

[NLL-5] Livestock Specialized Services Program
(Fundamental Data Collection, Reviews and Studies)

Objectives:

It is essential to precisely grasp present conditions and development potential to execute livestock development in the future.

At present, there are certain data indispensable for the analysis of the present situation remain vague, for example livestock population. Therefore, in this plan, the following data should be collected and collated for effective application to the execution of the above-mentioned projects.

Furthermore, there are some projects in this Master Plan which require reviews of the studies or further feasibility studies. These reviews and studies reviews should be executed under this program as well.

Description:

[NAA-1-1] Livestock Census Program

The most recent livestock population survey, the "Range and Livestock Survey", was conducted by GRM in 1982. This survey was not based on a complete report from all animal holders in Oman, but rather it was partially based on various estimations. The livestock population announced by the MAF in 1989 was estimated mainly on the basis of the data from the above-mentioned survey and additional information and estimates from the Southern Region Wali Office.

To understand the present situation for the livestock industry in the entire country, it is at least necessary to ascertain livestock population accurately. Through the investigation of all animal holders in Oman under this plan, the following items which are important fundamental data for livestock development, would be collected and collated:

- The number of animal holders

(for each animal holders)
- The number of each type of animal.
- Kidding rate, mortality rate and culling rate.
- Head for marketing and head for home consumption.
- Cultivated area for feed crops.

(This census should be conducted periodically, in conjunction with the agricultural census.)

[NLL-5-1] National Disease Survey

The reduction of economic losses caused by epidemic diseases is one of the most important subjects for Omani animal holders. Since the execution of the vaccination program in 1982, it is said that the number of occurrences of serious epidemic diseases has been decreasing gradually; however, there is no accurate data on the number of occurrences of animal diseases for the past several years. It is vital to know disease-occurrence conditions to take countermeasures to prevent diseases. Under this plan, the on-going "National Disease Survey" conducted by CVIL on the basis of a report from each animal clinic should be reinforced, and the information from the clinics should be processed with computer, applying a fixed format. This data base will be effective in various fields, such as establishment of quarantine facilities, CVIL development, etc.

Moreover, a foreign expert should be periodically invited for a detailed survey and review and revision of the countermeasures against serious epidemic diseases.

[NLM-2] Livestock Products Marketing Survey

As the distribution of domestic livestock products increases in accordance with increased production in local areas, competition between domestic products and imported ones will be inevitable. To promote an increase in the distribution of domestic products, the following points are proposed:

- (1) Enhance productivity and quality of domestic livestock
- (2) Reduce the price difference between domestic and imported products by means of price controls

With respect to (1), such enhancement can be realized through implementation of the above-mentioned projects. With respect to (2), there are several ways to reduce the price difference, for instance, levy customs duties on imported products, subsidize domestic products, etc.

In the case of (2), government information in price-setting is a central issue, given its ultimate effect on the consumer.

Precise market surveys and studies are necessary to make an appropriate evaluation. Therefore, under this program, the following surveys are proposed:

- (1) Identify present consumption orientation regarding livestock products, and forecast trends.
- (2) Estimate the worth of livestock products on the basis of marketed form at the retail level (for instance frozen, warm, chilled, etc.) on the consumer market.
- (3) Identify marketing margins for domestic and imported livestock products.
- (4) Estimate the extent of possible further reduction in production costs for domestic livestock products.

(5) Execute simulations for various price-control patterns.

[NLL-5-2] Consultancy Services (Reviews and Studies)

The reviews of the feasibility studies already conducted or further feasibility studies will be required in the near future. These are as follows:

- Establishment of a livestock marketing organization in the south
- Establishment of a public beef cattle fattening farm in Nejd
- Establishment of milk collecting and processing facilities in the north and south
- Collecting and processing facilities for poultry products in the north and south
- Establishment of hide and skin collection and marketing facilities
- Establishment of the Livestock Input Company
- Viability of corral animal husbandry in the rangeland

Responsibility: MAF

Timing:

NAA-1-1 Livestock Census-----1995
NLL-5-1 National Disease Survey-----For 5 years from 1991
NLM-2 Marketing Survey-----1991
NLL-5-2 Consultancy Services -----For 5 years from 1991
(Reviews and studies)

TIMING

Project	1991	1992	1993	1994	1995
Livestock Census					
National Disease Survey					
Marketing Survey					
Consultancy Services (Reviews and Studies)					

Budget:

Budget is as follows:

BUDGET 1,222,000 R.O.

Project	1991	1992	1993	1994	1995	Total
Livestock Census	524,000					524,000
National Disease Survey	11,000	11,000	11,000	11,000	11,000	55,000
Marketing Survey	143,000					143,000
Consultancy Services (Reviews and Studies)	100,000	100,000	100,000	100,000	100,000	500,000

<Reference>

Specific policy toward livestock products should be shaped on the basis of the "Marketing Survey (NLM-2)". However, fundamental policy toward livestock products on the basis of present obtainable information is as follows:

The following four measures are proposed in order to address the difficulties regarding the difference in price between domestic and imported livestock products.

- (1) To brand the local products by enhancing its quality to absorb the price difference and thereby make it more widely acceptable to consumers
- (2) To minimize the price difference between domestic and imported products by reducing the production costs of local meat through increasing the productivity of livestock management
- (3) To minimize the price difference between domestic and imported products through adjusting import duties for imported products or restriction of imported amounts
- (4) To minimize the price difference between domestic and imported products by means of reducing the local products price through subsidizing the distribution process

In practice, the implementation of an appropriate combination of items (1) to (4) is considered to be most effective.

The following reference models are suggested in this proposal for each livestock product.

- (a) Poultry meat The implementation of (1) and (2)

Present retail price difference between domestic and imported poultry meat is relatively small, and

domestic products can compete with imports if (1) and (2) are pursued successfully.

(b) Table egg The implementation of (1) and (2)

Domestic table egg has the advantage of freshness and low price difference between domestic and imported table eggs. Therefore, domestic table eggs can compete with imports if (1) and (2) are successful.

(c) Goat meat The implementation of (1), (2) and (3)

Domestic goat meat has the advantage that Omanis prefer domestic goat meat to imported. However, the retail price of domestic meat is about twice that of imported meat and this is a big handicap for domestic meat.

For the time being, until domestic meat has enough competitive ability on the basis of the implementation of (1), (2) and (3) adjusting import duties for imported goat meat is necessary.

The revenue from the duties should be used for funding the already-mentioned "Small Farms Development Support Project(NLL-4)", or reducing the retail price of domestic meat, etc.

(d) Mutton The implementation of (1), (2) and (3)

Fundamentally, the same measures taken in the case of goat meat will be necessary. However, domestic mutton does not have as big an advantage as goat meat has in terms of Omanis preference. Therefore, more efforts to enhance the quality of domestic mutton will be necessary.

(e) Beef The implementation of (1), (2), (3) and (4)

It is estimated that domestic beef has almost no advantages compared to imported beef except its freshness. All of (1), (2), (3) and (4) should be executed to reduce the price gap. The duty rate should be set at a higher level than that of imported goat meat and mutton.

The revenue from the duties should be used to fund the already-mentioned "Small Farms Support Project(NLL-4)", "Cattle De-stocking Subsidy (NLM-1-6)", or reducing retail prices of domestic meat etc.

(f) Milk products The implementation of (1) and (2)

Domestic fresh milk has the advantage of freshness over imported.

Fresh milk which is produced by small holders can compete with that of commercial dairy farms if (1) and (2) are successful.

Concerning cheese and butter, which can be preserved for a long time, cheap products from foreign countries dominate the market at present.

feasibility study for the establishment of processing facilities for these products should be done as a first step.

In the implementation of the above models, a solution to the price gaps between domestic and imported livestock products should be pursued mainly based on the execution of items (1) and (2). Items (3) and (4) should be executed as temporary and supplementary measures.

In the case of executing (3) and (4) in line with the progress of (1) and (2), duty rates and government-purchase prices of livestock (products) should be lowered gradually.

The execution of (3) and (4) should be planned so as not to discourage the farmer's own management-improvement efforts.

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Rangeland Revegetation Project in Southern Region
Table 6.3.9 Cost Estimation of NLL-1-1:

Establishment of Rangeland Management

Item	Amount	Unit	Unit Price	Cost	Remark
Forest Management	1	Set	60,000	60,000	including Plantation
Rangeland Survey	1	Set	80,000	80,000	including Map Making
Management Unit	10	Unit	15,000	150,000	Fundamental Research
Demonstration Unit	4	Unit	30,000	120,000	Applied Method
Training	6	Set	10,000	60,000	Technician
Total				470,000	
	x0.75			352,500	Assumption FAO:25%

Source: JICA estimate

Table 6.3.10 Cost Estimation of NLL-1-2:

Grazing Control

Item	Set	Unit	Set Price	Cost	Remark
Seed, Forestry	5 years	10,000	50,000	50,000	Plantation Seed for 5 years
Grazing Group	5 years	10,000	50,000	50,000	Organizing Group 10 years
Rotation Grazing	5 years	10,000	50,000	50,000	Implementation of Rotation
Fertilization	5 years	20,000	100,000	100,000	For Upgrade Vegetation
Fencing	28 unit	300	8,400	8,400	Electricity line
Livestock shed	1 set	1,719,900	1,719,900	1,719,900	Cattle, Camel, Goat
Training	5 years	10,000	50,000	50,000	Farmers Training 200farmers/year for 5 years
Total				2,028,300	

Source: JICA estimation on basis of Regional Development Plan for the Southern Region

Assumption

(Fencing)		
Relatively good condition pasture area		70000 ha
Assumed 1 grazing unit area		500 ha
Fence Set		140
(Shed only in Monsoon)		
Camel		27000
Cattle		90000
Goats		60000
Livestock Logging Rate in Shed	Camel	30 %
	Cattle	50
	Goats	30
Shed Area per Head	Camel	6
	Cattle	4
	Goats	2
Total Shed Area	Camel	48600
	Cattle	180000
	Goats	36000
Total		264600
Shed Cost /m ² (Subsidy Rate 50%)		10
Total cost		2,646,000
First 5-years 65% implementation		1,719,900

Table 6.3.11 Cost Estimation of NLQ-1:
Development of New Quarantines

Location	Existing			Required			Additional			Facilities Scale head/term	Unit Price R0/head Office	Cost R0	Required Vehicle NOS
	Doctors	Assistants	Nurses	Doctors	Assistants	Nurses	Doctors	Assistants	Nurses				
M Port Qaboos (Office)	3	2	0	4	1	1	1	-1	1	(5,000)	10,000		
M Seeb Airport (Office)	1	0	0	3	0	1	2	0	1				
M Rusait Quarantine(Center)	1	3	0	1	1	1	0	-2	1				
B Wajajah Border (Office-center)	3	0	0	4	0	1	1	0	1	1,000	200,000	1	
Dh Hafeet Border (Office-center)	3	1	0	4	0	1	1	-1	1	2,000	350,000	2	
S Sur Quarantine(Center)	0	0	0	1	3	2	1	3	2	10,000	1,000,000	5	
Dh Al-Gizy Border(Office-center)	0	0	0	4	3	3	4	3	3	100	30,000		
J Surfait Border (Office)	0	0	0	1	1	2	1	1	2	(5,000)	100,000	1	
J Raysut Quarantine(Office-center)	1	1	2	2	4	4	1	3	2	Road etc.			
J Shaham Border (Office)	0	0	0	1	1	2	1	1	2	100	30,000	1	
Mu Kasab (Office- Center)	0	0	0	4	0	1	4	0	1	1,000	200,000	1	
Total	12	7	2	29	14	19	17	7	17		1,920,000	11	

Investment

Item	Amount	Unit	Unit Price	Cost
Facilities	See Above			1,920,000
Vehicles	11 Cars		5,000	55,000
Total				1,975,000

The distribution plan of veterinarians in each Animal clinic

Region	Clinics and Sub-Clinics			Existing			Required			Additional			Location
	Existing	Required	Additional	Doctors	Assistants	Nurses	Doctors	Assistants	Nurses	Doctors	Assistants	Nurses	
South	4	5	1	1	8	3	5	8	8	3	0	5	(Upgrade)
Batinah	3	2	-1	2	3	3	3	3	3	3	0	5	Al Hajar
North	1	3	2	2	4	3	3	6	6	1	2	3	Shinas
Batinah	5	5	0	2	4	3	3	6	6	1	2	3	Saham
Sharqiya	3	4	1	3	6	10	4	9	9	1	3	-1	(Upgrade) Sur Wadi Bani Khalid
Oman	3	4	1	3	8	10	4	12	12	1	4	2	(Upgrade) Adam
Interior	5	4	-1	3	8	10	4	12	12	1	4	2	
Wusta	2	2	0	2	1	2	2	3	3	0	2	1	
Dahira	2	2	0	2	0	5	2	4	4	0	4	-1	
Buraimi	1	1	0	3	0	0	1	3	3	-2	3	3	Sinena
Musandam	1	2	0	1	3	0	2	3	3	1	0	3	
South Region	(2) 5	10	5 #	5 #	3 #	9 #	8 #	6 #	13	11	3 #	4	
	7	7	7 improve	2	5	23	15	30	60	13	25	37	
TOTAL	(2) 33	33	10	25	38	65	46	84	121	21	46	56	
	23	29	-1										

NOTE: 1. Above numbers show clinics, below numbers show sub-clinics in each column
2. #These numbers show veterinarians in Salalah Hospital

Table 6.3.12 Cost Estimation of NLL-2-1:
Animal Clinics Improvement

Investment

Item	Amount	Unit P	Cost	Remark
Clinic Improvement	7 Set	40,000	280,000	South
New Clinic	7 Set	70,000	490,000	
New Sub-Clinic	2 Set	50,000	100,000	
Vehicle	19 Cars	6,500	123,500	
Clinic Upgrading	3 Set	30,000	90,000	North
Total			1,083,500	

Salalah Animal Hospital Improvement Cost

Item	Amount	Unit P	Cost	Remark
Refurbishment	200 m ²	110	22,000	
Office Building	100 m ²	150	15,000	
Residence	240 m ²	180	43,200	For Doctor
Pens for Animals	250 m ²	50	12,500	
Fence	1 Set	5,000	5,000	
Well-Pump	1 Set	7,000	7,000	
Total			104,700	

Source: JICA estimation on basis of MAF's information

Table 6.3.13 Cost Estimation of NLL-2-2: Laboratory Development

Laboratory Development

Civil development plan

(1) Virology Laboratory

Item	Character	Amount	Unit	Unit Price	Cost	Remark
Building	Hygienic	400	m ²	400	160,000	
Equipment		1	Set	63,000	63,000	In Virology Lab.
Machine		1	Set	50,000	50,000	Air Conditioner etc
Material		1	Set	20,000	20,000	
sub-total					293,000	

(2) Existing Laboratory

Building	Improvement	30	m ²	100	3,000	
Equipment		1	Set	5,000	5,000	CCPP Development
Machine		1	Set	5,000	5,000	CCPP Development
sub-total					13,000	

(1)+(2) 306,000

(3) Salalah Laboratory development plan

Item	Character	Amount	Unit	Unit Price	Cost	Remark
Building	Hygienic	300	m ²	400	120,000	
Equipment		1	Set	53,000	53,000	
Machine		1	Set	50,000	50,000	Air Conditioner etc
Material		1	Set	20,000	20,000	
Road, Fence		1	Set	50,000	50,000	
sub-total					293,000	

(1)+(2)+(3) 599,000

Table 6.3.14 Cost Estimation of NLL-2-3:
CCPP Vaccine Development

Item	Amount	Unit Price	Cost	Remark
Specialist	12 men	5,000	60,000	man/months
Machine	1 set	20,000	20,000	
Materials	1 set	10,000	10,000	
Total			90,000	

Source : JICA estimate

Table 6.3.15 Cost Estimation of NLL-2-4:
National Vaccination

(Condition)		
1990-2000 Livestock Population Increase Rate		20 %
Vaccination Achievement Rate (Assumption)		
	1990	60 %
	1991	70
	1992	80
	1993	90
Year	1994	95
	1995	100
	1996	100
	—	—
	2000	100
60% Vaccination Cost for Present Number of Livestock ('000R.0) (Including CCPP Vaccine) (Including Omani Training)		1150
(Cost)		
	1991	1,369
	1992	1,595
	1993	1,831
	1994	1,971
	1995	2,116
	1996	2,158
	1997	2,202
	1998	2,246
	1999	2,291
	2000	2,336
Total		20,114

Table 6.3.16 Cost Estimation of NLL-2-5:

Supplies of Veterinary Equipment
(Subsidy)

Present Subsidy-----	300,000	450,000 R.O	(It fluctuates year by year)
Ideal Subsidy	-----600,000	R.O	(In case of 62 Animal Clinics in Oman)

Assumed 2% increase in animal population and 2% decrease in veterinary equipment every year in the future.

Because budget will be 600,000 R.O/year

Table 6.3.17 Cost Estimation of NLL-2-6:

Brucellosis Control in the South

Item	Amount	Unit Price	Cost	Remark
Vaccination	20000 Unit	1	20,000	Coordination with
Transport	400 Times	4	1,600	Vaccination Prog.
Testing	400 Times	5	2,000	
Slaughter	400 Times	4	1,600	
Compensation	200 Cattle	300	60,000	cattle
	200 Goats	75	15,000	goats
Sub-Total			100,200	----①
Specialist	1 man	12,000	12,000	
Assistant	2 men	5,000	10,000	
Vehicle	1 Car	650	650	
Sub-Total			22,650	----②
Vehicle	1 Car	6,500	6,500	Investment
(①+②)x10year			1,228,500	
Total			1,235,000	

Table 6.3.18 Recurrent Budget Regarding "Animal Health and Disease Control Project"

New Quarantines
Operation Cost

Item	Amount	Unit Price	Cost	Remark
Facilities	1920000	%	0.01	19,200 Maintenance
Vehicles	11 Cars	500	5,500	
Running (Staff)	1920000	%	0.05	96,000
Doctor	17 Men	6912	117,504	
Assistant	7 Men	2808	19,656	
Nurse	17 Men	2376	40,392	=Clerk
Total			298,252	

Source: JICA estimation on basis of MAF information

New
Animal Clinic Operating Cost

Item	Amount	Unit P	Cost	Remark
Maintenance	960,000	%	0.01	9,600
Running (Staff)	960,000	%	0.05	48,000
Vehicles	19 Cars	650	12,350	
Doctor	21 Men	6,912	145,152	
Assistant	46 Men	2,808	129,168	
Nurse	56 Men	2,376	133,056	
Total			477,326	

Table 6.3.18 Recurrent Budget Regarding "Animal Health and Disease Control Project" (continued)

Civil Development plan Operating Cost

Item	Character	Amount	Unit	Unit Price	Cost	Remark
Doctor	6.1	2	Men	9,744	19,488	
Doctor	2.2	4	Men	6,912	27,648	
Engineer	3.2	1	Men	5,700	5,700	
Technician	4.2	9	Men	3,372	30,348	
Assistant	5.2	10	Men	2,808	28,080	
Attendant	5.3	7	Men	1,776	12,432	
Building		163,000	R.0%	0.01	1,630	
Equipment		123,000	R.0%	0.05	6,150	
Electricity		12	Month	300	3,600	
Material		1	Set	10,000	10,000	
Training		1	Set	10,000	10,000	
Total					155,076	

Salalah Laboratory Development plan Operating Cost

Item	Character	Amount	Unit	Unit Price	Cost	Remark
Doctor	6.1	2	Men	9,744	19,488	
Doctor	2.2	2	Men	6,912	13,824	
Engineer	3.2	1	Men	5,700	5,700	
Technician	4.2	4	Men	3,372	13,488	
Assistant	5.2	6	Men	2,808	16,848	
Attendant	5.3	5	Men	1,776	8,880	
Clerk	2.5	2	Men	2,808	5,616	
Building		170,000	R.0%	0.01	1,700	
Equipment		103,000	R.0%	0.05	5,150	
Electricity		12	Month	300	3,600	
Material		1	Set	10,000	10,000	
Training		1	Set	10,000	10,000	
Total					114,294	

Table 6.3.19 Cost Estimation of NLE-1-1:
Extension Method Improvement

Item	Quantity	Unit	Unit Price	Cost	Remark
Extension Equipment					
Hoof Cutter	50	Set	10	500	
Dehorner	50	Set	12	600	
Scissors	50	Set	12	600	
Cutting Machine	50	Set	200	10,000	For Grass
Shearers	50	Set	15	750	
Scale	7	Set	500	3,500	Portable
Ear tag	50,000	Set	0.2	10,000	
Applicator	50	Set	5	250	For Ear tag
Sprayer	50	Set	30	1,500	
Brush	500	Set	1	500	
Rake	500	Set	6	3,000	
Spade	500	Set	6	3,000	
Wheelbarrow	50	Set	20	1,000	
Burdizzo	21	Set	10	210	For castration
Weigher	21	Set	70	1,470	Suspended
Milking Machine	7	Set	1,950	13,650	
Subtotal				50,530	
Video unit					
Film Making	10	Set	10,000	100,000	
pamphlet making	10	Set	500	5,000	
Video Film	1,000	Set	5	5,000	
pamphlet	300,000	Paper	0.2	60,000	
Video Machine	Included in Agricultural Sector's Budget				
Subtotal				170,000	
Demonstration Unit					
Poultry	1	Unit	20,000	20,000	Jabel Facilities, Feed,
Camel	1	Unit	20,000	20,000	Nejd Drug, Fuel etc
Bedouin Livestock	1	Unit	20,000	20,000	Nejd
Beef Cattle	1	Unit	20,000	20,000	Nejd
Subtotal				80,000	
Grand Total				300,530	

Table 6.3.20 Cost Estimation of NLE-1-2:

Training Center Development
Training center development plan(Rumais and Salalah)

Item	Character	Amount	Unit	Unit Price	Cost	Remark
(Investment)						
Center Building	Concrete	288	m ²	150	43,200	20 Students
Equipment		1	Set	15,000	15,000	
Vehicle		2	Cars	5,000	10,000	
Mini-Bus		2	Cars	13,000	26,000	
Dormitory	Concrete	400	m ²	180	72,000	Including Furniture
Subtotal					166,200	
(OP. Cost)						RECURRENT BUDGET
Staff						
Coordinator	2.3	1	man	4,980	4,980	
Clerk	5.2	1	man	2,808	2,808	
Cook	7.2	1	man	1,932	1,932	
Labour	4.3	1	man	1,776	1,776	
Vehicle		2	Cars	500	1,000	30000km/y
Mini-Bus		2	Cars	1,300	2,600	30000km/y
Catering		3,000	Unit	2	6,000	
Allowance		3,000	Unit	3	9,000	
Others		1	Set	3,000	3,000	Electricity etc
Subtotal					33,096	
Total					199,296	

Source : JICA estimate on basis of MAF information

Note: This budget is for one Training Center. Centers' Scale are same in both.

Table 6.3.21 Recurrent Budget Regarding "Livestock Extension Development"

Item	Character	Quantity	Unit	Unit Price	Cost	Remark
(Staff)						
Specialist	2.2	41	men	6,912	283,392	
Extensioner	4.2	40	men	3,372	134,880	
Extensioner Ass.	5.2	120	men	2,808	336,960	
Sub Total					418,272	
(Vehicle)						
Veh. Operation		94	cars	600	56,400	
TOTAL					474,672	

Source : JICA estimate on basis of MAF information.

Note: Recurrent cost is included in above Training Center's budget.

Table 6.3.22 Cost Estimation of NLR-1-1:

Item	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Development of Livestock Research Centers										
Rumais Development	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Quriyat Development	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Salalah Development	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Total	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000
Grand TOTAL										4,500,000

Source: JICA estimation on basis of MAF information

Table 6.3.23 Cost Estimation of NLR-1-2:

Item	Research Centers Management Consultancy				
	1991	1992	1993	1994	1995
Staff Salaries	195,000	195,000	195,000	195,000	195,000
Air Fares	25,000	25,000	25,000	25,000	25,000
Transportation	76,100	31,000	31,000	31,000	76,100
Management/Overheads	48,750	48,750	48,750	48,750	48,750
Utilities/Services	23,000	23,000	23,000	23,000	23,000
Accomodation	65,000	65,000	65,000	65,000	65,000
Specialists Visit	4,200	4,200	4,200	4,200	4,200
TOTAL	437,050	391,950	391,950	391,950	437,050
Grand TOTAL					2,049,950

Source: Based on University of Duham. Center for Overseas Research and Development MAF information

Figure 6.3.3 Structure of Livestock Research Centers

Ramais Research Center
Staff Structure

Project Co-ordinator (1)
(Animal Production Research Specialist)

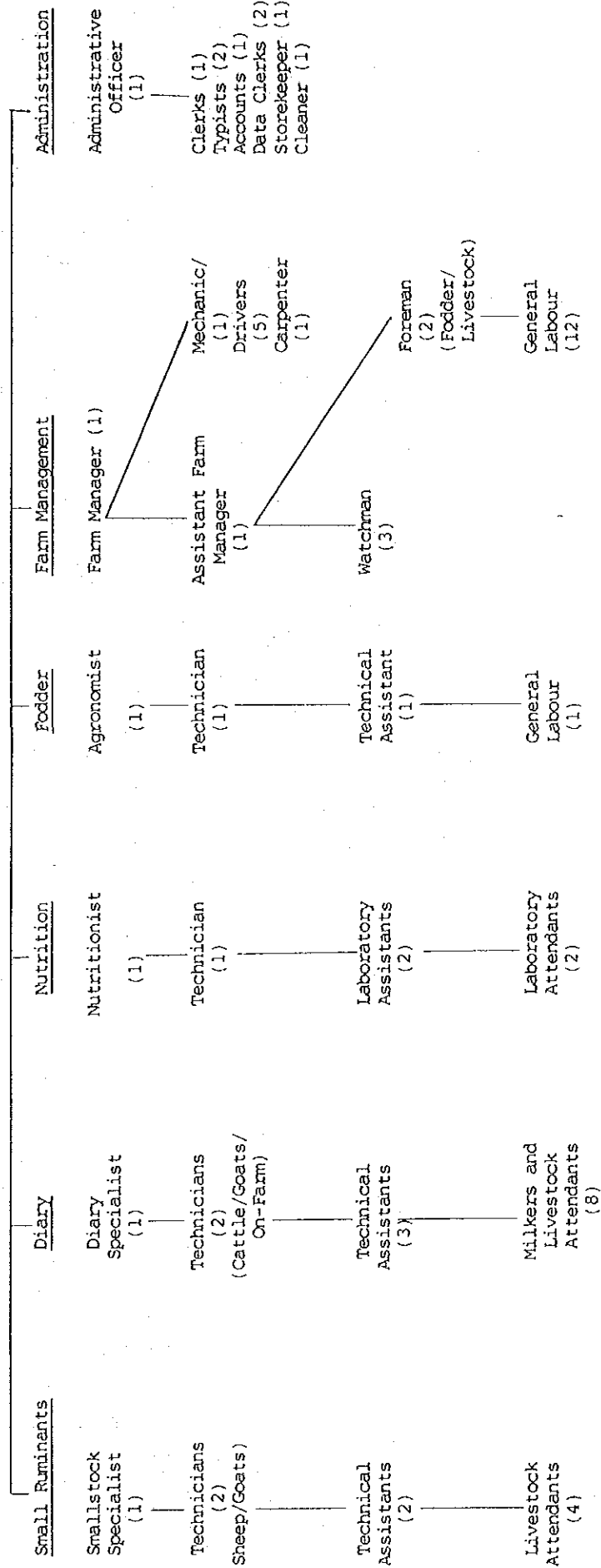


Figure 6.3.3 Structure of Livestock Research Centers (continued)

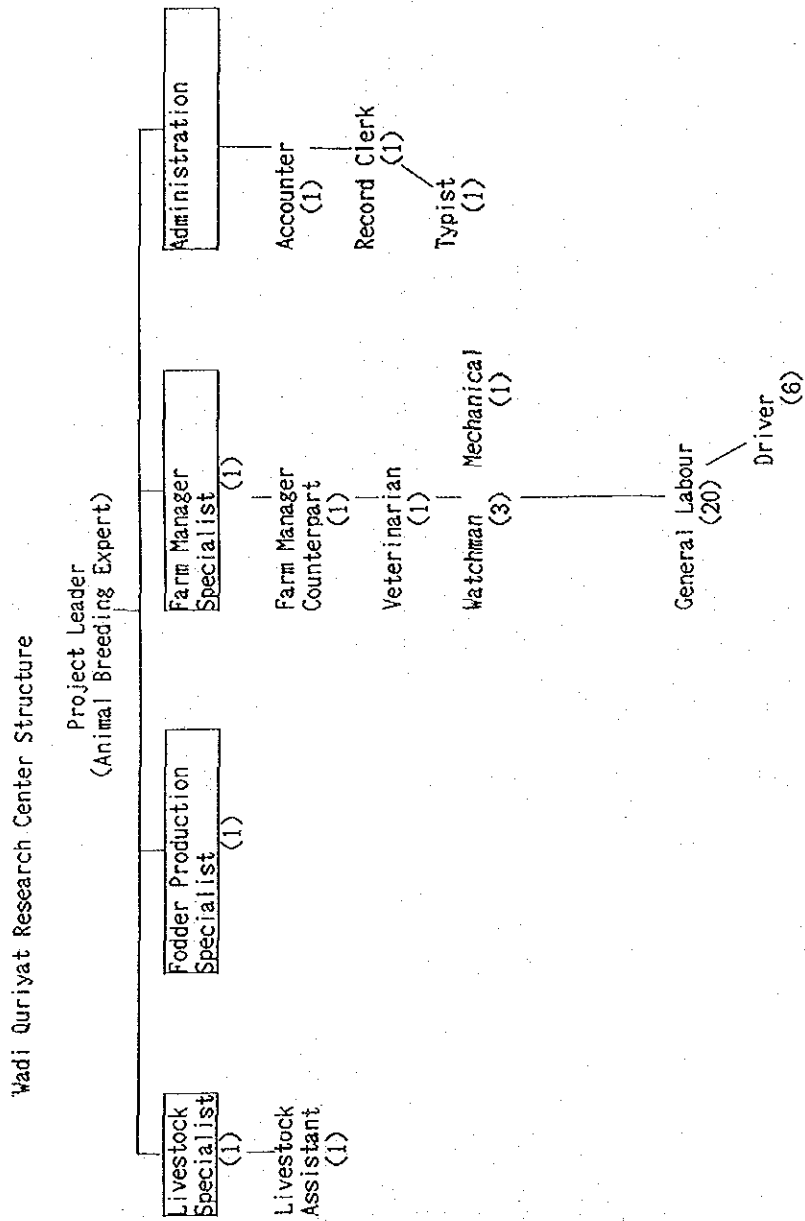


Figure 6.3.3 Structure of Livestock Research Centers (continued)

Salalah Research Center

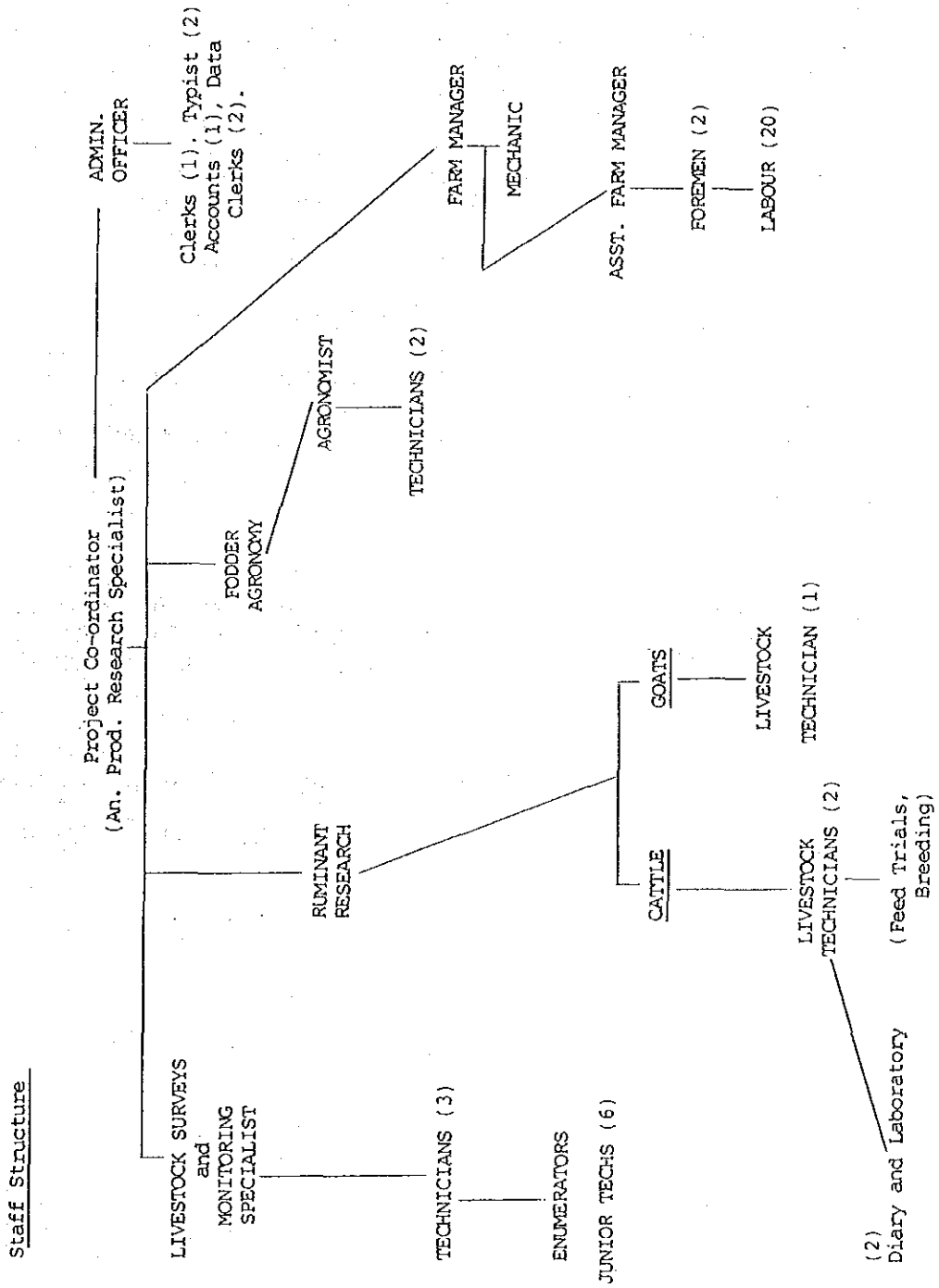


Table 6.3.24 Cost Estimation of NLM-1-1:
Company for Livestock Production

Item	Amount	Unit	Unit Price	Cost	Remark
Office	650	m ²	200	130,000	
Equipment	1	Set	80,000	80,000	
Vehicle	10	Cars	6,500	65,000	
Furniture	1	Set	30,000	30,000	
Parking	1	Set	10,000	10,000	
Store	150	m ²	110	16,500	Investment Total
Infrastructure	1	Set	30,000	30,000	361500
Working Capital	For Loan etc.			2,250,000	Government Responsibility 50%
Subtotal				2,611,500	1305750
(Op. Cost)					
Staff	2	men	10000	20,000	Government
Staff	20	men	5,000	100,000	Responsibility
Expenditure	12	Month	2,000	24,000	50%
Sub total			x5years	720,000	360000
Total				3,331,500	
D/D and Preparation	1	Set	50,000	50,000	Government Responsibility 100%
TOTAL				3,381,500	50000

Source : JICA estimate

Note: This cost shows governmental burden.

Governmental Burden 1715750 R.O.

Table 6.3.25 Cost Estimation of NLM-1-2:

Cattle Fattening

Item	Character	Amount	Unit	Unit Price	Cost	Remark
(Facilities)						Beef Cattle
Pens	Pipe	42,775	m ²	25	1,069,375	Fattening
Sorting pen	Pipe	750	m ²	10	7,500	Governmental Responsibility
Dip		120		7	840	50%
Concentrates Store	Steel	175	m ²	70	12,250	
Vet. Clinic	R.C.	240	m ²	110	26,400	
Hayshed	Pipe	110	m ²	30	3,300	
Office	R.C.	150	m ²	30	4,500	
Parking Shed	Pipe	75	m ²	30	2,250	
Manager's House	R.C.	120	m ²	120	14,400	
Staff Housing	R.C.	120	m ²	120	14,400	
H. for Technicians	R.C.	100	m ²	120	12,000	
Machinery Shed	Pipe	90	m ²	30	2,700	
Workshop, Car Wash	Steel	70	m ²	60	4,200	
Generator Room	Steel	50	m ²	90	4,500	
Water Tank	R.C.	125		60	7,500	
Incinerator Pit		1	Set	250	250	
Weighbridge		1	Set	2,500	2,500	
Guard Room		6	Set	120	720	
Roads		3,000	m	20	60,000	
Fence		2,700	m	7	18,900	
Well		1	Set	17,000	17,000	Facilities-Total
(Machinery)						1,285,485
Tractor 65HP		3	Unit	6,500	19,500	
Tractor 45HP		4	Unit	4,500	18,000	
Feed Mixer Wagon		3	Unit	5,900	17,700	Feed 3.67kg/head. day
Front End Roder		4	Unit	5,500	22,000	
Unloading Trailer		1	Unit	1,700	1,700	
Fuel Tank		1	Unit	600	600	
Fuel Pump		1	Unit	300	300	
Animal Handling Equip.		1	Unit	4,000	4,000	
Tipper Truck		2	Unit	8,000	16,000	
Cattle Truck		2	Unit	10,000	20,000	
4WD-Vehicle		4	Unit	5,000	20,000	
Elec. Generator		1	Unit	2,500	2,500	
Workshop tools		1	Unit	1,000	1,000	
Boratory equipment		1	Unit	500	500	
Spray-race equipment		1	Unit	1,000	1,000	
Weighbridge		1	Unit	3,500	3,500	
Office Furniture		1	Unit	1,000	1,000	
Housing Furniture		1	Unit	6,000	6,000	
Pumping Plant		1	Unit	17,000	17,000	Machinery-Total
TOTAL					1,457,785	172,300
(Staff)						Operation Cost
Manager, Vet.	2.2	2	men	6,912	13,824	
Vet. Assistant	5.2	2	men	2,808	5,616	
Accouter	4.2	1	men	3,372	3,372	
Clerk	6.2	1	men	2,376	2,376	
Driver	5.2	6	men	2,376	14,256	for tractor
Attendant	3.4	8	men	1,776	14,208	
Driver		2	men	1,800	3,600	
Office Boy		1	men	1,200	1,200	
TOTAL					58,452	

Source: Based on Feasibility Study of Animal Projects, Arab Co. 1988

Note : Pilot Project 50,000R.0 and Following Below

Governmental Support=50,000+928,893=978,893

Investment Working Capital and Training

1,457,785 ÷ 2 = 728,893 200,000 Total = 928,893

Table 6.3.26 Trial Calculation of the Profit on Jabal Cattle Feeding

Farm Management Plan(Cattle)		Local 80heads	
Rough Revenue	Amount	Cost	Unit PriceRemark
cull	8.9	1,788	200
Young	15.1	904	60
(Milk)	5.6	678	120
By-product	5,883	1,324	0.225 /L Home consumption=Half
Total		(1,324)	Milk 5883L
<hr/>			
Operating Cost			
Livestock Purchases			
Feed Hay	17.37	1,216	70 Rate of Purchased Feed
Feed Concentrate	29.62	2,369	80 28% on Nutrition Base
Feed Mineral	80	115	1.44
Fertilizer			
Seed			
Pesticide			
Veterinary	80	112	1.4
Market costs		0	
Transport	1562.5	188	0.12
Repairs, Maintenance			
Fuel	1	36	
Depreciation	1	450	450 = 1Cargo Car
Tools	1	20	20
Labour			Working time/day (Hour)
			feeding-observation 7
			cleaning 0
Unallocate cost			
Interest payment			
Taxes, Imports			
Contingencies	5%	225	
Total		4,731	
<hr/>			
Profit		(1,324)	Profit-rate
		-38	-1 %

Note: Herd number shows constant existing total heads
 In this calculation, if ratio of purchased feed was
 28% of total animal feed in this type of management,
 there would be a management deficit.

Table 6.3.27 Cost Estimation of NLM-1-3:

Cut Meat Processing							
Location	Scale	Item	Quantity	Unit	Unit Price	Cost	Remark
Slaughtering	75 heads/day	Facilities*	1	1set	331,800	331,800	1st year
Cut and Pack**		Vehicle	2		5,000	10,000	
		Building	450	m ²	150	67,500	1st year
		Equipment	1	1set	250,000	250,000	2nd Year
Chilled Vehicle		Chilled Room	150	m ²	100,000	100,000	2nd Year
		Labour	2	Cars	25,000	50,000	2nd Year
Training		Labour	30	Persons	500	15,000	2nd Year
Working Capital			1	Set	250,000	250,000	
Total						1,074,300	

Source:* Based on Study for the Viability of Manufacturing Processed Meat :
Sir M.Macdonald and Partners Limited

** Based on 'An Assessment of TheViability of Manufacturing Processed Meat in Oman

Governmental Burden Ratio 50 % = 537,150 R.0

Table 6.3.28 Cost Estimation of NLM-1-4:

Milk Collecting and Processing
COST ESTIMATION (Milk Collecting and Processing Project in South)

Item	Character	Amount	Cost	Remark
(Main plant)				
Building	Concrete		180,000	
Generator Room			120,000	including 3 nos 400kva generator
Pas. Plant			1,046,000	including U.H.T.
Guard Room			5,000	
Pump Room			10,000	including underground tank
Infrastructure			90,000	
Road			35,000	externally
Subtotal			1,486,000	
(Collection C.)				
Equipment			17,000	including generator
Building			15,000	
Infrastructure			7,000	
Subtotal		X7	273,000	
(Institutional Supprot)				
Building		100	12,000	
Equipment			8,000	
Vehicle		2	13,000	
Training Fund			35,000	
Working Capital			234,000	including Project SupportLevies
Subtotal			302,000	
Investment Total			2,061,000	
(Staff)				
Expert	6.1	1		for 4 years
Accounter	4.2	1		Including Above Working Capital
Clerk	4.2	1		

Source: Based on Milk Collection, Processing and Marketing Project in the Southern Region , GRM 1988

Table 6.3.28 Cost Estimation of NLM-1-4: (continued)

Milk Collecting and Processing						
Milk Collecting Project in North						
Item	Character	Amount	Unit	Cost	Remark	
(Collection C.)						
Equipment			1 Set	17,000	including generator	
Building	Concrete		1 Set	15,000		
Infrastructure			1 Set	7,000		
Subtotal		X5		195,000		
(Institutional Support)						
Building		100	m ²	12,000		
Equipment			1 Set	8,000		
Vehicle			1 Set	6,500		
Training Fund				20,000		
Subtotal				46,500		
(Op. Cost)						
Expert	6.1		1 man	9,744		
Assistant	4.2		1 man	3,372		
Expenditure			1 Set	2,400		
Materials			1 Set	1,000		
Subtotal		X5 years		82,580	for 5years	
Total				324,080		

Table 6.3.28 Cost Estimation of NLM-1-4: (continued)

Milk Collecting and Processing
Milk Processing Plant Phasing

Year	1	2	3	4	5	6	Total
Milk Plant in South	50,000	320,640	120,240	1,402,800	160,320	7,000	2,061,000
Milk Plant in North Initial Support		46,500					46,500
Annual Investment		55,516	55,516	55,516	55,516	55,516	277,580
Total	50,000	422,656	175,756	1,458,316	215,836	62,516	2,385,080
Government Burden 50%	25,000	211,328	87,878	729,158	107,918	31,258	1,192,540

Source: Based on Milk Collecting, Processing and Marketing Project in the Southern Region.

Table 6.3.29 Cost Estimation of NLM-1-5:
Hides and Skins Development

Project Year	PROJECT COST					Total
	1	2	3	4	5	
Hides & Skins Authority	101.40	25.04	-	-	-	126.44
Tannery	121.24	22.91	-	-	-	144.14
Collection Centre Credit	6.50	-	-	-	-	6.50
Project Office	136.27	63.62	-	-	-	199.86
Institutional Support	8.58	19.50	-	-	-	28.08
Working Capital	10.40	7.80	11.05	3.25	2.60	35.10
	384.384	138.866	11.05	3.25	2.60	540.124

Source: Based on Feasibility Study for Livestock Related Cottage Industry GRM, 1984

Governmental Burden Ratio 50 % = 270 R.0

Table 6.3.31 Cost Estimation of NLM-1-6:
Cattle De-stocking Subsidy

Buying Price R.O.	L.W.kg 1.00	Selling Price 0.70	Difference 0.30	
Commission			0.10	
			0.40	Total
Average L.W. kg			125	
Buying Cost per Head (R.O)			50.00	
Buying Head per Year			10,000	
Subsidy Total			500,000	

Note: Present estimated number of cattle in Jabal is around 160 thousand, and expected appropriate number will be around 90 thousand in the year 2000. Therefore, in coordination with the public beef cattle fattening project, it would be necessary to reduce around 10 thousand cattle per year for 7 years.

Table 6.3.32 Cost Estimation of NLM-1-7: Marketing Promotion

Marketing Promotion

Item	Character	Amount	Unit	Unit Price	Cost	remark
Table Egg	* Van 3ton	12	cars	10,000	120,000	to PAMAP
Collection	* Van 2ton	12	cars	7,200	86,400	to PAMAP
Birds Collection		10	cars	12,000	120,000	
sub total					326,400	
Advertisement		5	years	15,000	75,000	
Marketing Coordinator		5	men	15,000	75,000	1x5years
Driver		5	men	3,000	15,000	1x5years
Vehicle		1	car	6,500	6,500	
Expenditure		5	years	2,500	12,500	Including
sub total					184,000	Vehicle
	sub totalx50%(Subsidy rate)				92,000	Cost
total					418,400	

Source: * Based on Feasibility Study For Establishment of Poultry Project in Oman, GRM, 1988 and JICA estimation

Table 6.3.33 Cost Estimation of NLL-3:

Livestock Input Company

Item	Government Stock Holders Private Company			Total
	20%	50%	30%	
New Feed Mill	982,520	2,456,300	1,473,780	4,912,600 *
Poultry Breeder Farm	376,400	941,000	564,600	1,882,000 **
TOTAL	1,358,920	3,397,300	2,038,380	6,794,600

Source: *Based on Feasibility Study for Establishment of Animal Feed mills Arab Company for Livestock Development ,1988

**Based on Feasibility Study for Establishment of Poultry Projects GRM ,1988

Table 6.3.34 Cost Estimation of NLL-4-1:

Smallholder Poultry Production

Annual Costs of the Components of the Smallholder Poultry Project

Item	1991		1992		1993		1994		1995		TOTAL Cost
	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	
Poultry Coordinator	1	3512	1	4858	1	4800	1	4944	1	5068	24800
Allowances, air fares etc.	1	8980	3	5980	1	5360	1	5360	1	5360	29800
Poultry Technicians	3	7848	3	8480	3	8712	3	8964	3	9216	43200
Allowances, air fares etc.	3	11412	3	5412	3	5412	3	5412	3	5412	33600
Transport Purchase:											0
Lorries	2	17000	2	17000	2	17000	-	-	-	-	51000
1.5 Pick-ups	6	27000	-	-	-	-	-	-	-	-	27000
Shed Layers	195	341250	195	341250	195	341250	195	341250	195	341250	1706250
Shed Broilers	320	560000	320	560000	320	560000	320	560000	320	560000	2800000
Feed and Water Equipment											0
Broilers: Breeders	RO 20	6400	320	6400	320	6400	320	6400	320	6400	32000
Chick Water	RO 0.5	1600	3200	1600	3200	1600	1600	3200	1600	1600	8000
Chick Feeder	RO 0.5	1600	3200	1600	3200	1600	1600	3200	1600	1600	8000
Adult Water	RO 4.0	5120	1280	5120	1280	5120	1280	5120	1280	5120	25600
Adult Feeder	RO 5.0	9600	1920	9600	1920	9600	1920	9600	1920	9600	48000
Layers: Water	RO 4.0	3120	780	3120	780	3120	780	3120	780	3120	15600
Feeder	RO 5.0	5850	1170	5850	1170	5850	1170	5850	1170	5850	29250
P.O.L. Pullets (000)	RO 3.5	204750	58.5	204750	58.5	204750	58.5	204750	58.5	204750	1023750
D.O. Chicks (000,000)	RO .25	480000	1.92	480000	1.92	480000	1.92	480000	1.92	480000	2400000
sub total		718040		718040		718040		718040		718040	0
Vaccines and Drugs											0
(@RO 20 per shed all sheds)		15340	-	30680	-	48060	-	66440	-	84820	245500
Demonstrations:											0
Labour (inc. allowances)	2	3000	2	3096	2	3192	2	3288	2	3384	15960
Pullets	600	2100	600	2100	600	2100	600	2100	600	2100	10500
D.O. Chicks (000)	12	3000	12	3000	12	3000	12	3000	12	3000	15000
Feed, Drugs, Equip. & Running Expenses	-	7000	-	7000	-	7000	-	7000	-	7000	35000
Training:											0
RO 12.00 per man day:	900	10800	900	10900	900	10900	900	10900	900	10900	54000
Training Bursaries	1	5000	2	10000	2	10000	2	10000	2	10000	45000
Running Expenses:											0
Lorry Drivers (inc. allowances)	4	7502	6	11404	6	11824	6	12136	6	12456	55852
Lorries running @ RO 1800 per yr.	4	7200	6	10800	6	10800	6	10800	6	10800	50400
Pick-ups running @ RO 600 per yr.	8	4800	8	4800	8	4800	8	4800	8	4800	24000
ANNUAL TOTALS		1761194		1753318		1772150		1774334		1795528	8655502

Source: JICA estimation on basis of MAF's information

Table 6.3.35 Cost Estimation of NLL-4-2:

Intensive Livestock Production

Item	Character	Amount	Unit	Unit Price	Cost	Remark
(A) Goat						
Sheep	Shed	80.0	m ²	31.25	2,500.0	
Assumed herds	Seed	4.5	kg	5.0	22.5	
40	Irrigation	0.8	ha	2,000.0	1,600.0	
	Machine	1.0	Set	100.0	100.0	(Subsidy rate 50%)
	Subsidy				4,222.5	Grass Cutting
					x300	
Sub-Total					1,266,750	
Cattle						
(B) Cow	Shed	60.0	m ²	31.25	1,875.0	
average herds	Seed	7.5	kg	5.0	37.5	
10	Irrigation	0.8	ha	2,000.0	1,600.0	
	Equipment	1.0	Set	350.0	350.0	Milking Machine
	Machine	1.0	Set	100.0	100.0	Grass Cutting
	Subsidy				3,962.5	
					x50	
Sub-Total					198,125.0	
(C) Beef Cattle	Shed	160.0	m ²	25.0	4,000.0	
40	Seed	7.8	kg	5.0	39.0	
	Irrigation	0.8	ha	2,000.0	1,600.0	
	Machine	1.0	Set	200.0	200.0	Grass Cutting
	Subsidy				5,839.0	
					x40	
Sub-Total					233,560.0	
(A)x10years					12,667,500	
(B)x10years					1,981,250	
(C)x10years					2,335,600	
Total					16,984,350	

Source : JICA estimate : Unit Price of Machine is 50% Subsidized

Note : This subsidy covers 10% of goats and sheep, 30% of beef cattle, and 75% of dairy cows in Oman. (Except Jabal)

Table 6.3.36 Trial Calculation Regarding "Subsidy"

(Small Farm Development Support Project)
Farm Management Plan (Goats Intensive 40Heads)

In this section, some trial calculations are done in order to estimate the effectiveness of the "Subsidy".

The table below calculates the profit of farmers who accept various government support.

Case: Loan (12%, 9%, 2%interest) Subsidy: (30%, 50%, This plan)

Profit -----See below Table

Type	Contents	Profit	Repayment	Net Profit
12%interest	Rate/Year	904	635	269
9%interest		904	536	368
2%interest		904	336	568
30%subsidy	Remainder 2%interest	904	235	669
50%subsidy	Remainder 2%interest	904	168	736
Planned	Remainder 2%interest	904	8	896

Investment ----- 4323 R.O

Note: Replacement term is assumed for 15 years
 $\text{Payment rate} = \frac{\text{interest rate}}{1 - (1 + \text{interest rate})^{-n}}$
 $\text{Annual Payment} = \text{Investment} \times \text{Payment rate}$
 "n" shows interest rate

Table 6.3.37 Cost Estimation of NLL-4-3:

A.I. Services for Dairy Cows
 COST ESTIMATION (A.I. Nizwa , Salalah)

Item	Character	Amount	Unit	Unit Price	Cost	Remark
(1)Op. Cost (Staff)						
Specialist	2.2	1	man	6,912	6,912	housing, air fares etc
Inseminator	4.2	2	men	4,092	8,184	foreigner
Inseminator	4.2	1	man	3,372	3,372	Omani
Clerk	4.2	1	man	3,372	3,372	
Driver	3.2	1	man	1,932	1,932	
Attendant	4.3	1	man	1,776	1,776	
Running Cost		1	Set	21,000	21,000	from paper of Dept. of Animal Wealth
Expenditure		1	Set	1,000	1,000	drug etc
Sub-Total		Recurrent Budget			47,548	
(2)Investment						
Building		60		120	7,200	
Furniture		1		1,000	1,000	
Equipment		1		2,000	2,000	
Vehicle		2		6,500	13,000	
Training		1		7,000	7,000	
Sub-Total		Development Budget			30,200	
TOTAL					77,748	

Source: JICA estimation on basis of MAF information

Note: This budget is for one A.I. Service Center. Centers' Scale are same in both.

Table b.3.38 Cost Estimation of NLL-5:

Livestock Specialized Services Survey Cost

Population Survey(Census)180days	Amount	Unit	Unit Price	Cost	Remark
Vehicle Transportation	40 Teams		1400	56000	Every5year
Staff Specialist	40 Persons		2850	114000	
Assistant (Driver)	40 Persons		1200	48000	
Housing Accommodation	240 men/mon		300	72000	
Trip Cost (80x6 month)	480 men/mon		150	72000	
Company's Expenditure (Staff costx1.0)				162000	
Sub-Total				524000	Counted in Agriculture Sector
National Disease Survey 60days x10					
Vehicle Transportation	1 Car		1200	1200	
Staff Specialist	1 Person		2000	2000	
Assistant (Driver)	1 Person		600	600	
Accommodation (2x60days)	120 men/day		30	3600	
Trip Cost (2x2 months)	4 men/day		150	600	Allowance
Company's Expenditure(Staff costx1.0)				2600	
Sub-Total				106000	
Computer				5000	
Market Survey 1year					
Vehicle Transportation	3 Cars		2800	8400	
Staff Specialist	5 Person		8550	42750	
Assistant (Driver)	5 Person		2400	12000	
Housing Accommodation	5 men/yea		1500	7500	
Trip Cost (5x12 months)	60 men/mon		300	18000	
Company's Expenditure(Staff costx1.0)				54750	
Sub-Total				143400	
TOTAL				778400	

Study Cost

Item	men-month	Unit Price	x1.25x1	cost
Corral Husbandry Establishment	each			
Marketing Facility Establishment	15	5000	6562.5	98437.5
etc.				
				Every year

6.4 Distribution Sector

[ND-1] Establishment of Wholesale Market

(Combination of NM-1, NM-2 and NM-3 shown in detailed project tables)

Objective:

The objective of this project is to establish a wholesale market which would contribute to the formation of fair wholesale prices and the smooth circulation of agricultural produce, corresponding with the agricultural production increase expected under the 10-year Master Plan.

Description:

The wholesale market has two functions: price determination and physical distribution. In Oman, one of the problems concerning distribution is the fact that the price determination system does not function well enough to reflect the balance of supply and demand. There is no adequate place where producers can sell produce and retailers can purchase required goods at the same time. In order to combine production and consumption in an acceptable manner for both producers and consumers, the establishment of a wholesale market is essential.

Under the project, the wholesale market will be established gradually to avoid confusion in the present distribution structure. In order to achieve a favorable co-existence between public distribution organizations like PAMAP and private traders, it is indispensable for all parties to cooperate together to supplement insufficient functions.

The project's three stages are shown below.

(1) First Stage

In the first stage, necessary studies and preparatory work are conducted to establish the wholesale market. The following are the main activities at this stage:

- Feasibility study on the establishment of a wholesale market
- Study on the expansion of collection and distribution volume handled by PAMAP in which both methods to facilitate the shipment of produce, and policies including subsidies for collecting materials will be examined
- Implementation of distribution volume expansion by PAMAP so that it can maintain fundamental market functions during the first stage of the project
- Training of PAMAP staff for the implementation of the second stage project (pilot wholesale market)

(2) Second Stage

At the second stage, a pilot wholesale market will be established to verify the effectiveness of the wholesale market in Oman. The activities are:

- Operation of pilot wholesale market
A pilot wholesale market will be established in Muscat and Salalah by utilizing the existing facilities in the retail market. PAMAP will direct the functions of the wholesale market on an experimental basis.
- Detailed design of wholesale market
A detailed design of the wholesale market, targeting the most promising site, will be prepared in parallel with operating and appraising the pilot wholesale market.

(3) Third Stage

The final stage consists of the following:

- Construction of a central wholesale market
PAMAP will construct central wholesale markets in large

consumption centers in Oman, namely Muscat (Muttrah and Seeb) and Salalah. The central wholesale market will function as a nationwide distribution center.

- Operation of central wholesale market

The newly constructed market will be operated by PAMAP on the basis of the method developed under the pilot project. PAMAP will provide training guidance and supervision materials to the wholesale traders in order to facilitate physical distribution and price determination.

- Construction of local wholesale markets

The need for local wholesale markets would be studied, and they would be subsequently constructed on a step by step basis as the demand arose.

The factors to be considered when a wholesale market is established are:

(1) Dealing Volume

A realistic and reasonable volume of agricultural produce to be dealt with through the wholesale market should be estimated. The present and forecasted future production volume and dealing volume by PAMAP and the wholesale market are described in Tables 6.4.1-6.4.3.

(2) Organization

The operation functions of organizations concerned with the distribution sector should be clearly demarcated. The future roles of these organizations are suggested in Tables 6.4.4-6.4.5.

(3) Balanced Development

Well-balanced development among regions should be reflected in the selection of local wholesale markets. Table 6.4.6 shows the selection criteria and target locations for establishing wholesale markets. After rough examination, the JICA study team recommends the construction of 8 local wholesale markets in each regional center,

Table 6.4.1 Production Amount

ITEM	1988	1995	2000
	ACTUAL	PROSPECT	
	(1)	(2)	(3)
1. VEGETABLES	133,909	172,950	204,005
2. TUBERS	5,900	19,382	22,754
3. FRUITS	167,442	248,768	286,500
DATES	100,000	126,651	145,020
4. SPICES	5,553	7,934	9,777
5. TOTAL	212,804	322,383	378,016
INCREASE IN PRODUCTION			
	100%	151%	178%

NOTES : ITEMS=1+2+3+4-DATES

SOURCE : JICA TEAM ESTIMATE

Table 6.4.2 Distribution Volume Prospect by PAMAP

ITEM	1988	1995	2000	REMARKS
	ACTUAL	PROSPECT		
	(4)	(5)	(6)	
# ALTERNATIVE-1	17,669	38,686	94,504	*
RATIO FOR				
PAMAP/PROD.	8%	12%	25%	
INCREASE IN PAMAP	100%	219%	535%	
ALTERNATIVE-2	17,669	51,581	124,745	**
RATIO FOR				
PAMAP/PROD.	8%	16%	33%	
INCREASE IN PAMAP	100%	292%	706%	
ALTERNATIVE-3	17,669	80,596	189,008	***
RATIO FOR				
PAMAP/PROD.	8%	25%	50%	
INCREASE IN PAMAP	100%	456%	1070%	
ALTERNATIVE-4	17,669	128,953	283,512	
RATIO FOR				
PAMAP/PROD.	8%	40%	75%	
INCREASE IN PAMAP	100%	730%	1605%	
ALTERNATIVE-5	17,669	161,192	283,512	
RATIO FOR				
PAMAP/PROD.	8%	50%	75%	
INCREASE IN PAMAP	100%	912%	1605%	

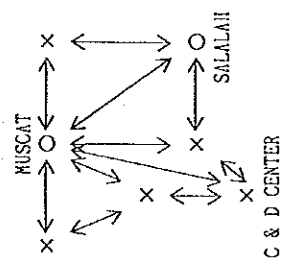
Table 6.4.3 Dealing Volume Prospect in Wholesale Market in 2000

POPULATION NUMBER			
CENTRAL W/M	3 PLACES	612,000	29%
	(MUTTRAU, SEED, SALALAH)		
REGIONAL W/M	4 PLACES	572,000	27%
	(SOHAR, SUR, NIZWA, IBRI)		
(TOTAL POPULATION IN OMAN IN 2000 : 214,6000)			
.....			
RATIO VIA W/M		50 %	67 %
			100 %
.....			
TOTAL DEALING VOLUME IN W/M (TON)			
		94,000	124,000
			18,800
		*	**

Table 6.4.4 Future Role of Organizations Concerned with Distribution

ORGANIZATION	ROLE	PRESENT 1990	INTRODUCTION STAGE 1991-1994	CONSTRUCTION STAGE 1995-2000	OPERATION STAGE 2001-
PUBLIC SECTOR	1. TO PURCHASE AND DISTRIBUTE	○	○ (EXPANSION WITH DECREE)	△	△ (ON CONSIGNMENT OR PURCHASE)
	2. TO SELL	○	○ (EXPANSION WITH DECREE)	△	△ (PILOT PROJECT)
	3. TO PROCESS	○	△ (PILOT PROJECT)	○ (PRODUCE & LIVESTOCK)	○ (PRODUCE & LIVESTOCK)
	4. TO ISSUE IMPORT PERMITS	○	○ (PRODUCE & LIVESTOCK)	○	○ (PRODUCE & LIVESTOCK)
	5. TO SUPERVISE AND SUPPORT W/M OR OPERATE W/M *	○	○ (STUDY, PILOT, ANNOUNCE & TRAIN)	○ (CONSTRUCTION & OPERATE)	○ (AUCTION OR NEGOTIATED MARKET)
	6. TO ASSIST LOW-LEVEL SHIPPING ORGANIZATION	○	○ (PRODUCE & EGGS)	○	○ (PRODUCE & EGGS)
	7. TO IMPLEMENT NATION-WIDE DISTRIBUTION SYSTEM	○	○	○	○
	8. TO PROMOTE BALANCE	○	○	○	○
	9. TO IMPLEMENT PRICING POLICY	○	○	○	○
	10. TO MAKE STRATEGY	○	○	○	○
	11. TO COORDINATE AMONG ORGANIZATIONS CONCERNED	○	○	○	○
	12. TO CONDUCT NUTRITION SURVEY	○	○	○	○
	13. TO CONSTRUCT RETAIL MARKETS	○	○	○	○
	14. TO PURCHASE AND DISTRIBUTE	○	○	○	○
	15. TO SELL	○	○	○	○
	16. TO PROCESS	○	○	○	○
	17. TO IMPORT AND EXPORT	○	○	○	○
	18. TO OPERATE W/M *	○	△	△	△ (AUCTION OR NEGOTIATED MARKET)
PRIVATE SECTOR					

TO PURCHASE AND DISTRIBUTE AT PRESENT
BY PRESENT



OPERATION STAGE
6. TO IMPLEMENT LOW-LEVEL SHIPPING ORGANIZATION
7. TO IMPLEMENT NATION-WIDE DISTRIBUTION SYSTEM
14. TO PURCHASE AND DISTRIBUTE

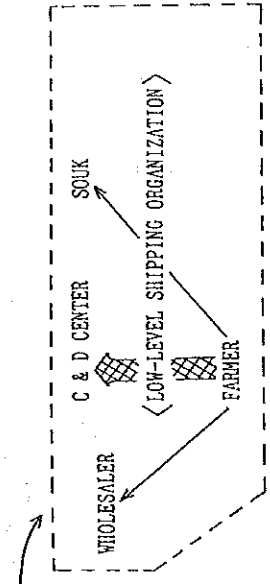


Table 6.4.5 Future Role of PAMAP

ITEM	PRESENT	FUTURE	REMARKS																				
1. DEVELOPMENT TARGET		<p>TO CONNECT PRODUCTION AND CONSUMPTION IN A WAY ACCEPTABLE TO BOTH PRODUCERS AND CONSUMERS</p> <p>TARGET FIGURE</p> <table border="1"> <tr> <td>YEAR</td> <td>1988</td> <td>1955</td> <td>2000</td> </tr> <tr> <td>PRODUCTION AMOUNT</td> <td>212804</td> <td>322383</td> <td>378016</td> </tr> <tr> <td>DISTRIBUTION VOLUME IN PAMAP</td> <td>17669</td> <td>38686</td> <td>94504</td> </tr> <tr> <td>SHARE OF PAMAP</td> <td>8%</td> <td>12%</td> <td>25%</td> </tr> <tr> <td>INCREASE IN PAMAP</td> <td>100%</td> <td>219%</td> <td>535%</td> </tr> </table>	YEAR	1988	1955	2000	PRODUCTION AMOUNT	212804	322383	378016	DISTRIBUTION VOLUME IN PAMAP	17669	38686	94504	SHARE OF PAMAP	8%	12%	25%	INCREASE IN PAMAP	100%	219%	535%	
YEAR	1988	1955	2000																				
PRODUCTION AMOUNT	212804	322383	378016																				
DISTRIBUTION VOLUME IN PAMAP	17669	38686	94504																				
SHARE OF PAMAP	8%	12%	25%																				
INCREASE IN PAMAP	100%	219%	535%																				
2. OBJECTIVES	<p>1) TO ENCOURAGE THE OMANI FARMERS TO INCREASE THEIR PRODUCTION OF FRUITS, VEGETABLES AND OTHER AGRICULTURAL CROPS BY CREATING A BODY TO MARKET SUCH PRODUCTS</p> <p>2) TO ENSURE THE AVAILABILITY OF SUCH PRODUCTS IN THE LOCAL MARKET, IN THE REQUIRED QUANTITIES AND AT REASONABLE PRICES</p>	<p>1) TO FORM PRICE DETERMINATION AND PHYSICAL DISTRIBUTION THROUGH THE WHOLESale MARKET</p> <p>2) TO PROMOTE WELL-BALANCED SUPPLY AND DEMAND RELATIONSHIPS</p> <p>3) TO PROMOTE DISTRIBUTION EFFICIENCY OF NATION-WIDE DISTRIBUTION SYSTEM</p> <p>4) TO STRENGTHEN FARMER-LEVEL SHIPPING ORGANIZATIONS</p>																					
3. ROLE	<p>1) TO PURCHASE AGRICULTURAL PRODUCE BROUGHT INTO CENTERS BY THE FARMERS AND TO DISTRIBUTE IT TO THE CONSUMER AREA</p> <p>2) TO SELL PRODUCE THROUGH EACH CENTER</p> <p>3) MANAGE AGRICULTURAL PROCESSING FACILITIES</p> <p>4) TO ISSUE IMPORT PERMITS FOR AGRICULTURAL PRODUCE TO TRADERS</p>	<p>1) TO PURCHASE AGRICULTURAL PRODUCE AND EGGS BROUGHT INTO CENTERS BY FARMER-LEVEL SHIPPING ORGANIZATIONS AND FARMERS ON CONSIGNMENT OR PURCHASING BASIS AND TO DISTRIBUTE IT TO MUSCAT AND SALALAH AS MAIN CONSUMER AREAS THROUGH NATION-WIDE DISTRIBUTION SYSTEM</p> <p>2) TO MANAGE PILOT AGRICULTURAL PROCESSING PROJECTS</p> <p>3) TO ISSUE IMPORT PERMITS FOR AGRICULTURAL PRODUCE AND LIVESTOCK TO TRADERS ACCORDING TO PROSPECTS FOR DEMAND AND SUPPLY</p> <p>4) TO SUPERVISE AND SUPPORT THE WHOLESale MARKET OR OPERATE THE WHOLESale MARKET WHICH CONTRIBUTES TO THE FORMATION OF PRICE DETERMINATION AND PHYSICAL DISTRIBUTION</p> <p>5) TO FORM, TRAIN AND ASSIST FARMER-LEVEL SHIPPING ORGANIZATIONS</p> <p>6) TO PROMOTE WELL-BALANCED SUPPLY AND DEMAND RELATIONSHIP THROUGH VARIOUS COUNTERMEASURES</p> <p>7) TO IMPLEMENT PRICING POLICY FOR AGRICULTURAL PRODUCE</p>																					

Table 6.4.6 Target Region for Wholesale Market and Farmer-Level Shipping Organizations

NO	WILAYAT	REGION	NUMBER OF HOLDINGS	AREA UNDER CULTIVATION (ha.)		POPULATION		REGIONAL CENTER	PAMP. C&D CENTER PLACE	PURCHASE (TON) IN 1989	CENTRAL WHOLESALE MARKET (POPULATION 1988-2010)	REGIONAL WHOLESALE MARKET (POPULATION 1988-2010)	LOW-LEVEL SHIPPING ORGANIZATIONS
				(78-79)	(78-79)	1988	2010						
1	SEEB & MUSCAT	MUSCAT	1,694	24 18	1,314	34 10		MUSCAT	CAPITA AREA QURLIYAT	1,784	4 MUTTRAH (176,000-249,000)		
2	QURLIYAT	MUSCAT	2,244	34 12	801	24 18				84 14	SEEK (124,000-174,000)		
3	MUSCAT TOTAL		3,938	52	2,115	52					43,000	21	
4	RAJI MAWIL	BATINAH	-	02 43	-	02 43					30,000	18	
5	AL AHABI	BATINAH	688	14 36	284	14 36					13,000	31	
6	GARQA	BATINAH	2,398	32 8	2,000	52 7			GARQA	377 9			BARQA
7	MACHAL	BATINAH	1,386	22 21	498	14 23							
8	AL MUSANNA	BATINAH	1,430	24 20	1,406	32 9			KHABURA	938 6			AL MUSANNA
9	AL SUWAIQ	BATINAH	2,420	32 7	2,768	72 3			SUWAIQ	2,195 2			AL SUWAIQ
10	AL RUSTAQ	BATINAH	4,334	52 3	1,162	32 12			RUSTAQ	171 10			AL RUSTAQ
11	MASIRAH	BATINAH	154	02 42	14	02 42							
12	AL KHABURA	BATINAH	1,892	22 16	1,074	32 14							
13	SANAH	BATINAH	3,095	42 6	2,043	52 6							
14	SOHAR	BATINAH	3,564	42 4	4,424	112 1			SOHAR	2,558 1			SOHAR (84,000-143,000)
15	LIMA	BATINAH	1,298	22 23	1,615	42 8							
16	SHINAS	BATINAH	2,398	32 9	4,117	102 2			SHINAS	1,942 3			SHINAS
17	BATINAH TOTAL		24,970	302	21,416	522							
18	MAJDI BARI KHALI	SHARQIYA	550	12 38	69	02 41							
19	IBRA	SHARQIYA	902	12 29	311	12 35			IBRA	49 16			IBRA (119,000-44,000)
20	ABU HASSAN	SHARQIYA	1,210	12 25	350	12 32							
21	AL QABIL	SHARQIYA	748	12 34	346	12 33							
22	MADI DINA	SHARQIYA	1,958	22 15	365	12 30							
23	KHALI & WAFI	SHARQIYA	924	12 28	548	12 21			KAMIL	219 9			
24	BARI ABU ALI	SHARQIYA	2,268	32 11	355	12 31							
25	SUR	SHARQIYA	1,884	22 17	631	22 20							
26	AL HUDHAYBI	SHARQIYA	3,488	42 5	1,269	32 11			HUDHAYBI	88 13			AL HUDHAYBI
27	SHARQIYA TOTAL		14,696	182	4,705	112							
28	BAHALA	DAKHLIYA	2,068	22 13	1,076	32 13			BAHALA	416 7			
29	NIZWA	DAKHLIYA	2,288	32 10	882	22 15			NIZWA	117 11			NIZWA (59,000-126,000)
30	AL HANRA	DAKHLIYA	968	12 27	665	22 19			SAYO	46 17			
31	MADHA	DAKHLIYA	668	12 35	181	02 37							
32	ADAN	DAKHLIYA	374	02 41	121	02 40							
33	JEBEL AKHDAR	DAKHLIYA	484	12 39	130	02 36							
34	IZKI	DAKHLIYA	1,628	22 19	868	22 16			IZKI	78 15			
35	SAMAIL	DAKHLIYA	2,024	22 14	857	22 17			SAMAIL	39 18			SAMAIL (47,000-88,000)
36	DAKHLIYA TOTAL		11,288	142	5,167	132							
37	DHANK	DHAHIRA	836	12 30	446	12 25							
38	IBRI	DHAHIRA	4,458	52 2	2,481	52 2			IBRI	115 12			IBRI (90,000-175,000)
39	YANBUUL	DHAHIRA	1,078	12 26	376	12 29							
40	BURAIMI	DHAHIRA	1,278	22 24	447	12 25							BURAIMI (33,000-93,000)
41	MADHA	DHAHIRA	748	12 33	438	12 27							
42	DHAHIRA TOTAL		8,428	102	4,169	102							
43	DHOAFAR	JANUBIYA	17,468	212 1	2,414	62 5			SALALAH	1,262 5			SALALAH (133,000-190,000)
44	KHARAB	MUSANDAM	1,342	22 0	2,414	62							
45	AL BIYA	MUSANDAM	638	12 37	312	12 34							
46	BUKHA	MUSANDAM	448	12 48	172	02 38							
47	MUSANDAM TOTAL		2,420	32	1,030	32							
48	GRAND TOTAL		83,204	1032	41,024	1032							

SOURCE : REGIONAL DEVELOPMENT PLAN BY DEVELOPMENT COUNCIL
TABLE 3.3.4 IN PROGRESS REPORT (I) BY JICA TEAM

namely Sohar, Rustaq, Sur, Ibra, Nizwa, Sumair, Ibri, and Buraimi as shown in Table 6.4.7.

The detailed contents of the project are described below:

(1) First Stage

- (a) Feasibility study on establishing a wholesale market (NM-1-1)
- (b) Study on the expansion of collection and distribution volume handled by PAMAP (NM-1-2)
- (c) Implementation of collection and distribution expansion of PAMAP (NM-1-3)
- (d) Training of PAMAP staff for implementation of the pilot project (NM-1-4)

(2) Second Stage

- (a) Consultant support for the operation of the pilot wholesale market (NM-2-1)
- (b) Detailed design on wholesale market establishment (NM-2-2)

(3) Third Stage

- (a) Construction and operation of the central wholesale market (NM-3-1, NM-3-2, NM-3-3)
- (b) Construction and operation of local wholesale markets (NM-3-4, NM-3-5, NM-3-6, NM3-7)
- (c) Training of staff engaged in the operation of wholesale markets (NM-3-8)

Responsibility:

The first and second stage will be done by PAMAP. The government will construct wholesale markets in Muscat and Salalah during the third stage. Also, the government will hire consultants to assist with the supervision of construction. PAMAP will organize an executing body for wholesale markets which will be composed of persons

Table 6.4.7 Establishment of Wholesale Market

REGION	MUSCAT		JANUBIYA		BATINAI		SHARQIYA		DAKILIYA		DIAHIRA		TOTAL
	MUTTRAH	SEEB	SALALAH	SOHAR	RUSTAQ	SUR	IBRA	NIZWA	SAMAIL	IBRI	BURAIMI		
POPULATION	248,000	174,000	190,000	143,000	101,000	128,000	44,000	126,000	88,000	175,000	93,000	1,510,000	
VOLUME PER DAY (TONS)	179	126	137	126	91	91	32	91	64	126	64		
WHOLESALE MARKET													
BUILDING AREA (m ²)	6,185	4,523	4,862	4,523	3,278	3,278	1,334	3,278	2,412	4,523	2,412	40,608	
PARKING AREA (m ²)	7500	5,500	5,750	5,500	4,000	4,000	1,750	4,000	3,000	5,500	3,000	42,000	
SITE (m ²)	30000	22,000	23,000	22,000	16,000	16,000	6,800	16,000	12,000	22,000	12,000	167,800	
CONSTRUCTION YEAR	1,995	1,997	1,997	1,998	2,002	2,000	2,002	2,000	2,002	1,998	2,002		
COST (1000 R.O.)	2,527	1,845	1,979	1,844	1,339	1,339	551	1,339	989	1,844	989	16,585	

from both private and public sectors. The operation will be conducted by both PAMAP and the executing body at the initial stage. After completely achieving a stable level of operation, the whole management authority will be transferred to the executing body. However, the government will continue to subsidize a part of the operation cost through PAMAP.

Timing:

(1) First Stage

- F/S on the wholesale market and study on PAMAP collection and distribution expansion will be conducted in 1991.
- Implementation of PAMAP collection and distribution expansion will come after the study from 1992-1995.
- Training of PAMAP staff for operating the pilot wholesale market will be conducted from 1992-1993.

(2) Second Stage

- The pilot wholesale market will be established in 1992.
- Consultant support for the operation of the pilot project will start in 1993 and be completed in 1996.

(3) Third Stage

- D/D on the central wholesale market at Muttrah and on that of Seeb and Salalah will be conducted in 1994 and 1996, respectively.
- Construction of central wholesale market will follow after the completion of D/D, i.e. Muttrah in 1995 and Seeb and Salalah in 1997.
- Subsidy for the operation of wholesale markets will be granted for three years from the start of operation, i.e. Muttrah from 1996 to 1998 and Seeb and Salalah from 1998 to 2000.
- Construction and operation of the local wholesale markets will start in 1998 during the second half of the 10-year Master Plan, according to priority confirmed by F/S.

- Training of staff engaged in wholesale market operation will start in 1994 and continue for 6 years.

Table 6.4.8 shows the detailed schedule.

Budget:

The outline of cost estimate for the 5-year Agricultural Development Plan is:

- First stage: R.O. 322,000
- Second stage: R.O. 524,000
- Third stage: R.O. 2,810,000

The detailed cost estimate for construction is shown in Table 6.4.9.

Table 6.4.8. Time Schedule of ND-1 Project (5-Year Plan)

DESCRIPTION PROJECT NUMBER	NAME OF PROGRAM/PROJECT	TOTAL BUDGET (RO 1,000)	EXECUTING AGENCY	SCHEDULE				
				1991	1992	1993	1994	1995
ND-1								
NM-1	ESTABLISHMENT OF WHOLESale MARKET (STUDY)	322						
NM-1-1	STUDY ON ESTABLISHING WHOLESale MARKET	218	PAMAP					
NM-1-2	STUDY ON EXPANSION OF DISTRIBUTION VOLUME IN PAMAP	33	PAMAP					
NM-1-3	IMPLEMENTATION ON EXPANSION OF DISTRIBUTION VOLUME IN PAMAP	--	PAMAP					
NM-1-4	TRAINING STAFF OF PAMAP FOR IMPLEMENTATION OF THE PILOT	79	PAMAP					
NM-2	PILOT WHOLESale MARKET	524						
NM-2-1	OPERATION OF PILOT WHOLESale MARKET (SUPPORT BY CONSULTANT)	216	PAMAP					
NM-2-2	DETAIL DESIGN ON WHOLESale MARKET	308	PAMAP					
NM-3	CONSTRUCTION AND OPERATION OF WHOLESale MARKET	2,810						
NM-3-1	CONSTRUCTION OF WHOLESale MARKET PHASE-1 MUTIRAH	2,526	PAMAP					
NM-3-2	CONSTRUCTION OF WHOLESale MARKET (SUPERVISION BY CONSULTANT) PHASE-1 MUTIRAH	126	PAMAP					
NM-3-8	TRAINING STAFF FOR OPERATION OF WHOLESale MARKETS (SUPPORT)	158	PAMAP					
	SUBTOTAL	3,856						

Table 6.4.9 Detailed Cost Estimation of ND-1 Project
(10-Year Plan)

DEMANDS OF FOOD PER CAPITA		kg/year		S/S RATE	
ITEMS	kg/person	kg/year	S/S RATE	kg/year	S/S RATE
TOMATOES	14.8	95.0x	13.9		
ONIONS	9.7	50.0x	4.9		
GARLIC	0.6	100.0x	0.8		
PELONS	13.7	92.0x	12.6		
CABBAGE	11.7	85.0x	9.9		
CUCUMBERS	6.1	95.0x	5.0		
OKRA	0.3	95.0x	0.3		
EGGPLANTS	4.0	95.0x	4.6		
CARROTS	3.1	95.0x	2.9		
RADISHES	0.9	95.0x	0.5		
SQUASH	1.0	95.0x	1.7		
CALIFLOWER	0.9	95.0x	0.9		
OTHERS	30.3	6.7x	2.0		
POTATOES	6.0	100.0x	6.0		
OTHERS	2.8	100.0x	2.8		
DATES	48.2	100.0x	48.2		
LIMES	0.2	100.0x	0.2		
CITRUS	6.5	95.0x	6.2		
BANANAS	8.0	100.0x	8.0		
COCONUTS	0.3	100.0x	0.3		
GRAPES	2.3	95.0x	2.2		
PAPAYAS	0.9	100.0x	0.9		
MANGOES	4.2	76.0x	3.2		
OTHERS	11.6	37.5x	4.4		
TOTAL	205.5		158.0		

RUSTAQ		SALAH REGION	
ITEMS	kg/year	kg/year	S/S RATE
MUTTRAH SEEB	17400	17400	17400
RURAL-1	19000	17400	17400
RURAL-2	12600	17400	17400
RURAL-3	8000	17400	17400
RURAL-4	4400	17400	17400
TOTAL	39800	17400	17400

MUTTRAH SEEB		SALAH CENTRE		RURAL-1		RURAL-2		RURAL-3		RURAL-4		TOTAL
ITEMS	kg/year	kg/year	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION
MUTTRAH SEEB	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-1	19000	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-2	12600	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-3	8000	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-4	4400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
TOTAL	39800	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400

MUTTRAH SEEB		SALAH CENTRE		RURAL-1		RURAL-2		RURAL-3		RURAL-4		TOTAL
ITEMS	kg/year	kg/year	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION
MUTTRAH SEEB	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-1	19000	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-2	12600	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-3	8000	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-4	4400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
TOTAL	39800	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400

MUTTRAH SEEB		SALAH CENTRE		RURAL-1		RURAL-2		RURAL-3		RURAL-4		TOTAL
ITEMS	kg/year	kg/year	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION
MUTTRAH SEEB	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-1	19000	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-2	12600	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-3	8000	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-4	4400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
TOTAL	39800	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400

MUTTRAH SEEB		SALAH CENTRE		RURAL-1		RURAL-2		RURAL-3		RURAL-4		TOTAL
ITEMS	kg/year	kg/year	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION	ESTIMATION
MUTTRAH SEEB	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-1	19000	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-2	12600	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-3	8000	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
RURAL-4	4400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400
TOTAL	39800	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400	17400

Table 6.4.9 (continued)

POPULATIONS	HUTTRAH SEEB	SALALAH RURAL-1	RURAL-2	RURAL-3	RURAL-4	UNIT PRICE	HUTTRAH SEEB COST ESTIMATION (1000RO) (1000RO)	SALALAH CENTRE COST ESTIMATION (1000RO) (1000RO)	RURAL-1 COST ESTIMATION (1000RO) (1000RO)	RURAL-2 COST ESTIMATION (1000RO) (1000RO)	RURAL-3 COST ESTIMATION (1000RO) (1000RO)	RURAL-4 COST ESTIMATION (1000RO) (1000RO)	TOTAL COST ESTIMATION (1000RO) (1000RO)
TOTAL VOLUME PER YEAR (TONS)	248000	174000	174000.0	126000.0	80000.0	40000.0							
VOLUME PER DAY (TONS)	39383.9	27832.3	30173.2	27632.3	20009.6	13974.8	6987.5						
	179.0	125.6	137.2	125.6	91.0	62.5	311.8						
4. DOCK													
RATIO VIA DOCK													
VOLUME VIA W/M PER DAY	10.0												
DEALING VOLUME PER M2	17.9	12.6	13.7	12.6	9.1	6.4	3.2						
SIZE (M2)	0.0825												
PATH (M2)	217.0	152.2	166.2	152.2	110.2	77.0	38.5						
TOTAL (M2)	72.3	50.7	55.4	50.7	36.7	25.7	12.0						
5. PARKING AREA	289.3	203.0	221.7	203.0	147.0	102.7	51.3	0.275	79.6	55.0	61.0	196.3	55.0
									40.4	23.2	14.1	318.2	515.2
6. WAREHOUSE													
RATIO VIA WAREHOUSE													
VOLUME VIA W/M PER DAY	12 %												
KEEPING PERIOD	21.5	15.1	16.5	15.1	10.9	7.6	3.6						
DEALING VOLUME (TONS)	129.9	90.4	98.7	90.4	65.5	45.7	22.9						
DEALING VOLUME PER M2	0.75												
SIZE (M2)	138.1	96.9	105.0	96.9	70.2	49.0	24.5						
PATH (M2)	46.0	32.3	35.3	32.3	23.4	16.3	8.2						
TOTAL (M2)	184.1	129.2	141.1	129.2	93.6	65.3	32.7	0.300	55.2	38.8	42.3	136.3	38.8
									28.1	19.5	9.8	221.4	357.7
7. REFRIGERATOR													
RATIO VIA REFRIGERATOR													
VOLUME VIA W/M PER DAY	8 %												
KEEPING PERIOD	14.3	10.0	11.0	10.0	7.3	5.1	2.5						
DEALING VOLUME (TONS)	95.9	60.3	65.6	60.3	43.7	30.5	15.2						
DEALING VOLUME PER M2	0.75												
SIZE (M2)	128.0	90.4	98.7	90.4	65.5	45.7	22.9						
PATH (M2)	25.0	18.1	19.7	18.1	13.1	9.1	4.6						
TOTAL (M2)	154.7	108.5	119.5	108.5	78.6	54.9	27.4	0.450	69.6	48.0	53.3	171.8	48.0
									95.4	24.7	12.3	279.0	450.7

Table 6.4.9 (continued)

POPULATIONS	MUTTRAH - SEEB	SALALAH	RURAL-1	RURAL-2	RURAL-3	RURAL-4	UNIT PRICE (1000R0/M2)	MUTTRAH - SEEB COST ESTIMATION (1000R0)	SALALAH COST ESTIMATION (1000R0)	RURAL-1 COST ESTIMATION (1000R0)	RURAL-2 COST ESTIMATION (1000R0)	RURAL-3 COST ESTIMATION (1000R0)	RURAL-4 COST ESTIMATION (1000R0)	TOTAL COST ESTIMATION (1000R0)
TOTAL VOLUME PER YEAR (TONS)	248000	174000	190000	174000.0	125000.0	88000.0	44000.0							
VOLUME PER DAY (TONS)	33883.9	27632.3	38173.2	27632.3	20009.6	13374.9	5987.5							
	178.0	125.6	137.2	125.6	91.0	63.5	31.8							
8. STAFF OFFICE														
ANNUAL DEALING VOLUME PER CAPITAL	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0							
NUMBER OF STAFF	19.7	13.0	15.1	13.0	10.0	7.0	3.5							
TOTAL STAFF	25.0	19.0	20.0	19.0	15.0	12.0	9.0							
SIZE OF OFFICE (M2)	500.0	300.0	400.0	300.0	300.0	240.0	180.0							
OTHER OFFICE	150.0	114.0	120.0	114.0	90.0	72.0	54.0							
TOTAL OFFICE (M2)	650.0	494.0	520.0	494.0	390.0	312.0	234.0							
9. OFFICE FOR RELATED COMPANIES														
ANNUAL DEALING VOLUME PER STAFF	250.0	250.0	250.0	250.0	250.0	250.0	250.0							
NUMBER OF STAFF	157.5	110.5	120.7	110.5	86.0	55.9	27.9							
TOTAL STAFF	160.0	110.0	120.0	110.0	80.0	60.0	30.0							
SIZE OF OFFICE (M2)	2400.0	1650.0	1800.0	1650.0	1200.0	900.0	450.0							
10. TRAINING OFFICE (M2)	300.0	300.0	300.0	300.0	200.0	150.0	100.0							
11. OTHER FACILITIES (M2)	300.0	300.0	300.0	300.0	200.0	150.0	100.0							
12. TOTAL AREA FOR BUILDING	6185.4	4622.8	4962.4	4622.8	3278.1	2411.6	1333.8							
13. TOTAL AREA FOR WHOLESALE MARKET (M2)														
AREA FOR BUILDING AND PARKING (M2)	13685.4	10022.8	10612.4	10022.8	7278.1	5411.6	3083.8							
GREEN RESERVE AREA	6432.1	4710.7	4987.8	4710.7	3420.7	2543.5	1449.4							
TOTAL AREA FOR W/M	30175.2	22100.4	23400.4	22100.4	16048.3	11932.7	6799.8							
	30000.0	22000.0	23000.0	22000.0	16000.0	12000.0	6000.0							

SOURCE : JICA TEAM ESTIMATE

[ND-2] Supply and Demand Forecast for Agricultural Produce
(Combination of NM-4, NM-5 and NM-6 shown in detailed project tables)

Objective:

The objective of the project is to study the possibility of providing stable production and planned delivery of agricultural produce by means of establishing a supply and demand forecast system and adjusting the market by either direct or indirect policies.

Description:

Statistical information for adjusting the relationship between demand and supply has not yet been satisfactorily sorted out in Oman, although some data are available. Statistical information which will clarify the present situation regarding production, distribution and consumption is urgently needed. Based on this information, future supply and demand for agricultural produce will be forecasted. Necessary measures should then be taken based on the data analysis and the results of the forecasted supply and demand.

The project is composed of three parts:

(1) Collection of basic data

In order to prepare supply and demand forecasts and the measures for the adjustment of the unbalanced marketing situation, the collection of basic data regarding planted crops, cropped areas, the date for planting and harvesting, volume of distribution and consumption, retail prices and so forth is essential. Consulting services will be provided to determine an efficient method to collect and process such basic data.

(2) Preparation and announcement of supply and demand forecast

The government will prepare a demand forecast of agricultural

produce based on the analysis of both production and consumption trends and will announce the same to farmers through the press, PAMAP, and agricultural institutes like extension centers, to enable the farmers to determine the best times for planting and shipping of produce. Under this project, consulting services will be provided to introduce and establish the method of forecasting. Following this, the forecasting activity will be initiated with support from the consultant for approximately the first 3 years.

(3) Adjustment of supply and demand imbalance

The appropriate measures to adjust supply and demand imbalance will be studied and examined by the project consultants. The following measures are deemed to be effective:

- to determine the specific agricultural produce which is to be supplied on a regular basis and is intended for the supply and demand forecast
- to guarantee a stable profit for the farmers
- to require farmers to follow the adjustment schedule for production and shipment as directed by the government
- to secure incentive funds for the immediate shipping of produce at the time of a marked rise in the price of produce
- to secure price-sustaining funds for adjusting shipments at the time of a marked drop in the price of produce

Responsibility:

PAMAP will conduct all the components of the project. MAF will support the activities of PAMAP.

Timing:

(1) Collection of basic data

- Basic data collection: 1991 (NM-4-1)
- Introduction of equipment to PAMAP for processing basic data: 1992 (NM-4-2)
- Support for data collection and processing: 1992-1994 (NM-4-3)

- Study on preparation for supply and demand forecast: 1991 (NM-4-4)
- (2) Preparation and announcement of supply and demand forecast
 - Study on introduction of pricing policy: 1991 (NM-4-5)
 - Support for supply and demand: 1992-1994 (NM-5)
- (3) Adjustment of supply and demand imbalance
 - Study on the measures to adjust supply and demand imbalance: 1994 (NM-6)

Budget:

The outline of the cost estimate is:

- | | |
|---|--------------|
| - Collection of basic data: | R.O. 240,000 |
| - Preparation and announcement of supply and demand forecast: | R.O. 144,000 |
| - Adjustment of supply and demand imbalance: | R.O. 60,000 |

[ND-3] Establishment of Shipping Organization for Farmers

(Combination of NM-7 and NM-8 shown in detailed project tables)

Objective:

The objective of the project is to assist farmers in establishing a farmer-level shipping organization in order to reduce shipping costs, increase the marketing volume of agricultural produce, and raise farmer's incomes.

Description:

The transportation sector has not yet been well developed due to the relatively limited volume of goods distributed in the Sultanate. As a result, PAMAP or other public organizations are required to collect the produce for the small farmers, or to assist them until farmer shipping groups are organized.

In the project, a method for establishing farmer-level shipping organizations in villages having adequate size and scale is to be studied first, and then to be implemented. The farmer-level shipping organization would have the following functions:

- collecting and shipping (using its own staff) its own agricultural produce to the PAMAP collection and distribution center
- the organization has responsibility for grading and packing of its produce
- for grading, packing, collecting and shipping, the organization will be provided with materials and equipment free of charge by PAMAP
- producing and shipping its produce in accordance with the demand forecast and the directives of PAMAP

The organization should be composed of both farmer representatives and PAMAP staff. The farmer representatives will be elected from the members of the municipal committee formed in each

village or community. The PAMAP staff working for the organization will assist and train farmer representatives in how to collect, handle, grade, pack, transport and in the future, how to deal in the wholesale market. Training for farming and operating farmer-level shipping will be provided by PAMAP at the initial stage. Furthermore, transport vehicles and working capital will be provided to the organization by PAMAP. It should be noted that farmers are responsible for the sale of produce and the operation of the organization regardless of whether or not a profit is made.

The target regions and the number of farmer-level shipping organizations are recommended in Table 6.4.10.

Responsibility:

PAMAP will conduct the project. The responsibility of operation will be transferred to farmers gradually. When self-reliance is established, the farmer representatives will have full responsibility for the operation.

Timing:

The study on the project will be completed in 1992. The equipment (trucks) will be provided between 1993 and 1995 after establishing farmer-level shipping organizations. Consultants are required to support the establishing and operating of the organizations from 1993-1995.

Budget:

- (1) Study on the project (NM-7): R.O. 160,000
- (2) Support for the project (NM-8-1): R.O. 60,000
- (3) Provision of equipment (NM-8-2): R.O. 1,000,000
(100 organizations times R.O. 10,000)
(unit price R.O. 10,000 includes 5 tons truck)

Table 6.4.10 Target Region for Farmer-Level Shipping Organization

NO	WILAYAT	REGION	NUMBER OF HOLDINGS	AREA UNDER CULTIVATION (ha)	AREA UNDER CULTIVATION RANK		POPULATION 1988		POPULATION 2010		REGIONAL CENTER	PAMAP CSD CENTER PLACE	CENTRAL WHOLESALE MARKET (POPULATION 1988 → 2010)	REGIONAL WHOLESALE MARKET (POPULATION 1988 → 2010)	LOW-LEVEL SHIPPING ORGANIZATIONS
					RANK	RANK	RANK	RANK							
5	BARKA	BATINAH	2,398	2,000	54	7	45,000	10	82,000	11	BARKA	377	8	BARKA	
7	AL RUSANNA	BATINAH	1,430	1,400	34	9	34,000	15	65,000	18	KHABUNA	338	6	AL RUSANNA	
8	AL SUHAIQ	BATINAH	2,420	2,760	74	3	91,000	1	94,000	8	SUHAIQ	2,195	2	AL SUHAIQ	
9	AL RUSTAQ	BATINAH	4,334	4,424	114	1	75,000	4	101,000	7	RUSTAQ	171	10	AL RUSTAQ	
13	SOHAR	BATINAH	3,564	4,117	104	2	84,000	3	143,000	2	SOHAR	2,559	1	SOHAR (75,000 → 101,000) -SOHAR (84,000 → 143,000)	
15	SHINAS	BATINAH	2,398	4,117	104	2	84,000	3	143,000	2	SHINAS	1,942	3	SHINAS	
24	AL RUDHAIIBY	SHARQIYA	3,498	1,269	38	11	35,000	14	66,000	14	RUDHAIIBY	88	13	AL RUDHAIIBY	
33	SAMAIL	DAKHLIYA	2,024	857	24	14	41,000	11	80,000	10	SAMAIL	115	12	SAMAIL	
35	IBRI	DMARIYA	4,488	2,481	64	4	90,000	2	175,000	1	IBRI	1,263	5	IBRI	
40	DHOAFAR	JANUBIYA	17,468	2,414	64	5	90,000	2	175,000	1	SALALAH	1,263	5	DHOAFAR	
GRAND TOTAL			40,022	22,097								3 PLACES	612,000	8 PLACES	23,000:572,000 2,005:898,000

GROUND

AREA WITH L.S.O. 40,000 FARMERS
 AREA SHIPPING TO PAMAP 50% 20,000 X 50% (10,000)
 FUTURE AREA SHIPPING TO PAMAP 25% 10,000 X 80% (8,000)
 AREA SHIPPING TO SOUC 25%
 TOTAL NUMBER OF L.S.O. = 100

AREA WITHOUT L.S.O. 43,000 FARMERS
 AREA SHIPPING TO PAMAP 20% 8,600 X 30% (2,700)
 AREA SHIPPING TO SOUC 80%
 TOTAL AREA 83,800 25% 20,700 (20,700)

NOTE : JICA TEAM ESTIMATE
 SOURCE : REGIONAL DEVELOPMENT PLAN BY DEVELOPMENT COUNCIL
 TABLE 3.3.4. IN PROGRESS REPORT (1) BY JICA TEAM

[ND-4] Fortification of PAMAP

(Combination of NM-9 and NM-10 shown in detailed project tables)

Objective:

The objective of the project is to improve and develop the facilities of PAMAP in order to cope with the handling volume increase of agricultural produce in the future.

Description:

PAMAP will continue to play an important role in the nation-wide collection and distribution systems in the future. In addition, the authority will be endowed with new roles to manage central wholesale markets, to supervise local wholesale markets, to foster farmer-level shipping organizations, to implement supply and demand forecasts, etc. From a 10-year perspective, establishing a new sophisticated nation-wide distribution system will be required. In this respect, it is essential to strengthen and reorganize PAMAP and its functions.

As efficient distribution will be achieved through the improvement of handling techniques in collecting, grading, packing, transporting and storing, the improvement of facilities, as well as the enhancement of human capabilities is of prime importance. The details of necessary facilities and functions to be improved or developed in PAMAP are:

(1) Additional cold/dry storage facilities

- Establishment of additional cold storage for potatoes with an approximate capacity of 3,500 tons to be located in Sohar. Grading and packing facilities should be added.
- Dry storage for garlic and onions to be located in Nizwa with a capacity of approximately 1,000 tons and 300 tons for onions and garlic, respectively.
- Establishment of additional cold storage and ripening facilities for bananas at Muscat, as well as facilities for receiving in Salalah to meet the increase in turnover.

- Dry storage for dry limes at Mawaleh with a capacity of 200 tons.
- Increase in cold storage facilities in general, and specifically for Muscat to meet the increase in turnover.
- Long-term cold storage for fresh limes.
- Long-term cold storage for fresh dates.
- Other:
 - Racking for existing and proposed cold storage.
 - Dry storage facilities for frankincense either in Dakhliya or in Mawaleh.

(2) Grading and packing facilities

- Grading and packing unit for papayas in Salalah.
- Grading and packing facilities for coconuts in Salalah.
- Receiving unit for frankincense in Salalah. Grading and packing facilities located either at Salalah or at Mawaleh should be added.
- Grading and packing facilities for other produce.
- Packing materials for local as well as export marketing.

(3) Additional centers, retail outlets and expansion of existing facilities

- Expansion of Shina collection center to meet the increased production of tomatoes.
- Development of Ibra center to meet the requirements of receiving and storage, whether in the receiving or in the cold storage facilities.
- Establishment of various retail outlets in the present collection and distribution center as well as in other markets.
- Establishment of collection points in Nejd, Hailat Araka areas in the Dhofar Region and seasonal collection points in the areas required.
- Expansion and development of Suwaiq banana receiving unit.
- Additional building for head office.
- Expansion of computer facilities.
- Other:
 - Establishment of new collection centers in Khasab, Mehda,

Mussanah, and other areas.

(4) Transportation facilities

- Development of transportation arrangements for selling functions in the various markets where there are no centers or retail outlets.

(5) Others

- Development of exports
 - Quality increase in packing and grading
 - Development of exports of papayas, bananas, etc.
- Promotional activities
 - Development of promotional activities to meet the increase in turnover and to target both local and international markets.
- To make representatives available from the import permit section of various customs points for the inspection of imported produce and the collection of import statistics.
- Development of laboratory in order to offer more services to the authority and also to provide the service to the outside parties for a fee.
- Activity center for training purposes including an audio-visual and production unit.
- Building of a mosque in Muscat head office.
- Sewage treatment plant for re-use of water for irrigation purposes in Muscat.

The recommended nation-wide distribution system is shown in Table 6.4.11.

Responsibility:

PAMAP has full responsibility for the project.

Timing:

- (1) Feasibility study and detailed design on nation-wide distribution

Table 6.4.11 Nation-Wide Distribution System

SYSTEM	PLACE	DESCRIPTION
1. COLD-CHAIN SYSTEM	1. SOHAR	C & D FACILITIES WITH PRECOOLING FACILITIES. FORKLIFT
	2. SHINAS	C & D FACILITIES WITH PRECOOLING FACILITIES. FORKLIFT
	3. SALALAH	C & D FACILITIES WITH PRECOOLING FACILITIES. FORKLIFT
2. RE-ORGANIZATION FOR C & D CENTER	1. HAILLET	COLLECTION UNITS
	2. IBRA	EXPANSION OF CENTER
	3. KHASAB	NEW CENTER
	4. MAWAH	STORAGE FACILITIES
	5. MEHDA	NEW CENTER
	6. MUSCAT	EXPANSION OF CENTER. STORAGE FACILITIES
	7. MUSSANAH	NEW CENTER
	8. NIJD	COLLECTION UNITS
	9. NIZWA	STORAGE FACILITIES
	10. SALALAH	GRADING AND PACKING FACILITIES
	11. SHINAS	EXPANSION OF CENTER
	12. SOHAR	STORAGE FACILITIES
	13. SUWAIQ	EXPANSION OF CENTER

system will be conducted from 1991-1992.

(2) Project implementation will take place from 1993-1995.

Budget:

(1) Feasibility study and detailed design: R.O. 468,000

(2) Project implementation: R.O. 9,609,000

(Detailed cost estimate is shown in Table 6.4.12.)

Table 6.4.12 Detailed Cost Estimates of ND-4 Project

Item	Unit	Volume	Unit Price (R.O. 1,000)	Amount (R.O.)	Region
1. Additional Cold/Dry Storage Facilities					
1) Cold storage for potato	set	1	900	900	Batinah
2) Dry storage for garlic and onion	set	1	250	250	Dakhliya
3) Cold storage and ripening facilities for banana	set	1	2,200	2,200	Muscat & South
4) Dry storage for dry lime	set	1	160	160	South
5) Increase cold storage in Muscat	set	1	900	900	Muscat
6) Long term cold storage for fresh lime	set	1	1,500	1,500	All Oman
7) Long term cold storage for fresh dates	set	1	1,500	1,500	All Oman
Subtotal				7,418	
2. Grading & Packaging Facilities					
1) Papaya	set	1	80	80	South
2) Coconut	set	1	80	80	South
3) Frankincense	set	1	95	95	South
4) Other produces	set	1	80	80	All Oman
5) Packing materials	set	1	100	100	All Oman
Subtotal				435	
3. Additional Centers/Retail Outlets					
1) Shina collection center	set	1	60	60	Batinah
2) Ibra center	set	1	300	300	Sharqiya
3) Retail outlets	set	1	180	180	All Oman
4) Collection points in Dhofar	set	1	20	20	South
5) Head office	set	1	19	19	Muscat
6) Computer facilities	set	1	120	120	Muscat
Subtotal				699	
4. Transport Facilities					
set		1	350	350	All Oman
5. Others					
1) Development of export	set	1	100	100	All Oman
2) Promotional activities	set	1	25	25	All Oman
3) Import inspection & statistics	set	1	25	25	All Oman
4) Laboratory development	set	1	175	175	All Oman
5) Training center	set	1	300	300	All Oman
6) Building of mosque	set	1	40	40	Muscat
7) Sewage treatment plant	set	1	50	50	Muscat
Subtotal				715	
6. Grand Total					
				9,609	

<Appendix for section 6.4>

The following are appendix tables and figures prepared for better understanding of the new projects in the distribution sector. The list of tables and figures is shown below:

- (1) JICA team's estimate of the incremental recurrent budget required for new projects

Table 6.4.13 Recurrent Budget Total for Distribution Sector -
5-Year Plan

(2) Figures

Figure 6.4.1 PAMAP Organizational Structure in Future

Figure 6.4.2 Location Map of New Projects in Distribution Sector -
5-Year Plan

Table 6.4.13 Recurrent Budget Total for Distribution Sector - 5-Year Plan

PROJECT NUMBER	NAME OF PROJECT/PROGRAM	PRIORITY	RECURRENT TEN YEAR (188880)	ANNUAL RECURRENT ON 4TH PLAN					TOTAL	
				1991	1992	1993	1994	1995		
NM-1	ESTABLISHMENT OF WHOLESALE MARKET (STUDY)	A	250		125	125			250	100%
NM-1-1	STUDY ON ESTABLISHING WHOLESALE MARKET									
NM-1-2	STUDY ON EXPANSION OF DISTRIBUTION VOLUME IN PANAP									
NM-1-3	IMPLEMENTATION ON EXPANSION OF DISTRIBUTION VOLUME IN PANAP									
NM-1-4	TRAINING STAFF OF PANAP FOR IMPLEMENTATION OF THE PILOT									
NM-2	PILOT WHOLESALE MARKET	A								
NM-2-1	OPERATION OF PILOT WHOLESALE MARKET (SUPPORT BY CONSULTANT)		428		107	107	107		321	75%
NM-2-2	DETAIL DESIGN ON WHOLESALE MARKET									
NM-3	CONSTRUCTION AND OPERATION OF WHOLESALE MARKET	A								
NM-3-1	CONSTRUCTION OF WHOLESALE MARKET		875				125	125	250	29%
	PHASE-1 HUTTRAH									
	PHASE-2 SEEB									
	SALALAH									
NM-3-2	CONSTRUCTION OF WHOLESALE MARKET (SUPERVISION BY CONSULTANT)									
	PHASE-1 HUTTRAH									
	PHASE-2 SEEB									
	SALALAH									
NM-3-3	SUBSIDY FOR REMUNERATION OF OPERATION IN WHOLESALE MARKET									
	PHASE-1 HUTTRAH		3951						0	0%
	PHASE-2 SEEB									
	SALALAH									
NM-3-4	STUDY & D/D ON LOCAL WHOLESALE MARKET									
NM-3-5	CONSTRUCTION OF LOCAL WHOLESALE MARKET		308						0	0%
	PHASE-1 SOHAR									
	IBRI									
	PHASE-2 SUR									
	NIZWA									
NM-3-6	CONSTRUCTION OF LOCAL WHOLESALE MARKET (SUPERVISION BY CONSULTANT)									
	PHASE-1 SOHAR									
	IBRI									
	PHASE-2 SUR									
	NIZWA									
NM-3-7	SUBSIDY FOR REMUNERATION OF OPERATION IN LOCAL WHOLESALE MARKET									
	PHASE-1 SOHAR									
	IBRI									
NM-3-8	TRAINING STAFF FOR OPERATION OF WHOLESALE MARKETS (SUPPORT)									
NM-4	BASIC DATA COLLECTING PROGRAM	A	414		46	46	46	46	184	44%
NM-4-1	BASIC DATA COLLECTING PROGRAM (STUDY)									
NM-4-2	BASIC DATA COLLECTING PROGRAM (EQUIPMENT)									
NM-4-3	BASIC DATA COLLECTING PROGRAM (SUPPORT BY CONSULTANT)									
NM-4-4	PREPARATION & PUBLICATION OF SUPPLY AND DEMAND FORCAST									
NM-4-5	INTRODUCTION FOR PRICING POLICY (STUDY)									
NM-5	PREPARATION & PUBLICATION OF SUPPLY AND DEMAND FORCAST (SUPPORT)	A								
NM-6	MEASURES FOR ADJUSTMENT OF SUPPLY AND DEMAND (STUDY)	A								
NM-7	ESTABLISHMENT OF SHIPPING ORGANIZATION FOR FARMERS (STUDY)	A								
NM-8	ESTABLISHMENT OF SHIPPING ORGANIZATION FOR FARMERS	A								
NM-8-1	ESTABLISHMENT OF SHIPPING ORGANIZATION FOR FARMERS (SUPPORT)									
NM-8-2	ESTABLISHMENT OF SHIPPING ORGANIZATION FOR FARMERS (EQUIPMENT)									
NM-9	STRENGTH PROGRAM FOR MAIN DISTRIBUTION CHANNELS IN PANAP (STUDY)	A								
NM-9-1	STUDY ON STRENGTH PROGRAM FOR MAIN DISTRIBUTION CHANNELS IN PANAP									
NM-9-2	D/D ON STRENGTH PROGRAM FOR MAIN DISTRIBUTION CHANNELS IN PANAP									
NM-10	STRENGTH PROGRAM FOR MAIN DISTRIBUTION CHANNELS IN PANAP	A	231				77	77	154	67%
NM-10-1	INTRODUCTION OF PRE-COOLING FACILITIES									
NM-10-2	CONSTRUCTION OF 3 NEW AND 10 EXPANSION FOR CENTERS		2155				120	240	360	17%
TOTAL	DEVELOPMENT BUDGET TOTAL		8604	0	171	278	475	595	1519	18%
	(OBAF LOAN)									
	STRENGTH PROGRAM FOR CENTRAL & LOCAL RECIPT AGENT AND WHOLESALER (EQUIPMENT & CAPITAL)									

NOTES : 1) NM-1-3 THIS PROGRAM IS TO BE CONDUCTED BY THE RESULTS LIKE THE RELATIVE PROJECT/PROGRAM AS SHIPPING ORGANIZATIONS FOR FARMERS E.T.C.
2) TABLE 16.4.3 SHOWS THE DETAIL COST ESTIMATION.

SOURCE : JICA TEAM ESTIMATION

FUTURE PAMAP ORGANIZATIONAL STRUCTURE

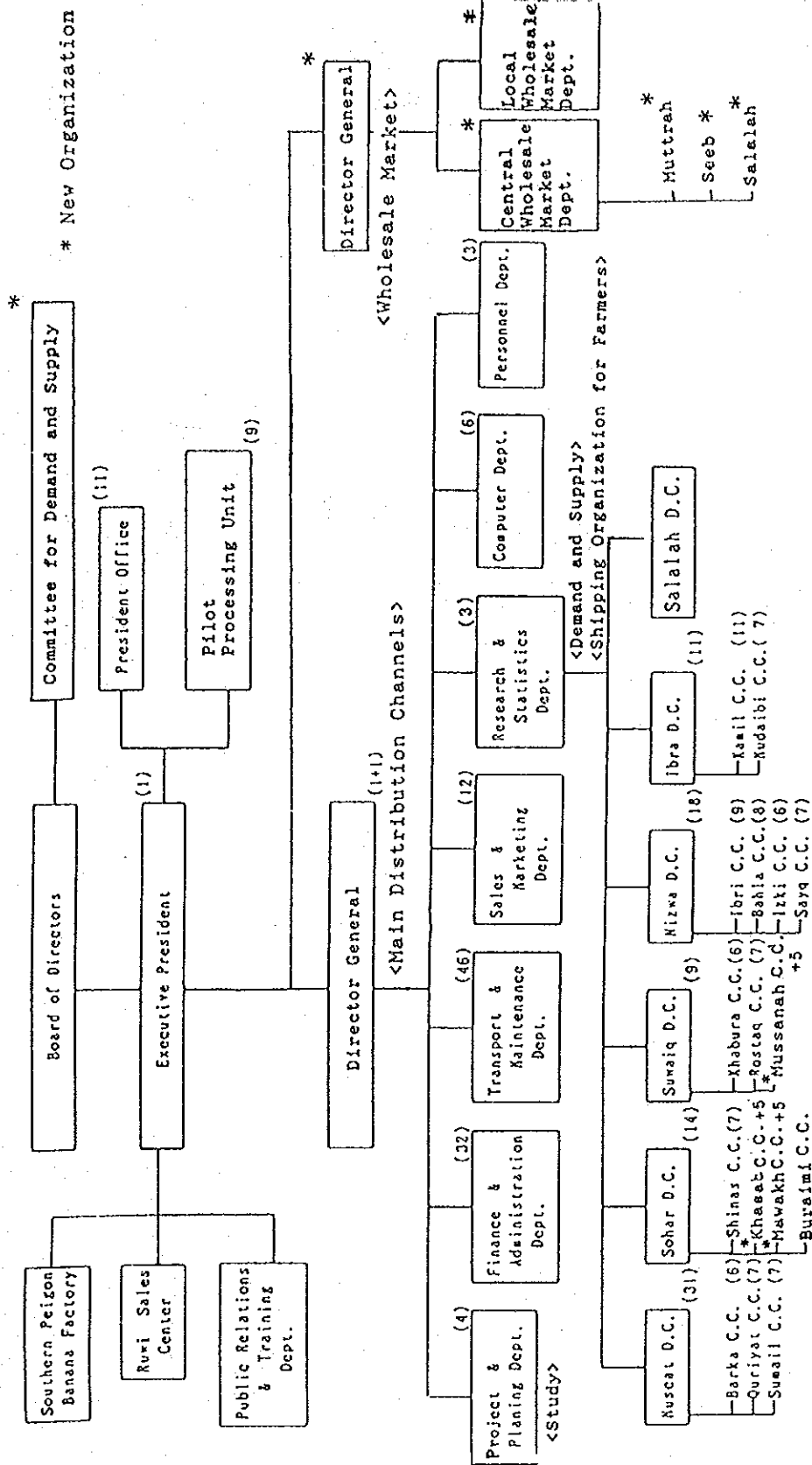


Figure 6.4.1 PAMAP Organizational Structure in Future

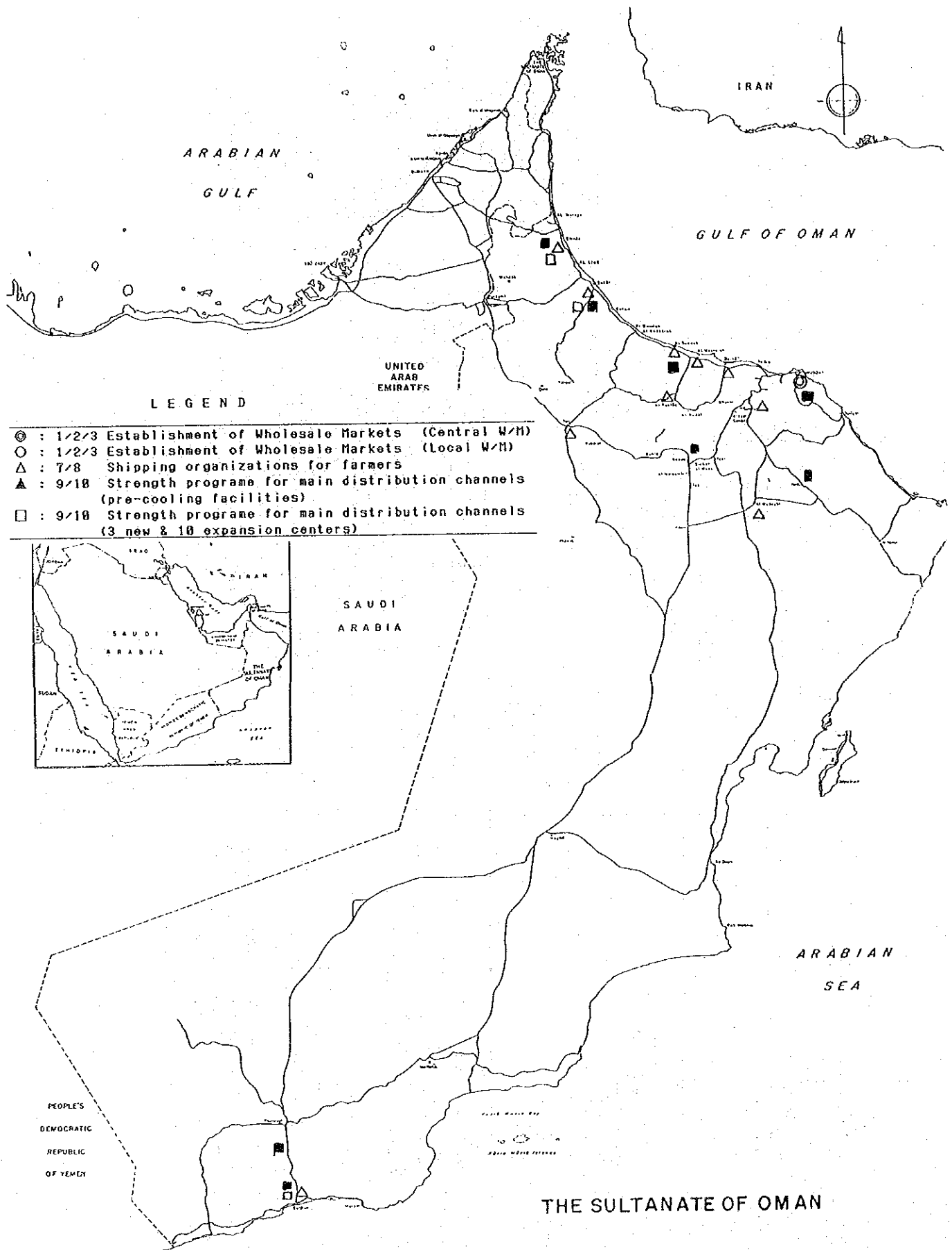


Figure 6.4.2 Location Map of New Projects in Distribution Sector
- 5-Year Plan

6.5 Agricultural Produce Processing Sector

[NP-1] Establishment of Private Company for Agro-Industry and Supply of Agricultural Inputs and Services

Objective:

The objectives of establishing a private company to manage the agro-industry and the supply of agricultural inputs and services to farmers are:

- (1) To provide agricultural inputs such as seed, fertilizer and chemicals to farmers.
- (2) To provide agricultural services such as plowing, aerial spraying and leasing agricultural machinery.
- (3) To improve agricultural land and farm management.
- (4) To raise and fatten animals to produce red meat and dairy products.
- (5) To promote poultry production such as chickens, eggs and white meat.
- (6) To provide animal health services such as vaccination and veterinary services.
- (7) To conduct purchasing, processing and packaging of dates and other crops.
- (8) To distribute crops and animal products which are produced or processed by the company.

Description:

The company will study each activity separately in order to decide on the economic feasibility. Moreover, it will study competitive relationships to other companies in order to promote a healthy private sector in the agriculture industry. It is important to note that agricultural services aimed at helping small farmers should be provided for a certain period by the company.

The company would need a sizable government subsidy in the early stages. In accordance with the goals of MAF to achieve success in

operating the company, it is proposed that the government grants R.O. 3 million to the company in either the form of subsidy.

Responsibility:

The newly established company will be responsible for its own activities. The agencies relevant to the company, including MAF, will support and facilitate its operation.

Timing:

The necessary study to elaborate on the appropriate activities of the company will be conducted in 1991. After evaluating the results of the study, the company will be established in 1992 and required construction works will be done from 1992-1993. The operation will start at the beginning of 1994.

Budget:

The necessary funds for establishing the company are R.O. 10.0 million, of which R.O. 3 million will be provided by the government through a subsidy. The capital of the company will be shared by:

Government	20%
Public share holder	50%
Founder of the Company	30%

The government will commit to purchasing all the shares that are not bought publicly. The government can sell some of its shares to any private company owned by Omani citizens. A rough cost estimate is shown in Table 6.5.1.

Table 6.5.1 Cost Estimation of NP-1 Project (1991-1995)

Item	Unit	Volume	Unit Price	Amount (R.O.)	Government Share
1) Capital	set	1	7,000,000	7,000,000	2,000,000
2) Government Subsidy	set	1	3,000,000	3,000,000	3,000,000
3) F/S and D/D	set	1	100,000	100,000	100,000
Total				10,100,000	5,100,000

[NP-2] Establishment of an Agro-Industrial Complex for Processing of Dates, Limes and Tomatoes

Objective:

This project aims to establish a processing industry for the most promising Omani agricultural produce - dates, limes and tomatoes - in order to diversify the industrial structure and to raise farmers' income levels in the Sultanate.

Description:

This complex is divided into 3 parts: date processing, lime processing and tomato processing within which dates have the priority. According to the 10-year Master Plan, only date plants will be constructed during the first 5 years (1991-1996). The description of the project, therefore, is centered on date plants.

One of the greatest assets that Oman has is its date palm trees. They will continue to be productive after exhaustion of oil resources and they will continue to feed people and animals all year round with a wide variety of nutritious foods and drinks. The JICA team estimated the area covered by dates to be 24,170 ha for 1988 and it should remain the same for 2000 on the premise that little expansion will occur since date cultivation is not profitable. The productivity of the crop, however, will be promoted from 99,097 tons in 1988 to 145,020 tons in 2000 by replacing unproductive trees with new high-yielding varieties, through a government support program.

Since date production exceeds domestic demand at present, the promotion of export should be considered for the future. In order to raise the value added to dates, utilize surplus product efficiently and export it at a higher value, a date-processing industry should be established.

Possible products from a date processing plant are:

(1) Natural products

- fresh whole dates (selecting and packaging)
- fresh pitted dates (selecting and packaging)
- chopped dates (selecting and packaging)
- dried dates (selecting and packaging)
- cold stored Rutab Dates

(2) Semi-processed products

- date syrup
- date paste
- date bars
- date pickles, etc.

(3) Date-based products

- confections and baked goods (biscuits, cakes, sweets, etc.)
- milk-related products (ice cream, yogurt, flavored milk drinks)
- miscellaneous desserts, etc.

(4) Further processed products

- sweeteners (fructose, glucose)
- vinegar
- alcohol, etc.

One method of date processing promotion is to utilize and expand existing date factories and private plants. Existing confectionery companies could cover the date-based confection production like date bars, date chip cookies, date creams, date sugar cookies, etc., although research for further diversification of products is needed. The existing date factories should aim to supply private company needs at a profit.

There are a number of things to study and examine before establishing a new date processing plant, e.g. marketing survey, trend of consumer's preference, and sales potential. Under the 5-year Agricultural Development Plan, the establishment of date processing plants is proposed on the assumption that a detailed feasibility study which will be conducted in the near future will conclude that the

project is viable. Details of the proposed new plant are described below.

A complex which can produce both semi-processed products and date-based products mentioned above is advisable because of its flexibility to correspond to internal and external demand fluctuations. In the present stage without a detailed study, it would be suggested that the plants not be too large, and as an alternative for establishing new plants, governmental assistance for promoting and expanding existing private confectionery factories should be examined.

The two existing government-owned date factories in Nizwa and Rustaq should be components of this complex. Accordingly, the government is to transfer the ownership of these factories to the company to be established which will be responsible for this complex.

The following must be considered before beginning the project are:

- (1) Quantifying the local market is extremely difficult as the data is either outdated or in the process of being assembled. Sufficient marketing research is thus essential.
- (2) Plenty of substitute products for dates are generally found in the market.
- (3) Although a factory must purchase high-yielding, meaty dates that are free of insect infestation and low in waste, such are not readily available in Oman due to low date quality.

Responsibility:

The newly established private company for agro-industry and supply of agricultural inputs and services will be responsible for all the plant activities (refer to NP-1).

Timing:

The feasibility study and detailed design for date processing

plants in 3 sites, namely Nizwa, Rustaq and the capital, will be conducted in 1991. The priority is put on a Nizwa plant followed by Rustaq and the capital in that order. The construction schedule of the plants is:

- Nizwa in 1992
- Rustaq in 1993
- capital in 1994

Budget:

In the same way as NP-1, the capital for establishing plants will be shared by:

Government	20%
Founder	30%
Public share holders	50%

A cost estimate is shown in Table 6.5.2.

Table 6.5.2 Cost Estimation of NP-2 Project (1991-1995)

NP-2 Establishment of Private Company for Agro-Industry and Supply of Agricultural Inputs and Services

Item	Unit	Volume	Unit Price	Amount (R.O.)	Government Share
1) Date Processing Plant					
New Processing Plant					
(1)Nizwa	set	1	2,150,379	2,150,379	430,076
(2)Rustaq	set	1	2,028,148	2,028,148	405,630
(3)Capital	set	1	750,000	750,000	150,000
Subtotal				4,928,527	985,705
2) Consulting Service (F/S, D/D, Supervision)	%	15	4,928,527	739,279	147,856
Total				5,667,806	1,133,561
Rounded Total				5,668,000	1,134,000

[NP-3] Establishment of Pickling and Vinegar-Processing Plant

Objective:

This project aims to promote resource availability by the efficient usage of agricultural product wastage and non-standardized agricultural products, by establishing a pickling plants.

Description:

MAF carried out a pre-feasibility study in 1988 and concluded that around 23,500 tons of vegetables and fruits were wasted due to lack of demand or other reasons. Out of this, around 15,400 tons could be used for pickling in oil and vinegar for which a definite market exists. Conclusions derived from the study suggested the establishment of 12 pickling plants, each with a 250 tons annual capacity in 12 different places, namely:

Phase I Quriat, Samail, Sohar, Khaburah, Barka, Bahla

Phase II Seeb, Shinas, Suwaiq, Izki, Ibra, Salalah

MAF conducted a detailed feasibility study and design of a pilot pickling plant in 1989-1990. The study revealed that a definite market for pickles exists because the average annual import of pickles was around 4,493 tons from 1981-1986. On the basis of apparent demand only, 9 plants of a 500 tons/year capacity will be required to be established. From the results of the study, it is clear that a pilot plant for pickling (500 tons/year) is suitable for the initial stage. Since vinegar would be the major requirement for pickling and also direct market needs, establishing a vinegar production plant has also been examined. In the detailed feasibility study, it was also mentioned that a vinegar plant with a capacity of 350 tons/year is suitable in combination with the pickling plant. Since the vinegar market demand is around 239 tons, additional demand for vinegar will be created if pickling plants are established. Since fruits and vegetables for pickling and vinegar are readily available, establishing a pilot plant is a step in the right direction.

Experimental results show that omsila dates (low-quality dates presently being fed to animals) can economically be utilized for vinegar production.

Two pilot pickling plants including vinegar production lines are suggested to be established during the first 5-year Agricultural Development Plan (1991-1995). One should be constructed in the Rusayl Industrial Estate since the necessary infrastructure is readily available and PAMAP collection and distribution centers are also located in the vicinity. Moreover, the capital area markets will provide a ready outlet for the products. Another pilot pickling plant is suggested to be constructed at Barka. Employment opportunities will be created for 74 personnel at each pickling plant (see Figure 6.5.1).

It should be noted that the financial viability of establishing vinegar plants in Oman on a commercial scale is suspect. It will be essential, therefore, to consider a tariff review for imported vinegar to make such a plant financially viable. The above study concludes that domestic demand of vinegar is not enough to justify large scale commercial operations.

Responsibility:

The private company to be established will manage all the plant activities.

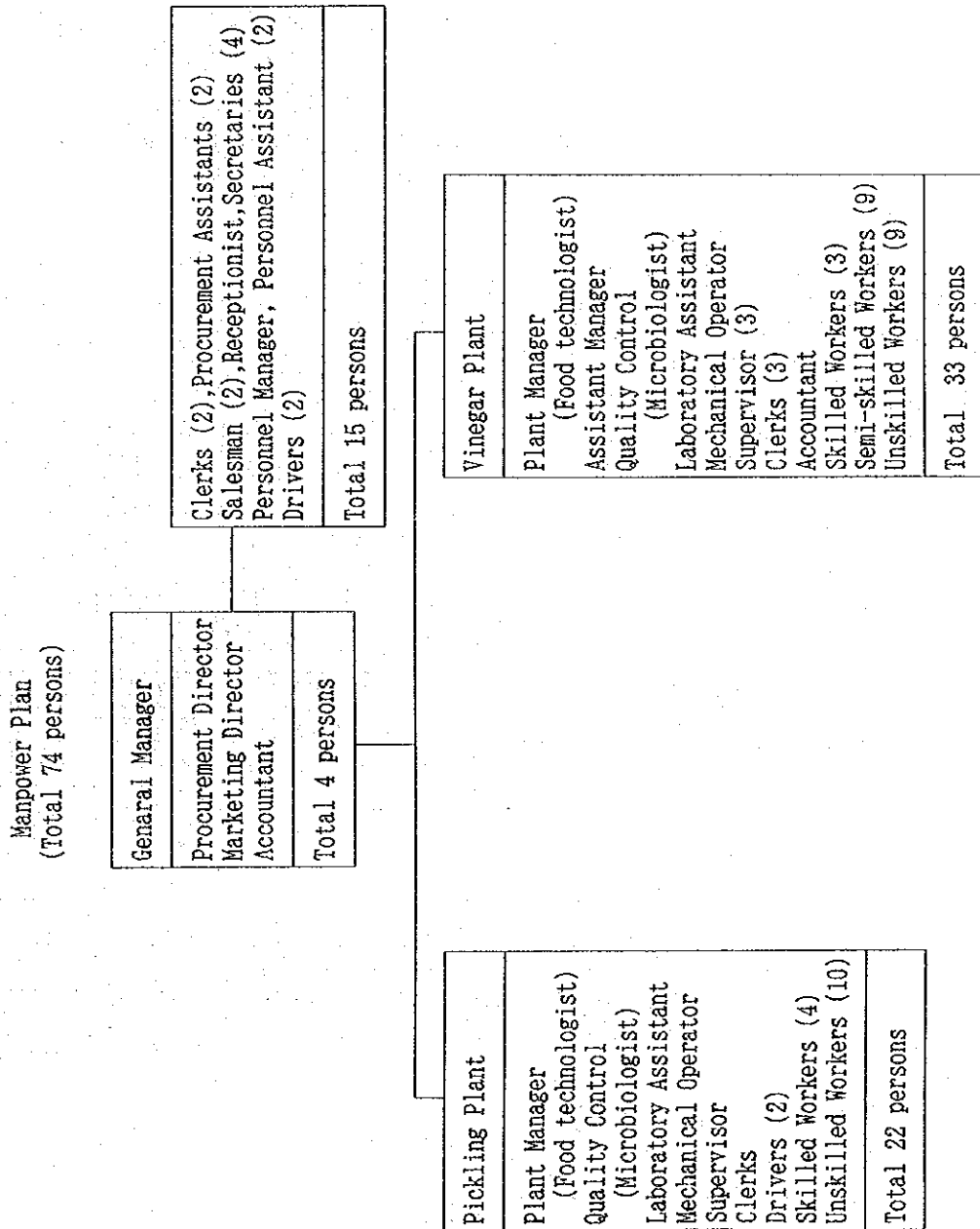
Timing:

After completing a detailed design in 1991, the construction of two pilot pickling plants combined with a vinegar plant will start in 1992. The operation will begin in 1993.

Budget:

Government will be responsible totally for the capital necessary for establishing two pilot pickling plants including vinegar production

Figure 6.5.1 PICKLING AND VINEGAR-PROCESSING PLANT ESTABLISHMENT PROJECT



line.

A cost estimate is shown in Table 6.5.3.

Table 6.5.3 Cost Estimation of NP-3 Project (1991-1995)

NP-3 Establishment of Pickling and Vinegar-Processing Plant

1. Cost Estimation

Item	Unit	Volume	Unit Price	Amount (R.O.)	Government Share
1. Pickling Plant including Vinegar Production Line					
1) Fixed Cost					
Land	set	1	4,225	4,225	
Civil Works, Land Development	set	1	297,000	297,000	
Plant and Machinery	set	1	173,000	173,000	
Duties and Taxes	set	1	8,650	8,650	
Transportation of Machinery	set	1	17,300	17,300	
Utilities Connection	set	1	8,000	8,000	
Erection/Installation	set	1	51,900	51,900	
Financial Charges	set	1	12,604	12,604	
Furniture and Fixture	set	1	10,000	10,000	
Vehicles	set	1	12,000	12,000	
Pre-operating Expenditure	set	1	6,000	6,000	
Contingency	%	10	600,679	60,068	
Subtotal				868,747	668,747
2) Net Initial Working Capital	set	1	146,030	146,030	146,030
Total				806,777	806,777
Rounded Total				807,000	807,000

2. Grand Total

Item	Unit	Volume	Unit Price	Amount (R.O.)	Government Share
1. Pickling Plant including Vinegar Production Line					
Pilot Plant (Capita)	set	1	807,000	807,000	
Pilot Plant (Batinah/Barka)	set	1	807,000	807,000	
Grand Total				1,614,000	1,614,000

3. Financial Analysis

Item	Value
1. Pickling Plant (with Vinegar Production Line)	
Pickles 500tons/year	
Vinegar 4.5% Acidity, 350tons/year	
FIRR (%)	14.30
Payback Period	7 years

[NP-4] Establishment of Coconut-Processing Plant

Objective:

This project aims to diversify crop production and to increase the value added to coconuts in the Southern Region through establishing a processing plant for coconuts which are a promising tree crop in the region.

Description:

Coconuts have been grown in the Salalah area for a considerable period of time. Where palm roots are able to reach the fresh groundwater table, they grow well, but supplementary irrigation is essential to achieve a good yield. The Department of Agricultural Statistics of MAF estimates that the area cultivated for coconuts in 1988 was approximately 328 ha. Up to three-quarters of the coconuts are harvested and sold as green nuts for drinking.

MAF conducted a feasibility study on the establishment of a viable coconut industry in the Salalah plain from 1988-1989. The study indicated that in the near future it should be possible for a processing industry to obtain at least 1 million nuts per year from recently planted trees. However, to ensure reliability of supply for any processing plant, it is considered essential that new trees be planted with the specific objective of providing raw material to the processing plant. In the study, one area along the Salalah coast was selected as the most appropriate place from a number of different areas. 300 ha could be planted here.

The most promising products of the coconut plant would be:

- Ice cream ingredient (for use in the manufacture of dairy ice creams)
- Rubberized coir (for use in the manufacture of mattresses, upholstered furniture and car seats)
- Charcoal (for baking)

By fully utilizing all the components of the whole coconut, this product mix will maximize the value added from the processing.

The proposed ice cream ingredient would form about 25% of the final ice cream product for sale to consumers. The total Omani market for ice cream, of all flavors, is estimated at 2.6 million liters/year, and the GCC market totals 30 million liters. The greatest part of this is manufactured by local dairy product firms. It is recommended that in the first phase of development, the production scale for ice cream ingredient be 400-500 tons/year with a single daily sift operation. This would be equivalent to 1.6-2.0 million liters of ice cream, or 5-6% of the Gulf market. This scale of production would require an input of 1 million coconuts/year.

Rubberized coir would be produced primarily for sale to mattress and upholstery manufacturers in Oman and the Gulf. The minimum viable scale of production of rubberized coir is 800 tons/year, requiring an input of 3 million coconuts. Production at this level is estimated to be equivalent to under 7% of the GCC market of mattress materials.

Charcoal could be produced from the shells of the coconuts which would be a by-product of the other processing plants. Charcoal for cooking purposes is imported to Oman and other GCC countries. The sale of limited quantities which could be manufactured in Oman would present no problems.

The proposed factory is to be an integrated process whereby the whole nut is collected from the farmer or estate and processed into a number of products. Three main products to be made from coconuts are:

- Coconut-flavored ice cream ingredient at 430 tons/year from the meat of coconut
- Coir fiber and rubberized coir at 800 tons/year from the husk
- Charcoal at 390 tons/year from the shell

The plant is expected to require 60,000 kwh of electricity per

year, 10,000 cu.m of water, and 100,000 liters of fuel oil when working at full capacity.

The factory complex will be managed by a central board who will be responsible for group transport, accounts and marketing. The complex is expected to provide 143 jobs ranging from management to labor (see Figure 6.5.2).

The factory will be located near Salalah township.

The proposed planting of 300ha of coconuts to ensure supply for processing could be undertaken as an integral part of the processing plant investment. The FIRR of 300ha of coconut planting, assuming a selling price per coconuts of R.O. 0.175, would be only 4 %. Combining the planting program and the processing plant, the FIRR for the full investment project would be about 7 %.

Responsibility:

A private stock company which will manage all the activities of plants and coconut estates is to be established.

MAF is responsible for the development and operation of the coconut farm.

Timing:

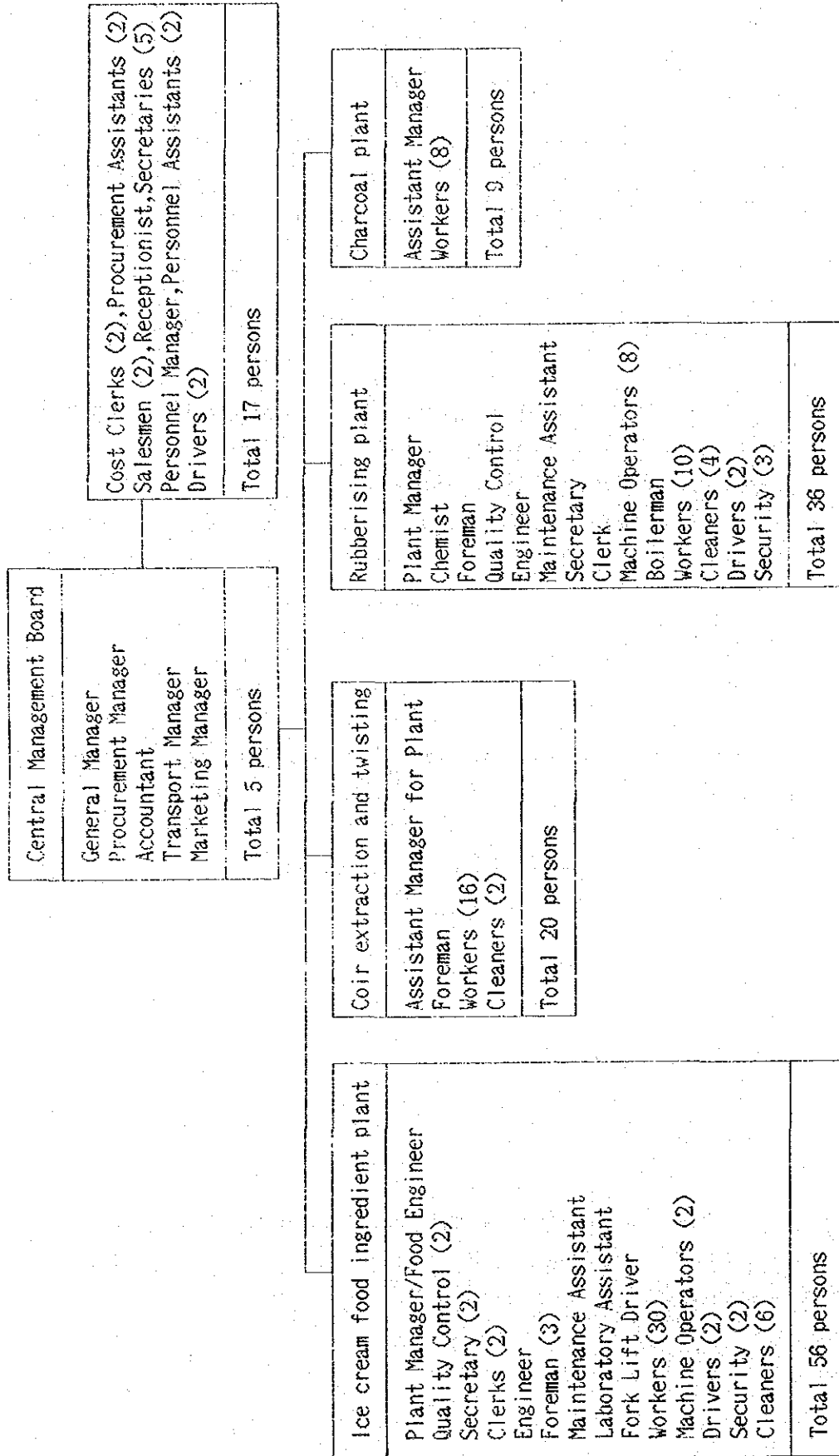
A detailed design will be completed in 1992. Construction of the whole complex takes two years (1993 and 1994). The operation will begin in 1995.

The coconut farm construction should be implemented before the construction of the plant complex in order to stabilize the supply of raw materials. It will be from 1991-1995.

Budget:

Figure 6.5.2 Manpower Plan for Coconut-Processing Plant

Manpower Plan
(Total 143 persons)



The capital of the company will be shared by:

Government	20%
Founder	30%
Public share holders	50%

The government will be responsible for all the shares that are not purchased by the public by providing soft loans of OBAF or ODB. The cost for the development and operation of coconut farm will be borne by MAF. A cost estimate is shown in Table 6.5.4.

Table 6.5.4 Cost Estimation of NP-4 Project (1991-1995)

1. Project Cost

Item	Unit	Volume	Unit Price	Amount (R.O.)	Government Share
1) Civil Works					
Site Preparation	sq.m	25,500	2.5	63,750	
Factory Buildings	sq.m	3,350	110.0	368,500	
Reception/Storage	sq.m	8,000	60.0	480,000	
Offices	sq.m	500	125.0	62,500	
Hard Standing	sq.m	900	17.5	15,750	
Contingency	%	10	990,500	99,050	
Subtotal				1,089,550	217,910
2) Plant & Equipment					
Ice Cream Ingredients	set	1	352,050	352,050	
Coir Extraction	set	1	207,090	207,090	
Coir Rubberizing	set	1	414,180	414,180	
Charcoal	set	1	103,600	103,600	
Primary Tools & Spares	%	5	1,076,920	53,846	
Engineering Design	%	5	1,076,920	53,846	
Contingency	%	10	1,076,920	107,692	
Subtotal				1,292,304	258,461
3) Working Capital					
Imported Raw Materials (3 months)	set	1	38,500	38,500	
Local Raw Materials (1 month)	set	1	49,410	49,410	
Accounts Receivable	set	1	51,010	51,010	
Subtotal				138,920	27,784
4) Consultancy Services (D/D, Supervision)					
		10	1,089,550	108,955	21,791
Grand Total				2,629,729	525,946
Rounded Total				2,630,000	526,000

2. Financial Analysis

Item	Value
1. Production	
Ice Cream Mix	1,300t/year
Rubberized Coir	800t/year
Charcoal	360t/year
2. Financial Analysis	
FIRR (%)	11.53
Payback Period	8 years

Table 6.5.4 (continued)

3. Cost for Development of Coconut Farm

ITEMS	1ST YEAR (1000R.O.)	2ND YEAR (1000R.O.)	3RD YEAR (1000R.O.)	4TH YEAR (1000R.O.)	5TH YEAR (1000R.O.)	TOTAL COST (1000R.O.)
INVESTMENT COST						
1. LABOUR	101	51	51	50	41	294
2. MACHINERY	135	9	9	9	9	171
3. PLANTING MATERIAL	150	8	8	7		173
4. FERTILIZER	4	8	15	30	30	87
5. PESTICIDE	18	2	1	1		22
6. PEST/WEED CONTROL		8	8	7	7	30
7. TOP SOIL/MANURE	330					330
8. IRRIGATION EQUIPMENT	365					365
9. IRRIGATION (PUMPING)	9	19	36	72	73	209
OVERHEADS AND MISC.	278	25	32	44	40	419
TOTAL	1390	130	160	220	200	2100

4. Operation Cost for Coconut Farm

OPERATING COST PER ANNUM

ITEMS	NUMBERS	UNIT PRICE (R.O.)	TOTAL COST (R.O.)
OPERATING COST			
1. LABOUR	300 ha	200	60,000
2. MACHINERY	300 ha	60	18,000
3. FERTILIZER	300 ha	100	30,000
4. PEST/WEED CONTROL	300 ha	25	7,500
5. IRRIGATION (PUMPING)	300 ha	245	73,500
OVERHEADS & MISC.	300 ha	157	47,000
TOTAL			236,000

6.6 Inter-Sectoral Projects

[NI-1] Integrated Agricultural Development Project in Nejd

Objective:

This project aims to increase agricultural production in the Nejd area, where a high potential for underground water development has been confirmed. The project will be implemented by integrating irrigation water development, irrigation facilities construction, extension activities, staff training, groundwater monitoring, and natural condition observation.

Description:

In the Salalah plain, the core city of the South, little room is left for additional large-scale agricultural development because there has been a rapid utilization of land and water resources through population increases and urbanization. In this regard, the agricultural development in Nejd, which has a high potential for large-scale development, is essential for the promotion of agricultural production in Janubiya.

The agricultural development in Nejd started at the beginning of the 1980's with the development of hand-dug and flowing wells by the local people. Major crops cultivated are fodder grass, fruits and vegetables. Besides these small-scale farms, a PDO farm with an area of 100 ha irrigated by the center pivot system was established in 1985 under the directive of H.M. Sultan Qaboos. In the PDO farm, 95% of the total farmland is covered with Rhodes grass.

According to the feasibility study conducted by JICA from 1987-1989, the lower UER (Umm Er Radhuma formation) aquifer bears pressurized groundwater of low level EC (electric conductivity) -- around 1,500 micro mho/cm. The aquifer has a formation range from 270 to 310+ m below ground level. It is notable that the Nejd groundwater is disconnected from the present hydrologic cycle and is believed to

be finite.

Based on the results of the JICA study, the following was pointed out:

- For a development area of 300-500 ha, the life time could be in the order of thousands of years.
- Initial drawdown of underground water level limits the scale of reclamation to 1,000 ha.

In order to optimize the utilization of limited water resources, the following phased development scheme is proposed:

(1) Phase 1

- Establishment of a pilot farm, through which data collection and experimental activities are made.

(2) Phase 2

- Development of up to 500ha based on the results of Phase 1.

(3) Phase 3

- Further development based on the results of Phase 2.

Based on soil conditions, static groundwater levels and socio-economic conditions, the following sites are recommended for agricultural development:

- Nagha area
- Dauka area
- Shasr area

Among them, both the Nagha and Dauka areas are selected as development areas, and the Nagha area is also selected as a pilot farm site.

The outline of the development project is shown below.

(1) Groundwater development and construction of irrigation facilities

Well digging up to 300 m in depth is necessary. Although the target groundwater is strongly pressured, the economical groundwater level is 100 m maximum from the surface. Irrigation facilities connected with wells will be constructed along with roads, windbreaks and houses. The necessary equipment and machinery also will be introduced.

(2) Farm arrangement

The intensive type of farm will be constructed because of its benefit in forming communities, using machinery effectively, and economy of scale in infrastructure development.

(3) Settlement

From the phase 2 development stage, a suitable farming group of local people should be selected to settle in the area to maintain the new developed farm. They will take full responsibility for farm management.

The pilot farm will be constructed prior to full-scale agricultural development. In the pilot farm, there will be an extension office and training unit, as well as production facilities and equipment. The size of the pilot farm is to be 50ha consisting of:

- Experimental farm 5ha
- Small-scale verification farm 15ha
- Large-scale verification farm 30ha

The activities on the pilot farm will be as follows:

- Soil improvement by cultivating fodder grass
- Experimental cultivation of other crops
- Training of extension staff and farmers
- Extension work such as guidance in appropriate farming

- techniques, publicizing technical information and investigating and collecting information
- Continuous observation of groundwater levels, and meteorological and soil conditions
 - Verification of irrigation methods such as center pivot type, rain gun, side wheel sprinkler and drip irrigation system

The required staff for the operation of the pilot farm is shown in Table 6.6.1.

Responsibility:

The Directorate General of Agriculture of MAF is responsible for the project. The construction work and operation of the project will be performed in coordination with other concerned MAF departments.

Timing:

The pilot farm will be constructed in 1991 and it will begin operation at the beginning of 1992. Phase 2 of agricultural development which targets 350ha of beneficial area will be implemented in the order shown below:

- 50ha in 1992
- 50ha in 1993
- 100ha in 1994
- 150ha in 1995

Budget:

MAF will establish and maintain the pilot farm by bearing the whole cost. Personnel required for the smooth implementation of activities in the pilot farm will also be deployed. Based on the results of the pilot farm operation, further development will follow. Since FIRR of full-scale development is only 1.1%, the whole construction cost of the subsequent project should be borne by MAF.

The budget needed for both the pilot farm and full-scale agricultural development project is:

- Pilot project R.O. 1.655 million
- Agricultural development project R.O. 11.587 million

A cost estimate is shown in Table 6.6.2.

The operation cost of the pilot project (recurrent budget) is estimated to be approximately R.O. 175,000 per annum as shown in Table 6.6.3.

Table 6.6.1 Manpower Plan of Pilot Farm in Nejd Development Project

NI-1 Integrated Agricultural Development Project in Nejd

Manpower Plan in the Pilot Project

Speciality	Number	Remarks
1. Project Manager	1	Management of all the activities
2. Agronomist	2	Cropping experiment
3. Irrigation engineer	2	Irrigation
4. Extension engineer	2	Extension
5. Engineer specialized in observation	4	Monitoring of groundwater level, meteorology, soil, etc.
6. Mechanics	2	Maintenance and repair for machinery
7. Machine operator	2	Machinery operating
8. Administrator	1	
9. Clerk	1	
10. Secretary	1	
11. Laborer	3	Farming
12. Cook	1	
Total	22	

Table 6.6.2 Cost Estimation of NI-1 Project (1991-1995)

NI-1 Integrated Agricultural Development Project in Nejd

1. Pilot Farm (50ha)

Item	Unit	Volume	Unit Price	Amount (R.O.)
1. Civil Works				
1)Preparation work	set	1	7,500	7,500
2)Land reclamation	set	1	500	500
3)Intake facility	set	1	100,000	100,000
4)Irrigation facility	set	1	455,000	455,000
5)Drainage system	set	1	14,000	14,000
6)Road works	set	1	79,000	79,000
7)Windbreaks	set	1	250,000	250,000
8)Water supply	set	1	11,000	11,000
9)Buildings	set	1	210,000	210,000
Subtotal				1,127,000
2. Equipments				
1)Generator	set	1	40,000	40,000
2)Machinery	set	1	93,000	93,000
3)Meteorological Equipment	set	1	4,000	4,000
4)Vehicle	set	1	35,000	35,000
5)Office equipment	set	1	12,000	12,000
Subtotal				184,000
3. Project facilities	set	1	9,000	9,000
4. Administration	set	1	5,000	5,000
5. Consulting Service	set	1	180,000	180,000
6. Contingency	set	1	150,000	150,000
7. Grand Total				1,655,000

2. Main Development Project

Item	Unit	Volume	Unit Price	Amount (R.O.)
A. Cost per 50ha				
1. Construction cost	set	1	1,296,500	1,296,500
2. Machinery cost	set	1	84,500	84,500
3. Project facilities cost	set	1	7,400	7,400
4. Administration cost	set	1	5,700	5,700
5. Consulting Service cost	set	1	1,110,700	110,700
6. Physical contingency	set	1	150,500	150,500
Total				1,655,300
B. Project Cost for 350 ha				
	Block	7	1,655,300	11,587,100

Source: The Study on Agriculture Development Project in the Nejd Region, Final Report (JICA, October 1989)

Table 6.6.3 Recurrent Budget for Pilot Farm in Nejd Development Project

NI-1 Integrated Agricultural Development Project in Nejd

1. Recurrent Budget for Pilot Farm

Item	Unit	Volume	Unit Price	Amount (R.O.)
1. Project Office				
1)Salaries	set	1	18,000	18,000
2)Fuel	set	1	2,803	2,803
3)Maintenance and repair	set	1	6,375	6,375
Subtotal				27,178
2. Experiment and Verification Farm				
1)Laborers	set	1	75,120	75,120
2)Maintenance and repair				
(1)Water intake facilities	set	1	601	601
(2)Irrigation facilities	set	1	7,533	7,533
(3)Drainage facilities	set	1	14	14
(4)Roads	set	1	79	79
(5)Windbreaks	set	1	2,035	2,035
(6)Water supply	set	1	56	56
(7)Buildings	set	1	219	219
(8)Generator	set	1	50,372	50,372
(9)Machinery	set	1	11,457	11,457
(10)Meteorological equipment	set	1	112	112
Subtotal				147,598
Total				174,776
Rounded Total				175,000

[NI-2] MAF Facilities Improvement and Maintenance

Objective:

The objective of this project is to construct and improve the building and facilities of the ministry headquarters as well as regional offices in order to correspond with the expansion of ministerial functions and technical modernization.

Description:

This project has three components:

- Ministry building
- Office building for Directorate General of Agriculture in 6 regions
- Separate consolidated allocation for all consultancies

The outline of each project component is as follows.

(1) Ministry building

This component includes the construction of additional office space, refurbishment and maintenance of existing facilities and the establishment of central library facilities in MAF headquarters. Necessary equipment and materials such as furniture, books, office machines and so forth will be introduced. Tender documents will also be prepared.

(2) Office building for Directorate General of Agriculture in 6 regions

This component includes the transfer and new development of regional offices in 6 regions, namely Batinah (Sohar), Sharqiya (Ibra), Dakhliya (Nizwa), Dhahira (Ibri), Janubiya (Salalah), and Musandam (Khasab). Equipment and furniture, as well as computer terminals connected with the host computer in the headquarters are

included. The study for the construction was completed in 1985 and the sites for new offices have been secured.

(3) Separate consolidated allocation for all consultancies

This component covers the additional consulting services by foreign experts or consultants who are required temporarily to respond to specific technical needs that can not be dealt with by annually contracted expatriate experts. The field requiring experts are citrus, grapes, mangoes, pineapples, whitefly, leaf minors, plant nematoda and plant virus. Work conducted by those experts and consultants will not exceed a time period of 3 months.

Responsibility:

The Planning Unit of MAF is in charge of this project.

Timing:

The timing of each component is:

(1) Ministry building

Construction: 1991 and 1992

(2) Office building for Directorate General of Agriculture in 6 regions

Construction: Batinah, Sharqiya in 1991

Dakhliya, Dhahira in 1992

Janubiya, Musandam in 1993

(3) Separate consolidated allocation for all consultancies

Annual activity

Budget:

A cost estimate is shown in Table 6.6.4.

Table 6.6.4 Cost Estimation of NI-2 Project (1991-1995)

NI-2 Improvement and Maintenance of MAF Facilities

Item	Unit	Volume	Unit Price	Amount (R.O.)
1. Ministry Building				
1) Ministry Building	set	1	2,266,000	2,266,000
2) Refurnishment and Maintenance	set	1	2,000,000	2,000,000
3) Central Library Facilities for Ministry Headquarters	set	1	925,000	925,000
Subtotal				5,191,000
2. Office Building for Directorate General of Agriculture in 6 Regions				
1) Batinah	set	1	1,200,000	1,200,000
2) Sharqiya	set	1	1,200,000	1,200,000
3) Dakhliya	set	1	1,200,000	1,200,000
4) Dhahira	set	1	1,200,000	1,200,000
5) Janubiya	set	1	1,500,000	1,500,000
6) Musandam	set	1	1,200,000	1,200,000
7) Computer system (terminal)	set	6	50,000	300,000
Subtotal				7,800,000
3. Separate Consolidated Allocation for All Consultancies				
	set	1	4,000,000	4,000,000
Total				16,991,000

[OI-1] Citizen's Compensation against Natural Crisis

Objective:

This project aims to compensate farmers who suffer from natural disasters such as floods, droughts, landslides, etc.

Description:

This project is one of the on-going projects from the Third Five-year Development Plan and should continue since the necessary budget should be secured as an emergency fund to cope with natural crises and to help sufferers.

Responsibility:

The Directorate General of Agriculture of MAF is responsible for the project.

Timing:

Annual activity.

Budget:

The budget should be prepared annually. The necessary annual budget is approximately R.O. 300,000.

[OI-2] Master Plan for Development of Date Palm Cultivation

Objective:

The project intends intended to increase date production, improve quality, reduce waste and losses and cost of production, increase returns on investment, and improve national capabilities in date production, processing and utilization.

Description:

The project was agreed upon by MAF, FAO and UNDP in December, 1988. The activities of the project focus on:

- (1) Date palm production
- (2) Date palm protection
- (3) Date handling, processing and industrialization

The project consists of recruiting international experts, assigning Omani national counterparts and training of counterparts in order to achieve the objectives mentioned above. Experts in the following are required:

- (1) Date production
- (2) Date processing and industrialization
- (3) Date palm protection
- (4) UN volunteer (UNV) specialists
 - Food technology
 - Horticulture date palm
 - Plant protection

Omani national counterparts for all the above international experts and UNV specialists are also required. International experts and UNV specialists are recruited after government clearance. The project is coordinated by an international project coordinator and by a national project coordinator to be selected and appointed by the government. The project is also coordinated by a project coordination

committee to be organized by MAF.

The expected output from the project is:

- (1) Intensification of date palm production
 - Definition of improved management practices, namely manuals, guidelines and advanced technology leading to improved yield, reduced waste and low cost of production
 - Introduction of improved management practices
 - Utilization of the existing pollen extraction station in Ghala
- (2) Improvement of existing methods for better management of pests and disease control
- (3) Development of an industrial date-processing capacity
- (4) Upgrading and development of technical staff in date palm improvement programs through appropriate training
 - Establishment of a program for local training including courses, seminars and workshops, teaching material and operating manuals for ten nationals
 - Three nationals to be trained abroad

Responsibility:

The Directorate General of Agriculture of MAF is responsible for the implementation of the project.

Timing:

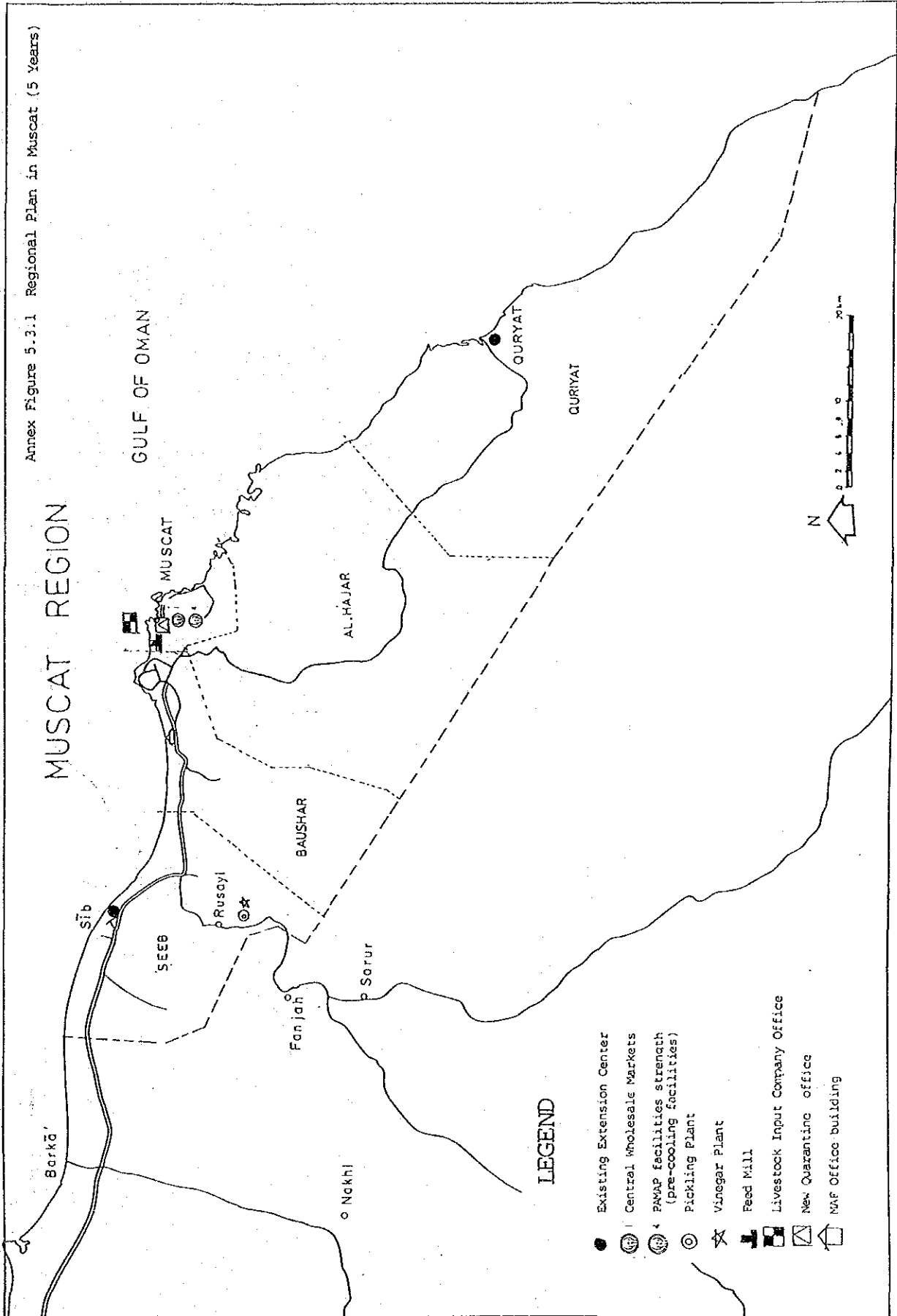
The project was started in 1988 and will be completed in 1991.

Budget:

Approximately R.O. 600,000 is needed and the agreed cost is shared by MAF, FAO and UNDP.

ANNEX

Annex Figure 5.3.1 Regional Plan in Muscat (5 Years)



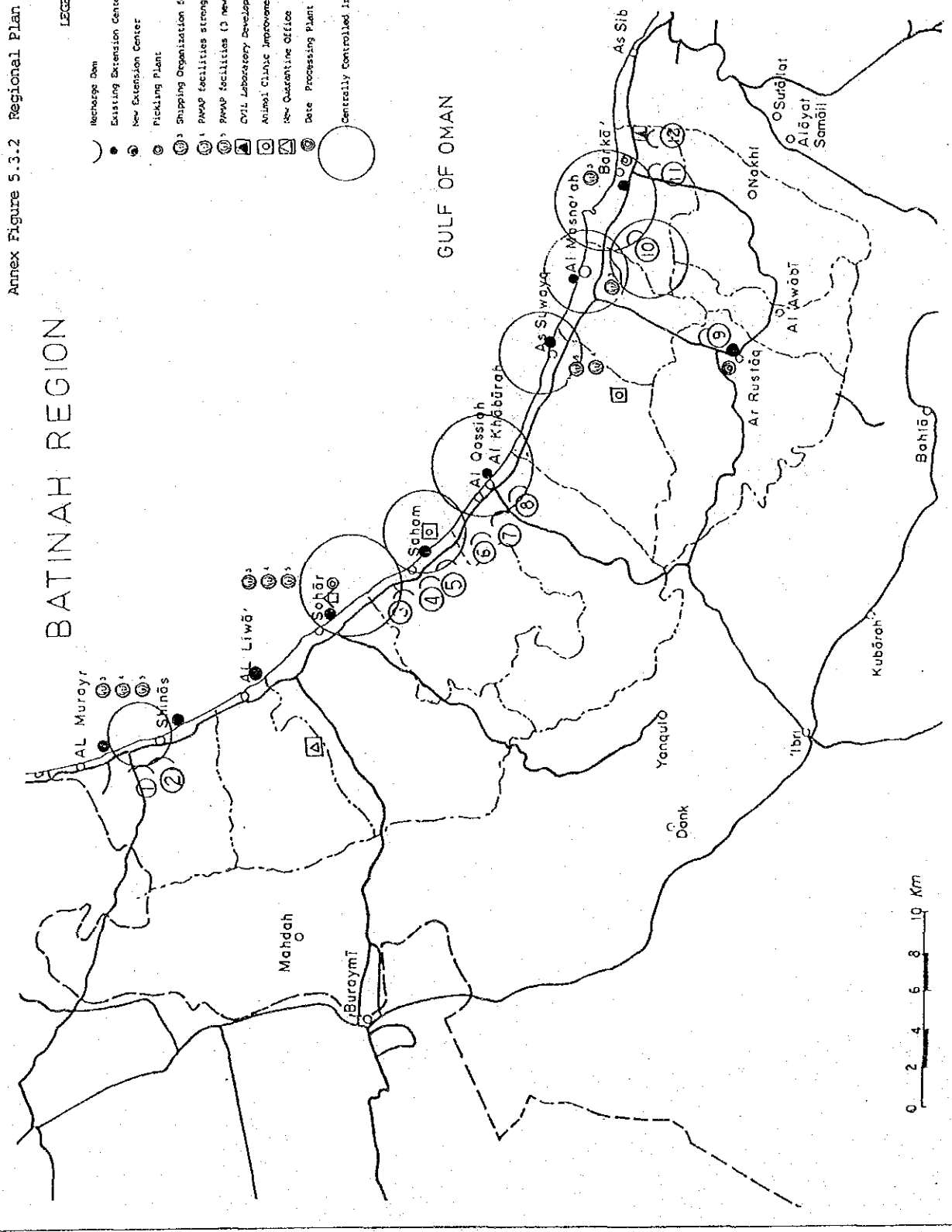
Annex Figure 5.3.2 Regional Plan in Batinah (5 Years)

BATINAH REGION

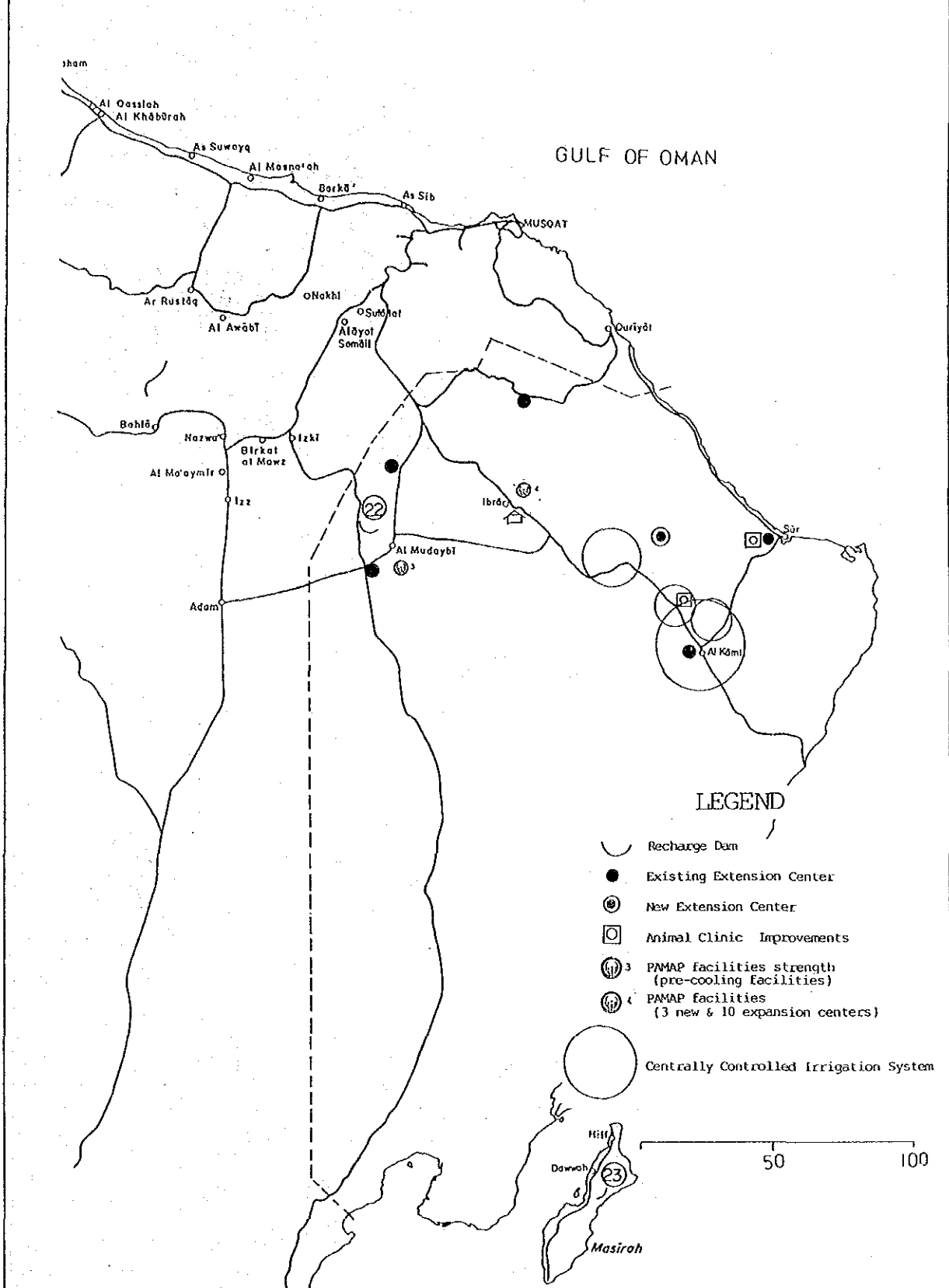
LEGEND

- Recharge Dam
- Existing Extension Center
- New Extension Center
- Pickling Plant
- Shipping Organization for farmers
- PMAP facilities strength (pre-cooling facilities)
- PMAP facilities (3 new & 10 expansion centers)
- CVL Laboratory Development
- Animal Clinic Improvements
- New Quarantine Office
- Date Processing Plant
- Centrally Controlled Irrigation System

GULF OF OMAN



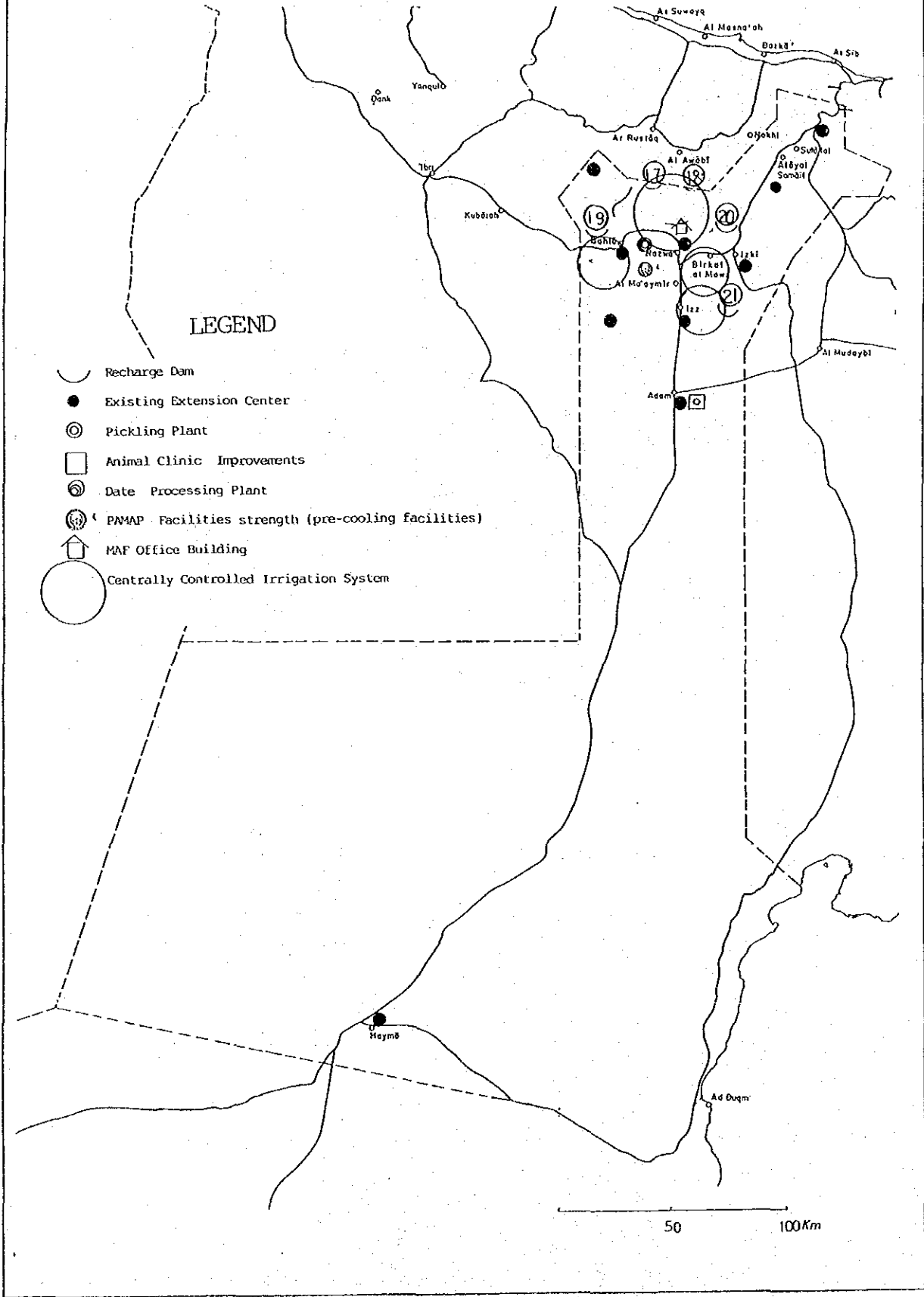
A'SHARQIYA REGION



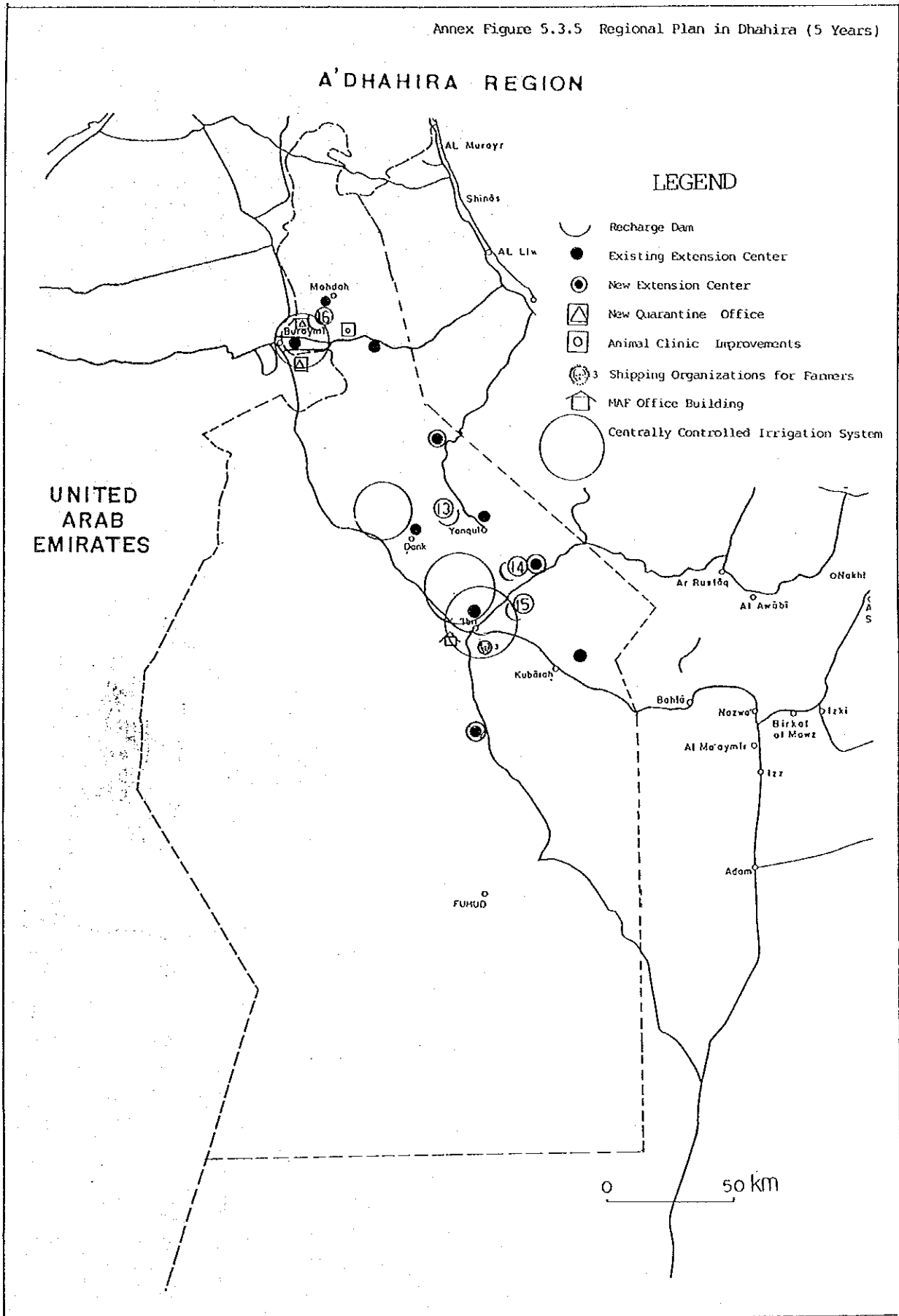
Annex Figure 5.3.3 Regional Plan in Sharqiya (5 Years)

Annex Figure 5.3.4 Regional Plan in Dakhliya (5 Years)

A'DAKHLIYA REGION

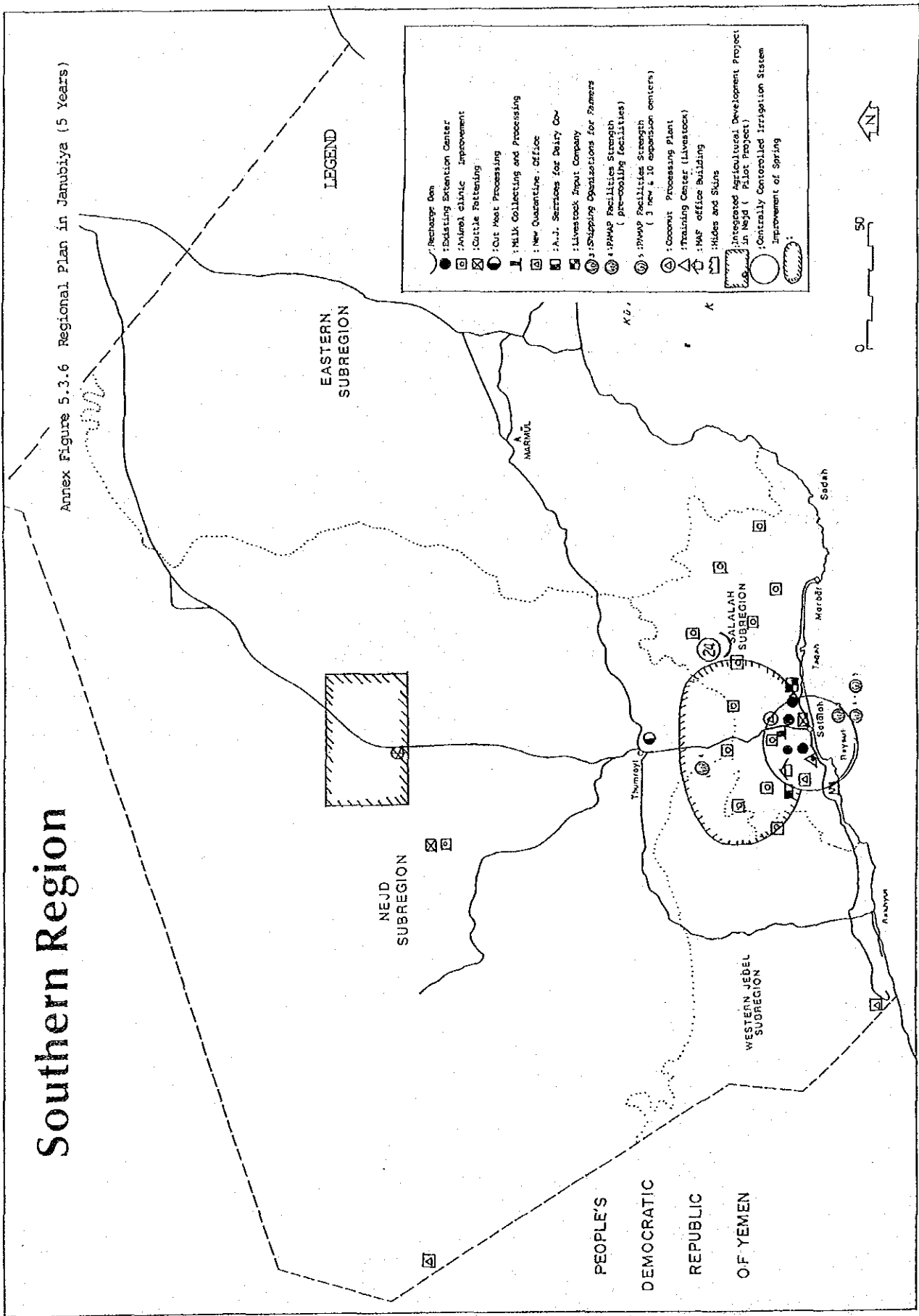


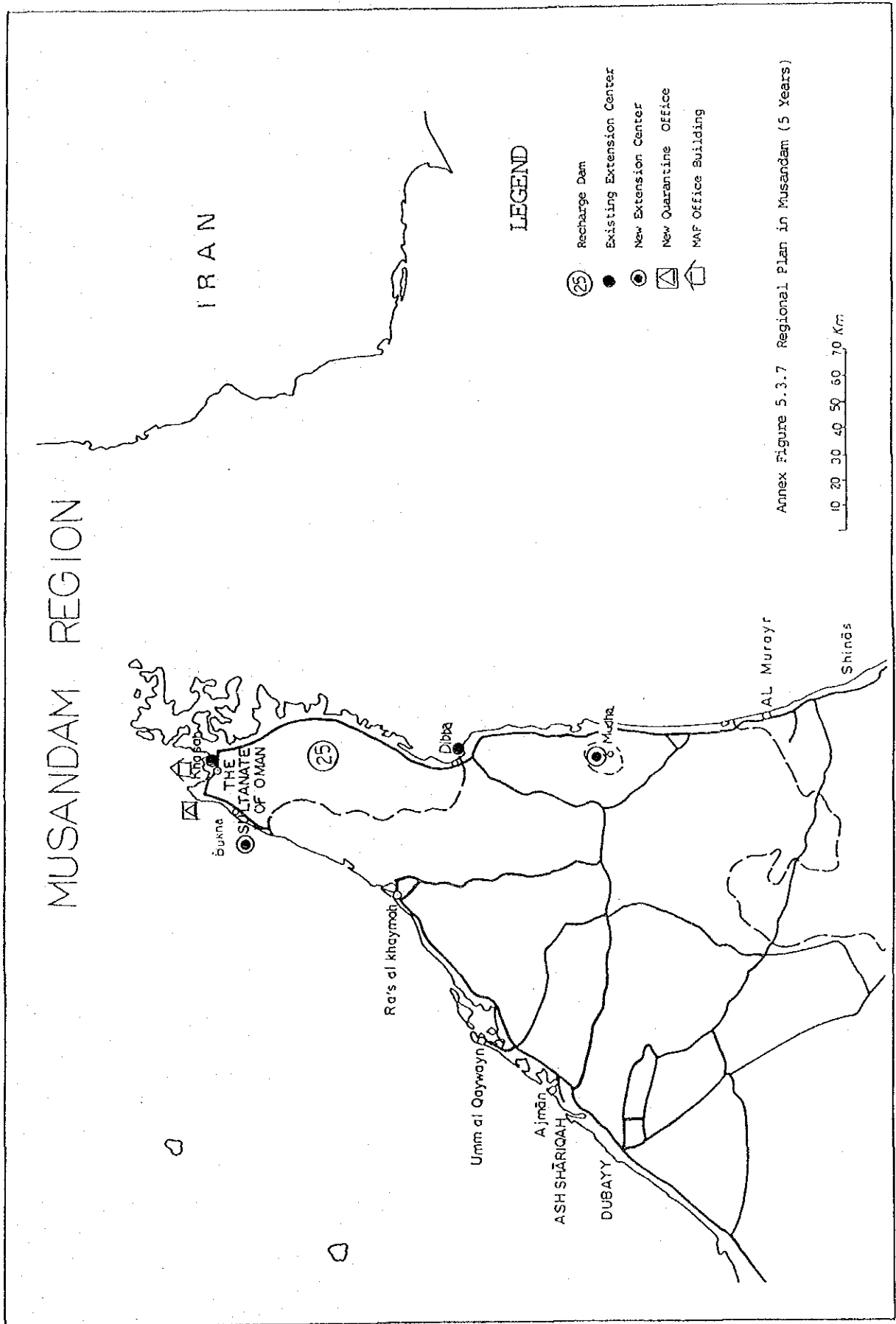
Annex Figure 5.3.5 Regional Plan in Dhahira (5 Years)



Southern Region

Annex Figure 5.3.6 Regional Plan in Jamubiya (5 Years)





Annex Figure 5.3.7 Regional Plan in Musandam (5 Years)

