JICA) Estimation is 60ton/ha Green Fodder Yields
Dry Matter Rate (Green) 24% ——— (Semi-Dry) 37.5%

hand, Rhodes grass has a resistance to these diseases.

- 4 In recent years, the salinization of soil has become a serious problem for agriculture in Oman. However, Rhodes grass has more resistance to saline soil than Alfalfa.

In the near future, increases in feed resources can be expected following the introduction of Rhodes grass as a partial substitute for alfalfa, provided that the time lost mowing (due to the hard stem of the grass) is overcome by the extension of simple equipment such as portable engine mowers.

In connection with the above (ii), the number of grazing livestock should be controlled to the appropriate size for the conservation of the rangeland resources. Since identifying the appropriate number of animals is rather difficult, as a realistic approach the introduction and production of appropriate feed crops should be conducted in parallel with the herd control. Feed trees and Spineless Cactus may be considered as desirable species for rangeland where precipitation is very limited. The practicability of introducing new species, however, is thought to be low unless otherwise verified through experiment and research including a study of the methods of how best to raise and use them.

Regarding the above (iii), agricultural and fishery by-products such as dates, crop residue, and dry sardines have been traditional part of livestock feed. There are more opportunities to promote more effective utilization of those by-products, like dates which are left on trees after harvesting (refer to the report issued by Arab Company for Livestock Department: Feasibility Study for Animal Feed Mills in the Sultanate of Oman). The palms tree planting area in Oman is 24,170 ha. Some farmers cultivate the area beneath date palms, but this has not yet been fully utilized. An increase in feed resources can be expected from the promotion of intercultivation among date trees which involves planting sorghum and greenpanic grass which can be raised in shade. Furthermore, there is also a high potential for feed trees which are to be planted in the vicinity of villages and do

not require additional irrigation water. The following could be other feasible developments for feed resources besides agricultural cropping fields.

- (i) Adoption of by-products obtainable through food processing
- (ii) Adoption of droppings collected in poultry farms
- (iii) Making use of urea produced in the petro-chemical industry

New feed resources shall be applied after examining feed value, method of supply to livestock, and relevant inter-connected experiment, research and extension of the objective feed.

(b) Prospects for Feed Supply in 2000

"Based on the discussion in above item (a) "The potential of securing feed resources", it can be expected that feed resources (excluding concentrates) in 2000 will increase to a level of 689,505 tons (dry matter).

Moreover, the concrete method of this calculation is described in section 5.2.2 "Production Prospects for Agricultural Produce".

(2) Improvement of Livestock

A low productive capacity of Omani livestock can be pointed out as one cause of low productivity in animal husbandry. Omani livestock are generally small in size. For instance, a mature Dhofari cattle female weighs approximately 200 to 250 kg. It is supposed that the individual animal which has a relatively large body surface compared to its weight is naturally better able to stand the severe climate. Accordingly, the improvement of livestock aiming only at increasing size, without adequate consideration of other factors, may inhibit adaptability to the living environment in Oman. In other words, the improvement of livestock should be practiced with due consideration and in line with the results of the necessary experiments and research.

Table 5.7.14 Supply of Fodder (estimated amount in 2000) (DM ton)

Region	Rangeland	Irrigated Land		Residues	Under Dates	By-Products			TOTAL
		Rhodes	Alfalfa			Dates	Dry-Fish	Banana	
South	208,336	29,030	2,212	124			4,462	1,200	245,364
North	104,227	201,992	58,406	3,691	47,040	16,640	10,412	1,733	444,141
TOTAL	312,563	231,022	60,618	3,815	47,040	16,640	14,874	2,933	689,505

Table 5.7.15 PERFORMANCE OF DAIRY CATTLE AT RUMAIS. (1983-86)

ITEM	BREED TYPE			
	GRAVIEH	JERSEY	LOCAL	JER X LOC
TOTAL MILK (1)	2733	2497	238	1465
LACTATION PERIOD (days)	282	291	144	232
AVE. DAILY PROD. (1)	10.8	8.7	2.1	7.1
BUTTERFAT %	29.8	4.47	5.28	5.11
TOTAL BUTTERFAT (kg/lactation)	81.5	111.6	12.6	74.9
AVE. CALVING INTERVAL (days)	374	425	383	378
SERVICES/CONCEPTION	1.6	2.2	1.3	1.5
BIRTH WGHT. (kg)	27.7	19.5	15.3	17.6
WEANING WGHT. (kg)	69	63	40	61
MATURE WGHT. HEIFERS (kg)	281	237	155	215
CALF MORTALITY RATE (%)	12.5	22.5	5.6	8.0
D.M. I. (kg)	10.5	10.5	6.8	9.4
D.M. I. (% B.W.)	2.5	2.5	2.4	2.5
CONC. : ROUGH.	49:51	49:51	40:60	42:58
CONC. / . MILK (g/kg)	613	667	800	600
COST OF PRODUCTION (Bz/l)	96	103	151	106

Results of the cross-breeding experiment of Baladi and Jersey conducted by the Rumais Research Center and Qaboos University indicate that the cross-bred variety possesses high productivity and low calf mortality.

Table 5.7.15 shows the performance of dairy cows (cross-breeds) at the Rumais Research Center. According to this research, the productivity of the cross-bred cow is rather high compared to the local cow, especially with respect to milk yields.

The same cross-breeding test has been conducted for goat and sheep. The productivity in livestock, especially those raised in sheds, will rapidly increase if the improvements of the livestock by use of cross-breeding are judged as viable and introduced to holders.

Livestock managed mainly by grazing in open areas should be improved through selection of native varieties until sufficient adaptability of the cross-bred animal to grazing management is confirmed. Still, it should be noted that the improvement of native varieties takes rather a long time in general.

On the other hand, artificial insemination (A.I.) may be effective for cattle. The effectiveness of A.I. for cattle improvement has already been proven all over the world. Once a quality bull is identified, by the use of a progeny test, etc., it is practicable to propagate a large number of the quality variety promptly and consequently accelerate the improvement even more.

(3) Improvement of animal hygiene and livestock management

The following is expected to develop through the improvement of animal hygiene and livestock management.

- (a) To reduce the mortality rate through the improvement of animal hygiene and the prevention of epidemics.

Reducing the livestock mortality rate and economic damage is one

of the most important goals of animal husbandry in Oman. In recent years, it has been believed that the epidemic morbidity and the mortality rate of livestock have gradually been decreasing because of the improvement of the quarantine system, the increase in animal clinics, and the implementation of a vaccination program. However, the present animal hygiene system cannot aim to eliminate serious infectious diseases such as FMD and Rinderpest etc. due to following:

- (i) Existing quarantine stations cannot cover all distribution roads between neighbor countries
- (ii) The present vaccination program does not cover all villages in Oman

The decrease of high morbidity and the enhancement of livestock productivity can be expected through vaccination and substantiation of the quarantine system. These will aim to eliminate serious infectious diseases. A decrease in the livestock mortality rate can also be expected through strict hygiene breeding control at farms.

- (b) Enhancement of livestock productivity through the improvement of management and administration

As was discussed before (Progress Report I, 3.4.2(8)), the present nutritional intake level of livestock is estimated to be prominently low in the country. This is one reason for the present low productivity of livestock in Oman.

Accordingly, it would be possible to enhance livestock productivity, especially in prolificability and growth rate, through more appropriate feed supply and the improvement of nutritional intake for the animals.

In addition, it can be expected to enhance the profitability of livestock management through premeditated and efficient service, breeding and selling.

One major constraint on livestock management is the stock holders' lack of awareness of farm economics. It is possible to increase livestock productivity by enhancing the management awareness of livestock holders through extension services and strict practice of management record preparation, etc. The improvement of the breeding management, in consequence, depends largely upon each stockholder's awareness and recognition of its importance. The activities of the extension centers are thus regarded as essential. Securing extension-related specialists to the extent possible and promoting extension services actively are prerequisites, while the rapid increase in the number of extension workers may not be easy due to the overall shortage of qualified personnel in the country. In order to supplement the shortage, it is necessary to develop alternative extension measures for holders, like introducing audio-visual systems, etc.

(4) Goal of livestock productivity in 2000

Based on the "Improvement of Livestock" and the "Improvement of Animal Hygiene and Livestock Management", it can be expected that the productivity of livestock in 2000 will improve to the extent shown in Table 5.7.16.

(5) Improvement of Marketing System.

(a) Price manipulation in domestic and imported livestock products

There are only a limited number of markets and processing facilities for livestock and its products with the exception of fresh milk and yogurt. This fact suggests that the marketing system in Oman has not yet been well developed.

Locally produced livestock products are generally consumed by the farmer's family. Therefore, development of the distribution system might not be required.

Table 5.7.16 Principles and Rate for Estimating Animal Production

Item	Cattle		Goat		Sheep		Camel	
	Local Cattle	Exotic	Cross Bred	Extensive	Intensive	Extensive	Intensive	Local
Production	15 months	13.5 months	15 months	15 months	10 months	15 months	10 months	24 months
Delivering Interval								
Annual Delivering Percentage	73%	80%	73%	80%	120%	80%	120%	40%
Result of Live Births								
Replacement Ratio	Female 20% Male 15%	Female 28%	Female 20%	Female 25% Male 40%	Female 23% Male 30%	Female 25% Male 40%	Female 23% Male 30%	Female 6% Male 15%
Mortality Rate	Mature 2% young 12.5%	Mature 3% young 10%	Mature 2% young 12.5%	Mature 5-10% young 12.5%	Mature 3-10% young 10.6%	Mature 5-10% young 12.5%	Mature 3-10% young 10.6%	7%
(+immature)								
Meat Production								
Weight								
Mature Male	300kg	500kg	320kg	55kg	60kg	51kg	55kg	500kg
Mature Female	250kg	400kg(12m)	150kg (3m)	46kg	51kg	44kg	50kg	350kg
Immature Female								
Young Male	50kg (3m)		25kg (5m)	28.5kg(200d)	32kg(200d)	25kg(200d)	48kg(320d)	
Young Female	100kg (5m)		50%	28.5kg(200d)	32kg(200d)	25kg(200d)	48kg(320d)	
Carcass Yield Rate	50%	50%	50%	50%	50%	50%	50%	50%
Milk Yield (kg/year)	250kg	4500kg	1200kg		120kg			

Source: JICA estimation

However, in order to provide the farmer with production incentives and to increase locally produced products in the consumption market, inevitably, improvement and development of the marketing system, that connects production sites to areas for marketing, must take place. In particular, development of the distribution system connecting the Southern Region, which has high development potential in animal husbandry, to the capital area (Muscat), is imperative because an excess of livestock, including cattle, are fed in this region.

The needed livestock market, product processing facilities, storage facilities, and transportation measures, etc. will be constructed and developed to cater to the future supply of livestock products, and will parallel the promotion of the livestock industry. Such locally produced products, however, will not be consumed regularly in the domestic market unless the price differences between local and imported products are settled. Tables 5.7.17 to 5.7.21 indicate the prices of local and imported products.

As indicated in these tables, there are some differences in price between local and imported livestock products, particularly between locally produced meat and imported meat. In the following, marketing and pricing problems are discussed. For example, red meat carries the biggest price gap between local and imported products.

With respect to red meat, there is a marked difference in the price between locally produced meat and imported meat. This fact reflects the large handicap for local meat in retailing compared with that which is imported. In other words, big traders do not participate in the local livestock market because of expected smaller distribution margins. This may be why the market for local livestock remains so small in scale, and is obstructed from the expedited development of its facilities.

Although locally produced meat is retailed in very limited quantities, it is consumed mainly by the producers' family and is

Table 5.7.17 RELATIVE PRICES OF LOCALLY PRODUCED AND IMPORTED POULTRY PRODUCTS IN OMAN

(Poultry)

PRODUCT	LOCAL TRADITIONAL	LOCAL COMMERCIAL	IMPORTS FROM OTHER COUNTRIES	IMPORTS FROM G.C.C. ELSEWHERE
Table	Home	600 Bz/doz	360 Bz/doz	360-400 Bz each
Eggs	Consumption			
Frozen	-	-	600 Bz each	500-600 Bz each
Broilers				
Live	R.O. 1.000	R.O. 1-1.400	R.O. 1.200	
Birds	each	each	each	

Source : Consultant observations during fieldwork.
(GRM)

(Milk)

Table 5.7.18 Retail Price of Milk Products

	(RO)		
	<u>1 litre</u>	<u>1/2 litre</u>	<u>1/4 litre</u>
1. Domestic Material			
Oman Sun Farms			
(fresh pasteurised)	0.450	0.225	0.150
2. Imported Material			
Oman National Dairy			
Products Co.			
(recombined pasteurised)	0.250	0.130	0.080

Yoghurt produced from reconstituted milk by Oman National Dairy Products is marketed through retailers at RO 0.100 per cup (approx. 0.125 litre per cup).

Butter imported from Newzealard is marketed at R.O. 0.285 per/227 g pack.*

Source : Feasibility Study For Establishment of Animal Projects
(Arab Co.)

* JICA field survey

(Red Meat) Table 5.7.19 Retail Price of Goat's Meat
(Muscat Market in 1990)

	<u>Omani</u>	<u>Imported Live</u>
Boneless Price/kg	RO 3.0	RO 1.5

Source : Consultant's Field survey
(JICA)

Table 5.7.20
Price Comparison between Domestic Beef and Imported Beef

		<u>Omani</u>	<u>Imported</u>
Liveweight Price/kg	RO	1.00	
Killing Out	RO	50%	
Carcase Price/kg	RO	2.00	
Boning Loss	RO	30%	
Boneless Price/kg	RO	2.86	(not including distribution margin) RO 1.334 ⁽¹⁾

Source: Study for the Viability of Manufacturing Processed Meat.

(1) Average price of UK boneless carcasses, 1986

Table 5.7.21 Imports of Beef to OMAN in 1987

<u>Country</u>	<u>RO'000</u>	<u>Value</u> %	<u>Volume</u> tonnes	<u>%</u>	<u>Price</u> RO/tonne
India	790	47	1765	70	447
Australia	273	16	203	8	1342
New Zealand	231	14	195	8	1184
United Kingdom	158	9	106	4	1492
UAE	75	4	98	4	758
Netherlands	72	4	62	2	1165
France	50	3	50	2	1000
Other EEC	30	2	51	2	600
Others	16	1	10	—	1670
Total	1695	100	2540	100	668

Source: Oman Foreign Trade Statistics. 1987

costly compared to imported meat. The local fresh meat is still consumed by high income earners and the portion of consumers who favor it. When considering the government aim to increase the domestic self-sufficiency rate through an increase in the number of livestock and therefore, in productivity, it must be pointed out that an increased meat supply from local livestock may not be favored by the majority of consumers unless the better quality of local products is matched by a cost difference against the imported, or the present large cost disparity is minimized enough to be acceptable.

The issue of the improvement of the meat distribution system in the country is judged to be strongly related to the measures of how to resolve the unbalance in prices between local and imported meat. Traders are not expected to involve themselves in the local market without taking countermeasures against the price difference, even if both the market and distribution facilities are improved. It is likely that the improvement of the distribution facilities alone will result in further expansion of the price difference owing to the increase in distribution expenses.

The following measures are proposed in order to solve the difficulties regarding the difference in retail price between local and imported meat:

- (i) To brand the local meat by enhancing its quality to absorb the price difference and thereby make it more widely acceptable to consumers
- (ii) To minimize the price difference by reducing the production costs of local meat through increasing the productivity of livestock management
- (iii) To minimize the price difference by trade protection through adjusting import duties for imported meat
- (iv) To minimize the price difference by means of reducing the local meat price through subsidizing the distribution process

With respect to (a) above, every effort to enhance local meat quality should be made by local livestock holders. At the same time, the market itself, on the consumer's side, should be mature enough to accept the price difference with a corresponding quality difference, though this process may be long term.

In connection with (b) above, the livestock sector should make real efforts to reduce production costs, in spite of certain limits caused by the restriction of agricultural resources. In general, the larger the management scale becomes, the less the unit production cost, owing to the function of scale merit. Since the government aims at the promotion of a settlement program for the rural populace as one of its basic policies, the government has to secure an income source for that populace. The scale of livestock management areas, therefore, should be determined in concert with combined cultivation and be an appropriate size so that they can be dealt with by the available labor force within a settled family. Considering the above, reducing the production cost of livestock to an extent which significantly decreases the present market price will be difficult.

Regarding item (c), there are several difficult problems. One is the extent to which the price of imported meat is increased, and the other is what sort of methods are to be adopted. For the former, the following items should be taken into account:

- (i) Appropriate price differences shall be established on the basis of accurately forecasted consumer demand for local and imported meats. For instance, with respect to goat meat, which is liked by the Omani people and is expected to be in relatively high demand, it may be accepted by the consumers even if there are certain differences in price between local and imported meat. Contrary to this, the locally produced meat of sheep and beef, the demand of which is less compared to goat meat, will not be accepted by consumers unless there is a relatively small price difference.

(ii) In addition to forecasting consumer demand in (i) above, appropriate price differences shall also be established on the basis of accurately forecasted future market shares of local and imported meat. For instance, if the locally produced meat has a small market share, it may be accepted by the consumers due to scarcity, and in spite of the large price difference. Or, if locally produced meat has a large market share, a small price difference has to be established.

(iii) An increase in the price of imported meat causes an increase in the amount people spend for meat consumption. This affects the life of the nation considerably as meat is one of the principal foods for the Omanis. Accordingly, price differences should be established so as to allow increases in the price of imported meats and should be proposed on the basis of accurately forecasted influences it will have on the life of the consumer.

For the latter, no measures are being considered at present for import duty, etc. If such measures are to be introduced, in order to raise the price of imported meats, then legal arrangement is necessary, as well as consideration of the present relationship between the existing administrative institution and the organization. Provided that the market share for local meat will increase in the future, these details must be studied on a more practical basis.

With regard to item (d), the method employed by PAMAP for cattle in southern jabal is general practice. The cattle are purchased from the producer, and are sold to consumers at a lower price. This method has some difficulties because there is a temptation for producers not to make an effort to reduce production costs caused by the expectation of government subsidies. Accordingly, price manipulation and the methods of subsidizing need to be examined further.

(b) Target for Marketing Improvement

The price manipulation of red meat, which represents the largest

difference in prices between local and imported products, was discussed previously. However, the same situation exists for other livestock products. As discussed earlier, the appropriate combination and implementation of the above proposed items (a -> d), accompanied by the construction and improvement of distribution facilities, will prove to be practical and effective. Furthermore, slaughter facilities, together with transportation measures, corresponding to the larger volume of distribution of local products, shall be required to increase and develop, side by side, with the above implementation.

This Master Plan thus aims to provide the nation with quality livestock products, by means of encouraging the animal holders to expand the production starting with arousing production motivation, right through to the improvement of distribution facilities, as well as the development of a smooth marketing system from livestock farms to consumers.

5.8 Distribution and Agricultural Produce Processing

5.8.1 Distribution

(1) Present Situation

The present situation of distribution for agricultural produce in Oman is described below:

- (a) The nation has modernized rapidly by depending on oil revenues, and substantial infrastructures have been improved, including the development of rural areas. In the agricultural sector, in this context, rapid development resulted in farmers drifting toward urban areas to earn non-agricultural income, and foreign labor was introduced to cope with the labor vacancy in order to maintain agricultural production. The government has established various support programs for the farmers and has endeavored to promote agricultural development. Nevertheless, present agricultural productivity is still low, while production costs are high compared to other GCC countries, and developing countries.
- (b) Due to climatic conditions, the season suitable for agricultural production is limited and short in Oman. For this reason, farmers are forced to cultivate the same crops at the same time. Furthermore, lack of available information regarding current distribution conditions prevents farmers from taking advantage of the commercialization of crops. Consequently, several kinds of crops are produced in excessive amounts, which causes low selling prices. On the farmer side, the low selling price results in an increase in unharvested crops (i.e. low commercialization rate) and a decrease in incentive to enhance the quality of crops, or to introduce new crops and advanced production techniques.
- (c) Nation-wide purchasing power has increased along with the increase in both the national income and foreign labor, caused by rapid economic development. As a result, the demand for agricultural produce is rising continuously (refer to sub-section 3.1.3). As

domestic production has not been able to catch up with the demand for agricultural produce, the deficiency has been supplemented by a rapid surge in imported amounts. Although the government has intended to control the import with such measures as permits in terms of crops, the results have not shown tangible effects yet. The major exporting partner is the UAE, which also imports produce from U.S.A., Brazil and India, which are major agricultural producers. Imported produce is low in price and very high in quality. Most of the imported produce is regarded as superior in both price and quality compared to domestic produce.

- (d) Lack of farmer understanding of the distribution processes such as grading, packing, storing, transporting, etc. is also an obstacle to effective distribution of farm produce. Due to lack of farmer awareness of the importance of quality, crops of sub-competitive quality in markets are produced, which results in such produce ending up being utilized for family consumption only. Neither grading in terms of crop standard, volume and quality nor packing for marketing are done; most of the crops are sold in originally harvested form. Furthermore, available storage facilities are limited and cold storage facilities are rare. Produce is generally transported to the market by the farmer himself. However, there are many farmers who have no vehicles and so transport the produce by taxi or rented car. Further, there is no available information source for them to determine which trader or market is the most advantageous for them to sell to, and so they must determine those details after visiting a few markets by themselves. In any case, the handling cost of the produce borne by the farmers is considerable.
- (e) Wholesale markets for agricultural products are currently not operating. Many wholesalers are engaged independently in collection and shipping of agricultural products to the retailer. At the retail level, public management by the Ministry of Municipalities is present, with produce sold through numerous souqs.
- (f) Wholesalers generally determine at the farm gate the price of agricultural products in negotiation with the farmer. Prices are so

determined taking into consideration past trends. However, in some cases, product price is set by auction in the retail market square.

Shipping is not performed in a planned manner, but rather the amount of shipped produce is governed by farmer harvest trends.

Nevertheless, in all cases, the selling price of agricultural products by the farmer, with the exception of certain crops, exceeds the cost of production.

In general, the price for domestic agricultural products (purchasing price from PAMAP) is lower than that for imported products (CIF purchase price by wholesalers) according to government statistics. However, the interview survey by the JICA team in the field indicated in actuality a reverse situation for prices of imported and domestically produced agricultural products.

- (g) Administration of agricultural product distribution is performed by agencies such as MAF, PAMAP, the Royal Oman Police, the Ministry of Commerce and Industry and the Ministry of Municipalities. These agencies act independently, whereas overall coordination is necessary. Also, administrative efforts for the consumption sector have yielded inadequate results.

In order to cope with this situation, the Public Authority for Marketing Agricultural Produce (PAMAP) was established and started its services in 1986 for the collection and distribution of agricultural produce all over the country. The ways PAMAP distributes the produce, which is delivered by the farmers to PAMAP collection centers, are as follows:

- (a) to wholesale to retailers and supermarkets in the vicinity of each center
- (b) to sell directly to large consumers
- (c) to sell directly through PAMAP's retailing shops
- (d) to deliver to other PAMAP centers

The distributed volume from the farmers to PAMAP has shown a steady increase year by year. The share of distributed volume in PAMAP in 1988 is about 8 % against the production volume of vegetables and fruits except dates. The farmers' advantages in distributing through PAMAP can be summarized as follows:

- (a) The produce is purchased cash on delivery if the quality satisfies PAMAP standards
- (b) The time and labor to select the trader are minimized
- (c) The purchasing price at PAMAP is more stable than that of traders

Current issues are: (a) The farmers are required to deliver the produce directly to PAMAP themselves; (b) The ratio of commercialization still remains low because the farmers are less able to sell the produce which satisfies PAMAP's quality standards due to inadequate cultivation techniques employed by the farmers.

Moreover, some farmers are not covered by the operation range of the PAMAP centers, and some traditional farmers still prefer to sell their produce at the local market (souq). In addition, the slow process of organizing farmers results in only limited joint sales of the produce.

(2) Stagewise Distribution Development and Distribution Structure for Agricultural Produce in Oman

The development stage of the distribution process for agricultural produce can be generally outlined as follows:

- (a) The initial stage where the producer sells directly to the consumer at the market with the relationship of: producer - consumer
- (b) When the market expands, the merchant appears and participates in the following relationship: producer - merchant - consumer
- (c) When the market expands further and the difference between producer and consumer becomes large in terms of social aspects, the commodities in the distribution process are increased, classified and specialized. Thus, the following distribution channel appears: producer - collector - distributor - consumer

(d) Finally, the following channel emerges : producer - collector - middleman-distributor - consumer

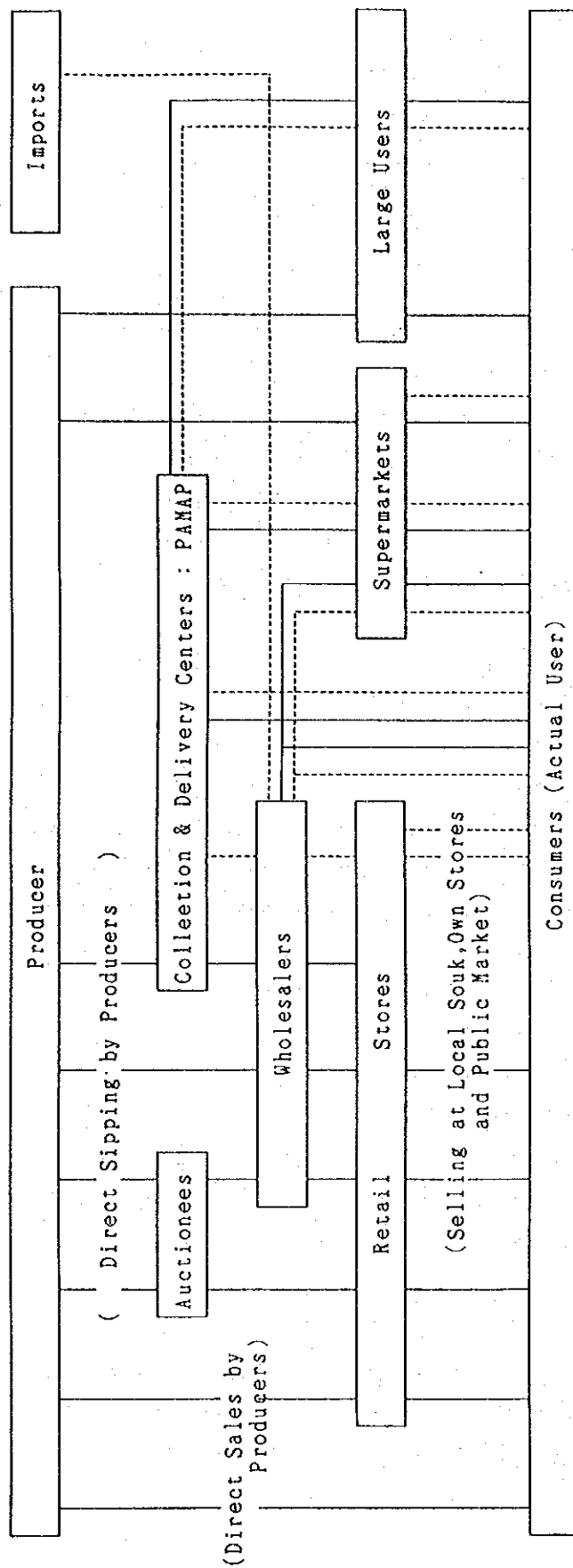
As indicated above, the distribution system becomes more complex with the maturity of the marketing structure for produce.

The present distribution system for agricultural produce in Oman is illustrated in Figure 5.8.1. The present major marketing system for domestic produce in the country still primarily uses the channel of: producer - merchant - consumer. However, since the establishment of PAMAP, the following channel has begun to emerge: producer - collector - distributor - consumer. On the other hand, most imported commodities are transported by road from Dubai, UAE, to the wholesaler who sells them to the consumer either through a retailer or directly.

The present unbalanced demand and supply of agricultural produce in Oman is adjusted by the imported amount, because any kind and any amount of low-priced agricultural produce can enter the Omani market at any time from Dubai, which is only about 400 km from Muscat with good road access. The imported amount in quantity and value for agricultural produce via Wajaja is 70 % against the total imported amount. (Refer to Annex Table 5.8.1) Due to the proximity of Dubai, the wholesalers in Oman transport agricultural produce obtained in Dubai to Omani markets, and sell the produce directly from 2 to 3 tons class trucks with no cooling facilities. The scale of retailers in Oman is generally small with only about 10 sq. meters of shopping space and monthly sales of less than R.O. 500. Regardless of quality and quantity, selling stock is always sufficient without the wholesale market. This is one of the reasons why the wholesale market, which was constructed several years ago by the Ministry of Regional Municipalities (MRM), has not opened yet.

Consumers purchase agricultural produce at various places: rural souqs, retailing stores, supermarkets and public retailing centers constructed by MRM. At present, there are 940 supermarkets and 6,200 grocery stores in the country which are sponsored by Omanis and managed by foreign personnel.

Figure 5.8.1
Distribution Channels of Perishable Foods



The management of the supermarkets is not so efficient in spite of their large scale. Also the retailing shops are not efficient due to small scale management. Extra expenses caused by inefficiencies are added to the regular price of the agricultural produce. In retailing shops, produce is arranged on show-shelves without packaging and is sold by weight. The size, grade and price of both imported and domestic produce are not indicated. Regarding prices in retailing shops in the public market, the same produce has the same price but is sold finally through negotiation on the basis of quality.

The supply of cereals, which is the primary staple, depends on imports except a limited amount of wheat and some barley which is cultivated in and around date trees in Oman. In order to supply cereals consistently and with reasonably low prices, the government established the Oman Flour Mills (OFM) and began flour milling in May 1977. OFM was founded under capital sharing, 60 percent by the government and the remaining 40 percent by the private sector, and produces 120,000 tons of flour and 60,000 tons of feed crop annually. All rice is imported through trade companies and is sold by retailers and by supermarkets.

(3) Public Authority for Marketing Agricultural Produce (PAMAP)

PAMAP was established to provide incentives to farmers to increase agricultural produce, and to supply necessary amounts of produce to the market at appropriate prices. The investigation for the establishment of PAMAP started in 1978, under the sponsorship of MCI, and the final report was submitted in 1981 by the HVA-International BV Consultant, Netherlands. This report recommended the establishment of: (a) a National Organization for the Commercialization of Fresh Produce (NOCFP), and (b) Retail Centers for Municipal Food Markets, etc.

In November 1981, His Majesty issued a Royal Decree for PAMAP and the construction work began. The present facilities were completed in 1985, and PAMAP started its collection and distribution services for agricultural produce at the beginning of 1986. The present major services of PAMAP can be summarized as follows:

- (a) to purchase agricultural produce brought into centers by the farmers and to distribute it to the consumer area
- (b) to sell produce through each center
- (c) to manage agricultural processing facilities
- (d) to issue import permits for agricultural produce to traders

The organization of PAMAP is shown in Figure 5.8.2 and Annex Table 5.8.2. The headquarters, with its associated facilities in Muscat, supervises the services of (a) and (b) above and executes (c) and (d) above, while 6 collection and distribution centers and 12 distribution centers execute (a) and (b) above.

Furthermore, 29 retail shops, directly managed by each center, including the shops under Ruwin Sales Center also carry out the services of (b) above. With regard to (d) above, the PAMAP headquarters issues the import permit to traders, for both export and import, in accordance with the criteria shown in Annex Table 5.8.3. The present number of personnel in PAMAP is 148 at the headquarters, 247 in the centers and PAMAP retail stores, and 395 in total.

The development projects proposed in the Third Five-year Development Plan and carried out by PAMAP are shown in Table 5.8.1. Since its inauguration in 1986, emphasis has been placed on expansion and maintenance upgrading of the facilities. The cattle de-stocking program is one of the related duties which has been conducted under PAMAP since 1988 when the Program was transferred from the jurisdiction of MAF. The accomplishments of PAMAP's major activities, which are to purchase agricultural produce from the farmers and to distribute it to the market, are listed in Annex Tables 5.8.4-5.8.7. Although total handling amounts for both purchasing and distribution in 1989 show a great increase (more than three times that in 1986, the first year of operation), PAMAP's share of the entire production amount in the country was still around 8 % in 1988. The amount purchased by PAMAP is characterized by the large seasonal variation. For instance, in 1988, the total handling amount of three high-ranking months exceeds 50 percent of the total amount in the year. This fact is mainly a result of production and is a major obstacle for the operation of PAMAP. If the capacity of the center and storage

Grand Total
(395)

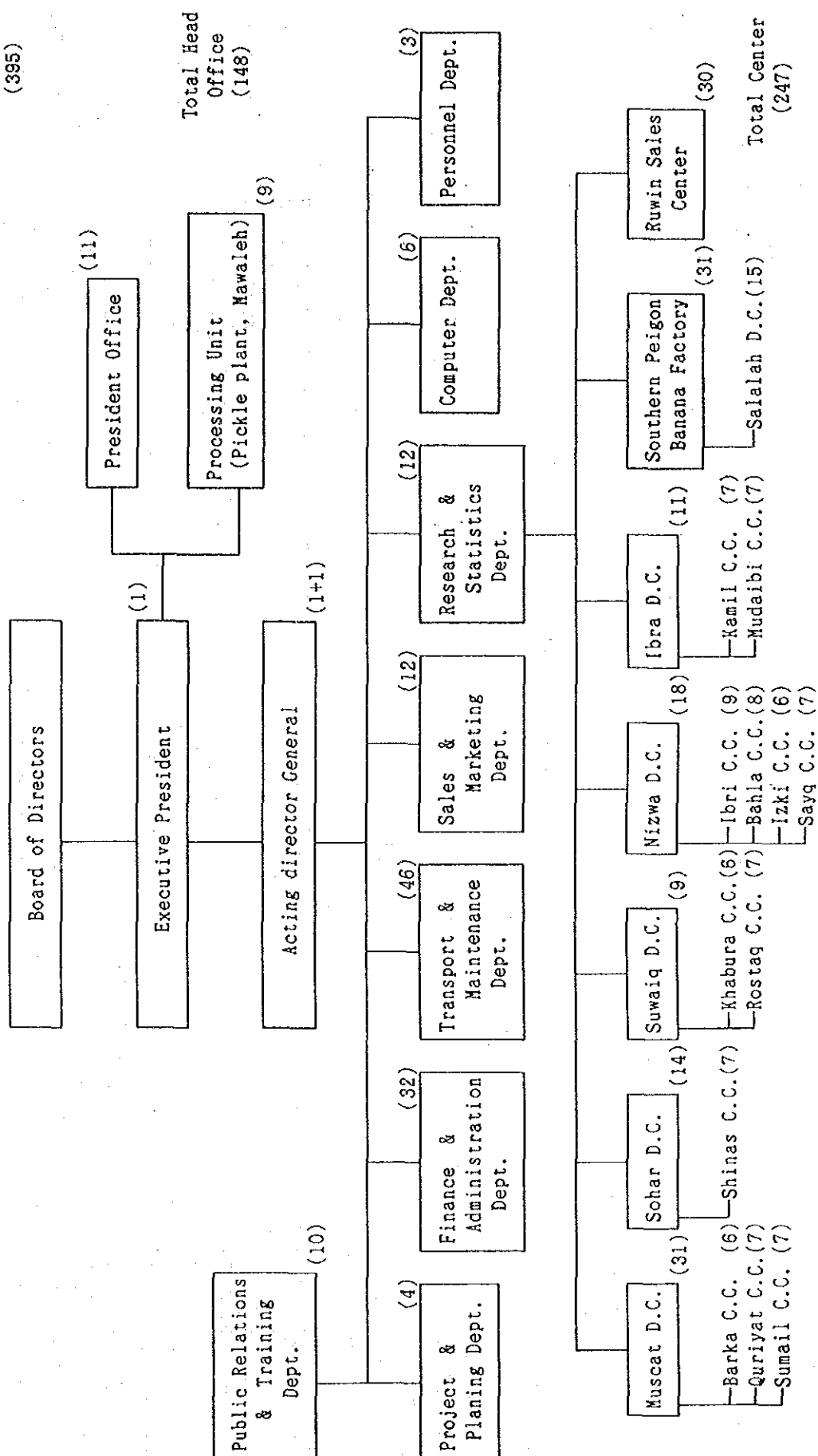


Figure 5.8.2 PAMAP Organizational Structure in December, 1989

Table 5.8.1 Development Budget 1986-90 for PAMAP

(Unit : R.O.)

Project Description	Total Project Cost	up to 1985	Expenditure			Allocation balance	
			1986	1987	1988	1989	1990
1. Project for Marketing Agricultural Produce (phase -1)	9,551,890	8,674,890	585,000	63,000	229,000	-	-
Plan							
Actual		8,674,890	585,260	139,085	132,288	80,204	
2. Project for Marketing Agricultural Produce (phase -2)	983,000	-	-	680,000	265,000	38,000	-
Plan							
Actual		-	-	184,735	333,215	219,801	
3. Collection Centre at Buraimi	360,000	-	-	-	200,000	140,000	20,000
Plan							
Actual		-	-	-	-	-	
4. Expansion and Maintenance of Ruwin Centre	150,000	-	-	-	100,000	50,000	-
Plan							
Actual		-	-	-	27,519	15,489	
5. Expansion and Maintenance of Banana Factory	330,000	-	-	-	-	165,000	165,000
Plan							
Actual		-	-	-	-	3,360	
6. Reducing Animals Number of Cattles	2,000,000	-	-	500,000	500,000	500,000	-
Plan							
Actual		-	-	-	709,994	310,315	
7. Drying Range at Chala	-	-	-	-	-	-	-
Plan							
Actual		-	-	-	-	-	
Total		8,674,890	585,000	1,243,000	1,294,000	893,000	685,000
Plan			585,260	323,820	1,203,016	629,169	
Actual							

facilities, as well as the transportation system, is designed to be able to handle such peak amounts, the net annual average operation rate will be lower and become inefficient. Table 5.8.2 indicates that the management of PAMAP is not favorable despite large subsidies provided by the government.

This is due to the following reasons:

- (a) Management is at an initial stage, and facilities are still not being used to their fullest.
- (b) PAMAP is carrying out functions which the private sector at present fails to perform (refrigeration, nation-wide collecting and shipping of produce, etc.).
- (c) PAMAP purchase of goods which are non-standard.
- (d) Selling prices must be suppressed at present.
- (e) Staff does not have sufficient training.

The following are observations on PAMAP's services ranging from purchasing to distributing the produce to the centers:

(a) Grading and Packing

The harvested produce must be arranged for distribution and sales. Though grading and packing are techniques primarily required for the commercialization of produce, they are vital factors. PAMAP has established standard criteria for agricultural produce. However, no criteria for size, weight and packing are included. It is assumed the consumer will accept the present situation due to the already established sales system in retailing as discussed previously and consumers requirement consequently for grading is not so high. PAMAP's inspection for receiving and distribution produce cannot be judged as adequate and appropriate. Moreover, the importance of grading is not well understood. This is mainly due to the following

Table 5.8.2 Profit and Loss Account 1986-1989 in PAMAP

Description	1986	1987	1988	1989	ALLOCA. 1990
Sales	1,180,758	2,696,723	3,587,966	4,690,123	
Cost of Sales	973,535	2,191,670	3,071,195	3,904,013	
(Gross Margin)	207,223	505,053	516,771	786,110	
Direct Expenses	1,759,254	52%100%	1,947,983	51%100%	60%100%
Direct Salaries	944,971	28% 54%	1,029,110	27% 53%	35% 59%
Packing Material	180,010	5% 10%	226,300	6% 12%	8% 13%
Transportation	209,482	6% 12%	267,010	7% 14%	6% 10%
Elec. for Refrigeration	142,314	4% 8%	118,504	3% 6%	3% 5%
Other operating expense	282,477	8% 16%	307,059	8% 16%	8% 14%
Indirect Expense	1,653,118	48%100%	1,855,619	49%100%	40%100%
Indirect Salaries	654,868	19% 40%	749,075	20% 40%	32% 81%
Indirect Expense	260,281	8% 16%	336,780	9% 18%	7% 19%
Depreciation	737,969	22% 45%	769,764	20% 41%	0% 0%
(Expenses)	3,227,469	3,412,372 100%	3,803,602 100%	2,897,110 100%	
Income	3,227,469	2,661,674	100% 2,755,968	100% 2,897,110	100%
Gross Margin	207,223	505,053	19% 516,771	19% 786,110	27%
Non-operating Revenue	27,296	61,615	2% 95,531	3% 22,000	1%
Government Subsidy	2,992,950	2,095,006	79% 2,143,666	78% 2,089,000	72%
Expenses	3,227,469	3,412,372	3,803,602	2,897,110	
Deficit	-	750,698	1,047,634	0	

NOTE : EVALUATION OF NECESSITY FOR PAMAP'S SUBSIDY

- 1 INITIAL STAGE
- 2 OWN ROLE OF PUBLIC ORGANIZATION
- 3 NECESSITY FOR STORAGE DUE TO SEASONABILITY
- 4 NECESSITY FOR LONG TRANSPORTATION
- 5 PURCHASE NO-STANDARD PRODUCE
- 6 LOW SELL PRICE
- 7 FAILING TO DO DEMAND ADJUSTMENTS BETWEEN THE CENTERS
- 8 INSUFFICIENT MARKET
- 9 INSUFFICIENT FACILITIES USAGE
- 10 INSUFFICIENT STORAGE TECHNIQUES

reasons:

- a) insufficient education of farmers, related to the importance of grading
- b) lack of a system for impartial grading
- c) consideration of farmers claims which might arise against PAMAP'S refusal of unacceptable produce

In connection with packing, the packing material is delivered by the Distribution Center in Muscat. However, due to a lack of awareness about the importance of packing, there are times when produce is damaged owing to poor packing.

(b) Transportation

The private transportation business is still underdeveloped in Oman because the population is small in relation to the size of the country and industries are centralized in the capital area. Furthermore, industries which require refrigeration are limited. Therefore, PAMAP owns a considerable number of vehicles at each center to transport produce in the peak season or at any time as required. The present PAMAP administration for transportation is insufficient, particularly, in the following areas:

- a) minimizing the transportation time
- b) maintaining appropriate temperatures during transportation
- c) loading the produce appropriately

In parallel with the improvement of the above areas, transportation based on an efficient distribution schedule is also a prerequisite. Annex Figure 5.8.1 depicts the location of each center and the transportation time between locations.

(c) Storage

The agricultural products handled by PAMAP are collected during their harvest seasons. Therefore, each PAMAP center has refrigerators in

order to prolong the sales period by storage. Since the purpose of cold storage of agricultural produce is to control respiration, metabolism, transpiration, germination and rooting, long term storage is viable only under the optimum storage conditions taking into account the specific temperature, humidity, period of storage, loading method, etc. for each product. Optimum storage conditions and the appropriate supervision are not presently utilized in PAMAP. Freezer-burn and rotting are frequently found. Moreover, the delay of removing damaged produce decreases the quality of the normal produce. In this context, the cold storage facility in PAMAP is not used efficiently though its scale is considerably large. With long term storage of agricultural produce, the pre-storage quality is extremely important. Therefore, a careful inspection of produce quality before storing should be a prerequisite to eliminate poor quality and damaged produce.

The destinations of agricultural produce collected from each center, are determined by the administrator of each center on the basis of the information for current inventory and collection forecast prepared by the PAMAP headquarters. There are no special problems seen in PAMAP's sales methods, which are the same methods as those of the retailing stores, though PAMAP aims to promote consumption increase for domestic produce under its "Green Oman" labeling campaign.

It has been four years since PAMAP was established. The name and the function of PAMAP have become familiar in the market. However, there still remains no outstanding difference between the respective functions of the private wholesaler and retail store, and PAMAP. Further examination especially towards giving sharper focus to the function of PAMAP should be conducted.

(d) Price Formulation

PAMAP determined its purchase price for agricultural products through its Committee for Demand and Supply. A survey is made of the retail market auction price for agricultural products as well as

consideration made to amounts of products being handled at collecting and shipping centers, and demand and supply trends.

The PAMAP selling price is determined by added commission (10-15% in the case of wholesalers and 20% in the case of retailers) and the cost of refrigeration to the original purchasing price. Annex Table 5.8.10 indicates the proportion of selling price accounted for by commission and refrigeration cost. Table 5.8.3, and Annex Table 5.8.11-15 indicates expenses incurred by the private sector and PAMAP at each stage of distribution. Despite some difference in refrigeration cost, the selling price by PAMAP is considered appropriate.

(4) Agricultural Product Price

At present, full fledged wholesale markets which function to distribute and set prices for agricultural products are not in operation. However, auction for some products, representing an embryonic stage in wholesale market development, is being carried out. Such auction is performed in the retail market square. Planned shipment of agricultural products is not performed, with amounts of produce governed by the size of farmer harvests.

The mainstay of the present distribution system is the wholesaler. The wholesaler engages in shipping, and both wholesaling and retailing of agricultural products. Products are purchased directly from the farmer, packed in cardboard boxes once a certain amount of produce is collected, and then shipped and sold to retailers, or in small amounts directly to consumers.

However, amounts of produce handled by the wholesaler are small and marketing strategy is absent. The purchasing price of produce is determined at the farm gate in negotiation with the farmer. Storage of produce for release to the market in response to supply and demand trends is not performed. Thus under the present system, neither price formulation reflecting supply and demand, nor a stable supply of good produce to the consumer can be expected.

Table 5.8.3 Farmgate Price and Retail Price on Private and PAMAP

Crop	Distribution between the farmer and the retailer					Distribution between the farmer and PAMAP					Note
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	
Banana	138	287	149	43.9	51.9	140	266	120	54.9	45.1	
Cabbage	85	199	114	57.2	42.8	52	91	39	57.1	42.9	
Cauli Flower	191	387	196	—	—	294	381	87	77.3	22.8	
Potato	153	238	85	64.3	35.7	128	186	58	68.8	31.2	
Tomato	236	308	72	76.6	23.4	135	179	44	75.4	24.6	

Note :

- (1) Farm Gate Price (Producer's Price) Baiza/kg
- (2) Retail Price Baiza/kg
- (3) Profit (2) - (3) or (6) - (3) Baiza/kg
- (4) $\frac{(1) - (2)}{(2)} \times 100$ %
- (5) $\frac{(3) - (2)}{(2)} \times 100$ %
- (6) PAMAP Baiza/kg

Each figure is weighted year averaged price in 1988.

SOURCE : ABSTRACT IN INTERNATIONAL SYMPOSIUM ON AGRICULTURE & FISHERIES DEVELOPMENT IN OMAN
IN MUSCAT ON 15-19 OCTOBER 1989

PAMAP determines its purchase price for agricultural products through its Committee for Demand and Supply. A survey is made of the retail market auction price for agricultural products, as well as consideration made to amounts of products being handled at collecting and shipping centers and demand and supply trends.

The PAMAP selling price is determined by added commission (10-15% in the case of wholesalers and 20% in the case of retailers) and the cost of refrigeration to the original purchasing price. Month-wise agricultural prices for 1989 are indicated in Annex Table 5.8.8 - 9. Produce sold at retail market auctions is not weighed, but rather sold by volume according to the form in which it is brought from the farm: by basket, crate, box, etc. Bulky produce such as watermelons, etc. is sold by the truckload.

Table 5.8.4 compares the selling price determined in the above manner with the farmer production cost, based on PAMAP purchase prices, and production cost statistics for agricultural products as published by the Department of Agricultural Statistics of MAF. As can be seen from the table, the market price for agricultural products is higher than the farmer production cost, except for certain crops. Products for which market price falls below that for production represent 10% of total agricultural products traded in terms of volume, and 3% in terms of value. Thus 1988 data indicates price formulation favorable to the farmer.

Annex Figure 5.8.2-17 indicate PAMAP data for month-wise price and domestic production amounts for agricultural products. Although large month-wise production fluctuations occur for bananas, coconuts, cucumbers, garlic, onions, papayas, potatoes and tomatoes, corresponding extreme price fluctuation is not seen. This is indicative of efforts by PAMAP to insure stable prices for farmers.

In general, the price for domestic agricultural products (purchasing price from PAMAP) is lower than that for imported products (purchase price by wholesalers) according to government statistics. However, an interview survey by the JICA team in the field indicated a reverse situation for prices for imported and domestically produced agricultural products.

Table 5.8.4 Production Cost and Purchasing Price in 1988

No. Produce	PRODUCTION COST		MINI. PRICE IN PAMAP RO/TON	PURCHASE IN PAMAP		PURCHASING LESS THAN PRODUCTION COST	
	RO/TON	QUANTITY TON		VALUE RO	QUANTITY KG	VALUE RO	
1 Banana	132	3943	140	539,641	0	0.0%	16.5%
2 Cabbage	55	835	51	82,561	264,753	31.7%	0.0%
3 Carrot	59	65	147	10,961	0	0.0%	69.6%
4 Cauliflower	141	152	73	18,424	131,605	86.7%	0.0%
5 Chilli Pepper	173	270	195	61,259	0	0.0%	0.0%
6 Coconut	88	41	125	6,815	0	0.0%	0.0%
7 Cucumber	77	469	232	109,497	0	0.0%	69.8%
8 Eggplant	84	625	31	36,108	546,580	87.5%	0.0%
9 Frankincense		12		25,568	0	0.0%	0.0%
10 Garlic	163	68	327	31,089	0	0.0%	0.0%
11 Lettuce	88	142	207	37,873	0	0.0%	0.0%
12 Lime	149	843	114	182,439	365	0.0%	0.2%
13 Mango	821	35	98	5,476	34,521	100.0%	100.0%
14 Onion	102	174	66	14,057	173,735	99.8%	99.7%
15 Papaya	125	299	98	41,149	85,182	28.5%	22.4%
16 Potato	51	1434	75	191,019	0	0.0%	0.0%
17 Pumpkin		469		30,770	0	0.0%	0.0%
18 Squash	70	379	65	41,124	111,428	29.4%	16.0%
19 Sweet-Melon	117	720	157	170,824	0	0.0%	0.0%
20 Sweet Pepper		180		26,821	0	0.0%	0.0%
21 Sweet Potato	59	147	143	25,332	0	0.0%	0.0%
22 Tomato	69	2561	68	348,440	488,418	19.1%	9.6%
23 Watermelon	83	1500	30	181,867	0	0.0%	0.0%
24 total		15363		2,219,114	1,836,587	12.0%	5.4%
25 other local		2306		531,570			
26 imported		1923		513,017			
27 GRAND TOTAL		19592		3,263,701	1,836,587	9.4%	3.6%

SOURCE : MAF PAMAP

(5) Development Potential

The salient problems of distribution in Oman are as follows:

- 1) Domestic agricultural produce is at a disadvantage compared with imported produce in aspects of price and stable supply, because of low productivity, high production costs, and large seasonal fluctuation in supply;
- 2) The quality of domestic agricultural products is no better than that of the imported, because of Omani farmers' poor knowledge about marketing and how to set prices in line with quality. The lack of incentives for farmers causes them to be satisfied with the poor quality of their produce;
- 3) The market for produce is concentrated in the capital area, while production areas are dispersed widely over the whole country, and the production capacity of each area is small. This is the main reason why the handling costs for domestic produce tend to be high; and
- 4) Though PAMAP was established in order to market domestic agricultural produce more smoothly, and has been operating for 4 years, effective performance has still not been accomplished in terms of collection, selection, packing, storing, transporting, and selling.

As a solution to these problems, the following items, classified according to the levels of producer, PAMAP, and MAF, can be considered.

(a) Producer

- (i) increase productivity by improving cropping techniques, introducing new varieties and new kinds of produce, etc.
- (ii) reduce production cost by rationalizing farm management.
- (iii) promote the organization of farmers and establish cooperative selling systems on each production unit (community or village).

(b) PAMAP

- (i) construct and install necessary facilities to cover areas more effectively.
- (ii) promote the discrimination of products on the basis of quality and

give farmers incentives to raise quality, by applying inspection standards severely when purchasing the produce from farmers.

- (iii) rationalize the operation of PAMAP by improving the operation methods and system, enhancing the capacities of staff through on-the-job training, etc.
- (iv) soften the competition of domestic produce against the imported by imposing appropriate control on importation.
- (v) examine the possibility to of establishing an agro-industry for produce which is seasonally over-produced.
- (vi) advertise nation-wide the necessity for increased consumption of domestic agricultural produce through appropriate information activities.

(c) MAF

- (i) give incentive to farmers to increase productivity and quality through introducing an output price supporting system, strengthening input subsidies, etc.
- (ii) enlighten farmers as to the importance of modern marketing for agricultural produce using experts in regional extension centers and other extension services.
- (iii) establish necessary regulation and subsidy systems, including assistance for construction of facilities such as storage in order to promote farmers' organization.

The conditions that final consumers require for agricultural produce are that it be cheap, of high quality, varied, plentiful, and healthy. The more the national income increases, the further the criterion of consumers shifts from the price of produce to its variety, quality or safety. Imported produce can meet the shift in consumers' preferences if appropriate supply countries are selected. Domestic producers should also be encouraged to respond to the consumers' preferences. In the present marketing situation, neither the producers nor PAMAP recognize the importance of this tendency. Certainly the market of Oman is by no means mature, but nevertheless, consumers will support the preferential side, provided that the proper marketing institutions or systems, e.g. proper grading and price discrimination of the produce, is introduced. Thus the efforts of suppliers will be reflected in consumption trends.

Moreover, in the present agricultural produce marketing system, MAF is in charge of production and PAMAP is in charge of marketing under the jurisdiction of MCI. The functional separation of production and marketing prevents a mutually close relationship between them. Some improvement in this situation is needed.

5.8.2 Agricultural Produce Processing

(1) Historical Development

The government's initiative in policy formulation and investment to develop local industries started around 1970, when there was virtually no industry in Oman. Since then it has been strengthened. In doing so, the government has naturally put emphasis on the oil sector which was seen as most promising in terms of revenue generation for the future development of the country.

Industrial development during the initial stages did not proceed as expected. In 1975/76, when the First Five-year Development Plan started, the number of industrial entities operating in the country was only 10 and their total capital only amounted to R.O. 470 thousand. At the end of the First Five-year Development Plan, however, the number of companies in operation increased to 393, and their total capital was R.O. 31 million. The Second Five-year Development Plan (1981-1985) saw a remarkable increase to 3,873 companies and R.O. 300.7 million in capital by the end of the plan in 1985. Under the on-going Third Five-year Development Plan, there are 4,302 companies totaling R.O. 382 million in capital as of the end of June, 1989.

Tables 5.8.5-5.8.6 show the number of companies and their aggregate capital in the manufacturing industry. Among these, the agricultural processing industry merely accounts for 4% (114 companies) and 9% (R.O. 33 million). Major factories listed in Table 5.8.7 include meat processing, dairy products, canning of vegetables and fruits, milling and animal feed, etc. During the 1986-1988 period, various types of agricultural processing

Table 5.8.5 Number of Registered Industries From 1975 - 1988 by Industrial Activity

Industrial Activities	1975	First Five Year Plan (1976 - 80)	Second Five Year Plan (1981 - 85)	Third Five Year Plan			Grand Total
				1986	1987	1988	
Food and Beverage	-	14	39	23	18	20	114 < 4>
Textile Wearing Apparel	-	1	1	1	-	3	6 < 0>
Wood & Wood Productions	2	104	428	101	41	33	709 < 22>
Paper & Paper Products	1	7	14	1	3	2	28 < 1>
Chemical and Chemical Products	-	9	16	9	6	5	45 < 1>
Non-metallic Mineral Products	4	204	1,150	228	98	88	1,772 < 56>
Basic Metal Industries	-	-	-	1	1	-	2 < 0>
Fabricated Metal Products	3	54	283	80	43	37	500 < 16>
Other Manufacturing Industries	-	-	-	1	1	1	3 < 0>
Total	10 < 0>	393 < 12>	1,931 < 61>	445	211	189 < 27>	3,179 < 100>

Table 5.8.6 Investment in Registered Industries From 1975 - 1988 by Industrial Activity

Industrial Activities	1975	First Five Year Plan (1976 - 80)	Second Five Year Plan (1981 - 85)	Third Five Year Plan			Grand Total
				1986	1987	1988	
Food and Beverage	-	< 32> 10,402 (34)	< 29> 9,589 (5)	< 11> 3,790 (3)	< 22> 7,195 (22)	< 6> 2,047 (15)	13,032 < 4> 33,023 < 9>
Textile Wearing Apparel	-	941	105	40	-	249	289 < 0> 1,335 < 0>
Wood & Wood Productions	32	1,864	4,842	1,503	718	869	3,090 < 1> 9,828 < 3>
Paper & Paper Products	44	1,539	2,397	130	577	2,727	3,434 < 1> 7,414 < 2>
Chemical and Chemical Products	-	1,678	53,979	8,541	5,214	2,767	16,522 < 5> 72,179 < 20>
Non-metallic Mineral Products	369	11,762	97,857	6,211	8,261	3,131	17,603 < 5> 127,591 < 36>
Basic Metal Industries	-	-	-	83,000	6,200	-	89,200 < 25> 89,200 < 25>
Fabricated Metal Products	26	2,389	7,479	2,474	4,006	1,484	7,964 < 2> 17,858 < 5>
Other Manufacturing Industries	-	-	-	35	255	12	302 < 0> 302 < 0>
Total	471 < 0>	30,575 < 9>	176,248 < 49>	105,724	32,426	13,286	151,436 < 42> 358,730 < 100>

Table 5.8.7 Agro-Industry Factories List

No.	Sector	Establishment Name	Location	Production	Capacity	Established Date
3111	Slaughtering, Preparing and Preserving meat	Qan Livestock Co., 3449 Ruv	Al Russai	Poultry Slaughtering	200,000 Nos.	13.11.1982
		Sohar Poultry Co., 12558 Soh	Sohar	Poultry Slaughtering	200,000 Nos.	13.11.1982
		Dofer Chickens Co., 3925 Ruv	Salalah	Poultry Slaughtering	120,000 Nos.	12.10.1987
3112	Manufacture of Dairy Products	Masoog Falib Est., 3681 Ruv	Nizwa	Yoghurt & Laban	600 Tonnes	3.5.1987
		Tawoon LLC, 8676 Muttrah	Barkah	Milk Products	800,000 Litres	5.2.1989
		Qan National Dairy Products Company, 3618 Ruv	Al Ghobrah	Ice Cream	153,000 -	17.7.1978
				UHT Milk & Juice	702,700 -	
				Pasteurized Milk	198,000 -	
		Modern Dairy Factory, 1123 Muttrah	Al Hadi Al Kabir	Yoghurt	154,100 -	31.3.1979
				Laban	2336 -	
		Al Bahrain Corporate Dairy SAO, 10757 Musana	Musana	Yoghurt	2336 -	
				Fruits Juice	120,000 Litres	13.5.1986
				Ice Cream	120,000 -	
		Al Qadwa Trac & Cont. Co., 31533 Bont Bu Hassan	Bont Bu Hassan	Laban & Yoghurt	150,000 -	
		Sur Dairy Co., 39349 Sur	Sur	Yoghurt	240 Tonnes	29.10.1986
		Dofer Ent. Trac & Cont. Est., 18068 Salalah	Salalah	Laban & Yoghurt	300 -	30.10.1986
			Southern Region	Ice Cream	130,000 Cups of 180/24	2.1988
				Yoghurt	35,000 Half Litres	
		Dofer Cattle Feeds Co., 18238 Salalah	Salalah	Milk	65,000 Litres	
		Qan Sun Farm Co., 3684 Ruv	Southern Region	Pasteurized Milk	147,000 -	26.5.1988
		Yasien Icecream & Beverages Co. LLC, 4028 Ruv	Southern Region	Milk	265,000 -	12.2.1989
			Ruv	Ice Lollies	18,000 -	15.12.1987
				Ice Cream	35,000 -	
3113	Canning & preserving of Fruits & Vegetables	Aliah Supply & Stores Est., 3852 Ruv	Barkah	Pasteurized Milk	130,000 -	5.2.1989
		Al Khalifa Al-Wahid, Trac, 3018 Ruv	Al Russai	Yoghurt	30 Tonnes	2.1.1989
3115	Vegetable & Animal Fats	Al Hamed Est., 5322 Ruv	Sahar	Yoghurt	300 -	5.12.1987
				Yoghurt	120 -	
		Qan Uzo Oil & Derivatives, 500, 42022 Ruv	Al Russai	Yoghurt	130,000 -	22.9.1983
3116	Grain Mill Products	Qan Saffar & Sons, 3588 Ruv	Barkah	Yoghurt	35,150 KG	21.5.1987
		Qan Flour Mills Co. Ltd., 3586 Ruv	Greater Muttrah	Yoghurt	1,000 Tonnes	4.12.1977
		Saud Food Industries Co., 4464 Ruv	Al Russai	Yoghurt	2,000 -	16.2.1988
3117	Bakery Products	Qan Saffar, Al-Boush, Trac, Co., 3588 Ruv	Barkah	Yoghurt	55,150 KG	20.4.1987
		Al Boush, Trac, Co., 3588 Ruv	Muscat	Yoghurt	250 Tonnes	26.1.1989
				Biscuits	20 -	
				Cakes	20 -	
		Mond Abdullah Salih Al Bahrain, 4146 Ruv	Al Seeb	Yoghurt	300 -	24.9.1988
		Libri Int'l. Est., 4292 Ruv	Al Russai	Yoghurt	1,000 -	7.1.1986
		City Bakery, 6037 Ruv	Ruv	Yoghurt	38 -	19.4.1987
		Arabian Transport (Bakery) LLC, 3684 Ruv	Al Khawair	Yoghurt	1,785 -	31.8.1987
		Shaker Omid, 7059 Al-Salam, 8266 Muttrah	Medinat Qaboon	Yoghurt	120 -	9.3.1988
		Al-Bahraini, 8682 Muttrah	Ruv	Yoghurt	51,500 KG	4.4.1988
		National Trac Supplying & Cold Stores, 7121 Muttrah	Ruv	Yoghurt	338 Tonnes	?
		Bahr Al Arab, Bakery, 1078 Muscat	Ruv	Yoghurt	504,000 Nos	11.1.1976
		Qan Automatic Bakery, 7113 Muttrah	Ruv	Yoghurt	228 Tonnes	15.6.1977
		Qan Modern Bakery, 5449 Ruv	Muttrah	Yoghurt	27,600 R.O.	1.1.1989
		Arab Automatic Bakery, 3672 Ruv	Ruv	Yoghurt	455 Tonnes	15.5.1982
		Qhuson Est., 38239 (Al Salam Bakery)	Sur	Yoghurt	180 -	2.6.1983
		Al Modern Bakery, 5005 Ruv	Barkah	Yoghurt	36,000 Package	11.12.1984
		Bakeries Flower, 762 Muscat	Barkah	Yoghurt	17,500 Nos.	27.12.1984
		Bakeries Flower, 762 Muscat	Ruv	Yoghurt	756 Tonnes	21.1.1985
		Bakeries Flower, 762 Muscat	Ruv	Yoghurt	1,485 -	21.1.1985
		Bakeries Flower, 762 Muscat	Ruv	Yoghurt	682 21.1.1985	21.1.1985
		Bakeries Flower, 762 Muscat	Muscat	Yoghurt	1842 -	21.1.1985
		Bakeries Flower, 762 Muscat	Libri	Yoghurt	815 -	21.1.1985
		Al Ruha Bread, 9220 Ruv	Fajla	Yoghurt	21,000 Pak of 10	19.10.1985
		Al Salamah Est., 7320 Muttrah	Ruv	Yoghurt	11,000 Tonnes	?
		Automatic Bakery, 7320 Ruv	Ruv	Yoghurt	320 -	24.1.1986
		Orbit Trac & Services, 123 Muscat	Ruv	Yoghurt	192 -	24.1.1986
		Sasco Est., 271 Muscat	Al Khawair	Yoghurt	120 -	?
		Al Rustan Bakery, 4833 Ruv	Al Hadi Al Kabir	Yoghurt	230 -	20.8.1985
		Al Juma Trac & Cont. Est., 3586 Ruv	Musana	Yoghurt	335,500 R.O.	6.10.1985
		National Biscuit, 104, 9104 Ruv	Al Russai	Yoghurt	2400 Tonnes	8.7.1986
				Wafers	550 -	
				Sauces	600 -	
		Al Suwaidah modern Bakery, 18281 Al Buraimi	Buraimi	Yoghurt	320 -	23.3.1987
		Whir Trac & Cont. Est., 23021 Musana Island	Musana Island	Yoghurt	20 -	1.11.1988
3119	Manufacture of Cocoa chocolate, sugar confectionary	Al Badi Trac, Est., 3953 Ruv	Al Russai	Yoghurt	600 -	25.7.1984
		Sabco LLC, 6770 Ruv	Al Russai	Yoghurt	1500 -	23.3.1987
				Chocolate	529 -	

Table 5.8.7 Agro-Industry Factories List (continued)

[illegible]

plants were established, making the total 61. The industrial sector's share of Oman's GDP has rapidly expanded in the past thirteen years since 1976. During the Second Five-year Development Plan, there was remarkable development in chemical and related industries. Among the four major sectors of industry, mining, fisheries, and agriculture in Oman, industry has made the most sizable contribution to the growth of the GDP every year from 1985 to 1988, under the Third Five-year Development Plan period. The amount of production from agricultural processing in the industrial sector is steadily increasing mainly due to the opening of new plants, as listed in Table 5.8.8.

As shown in Tables 5.8.9-5.8.10, costs for establishing industrial plants in Oman are estimated to be higher than in other GCC countries, in spite of the existence of favorable government subsidies in Oman. The government of Oman not only provides the most favorable financial incentives in the region, but also has various measures shown in Table 5.8.11 in order to support industrialization.

(2) Major Agricultural Products for Processing

(a) Dates

Although dates have long been one of the major agricultural products, recently date growing has been declining due to unfavorable environmental and social conditions, a shortage of skilled workers, rising growing costs, and low product prices. At present, there are six main outlets for harvested dates:

- (i) Fresh dates consumed by growers or marketed locally for human consumption
- (ii) Fresh dates export
- (iii) Animal feed
- (iv) Production of date syrup by traditional means for home consumption or local markets
- (v) Production of dried dates ("busr") for export under a scheme administered by the Ministry of Commerce and Industry (MCI)

Table 5.8.8 Annual Production Value in Registered Industries From 1975 - 1988 by Industrial Activity
(R0 thousand)

Industrial Activities	1975	First Five Year Plan (1976 - 80)	Second Five Year Plan (1981 - 85)	Third Five Year Plan				Grand Total
				1986	1987	1988	Total	
Food and Beverage	-	6,408 (18)	8,641 (3)	1,770 (6)	4,750 (17)	2,389 (18)	8,909	23,958 < 7>
Textile Wearing Apparel	-	772	126	115	-	350	465	1,363 < 0>
Wood & Wood Productions	60	5,884	10,988	3,328	1,437	1,121	5,886	22,818 < 6>
Paper & Paper Products	60	2,799	3,029	96	120	1,718	1,934	7,822 < 2>
Chemical and Chemical Products	-	1,712	156,411	6,756	3,088	2,132	11,976	170,099 <47>
Non-metallic Mineral Products	483	15,591	61,593	9,288	10,923	3,452	23,663	101,330 <28>
Basic Metal Industries	-	-	-	6,930	1,865	-	8,795	8,795 < 2>
Fabricated Metal Products	39	3,009	13,806	2,959	4,949	2,213	10,121	26,975 < 7>
Other Manufacturing Industries	-	-	-	100	180	5	285	285 < 0>
Total	642 < 0>	36,175 <10>	254,594 <70>	31,342	27,312	13,380	72,034 <20>	363,445 % <100>

Table 5.8.9 Cost of Utilities in G.C.C.

(Unit: Omani Baiza)

	Unit	Oman	U.A.E.	Qater	Kuwait	Saudi	Bahrain
Land Rent	sq.m	500	562	103	277	7	650
Electricity	kwh	20	8	7	2	5	16
Water	cub.m	660	354	231	242	188	308
Fuel Regular-gas	l	112	85	58	55	25	81
Super-gas	l	118	92	61	69	53	103
Kerosene	l	118	80	52	55	20	25
Diesel	l	114	57	58	82	12	71
Fuel Oil	l	115	35	N.A.	N.A.	15	N.A.
LPG	kg	102	115	N.A.	58	48	102
Natural gas	cub.m	28	27	2	0.6	6	6

Table 5.8.10 Subsidies of Utilities in G.C.C.

	Oman	U.A.E.	Qater	Kuwait	Saudi	Bahrain
1. Land Rent (Baiza/sq.m)						
Actual Cost	1,000	685	265	2,214	173	2,148
Price	500	562	103	277	7	650
Subsidy	500	123	162	1,937	166	1,498
Subsidy Rate (%)	(50)	(18)	(61)	(87)	(96)	(70)
2. Electricity						
Actual Cost	32	30	27	27	32	30
Price	20	8	7	2	5	16
Subsidy	12	22	20	25	27	14
Subsidy Rate (%)	(38)	(73)	(74)	(93)	(84)	(47)
3. Water						
Actual Cost	916	878	839	881	878	878
Price	660	354	231	242	188	308
Subsidy	256	524	608	639	690	570
Subsidy Rate (%)	(28)	(60)	(72)	(73)	(79)	(65)

Table 5.8.11 Incentives and Support Provided to the Industry

The Ministry of Commerce and Industry provides the following incentives to total the industry:

1. Interest-free loans by government under Royal Decree 83/80 for the financial support to the private sector in agriculture, fisheries, industry, mining and quarrying, and Royal Decree 40/87 for the financial support to the private sector in industry and tourism, 62 interest free loans totaling approximately R.O. 22.2 million were provided to 58 industrial firms from the beginning of the Second Five-year Development Plan to June 1989.
 2. Low interest rate loans to industrial firms offered by ODB
 3. Exemption from custom duties on imports of equipment and raw materials required for production purposes
 4. Tariff protection through imposition or increase of custom duties on imported goods similar to local products, or to prohibit or restrict their importation, taking into consideration the quality and quantity of local production and the interest of the consumer
 5. Exemption from income tax for a period of five years which can be renewed for another period
 6. Planned and serviced industrial plots for setting up factories
 7. Recommendation to the Ministry of Electricity and Water to reduce electricity tariffs for industrial purposes for those industries fulfilling the conditions for reduction
 8. Survey of industrial investment opportunities and preparation of feasibility studies to be offered to the private sector
-

(vi) Processing and packing for local sales and export at the MAF's date factories in Nizwa and Rustaq

Among the above, with respect to (v) and (vi) processing, handle volumes of 2,300 tons and 1,300 tons per annum respectively. Both outlets have received government subsidies of R.O. 300 and 130 thousand respectively per annum since MCI and MAF were in charge of managing these outlets. Current farm gate prices of dates are not enough to compensate for average production costs of dates as shown in Table 5.8.12. Farm gate prices, at present, are even higher than prices of imported dates from Iran, etc.

(b) Limes

Limes also have a long tradition in Oman, and are consumed either fresh or sun-dried. Dried lime is currently exported at a volume of 2,000 tons per annum, which makes lime one of the major export items. In order to promote the export of dried lime, that is produced in traditional natural drying processes, further research and development of new products will be required, an example of which is the "lime-bag" (like "tea-bag") presently produced by PAMAP.

(c) Bananas

Bananas are an important cash crop in the Salalah Region in southern Oman. Most of the bananas in Oman are produced in this region, and sold in the Muscat capital area or exported. Currently, the volume of exports is around 300 tons annually. PAMAP ripening facilities are located inside the collection facilities in Muscat and Salalah with reasonable care given to the ripening process to match the marketing schedule, bananas have the potential to become a major export.

(d) Pickles of Vegetables/Fruits

A pilot scheme to produce and sell pickles from seasonal vegetables and fruits during the harvesting period has been started by PAMAP.

Table 5.8.12 Purchase Unit Prices for BUSR Dates, 1988

Variety	Price Range (R0/Ton)		
	Basic Price	Transport	Subsidy
Madlouki	260.00 ~ 321.25	12.50 ~ 15.00	62.50
Sharqia	286.25 ~ 300.00	8.75 ~ 15.00	62.50
Bidiya	300.00	12.50 ~ 15.00	62.50
Soori	286.25	10.00 ~ 15.00	62.50
Owani	236.25 ~ 260.00	6.25 ~ 8.75	62.50
Batinah	192.50	6.25	62.50

	337.50 ~ 396.25
	357.50 ~ 375.00
	375.00 ~ 377.50
	358.75 ~ 363.75
	278.75 ~ 328.75
	261.25

Table 5.8.13 Banana Plant

Year	Purchase				Sales				Note
	PAMAP		Salalah Factory		PAMAP		Salalah Factory		
	Quantity (Ton)	Value (1000 R0)	Quantity (Ton)	Value (1000 R0)	Quantity (Ton)	Value (1000 R0)	Quantity (Ton)	Value (1000 R0)	
1986	2,037	279.6	1,838	253.4	1,527	354.9	98	19.5	Upto September
1987	3,352	465.4	3,084	431.8	2,816	719.5	120	26.2	
1988	3,943	539.6	3,494	489.7	3,504	930.6	126	31.5	
1989	2,887	408.1	2,304	337.7	2,506	643.6	85	21.2	

(e) Coffee/Tea

Coffee and tea are imported in the raw form for local consumption or re-export, since they are not grown locally.

(3) Processing Facilities

(a) MAF

The processing and packing of dates by MAF is conducted at two date packing plants located in Nizwa and Rustaq, both of which started operation in 1976. Their current status is described below. In order to improve the productivity of these plants, measures including diversified modes of production need to be studied.

- (i) The production machines and their attached equipment are obsolete.
- (ii) The cost of products is high due to manually operated equipment and high percentage of losses of raw materials during processing (10-15%).
- (iii) The designed capacity of the two plants is 2,000 tons per annum. But the actual utilized capacity did not exceed 700 tons.
- (iv) The lack of packing and processing equipment for various packing lines minimizes the new marketing outlets of the products.
- (v) The conditions of the date collecting centers are not efficient due in part to the lack of pallets.

(b) MCI

MCI purchases dried dates ("busr") from farmers, stores them for some time, and then exports most of the product to India. Processing of dates after harvest, and transportation to the MCI collection ground for dried dates at Muscat, are done by farmers themselves. The facility owned by MCI at Muscat is merely a dried dates storage facility which was erected in 1986.

(c) PAMAP

As shown in Table 3.5.13, PAMAP is ripening bananas and grading and packing pickles and dried limes at three agricultural produce processing centers. The size of these operations is generally small, and basically pilot schemes, except for banana ripening. Whether PAMAP should continue or transfer the operations to the private sector, should be determined by taking into consideration sales results and market trends. There are banana-ripening facilities located at Muscat and Salalah, which started operation in 1986 and 1982, respectively. At Salalah, PAMAP took over management at the end of 1985 from MAF who originally started the facility. The capacity of ripening facilities is almost fully utilized by normal storage needs. A shortage of storage facilities has been experienced during certain times of the year. It is necessary to build additional ripening facilities to deal with the growth of banana production. They may be more efficiently managed by using them in a multi-product fashion.

(4) Development Potential

MCI has been in charge of policy formulation as well as the execution of administrative services for industrial development in Oman. It is currently working on the formulation of a Master Plan for Industrial Development in Oman in which priorities for proposed projects will be assessed for implementation during the Fourth Five-year Development Plan. Attention will be given to assessing the proposed projects in medium and small scale industries which utilize locally available materials. Such potential areas include industrial minerals, gas, fish and agricultural products. The idea of an industrial processing zone with the necessary infra-structure for industrial development is also being examined. Another notable feature to be studied is "Omanization" in the area of industry while maintaining productivity and efficiency.

The development of the processing industry for locally available agricultural products is in line with the above-stated policy

orientations. While the importance of increasing production, productivity, and quality standards of agricultural products cannot be overstressed, it is also highly advisable to add more value to the products by developing the processing industry. The processing industry is justified in light of enhancing regional development, settlement in rural areas, and "Omanization" of the economy, because it will provide employment as well as utilize products available locally.

In promoting the agricultural processing industry, the following factors should be fully taken into consideration, based on the present status of agricultural and industrial production in the country.

- (a) Stable and economical supply of agricultural products.
- (b) Measures for ensuring high utilization of plant capacity-combined agricultural processing.
- (c) Training of engineers and workers in order to involve new technologies and facilities.
- (d) Government support for the start-up period in terms of financial, institutional, and staffing requirements.

The factors listed above should also be fully examined in the course of ongoing studies by MAF. Export of other processed products such as coffee, tea, vegetable oil, etc. may be considered promising.

In establishing new plants, these four factors have to be dealt with before it will be possible to achieve normal production. Accordingly, medium and small scale processing in existing plants may have more merits in the medium-term. In existing plants, combined form of production, initial government management which will later be transferred to the private sector, diversification of products to be processed (including those from foreign sources), etc. have good potential for further development.

5.9 Subsidy Institution

5.9.1 Present Situation

(1) General Situation of Agriculture Finance in the Sultanate

Reflecting the high level of economic growth in the first half of the 1980s, followed by the moderate economic growth in the second half of the decade in Oman, the financial sector also, especially in the area of credit, has been developing and has an outstanding growth rate. As shown in Table 5.9.1, the average growth rate, of the total lending amount during the 9 years between 1980 and 1988, is 15.3%. The main sectors which obtained a lot of financing are trade and construction. The agricultural sector received only a small portion (less than 1.0% of the total). The agricultural sector's share, despite its small size, has increased from 0.29%, the lowest level in 1982 to 0.83% in 1988, with a growth rate of recognized. Figure 5.9.1 shows the agricultural sector's share of total bank lending.

The main institutions which offer financial services to the agricultural sector are the Oman Development Bank (ODB) and the Oman Bank for Agriculture and Fisheries (OBAF). The share of financing for the agricultural sector from ODB was relatively low because the bank was established as a promoter for industrial development projects. Thus, the major amount of financing from ODB was delivered to the manufacturing sector.

On the contrary, OBAF was established to contribute to the development of the agricultural sector and to be its principal lending institution. That is why the problems and projects relating to agricultural finance are regarded almost equally as those of OBAF.

The functions and activities of both OBAF and ODB are described in the following sections.

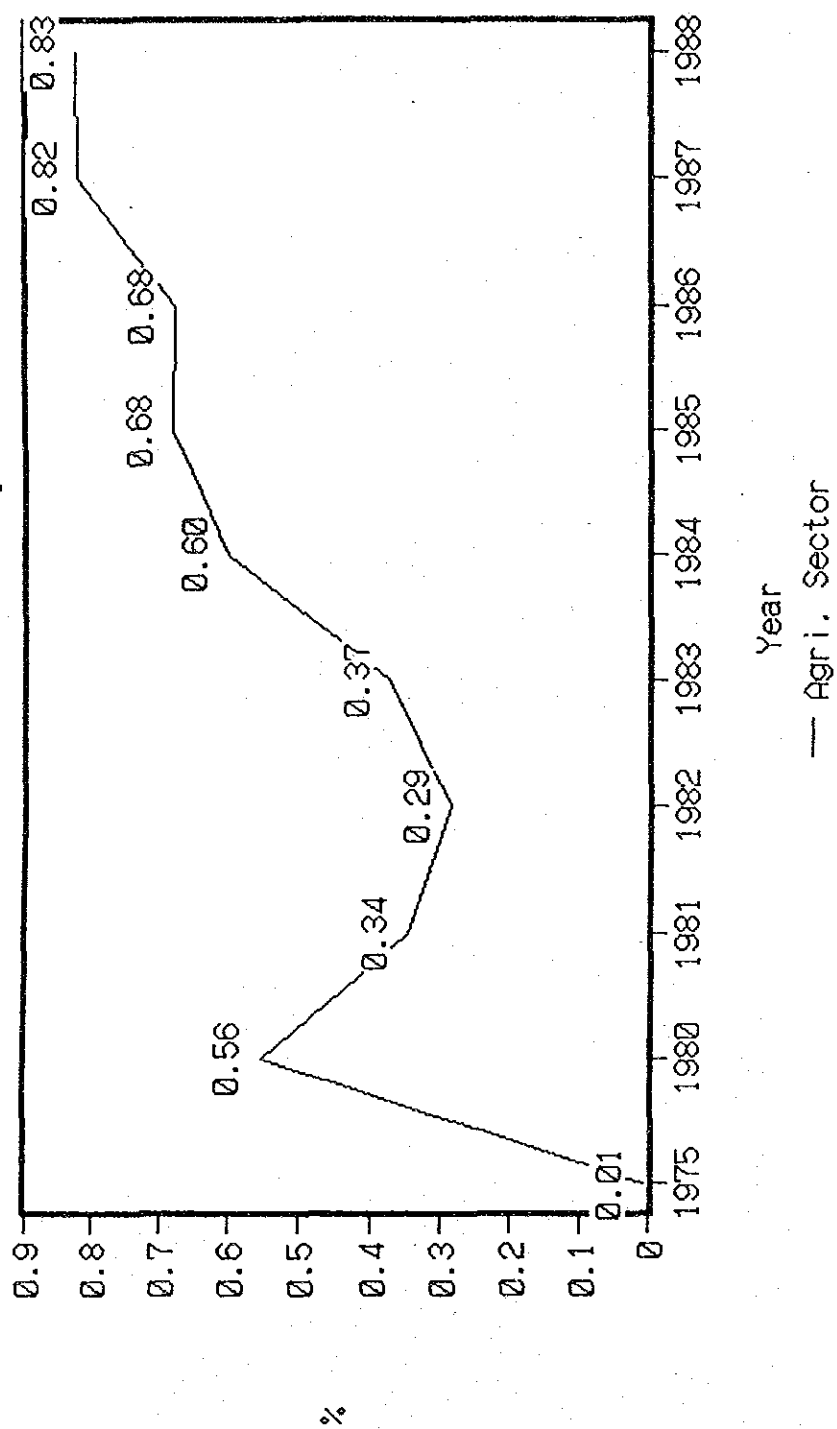
Table 5.9.1 Bank Lending by Economic Sector

Bank Lending by Economic Sector (Thousand R.O.)

Sector	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988
Trade	48,928	156,365	190,239	214,502	238,152	275,501	305,288	289,597	299,789	314,302
Mining & Quarrying	1,309	2,754	3,653	8,476	8,161	11,371	10,914	14,515	13,332	14,066
Construction	17,112	55,280	55,893	65,363	68,433	83,383	127,327	139,358	116,899	120,145
Manufacture	706	5,468	5,124	6,109	22,007	19,332	26,054	23,957	26,705	28,124
Electricity, Gas, & Water	1,025	546	746	464	682	3,447	4,899	4,467	4,731	3,944
Transport & Communication	820	5,397	5,078	10,669	11,360	6,981	13,914	11,728	6,749	5,493
Financial Institutions	19	2,435	2,805	2,548	5,923	7,433	5,709	6,699	7,861	5,386
Services	1,777	6,104	5,364	11,924	16,319	17,035	21,035	22,135	29,544	34,183
Government(1)	63,053	4,097	1,129	4,478	9,831	13,884	62,312	51,552	57,511	25,903
Personal Loans	10,257	36,986	51,767	62,809	97,058	122,812	142,440	136,894	147,563	183,042
Agriculture & Allied Activities	10	1,634	1,192	1,161	1,884	3,558	5,173	5,032	6,182	6,586
Others	2,017	17,069	23,377	17,030	28,196	25,055	31,572	41,883	41,146	56,396
Total	147,031	294,135	346,367	486,525	587,998	589,712	756,637	738,817	752,012	797,495
Percentage of Agri. Sector	0.01	0.56	0.34	0.29	0.37	0.60	0.68	0.68	0.82	0.83

Note(1): Excludes Government Loans from CBO
Source: Statistical Yearbook 1989

Figure 5.9.1
Percentage of Agricultural Sector
in Bank Lending



(2) OBAF

OBAF was established by Royal Decree 50/81 published on May 19, 1981. The formal operation of the bank commenced in April, 1982. Simultaneously, the first loans were granted. Identified as one of the major projects of the Second Five-year Development Plan of the nation, OBAF was meeting the dual objective of bringing credit facilities and fostering the development of two sectors, the agricultural and fishery sectors.

The lending criteria, therefore, were determined as follows:

(a) Range of loan

Private project, small scale farmers, etc. in the field of agriculture and fisheries or related fields

(b) Eligibility

All Omani individuals and companies involved with agriculture and fisheries are eligible for loans

(c) Requirements

(i) Provision of feasibility study in the case of large projects or investments

(ii) The project should prove its feasibility

(iii) Provision of related documents such as land documents, fishing license or fishing boat registration

In the beginning, the loans awarded were classified into three categories:

(a) General Development Loans

financing for the improvement of existing farms, establishing new farms, mechanization, livestock, fisheries

(b) Loans complementary to subsidies

complement the financing of water pumps distributed within the Water Pump Subsidy Program

(c) Loan to agro-industries and related activities

the loans for promoting agro-industries and small scale agribusiness, etc.

Category (b) was eliminated in 1986 because of a change in governmental policy and disproportionately high costs of collecting the related payments from borrowers in comparison with the low number of actual loans.

The practical contents of the OBAF loans are;

(a) Farm Improvement

includes various types of improvement activities from traditional management and facilities to modern ones, such as well, irrigation, etc.,

(b) New Farm

includes all expenses to establish new farms (newly established farm on the land obtained from the state) defined as modern farms having the standard scale of 10 feddans: such as land reclamation, land leveling, fencing, housing for laborers, modern irrigation systems, wells, pumps, tractors, etc.,

(c) Farm Mechanization

includes various machines used for agriculture depending on the project, though water pumps and tractors are dominant,

(d) Agro-Industries, Marketing and Related Activities

includes farm level small marketing facilities like freezing storage, finance for small trading equities, moderate or small facilities like greenhouses, etc.,

(e) Large Projects

includes all expenses necessary for the completion of large projects, which are ambiguously regarded as having a scale more than 100 feddans and/or a total cost of more than R.O. 100,000.

The lending conditions are as follows:

(a) the range of financing

- farmers: lending for 90% of project cost
- non-farmers: lending for 80% of project cost
- companies: lending for between 40 and 60% of project cost
- (b) interest rate
 - farmers: 2% per annum
 - non-farmers: 3 to 5% per annum (normally 4%)
 - companies: 4 to 6% per annum (normally 6%)
- (c) loan period
 - mechanization: normally 2 years for water pumps, 4 years for tractors, including replacements
 - large projects: variable depending on the project life
 - other: variable within the maximum 12 years depending on the project life
- (d) grace period
 - variable according to analysis
- (e) maximum amount
 - depends on total investment but within the financial ability of the bank
- (f) mortgage
 - other items besides large project:
 - land mortgage, personal property, equipment
 - large project: additional security besides the minimum stipulated above is required

Lending procedures of the bank are as follows:

- (a) Application is made by the borrower to the concerned branch
- (b) Applications studied and evaluated at branch and head office
- (c) The application is then presented to the concerned level of authority for necessary approval
- (d) Prior to sanctioning the loan, the legal documents concerning the loan are finalized (loan agreement, mortgage, etc.)
- (e) Disbursement is then made according to the progress reports
- (f) After the loan disbursement, the follow-up and repayment stages follow.

The trend of the annual loan amount for OBAF from the inauguration year to 1988 is shown in Figure 5.9.2. There is a steep fall in loans in 1985 and 1986. The bank points out the reasons below.

(a) The problem of land title as mortgage

Traditionally, sheiks gave their farmers a certificate called the "sheriah" court which proved the ownership of the land. But, the certificate inadequately described the name of the owner, the location, the direction, etc. After the establishment of the Ministry of Housing (MOH), this organization assumed responsibility for giving title to farmers through necessary procedures, which included farmers' requests, simple land surveys, drawing sketches of lands area, and calculations by MOH officials. Since the bank cannot provide financing without a legally recognized mortgage, the farmers who want a loan must obtain land title. But, formal procedures being troublesome, MOH tended to delay issuing land titles. This means that financing by the bank was also frequently hindered. 1985 and 1986 were peak periods for such delays. In order to cope with the problem, MOH, MAF and OBAF agreed on the resolution illustrated below:

- (i) The farmers who are really cultivating can get a "lease certificate" from MOH soon after its simple surveying. This lease certificate is regarded as a legal title deed necessary for the bank loan. By this means, the farmer will spend only 4 months to get a legal document. If the farmer continues farm at least 75% of the land for the succeeding 3 years, he can get formal land title.
- (ii) In the case of uncultivated land (state owned land), the farmer requesting land title must pass formal procedures which requires 1 to 2 years.

(b) The salination problem on the Batinah Coast

In 1985, the concern over incidences of aquifer salination on the Batinah Coast increased, probably due to high rates of water extraction caused by the rapid increase in farm settlement in this region. In 1986, a study of natural water resources was

Figure 5.9.2

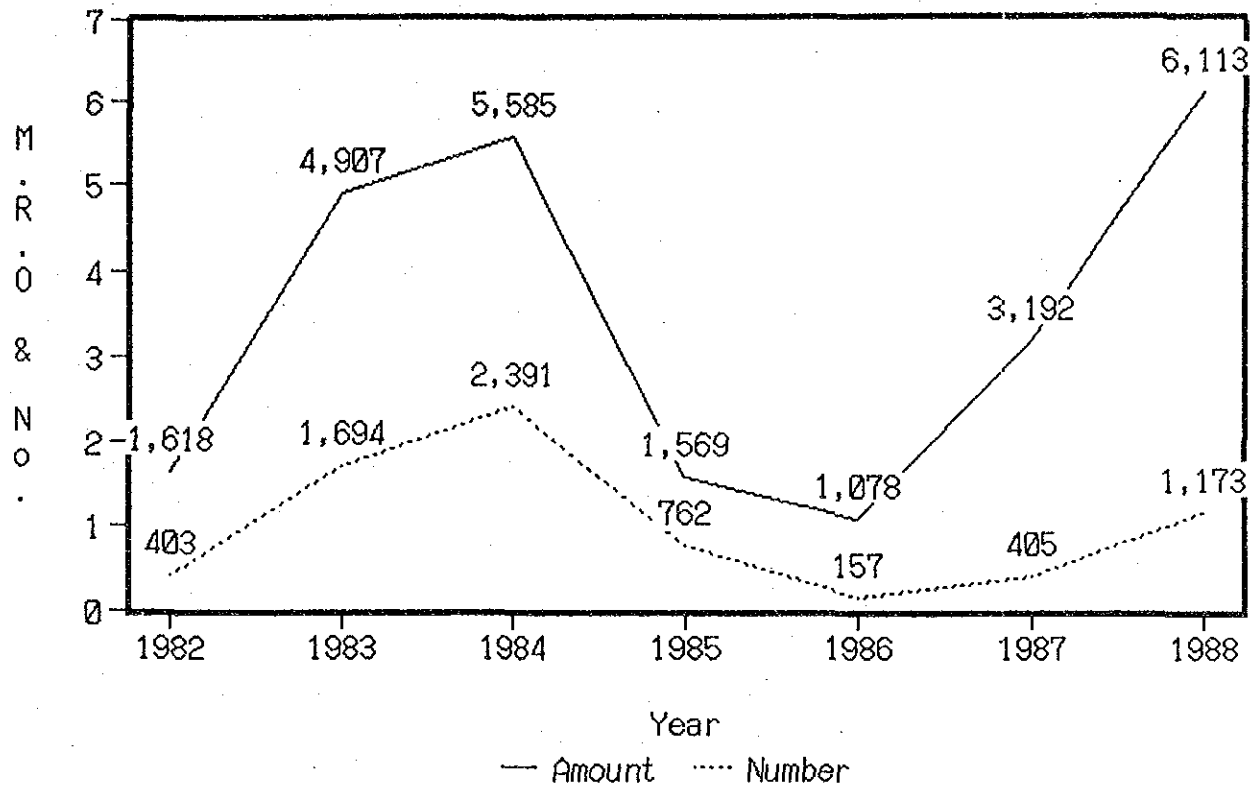
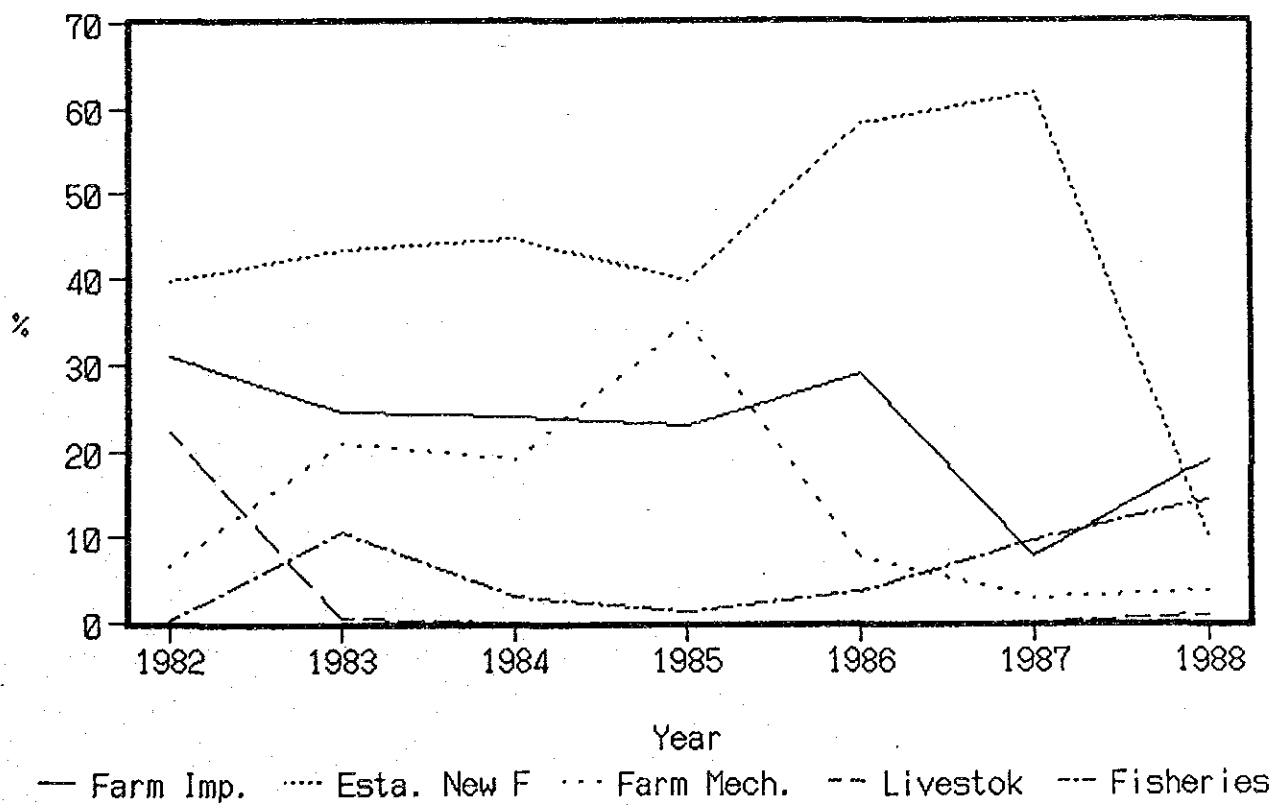
Trend of OBAF Loan
(Million R.O. & Number)

Figure 5.9.3

Percentage of OBAF Loan
by Purpose

commissioned. Until the completion of this study, the government prohibited the new installation of water pumps. However, the water-saving modern irrigation systems were recommended in the study report and the bank re-opened loan applications to the irrigation sector in 1987.

(c) Cessation of government subsidy

The fact mentioned in (b) caused the cessation of the Water Pump Subsidy Program and other mechanization programs which subsidized 50% of the farmer's purchases. Accompanying this cessation, bank loans decreased because the rest of the cost was covered by bank loans, e.g. in the case of tractors: 50% subsidy, 40% bank loan and 10% self-finance.

(d) Financial situation of the nation

The unexpected fall of international crude oil prices in 1986 caused the deterioration of the Omani economy and simultaneously resulted in a decrease in loan amounts.

After the resolution (in 1987), the bank was executing loan procedures smoothly. Taking a turn for the better in 1987, the total financing in 1988 increased to a maximum in the bank's history.

40% of total farmers at present are said to be retainers of land certificates or lease certificates.

An OBAF loan, by purpose, is indicated in Figure 5.9.3, from which the fact that the construction of new farms is the pillar of the bank, is easily recognized. In 1988, however, the share of new farm development decreased sharply. The control of land title distribution by MOH, who feared unruly development, was likely one reason for the phenomenon. The outstandings are the sustained share expansion of the fisheries sector and the declining trend of farm mechanization owing to the termination of the subsidy policy.

Figure 5.9.4 shows the trend of OBAF loans by region. It can be seen that priority went to the Batinah Region where new farm projects are

Figure 5.9.4 Percentage of OBAF Loan
by Region

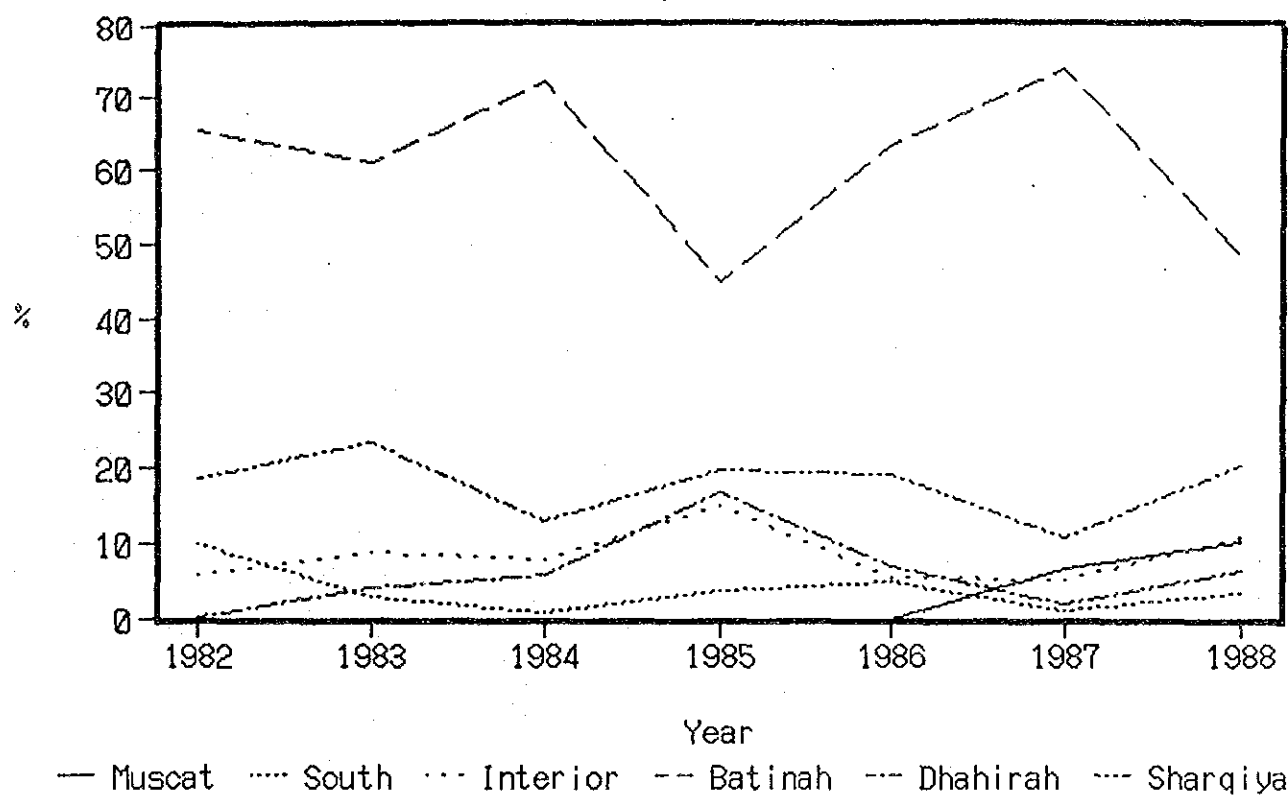
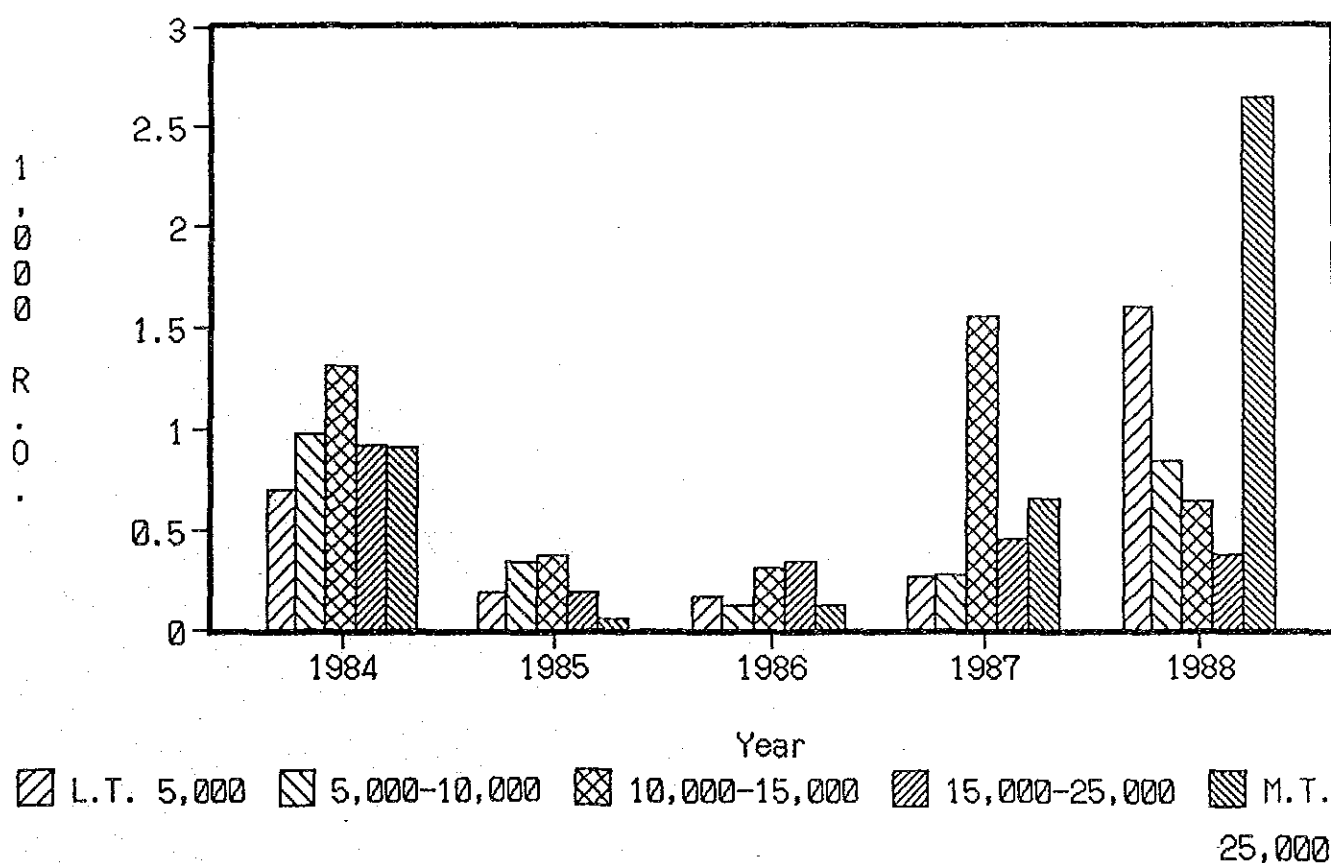


Figure 5.9.5 Value of OBAF Loans by Group
(Thousand R.O.)



concentrated. The other regions, where traditional and marginal agriculture is dominant, could not compete with Batinah in the field of development potential and market accessibility. Separated from the Batinah branch, the Muscat branch began to work in 1987.

Figure 5.9.5 shows the trend of OBAF loans by groups. The uniqueness of the OBAF loan is the mortgage settlement method, i.e. the mortgage includes not only the objective land and the same owner's other parcels of cultivated land, but also the total investment cost credited by the bank itself, including wells, irrigation systems, fences, sheds, etc. 100% of the total value of the project can be mortgaged. This means the small holder, even if he has insufficient resources, has easy access to bank loans. Most borrowers, who are financed for less than R.O. 15,000, are considered individual farmers. The Poultry Project in South Batinah, which will produce 42 million eggs per annum, or 21% of domestic demand, was financed with R.O. 1 million in 1988. This investment contributed to the rapid increase of the group to more than R.O. 25,000.

The OBAF staff is different from other banks and consists of 28 agronomists, agro-economists and assistant engineers out of a total of 134 employees. When the loan request inspection and examination are executed, the staff specializing in agriculture gives potential borrowers adequate advice and instructions relating to crop selection, land use, construction methods, contractors, etc.

(3) Future Strategy of OBAF

The present problems facing OBAF:

- (a) OBAF capital is set at R.O. 19 million, while R.O. 13 million was already paid by the government in 1989. Because of its small-scale capital and financial resources, the position of the bank is not deemed strong.
- (b) The average interest rate of the bank is set extremely low compared to the opportunity cost of capital in Oman (10 to 10.5%), because the bank loans mainly target the individual farmer. The

Ministry of Finance and Economy pays a subsidy to help cover part of the difference in the interest rate - a maximum 6%. The recent stagnant economy in the Sultanate resulted in the declination and fluctuation of government contributions, which also made the bank's operations unstable.

- (c) The repayment rate remains at a low level of 70 to 75 % of the amount due. This exacerbated the financial situation of the bank. The high cost to collect payments from borrowers, especially living in remote areas should be taken into consideration.

The future strategy of the bank should be as follows:

- (a) to fortify its financial status by receiving external loans with preferential interest rate,
- (b) to settle the role of the bank in general agriculture policy and projects of MAF, in order to distribute appropriate amounts of the budget to the bank.
- (c) to raise the repayment rate of borrowers by using various methods such as periodical campaigns, enlightenment of farmers through village committees, etc.

(4) ODB

The Oman Development Bank was set up by a Royal Decree in 1976 and began its operations in 1979. The main purpose of ODB is to help achieve development in the industrial sector in which private entities play a leading role. The bank concentrates on the following operations:

- (a) To advance or guarantee medium and long term loans to licensed projects, provided the credit is required for the purpose of financing investment in the sectors of industry, agriculture and fisheries,
- (b) To offer technical assistance and consulting to Omani companies by way of preparing economic and technical feasibility studies.

The bank's lending criteria and conditions are as follows:

(a) Criteria

registered companies related to the agro-industry will be financed if their economic viability is clarified during the appraisal of the relevant market, managerial, technical, and economic factors, as well as the analysis of proposed financial statements, cash flow, and sensitivity to revenue decrease or cost increase.

(b) Lending conditions:

- a) Range of finance: The bank finances 50% of the project cost. Where the total cost of the project is below R.O. 100,000 and it is promoted under the self-employment scheme, the bank may finance up to 80% of the project cost. It should be noted that only fixed assets are considered for ODB financing.
- b) Interest rate: 6% in Muscat, 4% elsewhere in Oman
- c) Loan period: 5 to 10 years
- d) Grace period: 1-1/2 years
- e) Maximum amount: up to 10% of the bank's reserves
- f) Mortgage: on all fixed assets and vehicles
- g) Total time for loan approval: 2 months, provided documentation is completed. Lending and implementation need 6 months.

The bank's accomplishments in finance for the past 6 years are shown in Table 5.9.2.

The bank places importance on the projects related to the food sector, in line with the national policy to pursue self-reliance. The bank mostly participates in three main food products which are imported i.e. poultry, eggs and milk. Table 5.9.3 shows the agricultural projects which the bank has financed in the past.

A unique aspect of the bank is that it will finance capital requirements of small projects and offer soft-loans to small entrepreneurs and graduates of the Vocational Training Institutes. Under the bank's Small Scale Enterprises Scheme, loan applications may be entertained for projects with an investment of up to R.O. 100,000.

Table 5.9.2

Loan & Equity Participations by Oman Development Bank by Economic Activity (Thousand R.O.)

Economic Activity	Total Finance (Loan & Equity)				
	1983	1984	1985	1986	1987
Industries	5,210	7,545	4,945	2,893	3,355
Food Processing, Beverages & Storage Facilities	1,115	885	340	178	795
Chemicals	1,930	2,860	870	1,080	630
Construction Materials	1,790	2,650	1,665	90	50
Agriculture & Fisheries	45	190	600	300	0
Paper & Printing	130	270	440	490	50
Metal Products	200	300	900	570	330
Furniture	0	390	130	185	1,500
Textile	0	0	0	0	0
Small Scale Industries	0	0	0	0	72
Miscellaneous	0	521	299	656	20
Total	5,210	8,066	5,244	3,549	3,375
					4,271

Table 5.9.3 Agricultural Projects Financed by ODB

Year	Project Title	Sector	Remark
1979	National Livestock	Poultry broiler	agri.animal
1979	Oman Farms Limited	Poultry layer	agri.animal
1980	Rasasi Farms & Gardens	Hursely	agri
1980	Oman Flour Mills	Animal feedmill	agri.animal
1980	Ahmed Nasser Associates & Partners	Poultry layer	agri.animal
1981	Oman Modern Farms	Greenhouses for fruit & vegetables	agri
1981	Oman Livestock	Poultry broiler	agri.animal
1981	Rasasi Poultry Farm	Poultry broiler	agri.animal
1982	Oman Organic Fertilizer & Chemical Industries	Compost fertilizer	agri.ferti
1982	Boat Manufacturing	Fireglass boats	agri.fish
1982	Nizwa Poultry Farm	Poultry broiler	agri.animal
1982	Sohar Poultry Farm	Poultry broiler	agri.animal
1983	Boat Manufacturing (2nd Loan)	Fireglass boats	agri.fish
1984	Oman Modern Farms (2nd Loan)	Fruit & vegetables	agri
1984	Sadah Marine Products	Lobsters & abalones	agri.fish
1984	Oman Farms Limited (2nd Loan)	Poultry layer	agri.animal
1985	Oman Sea Farms	Prawn breeding	agri.fish
1985	Al Raja Farm	Agriculture	agri
1986	Oman Sea Farms (2nd Loan)	Prawn breeding	agri.fish
1987	Sadah Marine Products (2nd Loan)	Fish processing	agri.fish
1987	Sawadi Poultry Farm	Poultry broiler	agri.animal
1988	Modern Poultry Farm	Poultry layer	agri.animal
1988	Ahmed Nasser Associates	Poultry layer	agri.animal

Projects in this scheme, with 100% Omani employees, would be entitled to interest free loans. Likewise, the graduates of Vocational Training Institutes can be financed through leases, which means they could own their workshops after a 3-year lease period, provided they manage it smoothly.

The bank played an important role not only in the field of industry but also in that of agriculture. The bank also co-financed some of the large projects with OBAF. Both of them should be maintained and work towards the future.

(5) Outline of Subsidies

The subsidy policy for agriculture in Oman is classified into two sectors: production input and production and output.

With respect to the output, PAMAP, which purchases vegetables and fruits from farmers at the support price (normally a 20% discount from the wholesale price) plays a major part in the policy. The share of vegetables treated by PAMAP increased to 73% of the total domestic produce on the market in 1987. Details are shown in section 5.8.1.

It is not difficult to understand why the Omani government adopted the agricultural product protection policy against external competition, imposing heavy tariffs and quotas on food imports and little or no tariffs on domestic materials. Oman has comparative disadvantages in the agricultural sector both in price and quality. The protection could also be regarded as an indirect subsidy.

On the other hand, subsidies to production input are divided into three parts: recurrent input, durable input, and government service. The contents of these are as follows:

(a) Recurrent input

Supported by government subsidies, most of the recurrent input is supplied to farmers at a cheaper price than market

price.

(b) Durable input

Although durable input - tractors, sprayers and pumps - is also subsidized, farmers could obtain preferentially low interest loans from OBAF to purchase them.

(c) Government service

The government offers various services to farmers which include not only extension, but spraying and tractor hire services in free of charge.

Tables 5.9.4 - 5.9.6 show input subsidies. Tables 5.9.7 - 5.9.8 show the proposed distribution of subsidies to farmers, along with the program allocation for the years 1988, 1989 and 1990 (proposed only).

(6) Details of Subsidies for Each Item

(a) Seeds

Of the total seed imports, MAF took about 30% in 1986. The majority of seed stocks used domestically, are purchased on an international tender by MAF, and supplied to the small farmers, who are given priority over commercial farmers for allocation of these supplies. Varieties are selected for purchase by a combination of various tests at the Rumais Research Station and feedback from extension services on farmers' preferences. Without the positive endorsement of this selection system, seed varieties are not considered for purchase by MAF and remain unavailable to farmers at the subsidized price, although a wide range of unapproved seeds are available from free market suppliers at the full retail price.

Until the relevant GCC body has framed the forthcoming pan-regional regulations, there will continue to be no established Omani law governing seed quality, seed phyto-sanitary regulations, or selection and testing procedures. Consequently, the private sector is consequently free to import any seed variety, supplied by reputable,

Table 5.9.4 Actual Subsidy for Plant Sector (in 1989)

I T E M	SUBSIDY (%)
1- Seeds	50%
2- Insecticides	50%
3- Chemical fertilizers	25%
4- Organic fertilizer	25%
5- Aerial spraying	100%
6- Ploughing (Tractor hire)	80%
7- Spraying	100%
8- Potato tuber	50%
9- Modern irrigation systems	R.O. 3million being a Sultanate grant for introduction of subsidized irrigation system in the Batinah (1990 - 1992)
10- Wheat seeds	100%
11- Bee hives	-
12- Mechanization	-
13- Extension services	free charge
14- Maintenance of falaj systems	100%
15- Maintenance of wells & springs	100%

Source: MAF

Table 5.9.5 Actual Subsidy for Animal Sector (in 1989)

S U B J E C T	SUBSIDY (%)
1- National vaccination scheme, vet. treatment, and extension	100%
2- Construction of pens and distribution facilities of livestock	100%
3- Purchase of beef from herds men	Remote areas
4- Animal feed	Remote areas
5- Preparation of feasibility studies for Animal production projects	free

Source: MAF

Table 5.9.6 Actual Support for Fisheries Sector (in 1989)

S U B J E C T	SUBSIDY (%)
1- Fishermen fund	
i) modern fishing gears (boats and moving engines)	2/3 the price
ii) fishing boxes for shrimp	100%
2- Marine workshops (repair & Maintenance of fishermen engines and boats)	100%
3- Fisheries research fund	under implementation

Source: MAF

Table 5.9.7 Proposed Distribution of the Farmer's Subsidy Program
Allocation for the Year 1988 and 1989

(UNIT: R.O.)

I T E M	AMT. PROPOSED	AMT. ALLCATED
	FOR 1989	FOR 1988
1. Insecticides	330,000	430,000
2. Sprayers	20,000	140,000
3. Aerial spraying	170,000	140,000
4. Vegetable seeds	100,000	92,000
5. Potato tuber	60,000	40,000
6. Plants	30,000	260,000
7. Chemical fertilizers	100,000	100,000
8. Organic fertilizers	50,000	40,000
9. Ploughs, threshers and implements	60,000	80,000
10. Subsidy for modern irrigation system	218,000	168,000
11. Propagation of wheat seed	160,000	20,000
12. Promotion of garlic cultivation	20,000	10,000
13. Control of coconut disease	30,000	10,000
14. Apiary inputs	50,000	40,000
15. Animal feed	10,000	30,000
16. Nurseries inputs and production farms	100,000	180,000
17. Agricultural exhibition/competition	100,000	180,000
18. Control of citrus disease	160,000	-
19. Production farms input	(included in 16 above)	600,000
T O T A L	1,600,000	2,500,000

Source: MAF

Table 5.9.8 Proposed Distribution of the Farmer's Subsidy Program
Allocation for the Year 1990

SERIAL NUMBER	I T E M	PROPOSED AMOUNT IN R.O.
1	Pesticides	100,000
2	Aerial spraying against dubas bug	170,000
3	Promotion of garlic cultivation	15,000
4	Control of coconut disease	10,000
5	Vegetable seeds	100,000
6	Chemical fertilizers	165,000
7	Organic fertilizers (manure pit)	20,000
8	Potato tubers	60,000
9	Extension services programs	35,000
10	Control of citrus disease	30,000
11	Propagation of wheat	15,000
12	Honey bee inputs	40,000
13	Nursery inputs	80,000
14	Subsidy for modern irrigation system	200,000
15	Plants	15,000
16	Irrigation systems subsidy in 100 sheep farms	70,000
17	Establishment of 55 enclosures for goats	170,000
18	Veterinary medicine	100,000
19	Spray machines	26,847
20	Cutting and baling machines	25,000
21	Tractors subsidy	50,000
22	Grass cutting machines	40,000
23	Date palm trees cutter	153
24	Date palm pollination machines	6,000
25	Wheat threshers	7,000
T O T A L		1,550,000

Source: MAF

international seed producers, for distribution and sale through the free market.

Figure 5.9.6 shows the trend of improved seed distribution by main crops for the past 9 years.

(b) Pesticides

MAF's share of in agro-chemical imports was small (around 3%) in 1986. With the same terms and conditions as seeds, pesticides are supplied to the government through the international tenders. After establishing a contract, imported chemicals are delivered to the MAF warehouse located in the capital. They are distributed to the main MAF regional and satellite centers for eventual sale to farmers. These MAF centers, along with the commercial outlets, constitute the major part of the supply network in the country.

Pesticides are informally controlled by a system of performance trial testing at the Rumais Research Station where products submitted by manufacturers undergo comparative performance trials over two or three seasons. To qualify for tender purchase, agro-chemical products must also be supported by proof of registration within the manufacturing country.

As with seeds, the importing or the use of pesticides in Oman remains unregulated. The GCC legal instruments currently being prepared are also intended to be adopted as Omani legislation. In the meantime, the private sector is free to import and sell any agro-chemical product, regardless of quality or safety.

Figures 5.9.7 - 5.9.8 show the field crop area and vegetable area, by region, treated with insecticides during the past 8 years.

(c) Fertilizers

MAF currently supports the subsidized supply of only two types of inorganic fertilizers, compound NPK (20:10:10) and ammonium sulphate

Figure 5.9.6 Improved Seeds Distributed to Farmers (kg)

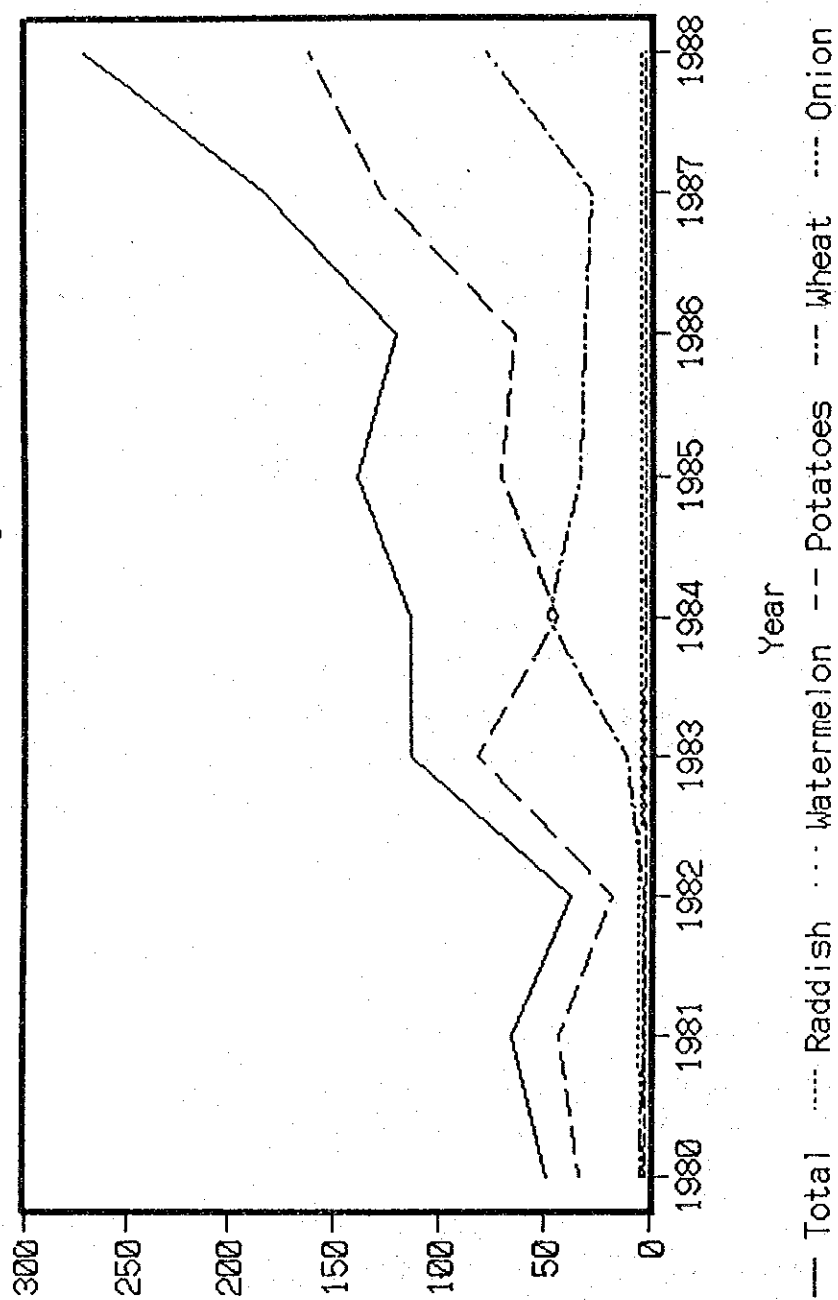


Figure 5.9.7 Field Crop Area Treated with Insecticides for Protection

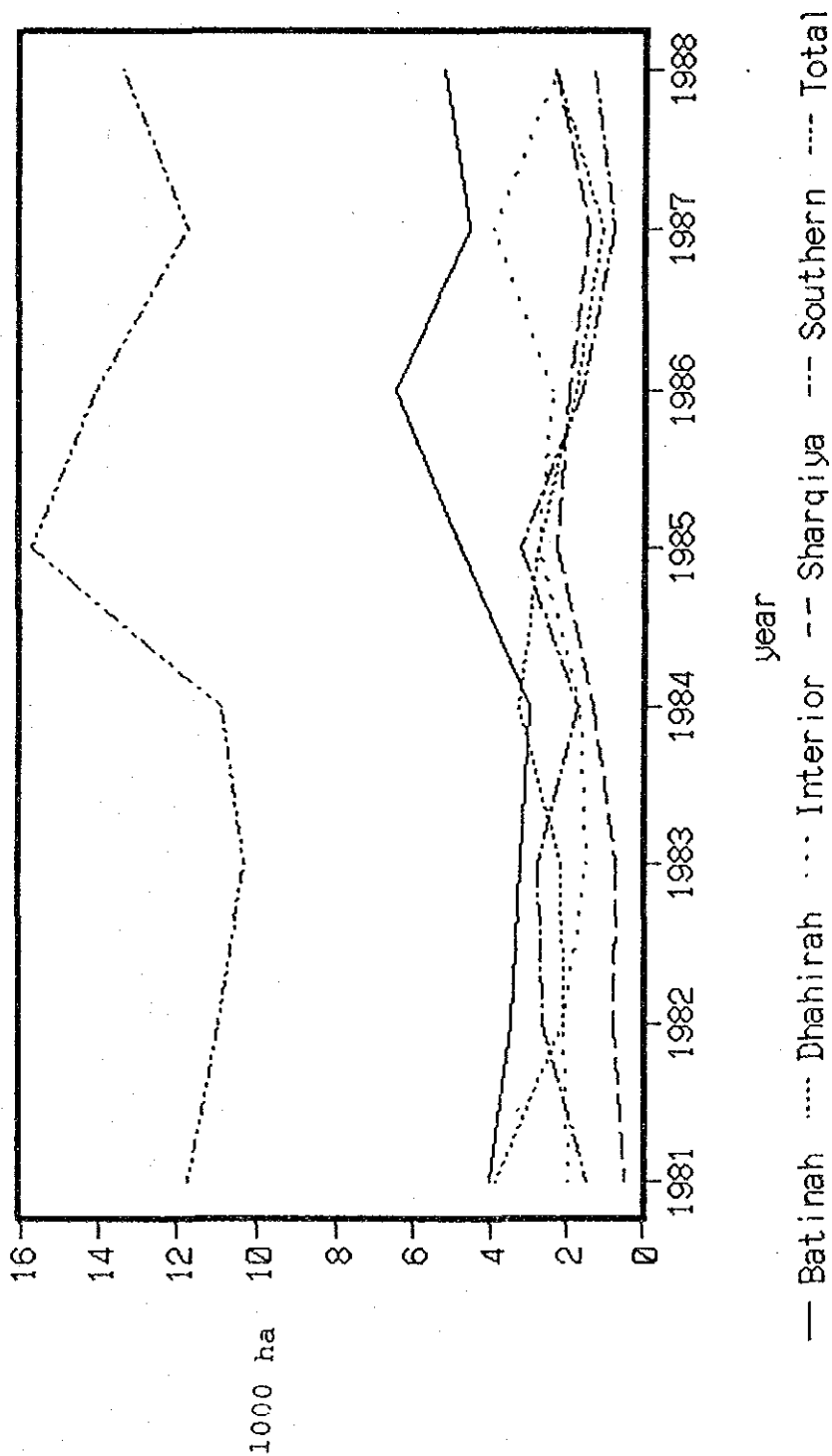
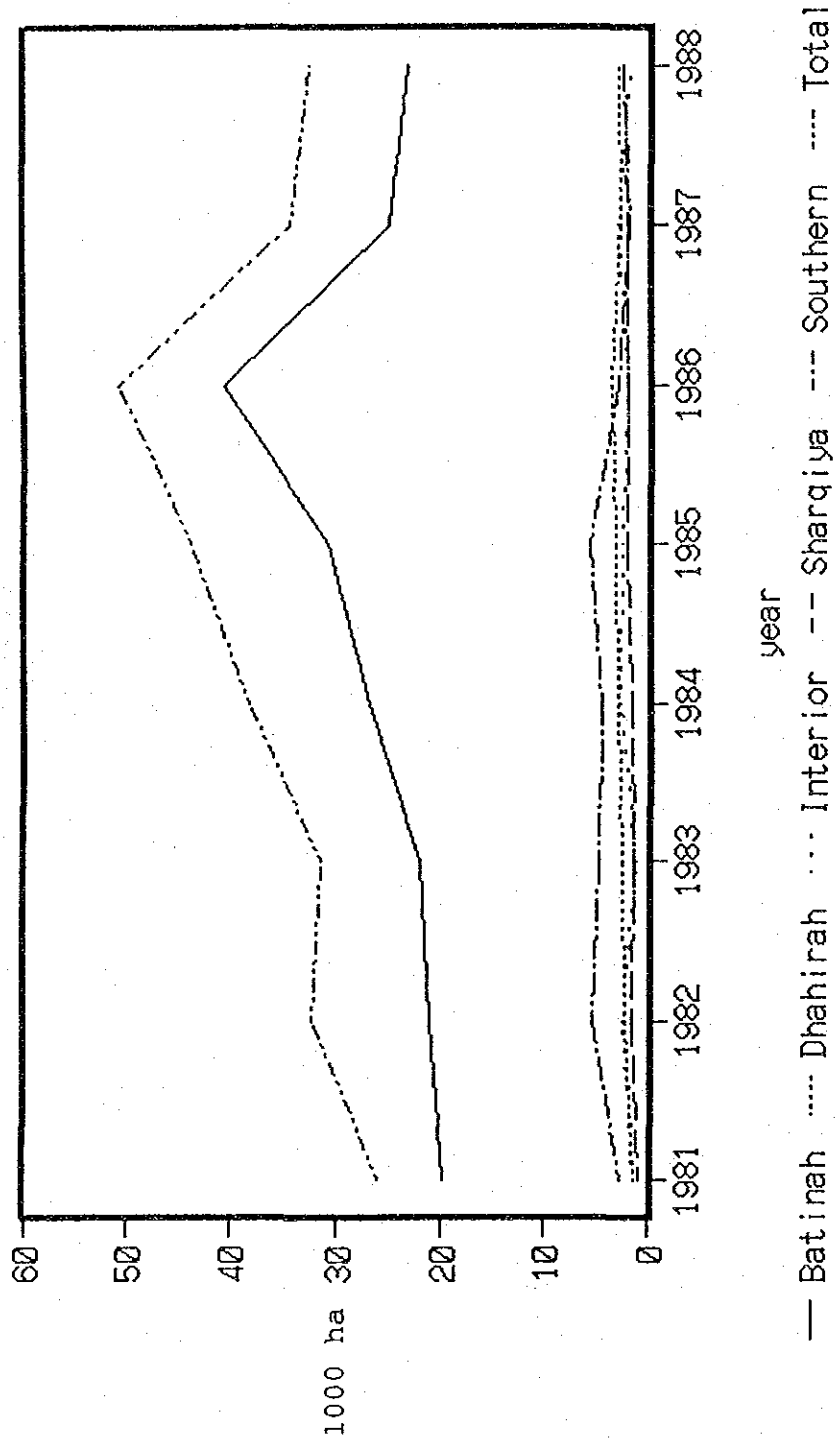


Figure 5.9.8 Vegetable Area Treated with Insecticides for Protection



and one organic fertilizer, produced locally from composed domestic refuse by the Oman Organic Fertilizer Company. All inorganic fertilizers are tendered for by MAF, and imported annually by one or two main suppliers who dominate the market. Companies foremost in the inorganic fertilizer market are Muscat Overseas, Nasser Lashko, Omani Company for Agricultural Services & Development and Omani Establishment for Agricultural Development. These companies have individually or collectively developed a comprehensive network of local distributors throughout the Sultanate. MAF tender imports in 1986 amounted to 2,000 tons or a 57% share of compound NPK, and 950 tones or a 12% share of ammonium sulphate. In 1987, however, the volumes imported by MAF decreased to 1,740 tons of compound NPK and 790 tons of ammonium sulfate because of budgetary constraints caused by depressed oil revenues. Details on volume, price and areas of distribution of MAF subsidized fertilizer products in 1986 and 1987 are shown in Table 5.9.9. The trend of total fertilizers distributed to farmers is shown in Figure 5.9.9.

(d) Spraying Equipment

MAF provides free spraying services to farmers through regional extension centers (only the crop chemical is charged for). It is believed that a surprisingly large number of farmers in some areas, particularly in the hinterland regions, do not own spraying equipment and tend to rely on MAF spray teams. Farmers also seem prepared to wait for allocation of equipment from the limited supply of subsidized machines that have been available through MAF. As the number of motorized sprayers purchased annually through the MAF tends to be relatively small, the waiting lists for sprayers are continually over-subscribed, by a factor of three or four times in most areas. In the past, MAF has also distributed very small numbers (usually about 200 per year) of subsidized manual sprayers. Subsidies on sprayers were withdrawn at the beginning of 1988.

Most of the larger pesticide and seed suppliers stock the manual (knapsack and pressure) sprayers, while high pressure, motorized sprayers and foggers tend to be more commonly available from

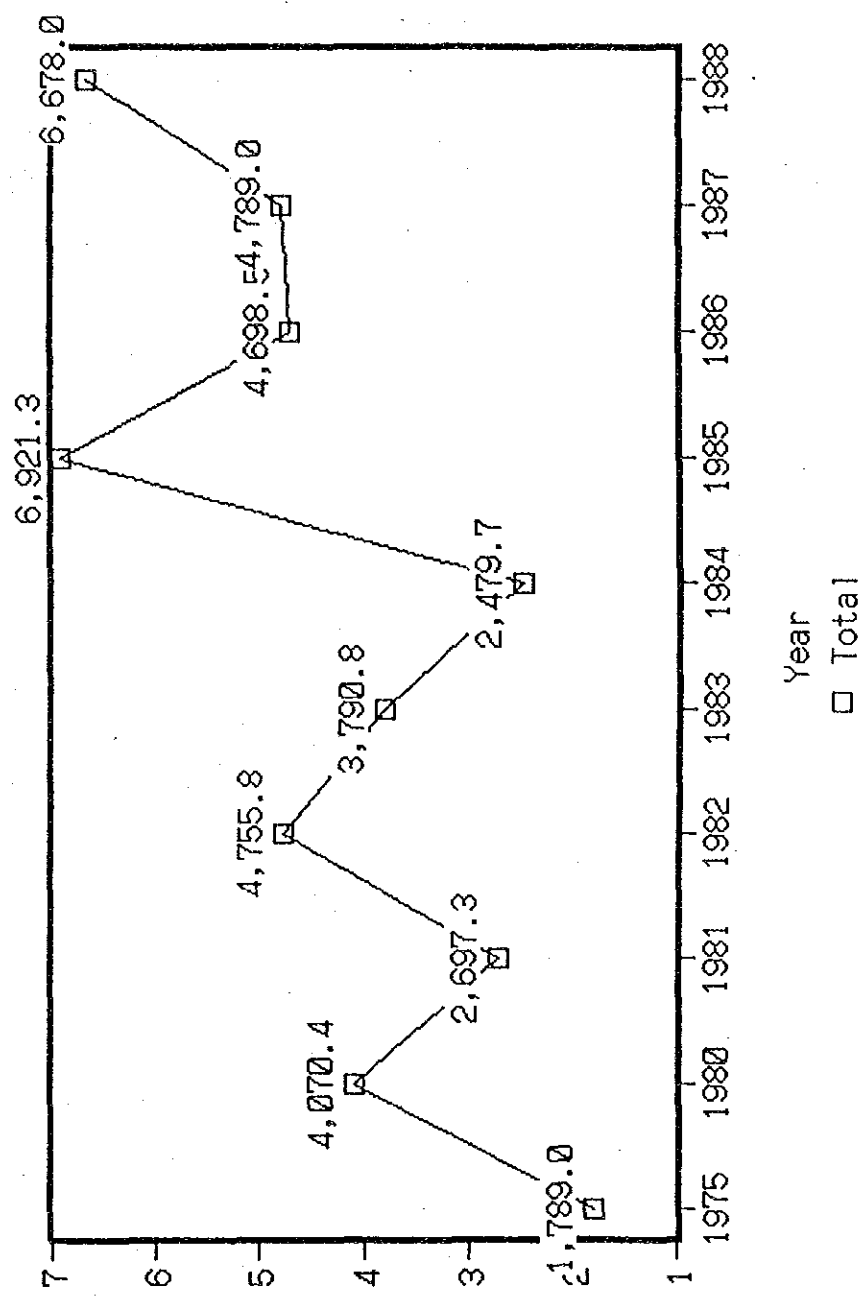
Table 5.9.9

Volumes, Prices and Areas of Distribution of Fertilizers

Region	1986		1987		As. Sul.		Org.
	NPK		NPK		1986	1987	
North Batinah	507.0	238.0	250.0	298.0	75.0	325.0	
South Batinah	504.0	183.0	250.0	384.0	111.0	555.0	
Interior & Wousta	339.0	196.0	500.0	334.0	93.0	240.0	
Dahirah	251.0	144.0	250.0	203.0	84.0	1,305.0	
Sharqiya	216.0	132.0	500.0	321.0	357.0	357.0	
Southern	182.0	50.0 N.A.		200.0	70.0 N.A.		
Totals	1,999.0	943.0	1,750.0	1,740.0	790.0	2,782.0	
R.O./tonne	125.0	98.4	36.3	87.6	98.4	36.3	
sale/tonne	93.8	73.8	27.2	65.7	73.8	27.2	
subsidy level (%)	25.0	25.0	25.0	25.0	25.0	25.0	

Source: Feasibility Study for the Establishment of a National Company for the Supply of Agricultural Inputs and Services to Farmers in the Sultanate of Oman

Figure 5.9.9 Fertilizers Distributed to Farmers



1 : 0 0 0 0 t

suppliers of light agricultural machinery and irrigation equipment. Despite the historically predominant requirement for spraying tall tree crops, drift sprayers are not sold by any suppliers. Motorized, pressure sprayers which are certainly the most effective for spraying tall or dense tree crops should be made more widely available.

In order to increase land productivity and quality, timely, frequent and adequate application of crop protection agents are indispensable. The ownership of sprayers, therefore, should be strongly promoted because the dependence of crop protection on third parties is risky, especially for those growing annual field crops like vegetables.

Figure 5.9.10 shows the number of spraying machines distributed to farmers in the past 8 years.

(e) Tractors and Agricultural Machinery

The tractor hire scheme operated by MAF is now inadequate to meet demand, which is estimated to be several times higher than can be satisfied with the present levels of staff, machinery and financial resources.

The agricultural machinery business in Oman is small and predominantly an adjunct of the motor trade related businesses of larger Omani trading houses. The supply of equipment and spares to MAF tractor hire service resulted in a smaller, diminishing proportion of revenue to the trading houses. While there is a small steady market for medium to large horsepower machinery, the large number of small farms of 10 feddans or less, establishes the small tractor or powered tiller market as best suited to the operational and financial circumstances of the average small farmer.

Ownership of tractors of any sort is uncommon amongst small farmers, partly due to the small farm sizes and low incomes, and the influence of the tractor hire scheme.

Figure 5.9.11 shows the number of tractors distributed to farmers by

Figure 5.9.10 Spraying Machine Distributed to Farmers

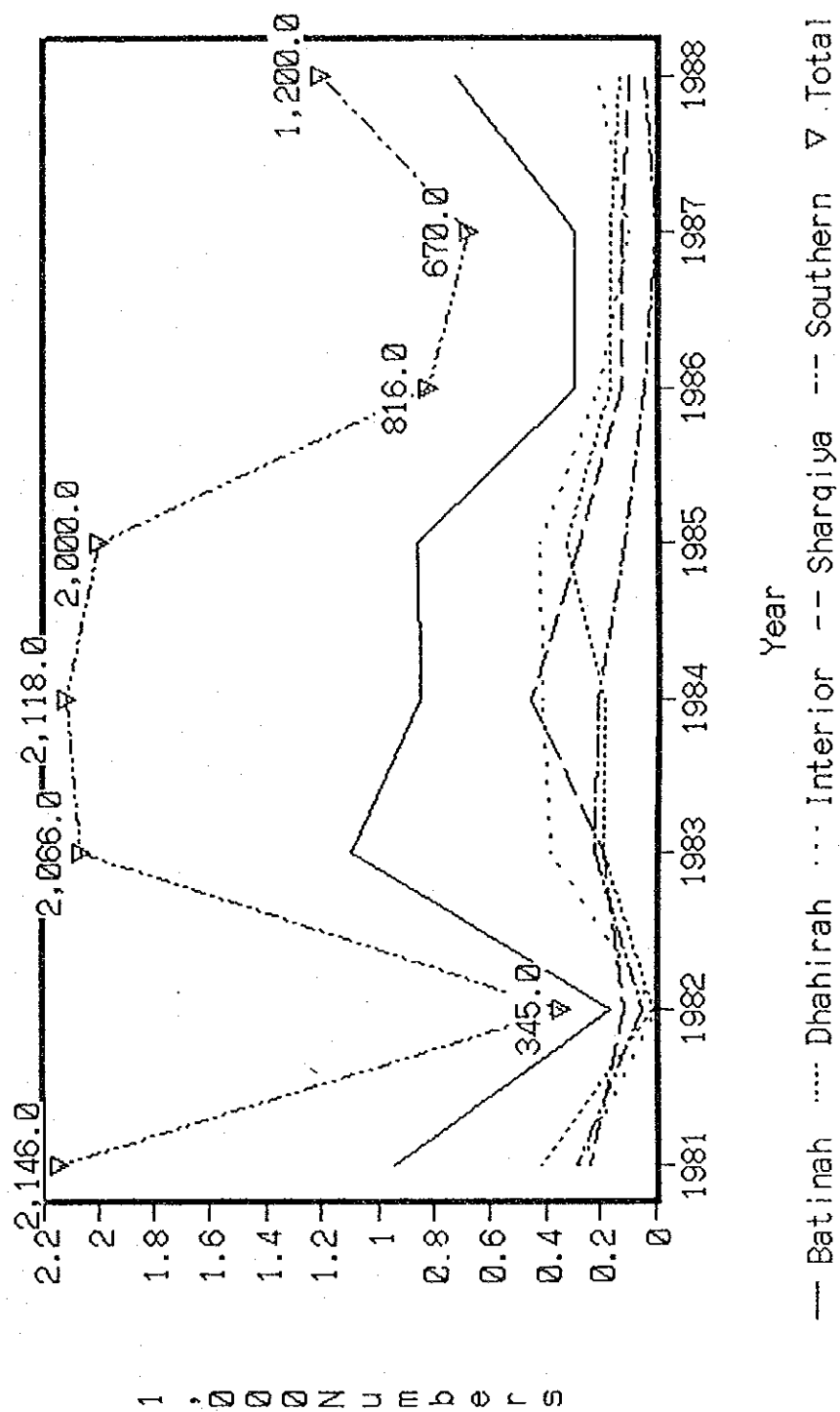


Figure 5.9.11 Tractors Distributed to Farmers

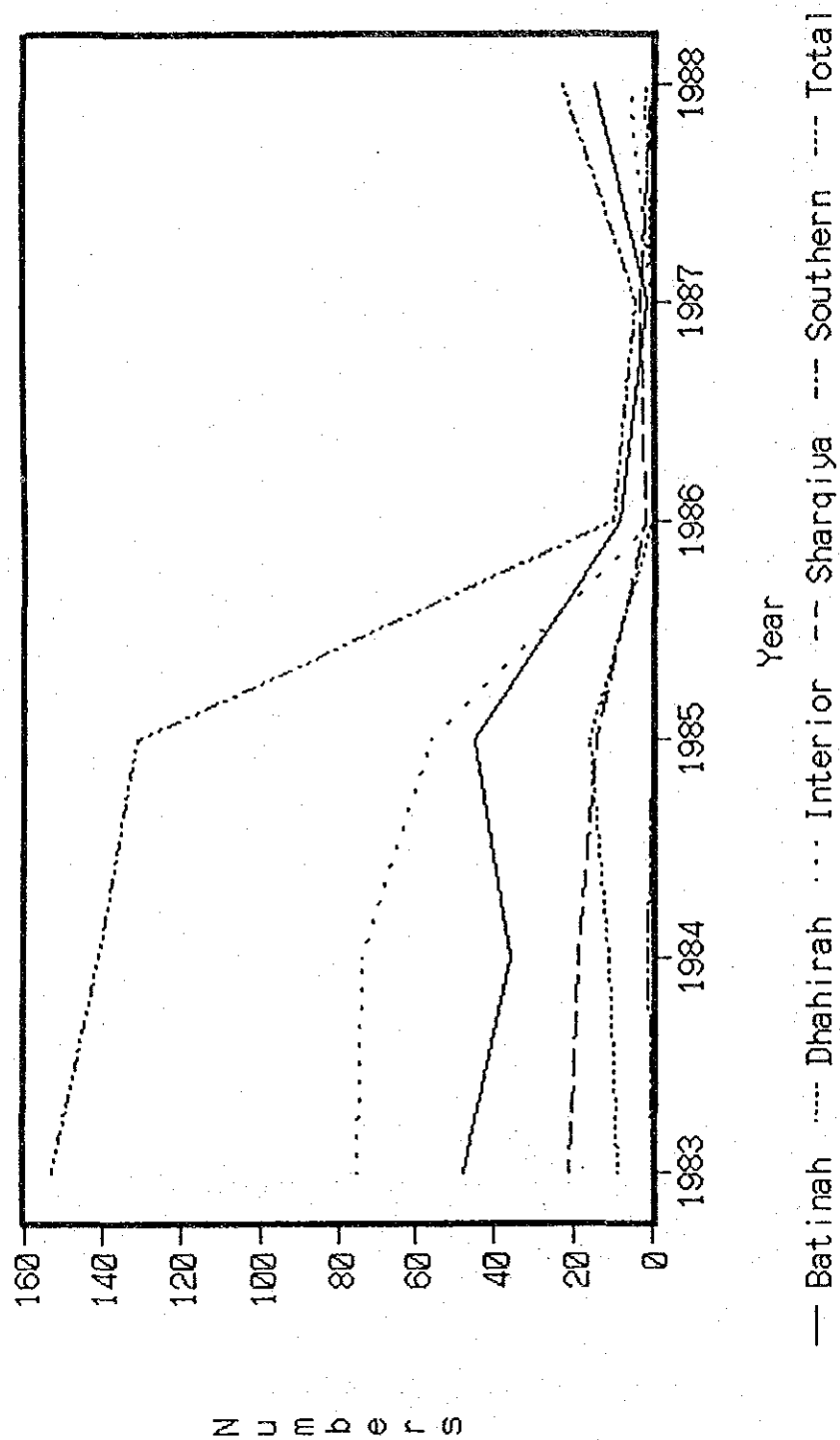
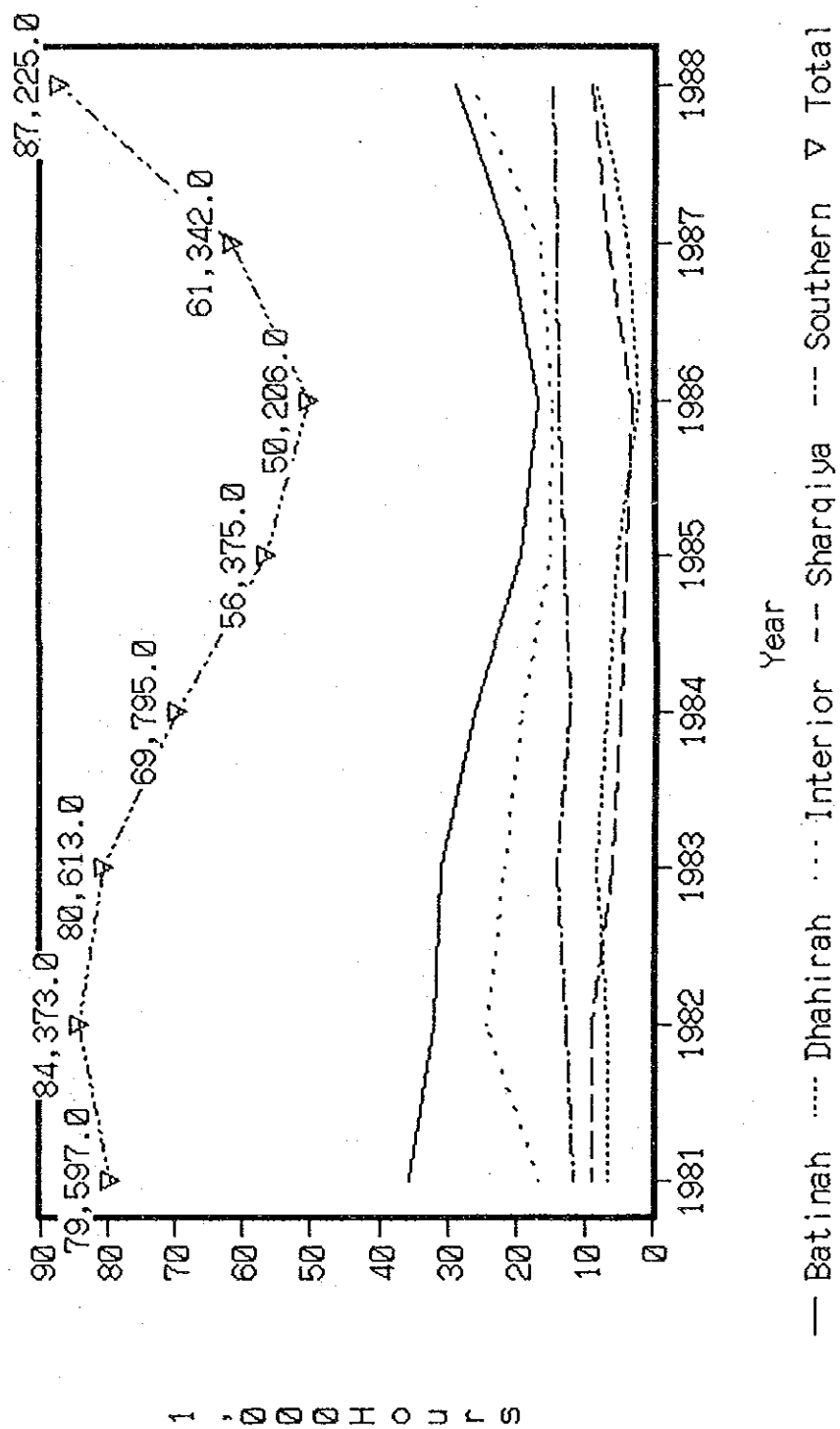


Figure 5.9.12 Tractor Hours Rendered to Farmers



region during the past 6 years. The tractor hours rendered to farmers by MAF is shown in Figure 5.9.12.

(f) Water Pumps and Irrigation Equipment

Prior to 1982, water pumps were supplied to farmers free of charge, under the terms of a Royal Decree. This arrangement was terminated in 1982 and replaced with a subsidy scheme which was terminated in 1986 when responsibility for pump-funding was handed over entirely to OBAF. Since the elimination of the MAF subsidy, installed pumps have declined considerably.

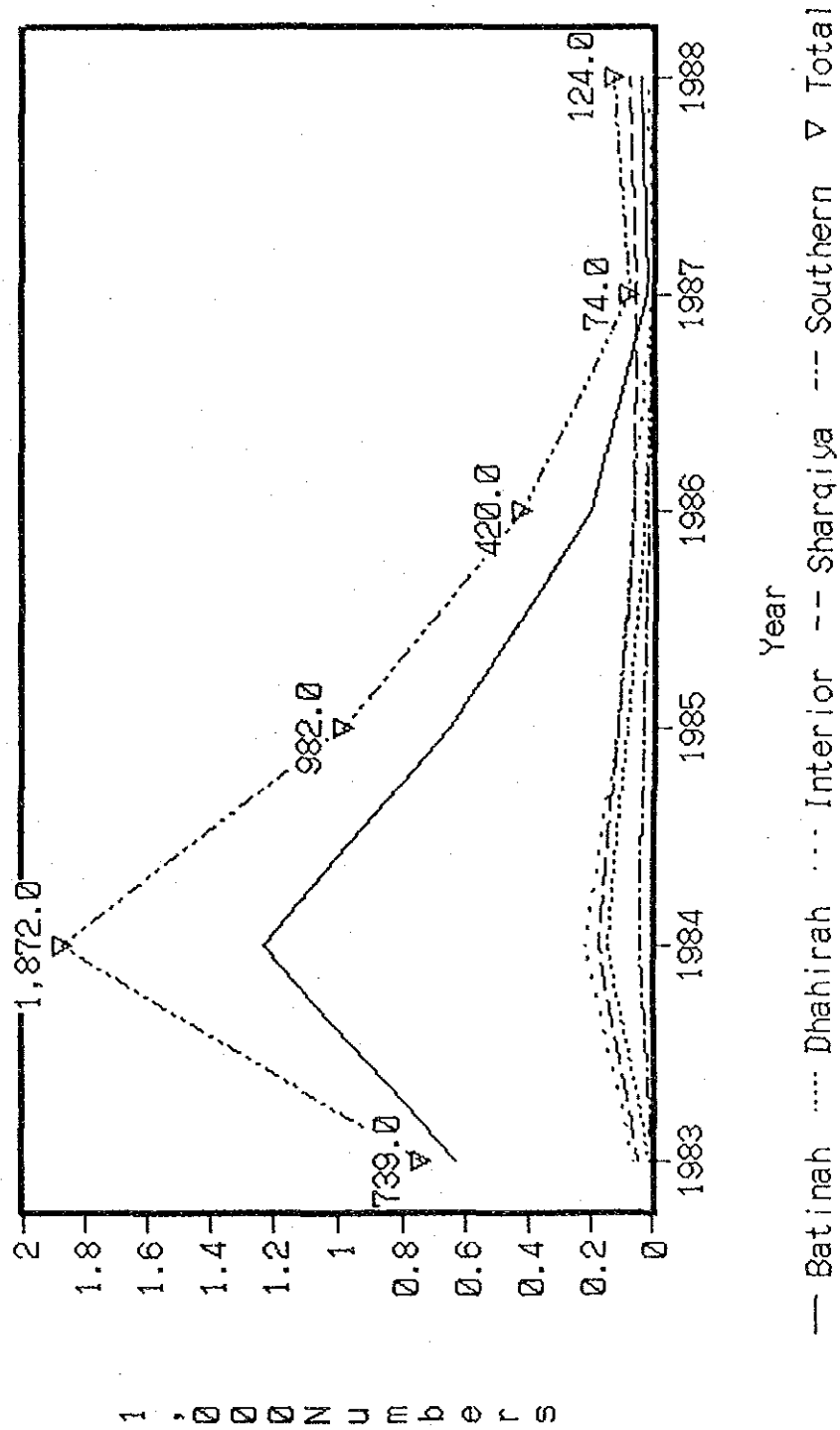
The supply and installation of irrigation equipment, conversely, is currently one of the greater growth areas of the supply input industry, following general recognition of the critical need to improve the efficiency with which Oman's finite water resources are used. This requires a move away from the traditional flood irrigation methods of the falaj system, towards the more water-conservation techniques of modern sprinkler and drip irrigation systems. The MAF policy in this respect centers on several schemes supported by loans from OBAF. The largest of these plans, to intensify production on 2,500 established farms by installing drip or sprinkler irrigation, is on-going. To qualify for inclusion, farmers must meet a number of criteria:

- a) they must be of proven competence
- b) the farm must be between 7 and 10 feddans
- c) some of this land must be unused or uncropped
- d) they must be able and willing to adopt improved techniques of husbandry, irrigation and harvesting
- e) ideally there should be similar farms nearby

It is intended that between 400 and 500 farms will be improved each year, depending on the availability of sufficient manpower resources within MAF.

Figure 5.9.13 shows the number of water pumps distributed to farmers

Figure 5.9.13 Water Pumps Distributed to Farmers



by region during the past 6 years.

(g) Animal Feed

All animal feed consumed in Oman is formulated in the country, either at the Oman Flour Mills plant in Muttrah, or at the Dhofar Cattle Feeds plant in Salalah. In both cases, all feed stock material is imported, with the exception of one component, mineral limestone which is produced locally. Both plants run efficiently, below capacity in both cases, and consistently meet national demand for all classes of animal feed required in the Sultanate. Feed products are sold at full, commercial, unsubsidized prices through a large network (Oman Flour Mills has 40 outlets) of local distributors and are protected from external competition by import tariffs. Though feed is not subsidized by MAF, it is supplied free to livestock farmers in years when seasonal jabal pastures fail due to severe drought, as was the case in 1986 and 1988, when 30,000 and 10,000 tons of feed, respectively, were supplied to livestock farmers by MAF.

The largest single consumer of ruminant feedstock in Northern Oman is Oman Sun Farms in Sohar. The main market, however, is with the livestock farmers on the southern jabal, to whom most production from both Oman Flour Mills and Dhofar Cattle Feeds, is sold. About 10% of the output from Oman Flour Mills goes to large commercial (mostly poultry) units. Demand is likely to increase substantially, since a new enterprise, Modern Poultry Farms, was established. The main consumer of poultry feed is the poultry unit owned by Ahmed Nasser Associates.

Veterinary services are also provided almost entirely by MAF (see details in section 5.7.1).

(7) Future Subsidies

The subsidies which are considered by MAF to be necessary in the future are shown below:

(a) Agricultural Sector

- a) Imposition of duties on the imports of selected agricultural products to protect the local produce
- b) Exemption of agricultural inputs and agricultural equipment from custom duties
- c) Exemption of companies operating in the agricultural field from taxes
- d) Reduction of electricity prices for farms and agricultural projects
- e) Reduction of fuel prices

(b) Livestock Sector

- a) Exemption of animal production inputs and equipment from custom duties
- b) Reduction of electricity prices for animal production and related projects
- c) Protection of local industries by imposing custom duties on animal product import or restriction on the same

(c) Fisheries Sector

- a) Exemption of fisheries inputs from duties
- b) Reduction of electricity prices for fisheries projects
- c) Imposition of custom duties on fisheries imports or restriction of their importation
- d) Reduction of fuel prices for fishermen

The appropriate subsidy system for the agricultural sector should be examined through a detailed evaluation of actual farm budgets classified by farm size and the marketing of agricultural products.

5.9.2 Development Potential

Agricultural finance should be included in the government subsidy

program, since subsidized low interest rate is the focal point of its operation. The subsidies relating to agriculture policies are classified as follows:

- 1) Government purchase of agricultural products in line with the supporting price (output subsidy).
- 2) Subsidy for production input (input subsidy).
- 3) Agricultural development projects directly implemented by the government (government project).
- 4) Subsidy or government shareholding for private projects relating to agriculture (government shared project).
- 5) Research and extension services for farmers (government service).
- 6) Agricultural finance with favorable conditions (preferential finance).

The government subsidizes all the items mentioned above at varying degrees of implementation. The major contents of subsidies allocated for agriculture are as follows:

- 1) Output subsidy
Purchase of products from farmers through PAMAP. It should be noted that, strictly speaking, no purchasing price is subsidized, because it is set as 20% lower than the market price.
- 2) Input subsidy
Subsidy for agricultural input, e.g. seeds, pesticides, fertilizers, etc., allocated from the development expenditure of MAF.
- 3) Government project
Government projects such as improvement of aflaj, construction of recharge dams and agro-industry (date-processing factory) allocated from development expenditure of MAF.
- 4) Government shared project
Capital sharing or supply of subsidized raw materials by MCI for enterprises relating to agro-industry and so forth.
- 5) Government service
Direct implementation of agricultural research and extension services by MAF for the development of agriculture and the increase of farmers' income.

6) Preferential finance

Favorable loans, by OBAF for farmers and commercial farms as well as the ODB loan for agro-industry, etc.

The evaluation of the effect of those subsidies has not yet been completed sufficiently by the government. The response to the subsidies from farmers, in which commercial farms are included, is more favorable for direct ones than indirect ones. Accordingly, indirect programs like input subsidies and extension services are not to be considered to have benefits corresponding to cost, due to the complicated procedures for getting permission, the delay of service, and the infrequency of services rendered to farmers. In future, the government should aim at more direct subsidies, for which demand from producers will increase. Subsidies for output in the form of purchasing agricultural produce at the supporting price is adequately direct and considerable effect can be expected. The merits and demerits of output subsidies are outlined below.

1) Merits

- (a) stabilize farmer's income.
- (b) induce external effects or multiplier effects through demand increases in rural area caused by farmer's income increase.
- (c) contribute to the correction of the income disparity between urban and rural areas through redistribution of wealth resulting from the subsidies.
- (d) give farmers incentive for production increases.
- (e) raise the commercialization rate of products and reduce wastage.
- (f) enhance the farmers' incentive for improved quality, provided that the discrimination of a supporting price in accordance with that improvement is introduced.
- (g) alleviate urbanization by increasing labor demands and offering attractive income increases in rural area.

2) Demerits

- (a) increase the national budget in future owing to the characteristics of the subsidies.
- (b) enlarge the governmental organization and increase operation costs in order to prevent unfair activities.

- (c) induce disorderly development and cause exhaustion problem of natural resources especially of water and land due to rapid increase of production.

Moreover, the following points should be examined as a policy matters:

- (a) Selection of crops
- (b) The scale of purchasing volume by the government
- (c) Purchasing Price (including price discrimination according to grade)
- (d) Priority setting (e.g. preference for small scale farmers)

Since the subsidies for agricultural products is the most direct of all and will definitely influence agriculture and farmers, most of the various problems relating to the agricultural sector in Oman will be solved with its introduction. MAF has acquired some experience by introducing a kind of output subsidy in the livestock sector as a cattle de-stocking program in the Southern Region. The program itself was not so successful in that the number of cattle heads actually increased. That fact, though, indicates eloquently how large the effect of price incentives is for farmers to increase productivity. If the government is aiming at production increases, output subsidies should definitely be examined.