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REPORT AND RECOMMENDATION OF THE PRESIDENT

TO THE EXECUTIVE BOARD ON A PROPOSED LOAN TO

THE SULTANATE OF OMAN

FOR

THE COMMUNITY RESOURCES MANAGEMENT PROJECT

TABLE OF CONTENTS

Page

APPENDIXES

CURRENCY EQUIVALENTS

Currency Unit	=	Rial Omani (OMR)
USD 1.00	=	OMR 0.38
OMR 1.00	=	USD 2.63

WEIGHTS AND MEASURES

1 kilogram (kg)	=	2.204 pounds (lb)
1 000 kg	=	1 metric tonne (t)
1 kilometre (km)	=	0.62 miles (mi)
1 metre (m)	=	1.09 yards (yd)
1 square metre (m^2)	=	10.76 square feet (ft^2)
1 acre (ac)	=	0.405 ha
1 hectare (ha)	=	2.47 acres
1 ha	=	2.38 *feddan*
1 *feddan* (fd)	=	0.42 ha

ABBREVIATIONS AND ACRONYMS

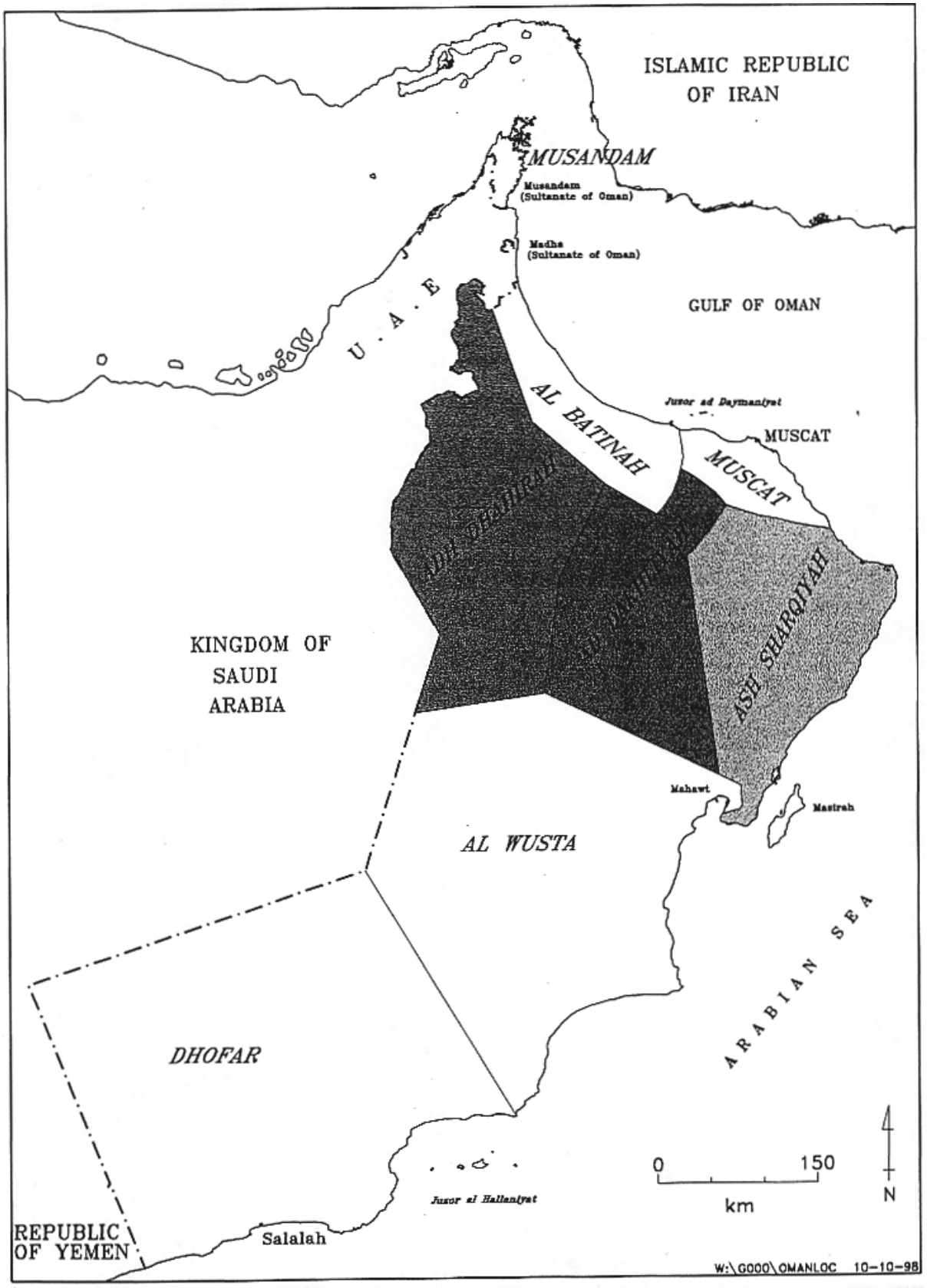
AFESD	Arab Fund for Economic and Social Development
CZ	Catchment zone
M&E	Monitoring and evaluation
MAF	Ministry of Agriculture and Fisheries
MF	Ministry of Finance
MIS	Modern irrigation systems
MSAL	Ministry of Social Affairs and Labour
MWR	Ministry of Water Resources
PCU	Project coordination unit
PIA	Project implementing agency
PSC	Project steering committee
TF	Task force
TWG	Technical working group
WHH	Woman-headed household
WUA	Water users association

GOVERNMENT OF THE SULTANATE OF OMAN

Fiscal Year

1 January - 31 December

MAP OF THE PROJECT AREA



Source: Ministry of Water Resources, Oman.

The designations employed and the presentation of the material in this map do not imply the expression of any opinion whatsoever on the part of IFAD concerning the delimitation of the frontiers or boundaries, or the authorities thereof.

SULTANATE OF OMAN

COMMUNITY RESOURCES MANAGEMENT PROJECT

LOAN SUMMARY

INITIATING INSTITUTION:	IFAD
BORROWER:	Sultanate of Oman
EXECUTING AGENCY:	Ministry of Agriculture and Fisheries (MAF) Ministry of Water Resources (MWR) Ministry of Social Affairs and Labour (MSAL)
TOTAL PROJECT COST:	USD 38.1 million
AMOUNT OF IFAD LOAN:	SDR ..... million (equivalent to approximately USD 5.2 million)
TERMS OF IFAD LOAN:	18 years, including a grace period of three years, with an interest rate equal to the reference interest rate per annum as determined by the Fund annually
COFINANCIERS:	Arab Fund for Economic and Social Development (AFESD)
AMOUNT OF COFINANCING:	AFESD: USD 15.2 million
TERMS OF COFINANCING:	To be determined
CONTRIBUTION OF BORROWER:	USD 8.4 million
CONTRIBUTION OF BENEFICIARIES:	USD 9.3 million
APPRAISING INSTITUTION:	IFAD
COOPERATING INSTITUTION:	IFAD supervised

PROJECT BRIEF

Who are the beneficiaries?

The project will be located within an overall area comprising the three contiguous interior regions of Dhahirah, Dhakliyah, and Sharqiyah. However project works will be concentrated on selected catchment zones that are experiencing serious imbalances between groundwater abstraction and recharge. The project is expected to benefit about 22 430 farming families, the majority of which are at the extremities of catchment zones, with small (0.5 ha), fragmented landholdings generating incomes of about USD 630 per capita, which is only about 13% of the per capita gross domestic product (GDP) of the country. The project will also benefit all other water users indirectly through more secure and sustainable water supplies.

Why are they disadvantaged?

Crop production in the project area depends entirely on irrigation from limited groundwater resources, and farm sizes are consequently very small. Although absolute poverty is rare, relative poverty and genuine financial hardship is common. Many families have escaped the definition of absolute poverty either because of income supplementation through the Social Security Assistance Fund or income transfers from extended family members in non-agricultural employment. However, new constraints on public expenditures and related employment opportunities are beginning to affect both of these safety nets and are forcing greater dependency on traditional primary industries. Agricultural productivity is low throughout the project area, and the sustainability of crop production is now threatened because of seriously declining water tables.

What will the project do for its beneficiaries?

The project aims to improve the sustainability and productivity of farming families through more efficient water utilization and improved conservation, accompanied by strengthened extension and research. It will also support community initiatives in water resource management and establish cost-sharing and cost-recovery mechanisms. It is expected that these will result in: (a) a balance between ground water abstraction and recharge; (b) improved incomes from agricultural production; and (c) reduced community dependence on public-sector funding of water-management initiatives. Special assistance programmes for economically vulnerable families, communities and woman-headed households are also included.

How will beneficiaries participate in the project?

The project will focus strongly on the promotion and development of water users associations (WUAs), which will be based on the traditional leadership structures in regional, local and tribal administration. Each WUA will act, *inter alia*, as: (a) a forum for awareness-building on the importance of water conservation; (b) a mechanism for establishing and implementing local policies in the management and control of groundwater abstraction; and (c) a community self-regulatory mechanism on water use.

What will the project cost and how will it be financed?

The estimated total cost of the project over six years is USD 38.1 million, which will be financed by an IFAD loan of USD 5.2 million, cofinanced with a loan of USD 15.2 million from the Arab Fund for Economic and Social Development. The balance of project costs will be financed by the Government of Oman (USD 8.4 million) and beneficiary contributions (USD 9.3 million).

REPORT AND RECOMMENDATION OF THE PRESIDENT OF IFAD TO THE EXECUTIVE BOARD ON A PROPOSED LOAN TO THE SULTANATE OF OMAN FOR THE COMMUNITY RESOURCES MANAGEMENT PROJECT

I submit the following Report and Recommendation on a proposed loan to the Sultanate of Oman for SDR ..... million (equivalent to approximately USD 5.2 million) on ordinary terms to help finance the Community Resources Management Project. The loan will have a term of 18 years, including a grace period of three years, with an interest rate equal to the reference interest rate per annum as determined by the Fund annually. It is proposed that this IFAD-initiated project be directly supervised by the Fund in view of its innovative features with respect to participatory resource management, which is a regional strategic focus.

PART I – THE ECONOMY, SECTORAL CONTEXT AND IFAD STRATEGY[1]

A. The Economy and Agricultural Sector

1. Oman has a land area of 309 500 km² and a population of approximately two million (1993 census). Prior to the discovery of oil 30 years ago, Oman's economy was based largely on crop cultivation, livestock and fishing, mainly practised at the subsistence level. In the absence of a substantial revenue base, state expenditures on public infrastructure had been minimal. Neither paved roads nor modern health facilities existed, and Oman was regarded as one of the least developed countries in the world.

2. The roots of current development policy began in 1970, when the accession of Sultan Qaboos bin Said – interested in modernizing Oman – and improving oil revenues made rapid change both politically and financially feasible. Development achievements in this short time period have been substantial and impressive, although the trappings of wealth that are so evident in the main urban centres remain in contrast to the economic realities of many rural areas, particularly those of inland regions. Despite efforts to diversify, economic development has remained heavily dependent on the recycling of government oil revenues into public-sector interventions.

3. In contrast to other Gulf oil-exporting states, however, Oman's oil reserves are extremely limited, with a life expectancy of about 20 years at current extraction rates. The heavy reliance on oil revenues also means that fluctuations in international fuel prices can trigger dramatic changes in national income, and the general stagnation in oil revenues since the early 1980s has resulted in an almost unbroken string of budgetary deficits as well as exhausting financial reserves. A key fiscal objective of the Fifth Five-Year Development Plan (1996-2000) is to achieve a balanced budget by the year 2000. This has necessitated major cuts in development expenditure as well as radical shifts in favour of privatization, curtailment of subsidies and reductions in the government payroll. Overall development expenditure is less than 40% of the amounts included in the Fourth Five-Year Plan, and those for the agriculture sector were reduced from about OMR 90 million (USD 235 million) to about OMR 35 million (USD 90 million).

[1] See Appendix I for additional information.

4. Before the discovery of oil, agriculture was the mainstay of the Omani economy, but it lost importance with the advent of oil exports and now accounts for less than 4% of GDP. Despite this, about half of working Omanis are employed in agriculture. Except in parts of the south where rainfall is significant, agriculture is dependent on irrigation from groundwater aquifers. Traditional methods of irrigation had kept water supply and demand in balance, but with the advent of the diesel pumping system, groundwater supplies have been seriously depleted. In the north of Oman, dates are the main crop but limes, tobacco, tomatoes and onions are produced, while in the south, coconuts, papaws and bananas are the main crops. Livestock, mainly goats and sheep in the north with some cattle in the south, are an important part of the agricultural system of Oman.

5. Although the contribution of agriculture to GDP declined dramatically during the oil-boom years, a reversion to dependency on agricultural production is now inevitable and is already in evidence. The importance of agriculture is further accentuated by the rapid growth in Oman's population at a time when employment opportunities in Oman's growing, but modest, manufacturing industries are unlikely to have much significance for most rural communities. However sustainable development of the sector faces many technical and economic problems, the foremost of which is the now widespread overpumping of groundwater. This practice has led to serious water-table decline and to sea-water intrusions into the coastal aquifers, which has contaminated significant areas of Oman's most productive farmland. At the same time, agriculture's overall terms of trade have deteriorated markedly due to real exchange-rate appreciation, which has contributed to a decline in traditional export markets and increased competition from imported produce. Economic cooperation among the Gulf Cooperation Council states has also seen the reduction of tariff barriers, but only Oman has had to drastically reduce its subsidy support to the agricultural sector due to fiscal pressure.

B. Lessons Learned from Previous IFAD Experience

6. IFAD has had no previous lending programme in Oman. A rural development review mission visited the country in 1988 in collaboration with the Arab Fund for Economic and Social Development (AFESD). In 1996 IFAD fielded an inception mission, which reviewed the resource endowments and socio-economic conditions of rural areas and examined opportunities for collaboration in sectoral development. A formulation mission visited Oman in October 1997 to draw up detailed proposals for IFAD assistance; these proposals were appraised by a mission that visited Oman in September 1998.

C. IFAD's Strategy for Collaboration with Oman

7. **Oman's policy for assisting disadvantaged households.** Since 1970 Oman has achieved internationally recognized advances in the well-being of its population in rural and urban areas with respect to fundamental indicators of quality of life such as life expectancy, infant mortality and school enrolment rates. These advances reflect the high priority that the Government has given to reinvesting oil revenues in infrastructure and social services. Generous support has likewise been provided to rural producers in the form of input supplies, subsidized credit and purchase of outputs. Finally, direct payments are made to very low-income and particularly disadvantaged groups. However there is recognition that previous levels of support are not sustainable, thus, while planning to maintain basic safety-net services, the Government is gradually disengaging from direct support to producers. A key new strategy for rural Oman is encouragement of self-reliance for community development. The Government is seeking ways to help rural families diversify income sources and reduce reliance on the State.

8. **Activities of other major donors.** At present there are no other donors involved in supporting major rural development initiatives in Oman. Assistance is provided by the United Nations Children's Fund in health, nutrition, education, social statistics and advocacy. Modest support is provided to the country by the World Health Organization, Food and Agriculture Organization of the United Nations and World Meteorological Organization

9. **IFAD's strategy in Oman.** IFAD's strategy in Oman is to assist the Government in the development of sustainable agriculture and the maintenance of household income levels. In this project the strategy is to alleviate fundamental – and increasing – natural resource constraints on the generation of adequate incomes from agriculture. These constraints relate to water availability and water use. The method will be to use investments in infrastructure, research, extension, training and the creation of the local institutions required for beneficiary management of water resources as a means of supporting sustainable incomes from agriculture.

10. **Project rationale.** All rural households practising agriculture in Oman face constraints related to water, the scarcest production input. Growing imbalances between abstraction and recharge of groundwater resources have become dramatically evident in many areas. Some communities and disadvantaged households in the lower sections of catchment zones have already been forced to abandon agricultural production and seek off-farm employment or government support as a result of declining water levels. To prevent further deprivation of such households and communities, effective management of water resources is required at the level of an entire catchment zone

11. The challenges to maintaining essential water resources for the livelihood of rural families at the level of an entire catchment are both technical and social. Moreover, households resident in a catchment will only benefit if the social and physical infrastructure required to improve availability of water is matched by increased efficiency in the use of water at the farm level. This, in turn, implies the adoption of agricultural practices and crops that raise the household return per unit of water consumed. The project has been designed to take a comprehensive approach to all facets of the critical water-related constraints that households face.

PART II – THE PROJECT

A. Project Area and Target Group

12. The project will be located within the three contiguous interior regions of Dhahirah, Dhakliyah and Sharqiyah, which together comprise roughly 31 500 holdings with a cropped area of 21 600 ha. Within this overall area, project activities will be targeted at six-eight selected catchment zones (CZs), each comprising either an entire catchment, or one or more subcatchments or watersheds that make a hydraulically interlinked system, in which water abstraction in the upper elevations is directly affecting aquifer recharge at lower elevations. These CZ have been identified and selected on the basis of the severity of the water-balance problem in the catchment area and the likely impact of the uncorrected imbalance on resident communities.

13. **Approach to targeting.** The project will approach targeting in a three-fold manner. First, it will prioritize catchments based upon the severity of the water imbalance, in recognition of the fact that poverty is most prevalent where water shortages are most acute. The project will then phase the implementation of project activities and investments according to these priorities.

14. Second, within these catchments the project will target households in strategic areas of the catchment zones to achieve greater impact in terms of water conservation. This will be done through on-farm infrastructure improvements, training and extension to meet the particular needs of farmers and farming systems in these areas.

15. Third, within these identified areas, the project will seek to identify those households that are especially disadvantaged based on characteristics other than those strictly related to water access. Other major determinants of household welfare have been found to include factors such as family size and dependency ratios, sources and levels of off-farm income, and gender. In the initial or pilot

phase the project will seek to understand the dominant characteristics and constraints of these households and use this information to further prioritize project activities and the provision of special assistance.

16. **Target group.** The households that make up the target group of the project generally have farm holdings of less than 2 *feddans* (0.84 ha) and cropped areas of 1.3 *feddans* (0.55 ha). Typical households, comprised of 9-15 members, farm small plots in heavily fragmented *aflaj* systems (an ancient system of water channels exploiting natural aquifer leakage or engineered aquifer drainage). In addition, many work slightly larger plots (2.5 *feddan*) irrigated by on-farm wells. Households typically cultivate 25-120 date palms as well as produce vegetables and forage (primarily alfalfa). Their production may also include small livestock, especially goats and sheep. Most agricultural outputs are consumed on-farm. As there is little if any surplus, production is generally insufficient to meet the basic income needs of rural households. Households are obliged to rely on other sources of cash income, usually one or more male family members engaged in off-farm employment or through direct payments from government.

17. The most disadvantaged households among the intended project beneficiaries appear to be those in which the number of male off-farm income earners is low relative to the number of dependants they support and the off-farm employment undertaken is at low wage rates. Woman-headed households with few or no adult male wage earners are among the most disadvantaged. A project area family of ten with only one off-farm wage earner whose only opportunity for employment is as a labourer in agriculture, is likely to have a cash income level of about USD 630 per capita per annum, which is a fraction (some 13%) of the USD 4 820 per capita gross national product (GNP) level for the country overall.

18. For the intended project beneficiaries, the as yet unquantified contribution that subsistence-level agricultural output makes to the overall income level in relatively poorer households is clearly significant. This fact is expected to help achieve better project targeting because those who have the fewest options for raising off-farm income, that is the poorest, are likely to be self-selecting. They will be the community members most eager to participate in the activities and investments offered by the project for improving agricultural productivity and returns to scarce natural resources.

19. **Women in the rural economy.** The 1992/93 agricultural census recorded 7 500 (8%) women landholders, and nearly 34 000 (24%) full-time women agricultural workers. Field evidence also suggests that women's role in agriculture is increasing, both as a consequence of cultural change and in parallel with non-agricultural employment among men, often in locations away from the family home. Even within traditional society, women have usually been the main decision-makers on their own land (inherited), as well as having prime responsibility for livestock rearing, except for camels. Although there are no overt legal or institutional barriers to their development, traditional mores have nevertheless tended to subordinate the status of women in Omani society. Under the project women will constitute a specific target, with monitorable indicators selected from an enhanced database against which the performance of normal project services to women will be judged.

B. Objectives and Scope

20. The project's primary goal is to promote sustainable and viable agricultural cropping systems. This will require: (a) the achievement of a balance between groundwater abstraction and recharge; (b) improvements in the productive and economic returns from irrigation water; and (c) a reduction in the dependency of rural communities on public funding of water-management initiatives. In addition, the project aims to ensure that economically vulnerable families and communities do not become further disadvantaged due to the now substantial overall reductions in government expenditure.

C. Components

21. The project will comprise the following components:

22. **Improved water utilization.** Modern irrigation systems (MIS), using pressurized pipe technology, can achieve substantial water savings compared to flood irrigation, but they presently cover only about 8% of overall cropped area. Appropriate designs already exist, and the project will aim to expand coverage to about 50% of the land irrigated from wells in the target areas. Provision is also included for MIS within *aflaj* command areas, but this is at a much more modest scale, reflecting the complicated socio-economic constraints that ongoing pilot undertakings have already identified.

23. MIS technology only provides the means for reducing water consumption and could be equally wasteful of water if badly used or abused. Since it involves considerable investment, it is important that production and productivity are improved in order to maximize returns both to beneficiaries and to the country. At present, however, there has been limited research and extension involvement in MIS and there is significant room for improvement. Substantial funding is accordingly included for on and off-station research into aspects such as crop water requirements and irrigation scheduling, for upgrading the technical and dissemination skills of extension staff, and for establishing formal field-to-research linkage mechanisms. Funding is also included for special media campaigns (radio/television) and for the preparation of extension material, demonstrations and field days. In conjunction with extension messages on irrigation management, extension activities will also include crop husbandry practices, post-harvest handling, marketing and farm economies. The project will also support existing efforts to ensure extension outreach to women farmers.

24. **Improved water resources.** CZ selection, and the options for remedial measures, will be based on detailed catchment planning to ensure that works are properly prioritized and that investments are accompanied by appropriate demand-management strategies. *Inter alia*, the latter will include restrictions on constructing new wells and deepening existing ones, particularly in the upper catchment, along with limits on well discharge and penalties for excess water use. In particular, the project will explore the potential for introducing self-regulatory mechanisms through the initiatives of water users associations (WUAs).

25. The project will also fund investments to improve water harvesting and to enable response to crisis situations, for example the repair of collapsed *aflaj* galleries, installation of support wells and improvements to surface canals. Project funding has been included for constructing small recharge dams to intercept flood discharges in strategic locations in the upper catchment, and for installing simple structures to recharge overspill irrigation water to the underlying aquifers. Provision is also included for constructing surface storage dams at higher altitudes for communities in the mountainous upper catchments with limited water-supply options.

26. **Community support.** The *aflaj* system has long depended on strong community organization and cooperation, and although this remains largely intact, it is within an entirely different socio-economic and technical environment than that in which it evolved. Farms irrigated from wells, on the other hand, are of recent evolution and, apart from the controls imposed through the well permit and licensing arrangement of the Ministry of Water Resources (MWR), these smallholders have been able to operate as independent water users. Under present day circumstances, there are two main issues to be addressed: firstly, the *aflaj* maintenance operations, which once depended entirely on community labour and material contributions, have proved much more difficult to sustain in a monetary economy; and, secondly, there is as yet no community structure operating at a level that can effectively influence all users and usage of hydraulically interlinked areas.

27. Both issues require resolution through community action, and while the project does not provide a recipe for this, it will set mechanisms in place in support of community dialogue and initiative that will enable these to evolve. As part of this process, the project will actively support the development of WUAs, drawing on traditional leadership structures in regional, local and tribal administration. It is intended that each WUA will act as: (a) a forum for awareness, building on the importance of water conservation; (b) a mechanism for establishing and implementing local policies in the management and control of groundwater abstraction; and (c) a community self-regulatory mechanism on water use. The geographical definition of project CZs, as well as the composition and phasing of development works, will be strongly influenced by the practicalities of WUA formation.

28. Three categories of beneficiary will also be eligible for specially targeted assistance, namely: small family farms (SFFs), defined as having less than 2.5 *feddans* of cropped land; woman-headed households (WHHs); and economically vulnerable communities that may be unable to raise the normal financial contributions for investment works. All will be eligible for higher levels of concessionary funding assistance, and holdings with less than 1.5 *feddans* of cropped land will further benefit from a special programme providing financial and technical support for greenhouse development. In order to ensure that WHHs have full access to project support services, fieldwork routines will be prepared in collaboration with women social workers from the Ministry of Social Affairs and Labour (MSAL).

29. **Management support.** Although the project has evolved around a single core objective, the division of ministerial responsibility and the provision of support services spans three main ministries: the Ministry of Agriculture and Fisheries (MAF), MWR and MSAL.

D. Costs and Financing

30. Overall project costs for the six-year implementation period (an initial two-year pilot phase for testing interventions and a four-year main phase for scaling up successful interventions) are estimated at USD 38.1 million, which includes community and beneficiary contributions amounting to USD 9.3 million; the net cost to the public sector is USD 28.8 million. The external contribution to this latter total will be USD 20.4 million (IFAD USD 5.2 million, AFESD USD 15.2 million), which represents 54% of the project costs. The net cost to government during the six-year period will be USD 8.4 million.

TABLE 1: SUMMARY OF PROJECT COSTS[a]
(USD '000)

Components	Local	Foreign	Total	% of Foreign Exchange	% of Base Costs
Improved water utilization	9 813	9 191	19 004	48	52
Improved water resources	5 503	5 606	11 108	50	31
Community support	3 355	326	3 681	9	10
Management support	1 811	700	2 511	28	7
Total base costs	**20 482**	**15 823**	**36 304**	**44**	**100**
Physical contingencies	196	193	391	49	1
Price contingencies	154	1 290	1 444	89	4
Total project costs	**20 834**	**17 306**	**38 140**	**45**	**105**

[a] Discrepancies in totals are due to rounding.

TABLE 2: FINANCING PLAN[a]
(USD '000)

	Beneficiaries		IFAD		AFESD		Government		Total			Local (Excl.	Duties and
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	For. Exch.	Taxes)	Taxes
Improved water utilization	7 504.3	37.8	1 638.5	8.2	9 105.8	45.8	1 621.4	8.2	19 870.0	52.1	9 974.9	9 862.8	32.3
Improved water resources	1 808.1	15.1	156.8	1.3	5 964.4	49.8	4 054.1	33.8	11 983.5	31.4	6 274.2	5 682.3	27.0
Community support	-	-	2 451.8	65.9	-	-	1 268.0	34.1	3 719.8	9.8	337.8	3 382.1	-
Management support	-	-	1 001.8	39.0	119.4	4.7	1 445.5	56.3	2 566.7	6.7	719.4	1 840.7	6.7
Total disbursement	**9 312.4**	**24.4**	**5 248.9**	**13.8**	**15 189.6**	**39.8**	**8 389.0**	**22.0**	**38 140.0**	**100.0**	**17 306.3**	**20 767.8**	**65.9**

[a] Discrepancies in totals are due to rounding.

E. Procurement, Disbursement, Accounts and Audit

31. **Procurement.** Goods and services to be financed from the proposed loan will be procured in accordance with the Guidelines for Procurement under Financial Assistance from IFAD. International competitive bidding will apply for each contract for the supply of goods and civil works estimated to cost USD 100 000 equivalent or more. International shopping will apply for contracts for the supply of goods and civil works estimated to cost from USD 50 000 to USD 100 000 equivalent. Local competitive bidding will apply for contracts for the supply of goods and civil works estimated to cost less than USD 50 000 equivalent but more than USD 20 000 equivalent. Local shopping will apply for contracts for the supply of goods estimated to cost USD 20 000 equivalent or less. Contracts for services to be provided by consultants and/or non-governmental organizations (NGOs) (local or international) will be in accordance with guidelines acceptable to IFAD.

32. **Disbursement.** The Government of Oman will finance all project expenditures in advance from its own resources and claim reimbursement from the IFAD loan proceeds on a regular basis.

33. **Accounts and audit.** Separate accounts will be maintained for all project expenditures at all levels. At present, all payments are centralized at the Ministry of Finance (MF). Payment orders for all but petty cash expenditures are made by the project implementing agency (PIA) to MF, which after review will make payments directly to the supplier. PIAs will make expenditures of less than OMR 5 000 from petty cash. Salaries will be paid monthly by MF to the respective PIA, which will then issue individual cheques to employees. Financial reports and accounts from the various PIAs will be prepared and submitted to the project coordination unit (PCU) for consolidation. Each PIA and the MF will prepare the project account financial statement, which will be subject to annual audit to be carried out by the General Secretariat for State Audit. Government will furnish certified copies of audit reports to IFAD not later than six months after the end of each fiscal year.

F. Organization and Management

34. **Project implementing agencies (PIAs).** Although the project has evolved around a single core objective, the division of ministerial responsibility and the provision of support services spans three main ministries. MAF and MWR will be the main executing ministries for ‘hardware’ investments, the former having prime responsibility for improved water utilization, including extension and research, and the latter having responsibility for water-resource improvements, including regulation of abstraction. MSAL’s principal role will be as a collaborative agency in the ‘software’ aspects of local institutional development. MSAL possesses long-standing experience in community development and an established and significant field-level structure of social workers and volunteers, including a network of women’s development centres.

35. An interministerial project steering committee (PSC) will be established to provide the necessary overall framework for the coordination of project activities. PSC will be chaired by an official of MAF. The membership will indicatively comprise the implementing agencies (MAF, MWR, and MSAL) and consultative agencies including the Ministry of National Economy and MF. The principal role of PSC will be to provide conceptual, strategic and policy guidelines for project implementation.

36. PSC will be serviced by a small PCU with full-time staff for the day-to-day coordination of project activities. PCU will be physically located in Muscat, and organizationally located within MAF (the lead ministry) but will report directly to PSC. The costs of PCU will be shared between MAF and MWR in proportion to the project funding received by the two ministries. The principal role of PCU will be to ensure that the necessary levels of coordination and cooperation are achieved among the various agencies and that workable operating systems are established at the field level.

37. PSC and PCU will be supported by a technical working group (TWG) that will constitute the core forum for the coordination of project activities. The TWG will bring together technical experts from MAF (irrigation, agricultural affairs, extension and information, research and planning); MWR (water resources, water conservation, dams and *aflaj*, public awareness and planning) and MSAL (community development). The task of TWG will be to pool all available data and expertise in order to develop coherent catchment management strategies and detailed development plans for the designated project catchment zones. The principal role of TWG will include presentation of data indicating priority catchment zones for selection for project interventions.

38. Each designated project catchment zone will be assigned a task force (TF) covering the field staff of the three concerned ministries that have normal field-function responsibilities within all, or part, of the area represented by a CZ. Indicatively, this is likely to include an MAF irrigation engineer, MAF extension officer from the Agricultural Development Centre serving the area; MWR engineers from the regional office responsible for water management, monitoring and regulation covering the CZ area and MSAL field workers. The principal role of the TF will be to interact collectively with communities to raise awareness of water management issues and to promote the formation of, and provide support to, WUAs.

39. The role of the community through the formation of WUAs, combined ultimately into a catchment association, will be to: provide a focal point for consultation and cooperation on water management; act as a forum for awareness-building on the importance of water conservation; develop community self-regulatory mechanisms on priority water use; mobilize local resources as a community contribution to the cost of *aflaj* repairs; and provide a mechanism for establishing and implementing local policies in the management and control of groundwater abstraction.

40. During the pilot phase, PCU will be supported by limited technical assistance to facilitate, in particular, the new approaches to coordinated planning and community participation. This assistance will comprise: a project management adviser (6 months); water-resource management expert (24 months); monitoring and evaluation specialist (3 months) and a financial adviser (2 months).

41. **Monitoring and evaluation (M&E).** PCU will have overall responsibility for project monitoring, which will include: (a) monitoring actual performance against planned objectives; and (b) assembly of physical indicators to facilitate environmental impact assessment. PCU's initial task will be to thoroughly review the already extensive monitoring and record-keeping activities of MAF, MWR and MSAL, assess the extent to which they will (or can) meet requirements, identify gaps and other possible deficiencies, define the manpower resources that could be tapped to remedy these, and prepare a draft M&E programme for review by PSC and IFAD. An important specific function of PCU will be to assemble data on economically vulnerable families and to translate these into specific implementation targets; likewise, specific monitoring indicators will need to be identified to ensure that defined targets are appropriately implemented. It is anticipated that most of the monitoring requirements can be undertaken through the manpower and service networks of the directly participating ministries. However evaluation surveys and specific diagnostic studies will be contracted out, either to private-sector companies or to Sultan Quaboos University as a special research assignment. Funding for these purposes has been included in project costs.

G. Economic Justification

42. **Benefits and beneficiaries.** Through the project, crop production and productivity will be increased on 12 450 *feddans* of crop land. Higher stable yields will derive from higher and more reliable water supplies, improved on-farm water management and better crop husbandry. Incremental production is expected to reach some 4 800 t of dates, 6 500 t of vegetables and 6 000 t of fodder at full development. Some 22 430 farm families are expected to benefit directly (16 950) and indirectly (5 480) from project intervention in *aflaj* gallery repairs and watershed management. Fifteen per cent of direct

beneficiaries will be woman-headed households, which will also benefit from the special assistance funds under the project and from an expansion of the outreach of the Women's Development Centres of MSAL.

43. **Financial/economic analysis.** The net incremental income per household[2] from conversion to MIS is expected to be from OMR 133 (USD 290) in *aflaj* areas to OMR 602 (USD 1 560) in well-irrigated areas. For the project as a whole, the economic rate of return is 14%. The rate is sensitive to a reduction in the costs of MIS conversion, which could come about during the life of the project as a result of tailoring MIS design to individual farmers' needs and adoption of more flexible execution arrangements.

TABLE 3: PROJECT BENEFICIARIES

Category	No.	Area (fd)	Farm Size (fd)	Beneficiaries Direct	Beneficiaries Indirect	Intervention
A. Management system						
Bores/wells	-	2 425	2.5	970	-	MIS
Aflaj	-	725	0.4	1 810	-	MIS/support wells
Combined	-	850	1.5	570	-	MIS/support wells
Greenhouse	330	-	-	330	-	MIS
Subtotal	**-**	**4 000**	**-**	**3 680**	**-**	
B. Watershed management						
Catchment a/						
- Aquifer recharge a/	4	3 140	-	-	5 480	Dams/pits/sumps
- Water harvesting	15	60	0.4	150	-	Farm dam
Aflaj						
- Collapsed galleries	105	3 045	0.4	7 610	-	Repairs
- Motherwell development	25	725	0.4	1 810	-	Development
- Distribution system	51	1 480	0.4	3 700	-	Upgrade
Subtotal		**8 450**		**13 270**	**5 480**	
Total		**12 450**		**16 950**	**5 480**	

a/ Average 785 *feddans* and 1 370 farms.

H. Risks

44. Most of the project components are able to draw on an excellent database, and are founded on largely proven technologies that are well within the general implementation capabilities of the executing agencies. However resolution of the environmental problems will depend on the synergistic effect of a range of components and, without this, the individual impact of any one component could be greatly diminished. This constitutes the main risk for the project and could occur due to: (a) poor coordination among the executing agencies; and (b) indecision on some of the policy changes that need to accompany physical implementation. The project's coordination mechanisms are specifically designed to mitigate this risk.

45. A further risk concerns the economic viability of agricultural production. During the last 30 years, the sector has declined markedly in economic importance, and many farming families have come to rely primarily on alternative income sources, often from younger family members for whom farming now has little appeal. Despite this, the farming communities have retained their social and cultural importance, along with a willingness to reinvest non-agricultural earning into farm-related developments. The decline in oil reserves is expected to trigger a resurgence in dependency on

[2] Farm size 0.4 *feddan* in *aflaj* and 2.5 *feddans* in well irrigated areas.

agricultural production. In addition, project design provides for research and extension support targeted at the transfer of appropriate technologies for increasing agriculture productivity and profitability.

I. Environmental Impact

46. The project has been designed specifically to address environmental problems and all components will have a direct, beneficial impact on preserving groundwater resources from further depletion. Unless effective remedial measures are implemented, the eventual destiny for many areas will be the partial or total loss of water supplies not only for agricultural but also domestic use. Project initiatives aim to address this problem through a combination of strategies involving: (a) measures to improve the efficiency of water utilization at the farm level; (b) investments to enhance the harvesting and storage of water resources; and (c) regulations to prevent waste of water and discourage any further expansion in the area of cropped land. Mechanisms for achieving the latter have been framed within the concept of community resource management.

J. Innovative Features

47. The project is an innovative approach to catchment management of water on a community basis; it rekindles community initiatives and self-help in water resource management and reorients the Government's agricultural development services from input delivery and subsidy administration towards the educational and advisory functions of change agents. A key factor in this approach is the coordination among different institutions in order to target priority areas and to plan and implement cohesive water-conservation activities in a timely manner. Once the modalities of physical and socio-economic planning have become established, along with the procedures for achieving service coordination and community involvement in resource management, project approaches could become widely replicated in other defined CZs, both within and outside the project area, and in so doing, they can maintain agricultural livelihoods in Oman.

PART III – LEGAL INSTRUMENTS AND AUTHORITY

48. A loan agreement between the Sultanate of Oman and IFAD constitutes the legal instrument for extending the proposed loan to the borrower. A summary of the important supplementary assurances included in the negotiated loan agreement will be tabled at the session.

49. The Sultanate of Oman is empowered under its laws to borrow from IFAD.

50. I am satisfied that the proposed loan will comply with the Agreement Establishing IFAD.

PART IV – RECOMMENDATION

51. I recommend that the Executive Board approve the proposed loan in terms of the following resolution:

> RESOLVED: that the Fund shall make a loan to the Sultanate of Oman in various currencies in an amount equivalent to ..... Special Drawing Rights (SDR .....) to mature on and prior to ..... and to bear an interest rate equal to the reference interest rate per annum as determined by the Fund annually, and to be upon such other terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

Fawzi H. Al-Sultan
President

APPENDIX I

COUNTRY DATA

OMAN

Land area (km^2 thousand) 1995 1/	**212**	**GNP per capita (USD) 1995 2/**	**4 820**
Total population (million) 1996 1/	**2**	**Average annual real rate of growth of GNP per capita, 1990-96 2/**	***-0.3***
Population density (people per km^2) 1996 1/	**10**	**Average annual rate of inflation, 1990-96 2/**	***-2.9***
Local currency	**Rial Omani (OMR)**	**Exchange rate: USD 1 =**	**OMR 0.38**

Social Indicators		**Economic Indicators**	
Population (average annual population growth rate) 1980-96 1/	4.2	GDP (USD million) 1996 1/	*12 102*
Crude birth rate (per thousand people) 1996 1/	42	Average annual rate of growth of GDP 1/	
Crude death rate (per thousand people) 1996 1/	4	1980-90	8.3
Infant mortality rate (per thousand live births) 1996 1/	18	1990-96	*6.0*
Life expectancy at birth (years) 1996 1/	71		
		Sectoral distribution of GDP, 1996 1/	
Number of rural poor (million) 1/	n.a.	% agriculture	n.a.
Poor as % of total rural population 1/	n.a.	% industry	n.a.
Total labour force (million) 1996 1/	1	% manufacturing	n.a.
Female labour force as % of total, 1996 1/	15.3	% services	n.a.
		Consumption, 1996 1/	
Education		General government consumption (as % of GDP)	*31.5*
Primary school gross enrolment (% of relevant age group) 1995 1/	80.0	Private consumption (as % of GDP)	*41.8*
Adult literacy rate (% of total population) 1994 3/	*35.0*	Gross domestic savings (as % of GDP)	*26.7*
Nutrition			
Daily calorie supply per capita, 1992 3/	n.a.	**Balance of Payments (USD million)**	
Index of daily calorie supply per capita (industrial countries=100) 1992 3/	n.a.	Merchandise exports, 1996 1/	6 395
Prevalence of child malnutrition (% of children under 5) 1990-96 1/	14.0	Merchandise imports, 1996 1/	4 610
		Balance of merchandise trade	1 786
Health			
Health expenditure, total (as % of GDP) 1990-95 1/	n.a.	Current account balances (USD million)	
Physicians (per thousand people) 1994 1/	*0.9*	before official transfers, 1996 1/	1 394
Access to safe water (% of population) 1990-96 3/	82	after official transfers, 1996 1/	- 265
Access to health service (% of population) 1990-95 3/	96	Foreign direct investment, 1996 1/	67
Access to sanitation (% of population) 1990-96 3/	78		
		Government Finance	
Agriculture and Food		Overall budget surplus/deficit (including grants) (as % of GDP) 1995 1/	-10.1
Food imports as percentage of total merchandise imports 1996 1/	*20.3*	Total expenditure (% of GDP) 1995 1/	42.4
Fertilizer consumption (hundreds of grams per ha of arable land) 1994-96 1/	6 875	Total external debt (USD million) 1996 1/	3 415
Food production index (1989-91=100) 1994-96 1/	88	Total external debt (as % of GNP) 1996 1/	31
		Total debt service (% of exports of goods and services) 1996 1/	9.9
Land Use			
Agricultural land as % of total land area, 1994 4/	5.0	Nominal lending rate of banks, 1996 1/	9.2
Forest area (km^2 thousand) 1995 1/	0	Nominal deposit rate of banks, 1996 1/	6.9
Forest area as % of total land area, 1995 1/	0.0		
Irrigated land as % of cropland, 1994-96 1/	98.4		

n.a. not available.
Figures in italics indicate data that are for years or periods other than those specified.

1/ World Bank, *World Development Report*, 1998
2/ World Bank, *Atlas*, 1998
3/ UNDP, *Human Development Report*, 1997
4/ World Bank, *The World Development Indicators CD-ROM*, 1998

LOGICAL FRAMEWORK

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Risks and Assumptions
Goal			
- To promote sustainable and viable agricultural cropping systems.	If goal is not achieved, cropped land will eventually be reduced due to lack of water and poor viability.	Time-series statistics. Development of database. Satellite imagery interpretation.	Will depend on three key ministries implementing a coordinated programme.
Objectives			
- Balance groundwater abstraction with recharge. - Satisfactory incomes to be earned from agricultural production. - Reduce dependency of communities on public-sector funding. - Ensure vulnerable families and communities are not further disadvantaged because of budget costs.	- Achieve constant SWLs* in aquifers and maintain base flows from *aflaj*. - Improved agricultural incomes and satisfactory returns to investment. - Reduced demand from communities for public-sector assistance. - identifying vulnerable families and improved targeting of assistance.	- Data generated from monitored wells and sharias. - Sample survey and evaluation studies. - Time series comparisons of requests for assistance. - Establishment and monitoring of AWB targets.	- Identifying change is complicated by seasonal and annual variations. - Quantitative data collection will be difficult due to small plots. - Assistance requests could be influenced by availability of funds. - Will require an accurate database and meaningful definitions.
Outputs			
- Reduced water consumption. - Improved aquifer recharge. - Improved returns to water. - Greater community self-help. - Improved income generation.	- Annual water consumption from wells. - Change in groundwater SWLs. - Improving crop yields and production. - Community mobilization achievements. - Amounts and sources of income.	- Installation of water meters. - Installation of monitoring wells. - Sample survey and evaluations. - Project monitoring records. - Special surveys.	- Meters may be vulnerable to damage. - Assumes regulations will be approved and compliance will be satisfactory. - Will require improvements in social science skills of government staff.
Activities			
Improved Water Utilization			
- Accelerated conversion to MIS. - Extension and research in water management and crop husbandry.	- Areas converted to MIS by project. - Undertaking appropriate research and developing new technical packages.	- Project monitoring records. - Publication of research results. - Production of extension guidelines.	- Assumes MIS will be well managed. - Assumes results will appear early on in the life of the project.
Improved Water Conservation			
- Catchment management strategies. - Construction of dams and other groundwater recharge investments. - Strengthen regulatory mechanisms.	- Developing policies and CZ plans. - Numbers and standard of construction development of suitable technology. - Agreements and their application.	- Quality assessment of CZ plans. - Physical and financial monitoring plus investigative research. - Monitoring performance/compliance.	- May require difficult policy changes. - Will in part depend on outputs from research and investigative studies. - Some regulations will be unpopular.
Institutional Support			
- Develop community initiatives in water resource management. - Establish cost sharing and recovery mechanisms for resource development and maintenance.	- Success in awareness building and gaining community agreements. - Agreeing on cost-sharing ratios and introducing revenue earning schemes.	- Participatory evaluation exercises and activity monitoring. - Statements and minutes of authorizations and approvals.	- Divergent interests of water users in different parts of the catchment. - Some will require significant changes in government policy.
- Provide special concessionary assistance to vulnerable groups.	- Agreements on rates-of-assistance scale of programme actually implemented.	- Physical and financial monitoring and special evaluation studies.	- Will depend on joint programmes in conjunction with MSAL staff.

* Static water level.

QUANTITATIVE INPUTS, TARGETS AND KEY PROJECT FACTORS

OBJECTIVES

The objective of the project is to promote sustainable and viable agricultural cropping systems through:

(i) achieving a balance between groundwater abstraction and recharge

(ii) improving productive and economic returns from irrigation water

(iii) reducing dependence of rural communities on public funding of water management

BENEFITS

No. of beneficiary households production 22 430

Incremental Production at Full Development

Dates	3 536	t/year
Tomatoes	1 983	t/year
Cucumber	2 640	t/year
Fodder	6 125	t/year

FINANCIAL AND ECONOMIC ANALYSIS

	Net Income (OMR)		Return/Person (OMR)	
	WOP	WP	WOP	WP
MIS in *falaj*	117	239	4.2	8.4
Flood to MIS	2 300	3 080	19.8	27.
Greenhouse/MIS	779	2 028	16.1	21.

Economic Analysis

Base cost	17%
Sensitivity	
Cost +10%	14%
Benefits -10%	14%
Benefits lag one year	13%

INSTRUMENTS AND TARGETS

	PY 1	PY 2	PY 3	PY 4	PY 5	PY 6	TOTAL
Water Utilization Improvement **Unit**							
* MIS systems on well irrigation fd	75	150	550	550	550	550	2 425
* MIS systems on *aflaj* irrigation fd	30	60	150	150	168	167	725
* MIS for combined well/*aflaj* fd	50	75	125	200	200	200	850
* Green houses (no)	10	20	75	75	75	75	330
Water Conservation Improvement							
* Recharge dams (no)	-	-	1	2	1	1	4
* Water harvesting structures (no)	1	2	3	3	3	3	15
* Seepage pits (no)	-	3	8	13	13	13	50
* Recharge pumps (no)	-	1	3	7	7	7	25
* *Aflaj* gallery repairs (no)	5	12	22	22	22	22	105
* Motherwell construction (no)	2	3	5	5	5	5	25
* Distribution systems (no)	2	5	11	11	11	11	51
	1	2	5	5	6	6	25
Community Support							
* WUA (no)	8	17	30	30	30	30	145

PROJECT COSTS

Component	USD million	%
Water utilization improvement	19.0	52
Water conservation	11.1	31
Community support	3.6	10
Management support	2.5	7
Subtotal	**36.2**	**100**
Contingencies	**1.8**	**5**
TOTAL	**38.0**	**105**

FINANCING

	USD million	%
IFAD	5.2	14
AFESD	15.2	40
GOV	8.4	22
BENEFICIARIES	9.3	24
TOTAL	38.0	100

COSTS AND FINANCING

Expenditure Accounts by Components - Base Costs
(USD '000)

	Water Utilization Improvements	Water Resource Improvements	Community Support	Management Support	Total	%	Physical Contingencies Amount
I. Investment costs							
A. Civil works							
Catchment improvements	-	5 779	-	-	5 779	5,0	289
Aflaj rehabilitation	-	4 390	-	-	4 390	-	-
Investigative civil works	-	56	-	-	56	5,0	3
Subtotal civil works	-	10 225	-	-	10 225	2,9	292
B. Equipment, vehicles & materials							
Modern irrigation systems	15 125	-	-	-	15 125	-	-
Greenhouse	2 143	-	-	-	2 143	-	-
Materials	631	481	-	-	1 112	5,0	56
Equipment	18	-	-	48	66	-	-
Vehicles	84	-	-	84	168	-	-
Subtotal equipment, vehicles & materials	18 001	481	-	132	18 613	0,3	56
C. Special assistance funds	-	-	3 091	-	3 091	-	-
D. Technical assistance, studies & training							
Technical assistance	135	30	312	540	1 017	-	-
Training	842	123	208	50	1 224	-	-
Subtotal technical assistance, studies & training	977	153	520	590	2 241	-	-
Total investment costs	18 978	10 859	3 611	722	34 169	1,0	347
II. Recurrent costs							
A. Salaries & allowances	-	-	-	1 252	1 252	-	-
B. Operation & maintenance	-	250	-	95	345	5,0	17
C. Annual supplies	26	-	70	442	538	5,0	27
Total recurrent costs	26	250	70	1 789	2 135	2,1	44
Total baseline costs	19 004	11 108	3 681	2 511	36 304	1,1	391
Physical contingencies	33	328	4	27	391	-	-
Price contingencies	833	547	35	29	1 444	1,2	18
Total project costs	19 870	11 983	3 720	2 567	38 140	1,1	409
Taxes	32	27	-	7	66	3,9	3
Foreign exchange	9 975	6 274	338	719	17 306	1,2	209

Disbursement Accounts by Financiers

(USD '000)

	Beneficiaries		IFAD		AFESD		Government		Total			Local (Excl.	Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	For. Exch.	Taxes)	Taxes
A. Civil works													
Catchment improvements	53.4	0.8	-	-	3 184.5	50.0	3 131.5	49.2	6 369.7	16.7	3 311.7	3 058.0	-
Aflaj rehabilitation	1 587.7	34.6	-	-	2 294.7	50.0	707.0	15.4	4 589.4	12.0	2 378.6	2 210.8	-
Investigative civil works	-	-	-	-	53.2	90.0	5.9	10.0	59.1	0.2	29.7	29.4	-
Subtotal civil works	1 641.1	14.9	-	-	5 532.7	50.2	3 844.4	34.9	11 018.2	28.9	5 720.0	5 298.2	-
B. Materials & vehicles													
MIS – cells -	4 830.7	50.0	-	-	4 830.7	50.0	0.0	-	9 661.3	25.3	4 530.3	5 131.0	-
MIS *Aflaj*	683.3	25.0	-	-	1 366.7	50.0	683.3	25.0	2 733.3	7.2	1 281.2	1 452.1	-
MIS – combined -	846.6	25.0	-	-	1 693.2	50.0	846.6	25.0	3 386.4	8.9	1 587.9	1 798.5	-
Greenhouse	1 143.7	50.0	-	-	1 143.7	50.0	0.0	-	2 287.4	6.0	1 747.6	539.8	-
Materials	-	-	548.7	45.0	488.6	40.0	183.1	15.0	1 220.4	3.2	924.8	241.5	54.1
Equipment	-	-	-	-	53.3	80.0	13.3	20.0	66.6	0.2	56.7	6.6	3.3
Vehicles	-	-	80.3	47.4	80.8	47.6	8.5	5.0	169.5	0.4	144.2	16.8	8.5
Subtotal materials & vehicles	7 504.3	38.4	629.0	3.2	9 656.9	49.5	1 734.8	8.9	19 525.0	51.2	10 272.9	9 186.2	65.9
C. Special assistance funds	**-**	**-**	**1 868.3**	**60.0**	**-**	**-**	**1 245.5**	**40.0**	**3 113.8**	**8.2**	**-**	**3 113.8**	**-**
D. TA, studies & training	**-**	**-**	**2 280.3**	**100.0**	**-**	**-**	**-**	**-**	**2 280.3**	**6.0**	**1 186.5**	**1 093.8**	**-**
E. Operation & maintenance	**167.1**	**7.6**	**471.4**	**21.4**	**-**	**-**	**1 564.3**	**71.0**	**2 202.7**	**5.8**	**126.9**	**2 075.9**	**-**
	9 312.4	24.4	5 248.9	13.8	15 189.6	39.8	8 389.0	22.0	38 140.0	100.0	17 306.3	20 769.8	65.9

APPENDIX V

ORGANIZATION AND MANAGEMENT

1. **Executing Agencies.** In view of the division of ministerial responsibilities and influence in water resource utilization and management issues and the need to address these issues in a holistic manner, the project will be the combined responsibility of three ministries: Ministry of Agriculture and Fisheries (MAF); Ministry of Water Resources (MWR) and the Ministry of Social Affairs and Labour (MSAL). MAF will be the lead ministry. While there will be a major need for coordination between the three ministries to ensure that the interdependence of activities is recognized and reflected throughout the planning and implementation of the project interventions, MAF and MWR will be fully responsible for implementation of the core investment activities of the project, which lie within their purview following their normal practices and procedures. MSAL's principal role will be as a collaborative agency in the 'software' aspects of local institutional development, building on their experience in community development and their network of field-level workers and volunteers.

2. Within this overall framework, ***MAF will be responsible for***:

- promoting and implementing the installation of modern irrigation systems, including the selection of beneficiaries within designated project catchment zones, in accordance within the overall framework and guidelines established by the Project Steering Committee;

- providing training to farmers in the operation and maintenance of the MIS;

- providing guidance and training to the farmers in improved water utilization and management and in improved crop husbandry through the extension service;

- carrying out research to improve the effectiveness of water utilization under MIS including investigation into more cost-effective designs for MIS schemes, investigation of crop water requirements and improved crop husbandry techniques for dates, field crops and protective agriculture;

- working in collaboration with MWR and MSAL to enhance community awareness of water conservation and management issues and the role of MIS systems in water conservation and to facilitate the formation of water users associations to address these issues;

- working in collaboration with MWR and MSAL in identification of *aflaj* for the installation of MIS with MSAL assisting with community interaction to gain community acceptance of the scheme and willingness of community to contribute to scheme costs; and

- developing monitoring models and undertaking assessment studies to evaluate the impact on water utilization, yields and farm economics of the improved water utilization and crop husbandry practices promoted under the project.

3. ***MWR will be responsible for:***

- identifying and recommending critical catchment zones for location of project activities on the basis of available information on the decline in the water table, etc., for approval by the PSC;

- identification of appropriate locations for water conservation structures, e.g., recharge dams, retention dams, seepage pits, etc., within the designated project catchment zones; design and implementation of schemes;

- identification, prioritization and selection of *aflaj* repairs within designated project catchment zones; design and implementation of schemes;

- interacting with communities, with the assistance of MSAL, to facilitate community contribution to the *aflaj* repairs;

- collaborating with MAF and MSAL in the identification of *aflaj* in lower catchment areas within the designated project catchment zones for installation of MIS, with MWR responsible for installation of support wells and MSAL assisting with community interaction;

- undertaking research and field testing on alternative technologies for water conveyance within *aflaj* systems;

- developing monitoring models and undertaking assessment studies to evaluate impact of the various catchment strategies promoted under the project; and

- working in collaboration with MWR and MSAL to enhance the awareness of communities to water conservation and management issues and the role of MIS systems in water conservation and to facilitate the formation of water users associations to address these issues.

4. ***MSAL will be responsible for:***

- assisting MAF in interacting with communities to promote the installation of MIS in selected *aflaj* and facilitating the participation of the community in the planning and design of the scheme and the management arrangements;

- assisting MWR in interacting with communities to promote the concept of community contribution to the cost of *aflaj* repairs;

- working in collaboration with MWR and MAF in interacting with communities to enhance awareness of communities to water conservation and management issues and to facilitate the formation of water users associations to address these issues;

- providing training to women farmers in water utilization and improved crop husbandry practices and crop processing and preservation;

- assisting MWR to identify and assess the eligibility of vulnerable communities to access the special assistance funds under the project where communities are unable to raise the necessary community contribution for *aflaj* repairs, etc.

- assisting MAF to identify and assess the eligibility of small family farms to receive assistance for the establishment of greenhouses under the project; and

- ensuring that woman-headed households and other vulnerable households are included on a priority basis among the beneficiaries of project activities.

5. An interministerial ***Project Steering Committee (PSC)*** will be established to provide the necessary overall framework for the coordination of project activities. The PSC will be chaired by MAF. The membership will indicatively comprise the implementing agencies (MAF, MWR and MSAL) and consultative agencies including the Ministry of National Economy and Ministry of Finance. The principal role of PSC will be to:

- provide conceptual, strategic and policy guidelines for project implementation;
- provide a forum for the implementing agencies to express their views and priorities regarding project implementation;
- provide a forum for the interchange of experience and information between implementing agencies;
- review and sanction selection of catchment zones for inclusion in both the pilot and development phases of the project;
- review and approve annual workplans and budget for the project;
- review and sanction expenditures under the institutional support component of the project
- review project progress and performance; and
- resolve any implementation problems, flow of funds, etc.

6. PSC will be supported by a ***technical working group (TWG)*** that will constitute the core forum for the coordination of project activities. The TWG will bring together technical experts from MAF (irrigation, agricultural affairs, extension and information, research and planning); MWR (water resources, water conservation, dams and *aflaj*, public awareness and planning) and MSAL (community development). The task of TWG will be to pool all available data and expertise to develop coherent catchment management strategies and detailed development plans for the designated project catchment zones. The principal role of TWG will include:

- presentation of data indicating priority catchment zones for selection for project interventions;

For designated project catchment zones:

- provision of detailed water-balance calculations;
- modelling of present/future use including data on present/future cropping patterns and water requirements;
- economic and geo-hydrological evaluations;
- development of a ***water management strategy*** for the catchment zone that will, *inter alia*, include:
  - role of recharge dams, farm storage dams, and other water conservation structures;
  - percentage of area that needs to be covered by MIS and critical locations within the catchments;
  - focus of regulatory measures; and
  - strategy for community participation and focus of community action;
- drawing up of phased, comprehensive, integrated ***Catchment Zone Development Plan*** that will, *inter alia*, indicate:
  - type/number/location of water conservation structures;
  - area and location for MIS;
  - priority *aflaj* for rehabilitation and repair;
  - identification of target communities, which will need to be the focus of community participation and encouragement of formation of water users associations;
  - design of public awareness campaigns through collaboration between MAF/MWR/MSAL;

- design and schedule of training programmes for farmers adopting MIS in operation and maintenance, crop water requirements and improved crop husbandry; and
- develop the roles, tasks and work programme for the field level task force.

7. The PSC will be serviced by a small ***Project Coordination Unit (PCU)*** with full-time staff for the day-to-day coordination of project activities. PCU will be physically located in Muscat, and organizationally located within MAF (the lead Ministry) but will report directly to the PSC. The costs of PCU will be shared between MAF and MWR in proportion to the project funding received by the two ministries. The principal role of PCU will be to:

- ensure that the necessary levels of coordination and cooperation are achieved among the different agencies and that workable operating systems are established at the field level;
- compile the overall annual workplan and budget based on the catchment zone development plans developed by TWG;
- guide, facilitate and monitor the work programmes of the task force in each designated project catchment zone;
- guide, facilitate and monitor the formation of water users associations;
- maintain a data base on the designated project catchment zones;
- establish monitoring and evaluation criteria, in collaboration with MAF, MWR and MSAL, for the project activities;
- monitor and evaluate the progress and performance of the project although some of these responsibilities will be delegated to the implementing agencies;
- preparing aggregate monitoring and progress reports for submission to GOM and the financing institutions;
- maintain consolidated project accounts;
- contract technical assistance inputs; and
- administer the Special Assistance Trust Fund under the direction of the Board of Trustees.

8. PCU is not intended to represent any structural change in ongoing institutional arrangements. It will not have any specific authority over staff other than those appointed directly to PCU, but it could, and will, receive delegated authority on an 'as needed' basis by way of decisions ratified by PSC. The staff of PCU, who will all be Omanis, will comprise: project coordinator, financial controller, water management specialist, M&E officer and community development specialist with supporting clerical staff. The staff of PCU will be drawn from existing staff in MAF/MWR/MSAL without incurring any additional budgetary burden – the only exception could be the project coordinator who may be recruited under local contract in order to provide the necessary neutrality required to foster the development of coordination and collaboration between the implementing agencies.

9. Each designated project catchment zone will be assigned a ***task force*** (TF), which will cover the field staff of the three concerned ministries who have normal field-function responsibilities within all, or part, of the area represented by a CZ. Indicatively this is likely to include an MAF irrigation engineer, MAF extension officer from the Agricultural Development Centre serving the area; MWR engineers from the regional office responsible for water management, monitoring and regulation covering the CZ area and MSAL field workers. The principal role of the TF will be to:

- interact collectively with communities to raise awareness of water management issues and to promote the formation of, and provide support to, water users associations;
- assist water users associations in developing systems of self-regulation;
- coordinate programmes to ensure that a full range of assistance reaches project beneficiaries e.g., to ensure that extension service guidance reaches farmers in *aflaj* that are being rehabilitated by MWR; and

- ensure that more disadvantaged members of the community are included in project activities and additional assistance is provided to vulnerable households/communities where necessary.

10. The role of the ***community*** through the formation of ***water users associations*** combined ultimately into a catchment association will be to provide a focal point for consultation and cooperation on water management; act as a forum for awareness-building on the importance of water conservation; develop community self-regulatory mechanisms on priority water use. mobilize local resources as a community contribution to the cost of *aflaj* repairs; and provide a mechanism for establishing and implementing local policies in management and control of groundwater abstraction.

11. During the pilot phase, the PCU will be supported by limited technical assistance inputs to facilitate, in particular, the new approaches to coordinated planning and community participation. These inputs will comprise:

(a) ***Project management adviser*** (6 months in PY1) to provide guidance on the drawing up of annual work plans and budgets, and reporting requirements.

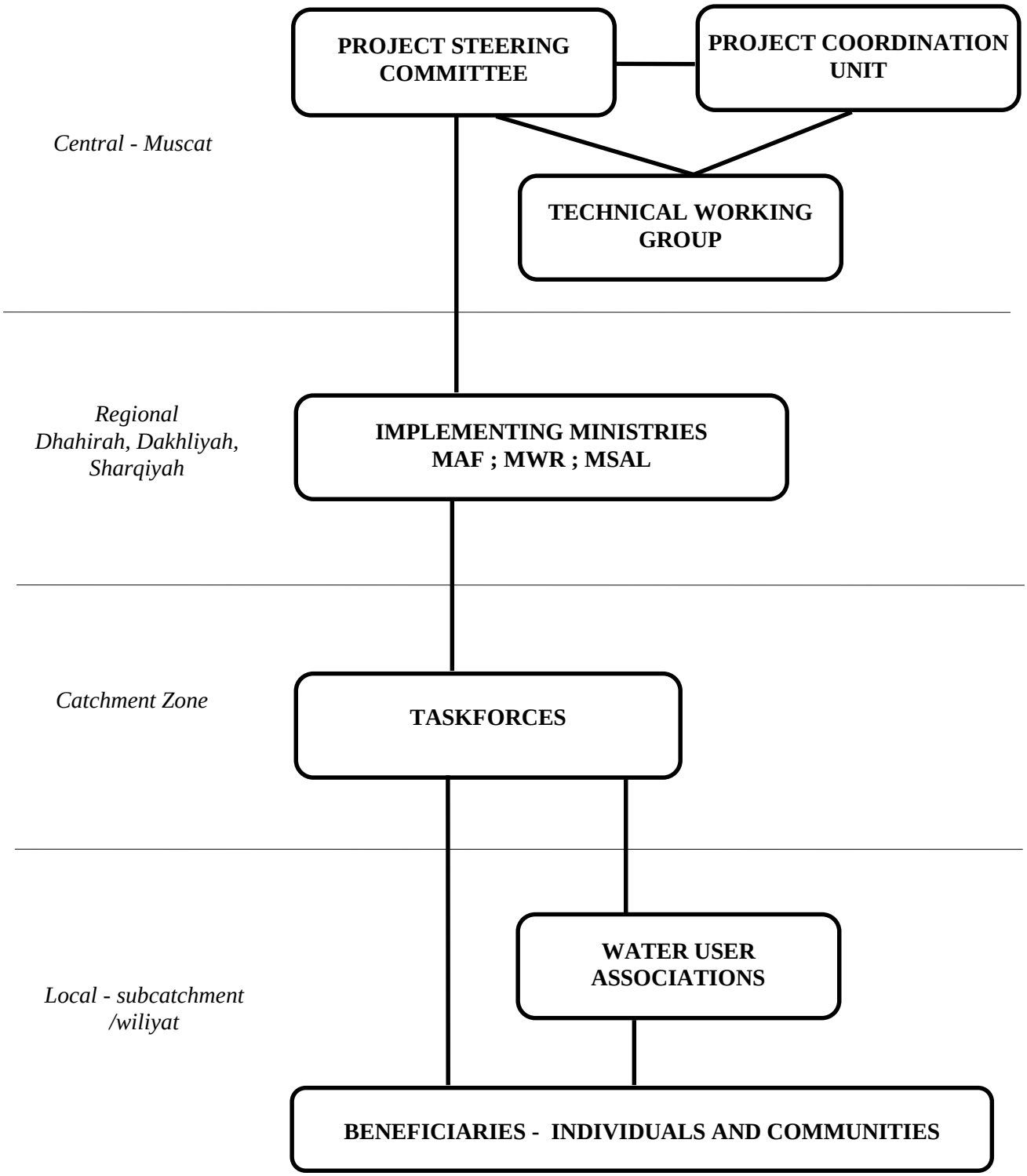
(b) ***Water resource management expert*** (24 months PY1-3) will have water resource management, engineering and agricultural skills and will bring valuable expertise to the integrated planning processes for the designated project catchment zones, assist in drawing together the Catchment Zone Development Plan, establishing strategies and programmes for facilitating the formation of water users associations (WUAs) in collaboration with the community development expert, and establishing monitoring and evaluation criteria.

(c) ***Monitoring and evaluation specialist*** (3 months in PY 1-2) will have skills and experience in techniques of rapid rural appraisal and participatory evaluation and will be involved in training local staff, particularly the field staff of the task forces, as well as setting up integrated survey, monitoring and evaluation systems.

(d) ***Financial adviser*** (2 months in PY1) will be experienced in public-sector finance and international aid and will be responsible for establishing accountancy and financial reporting systems as required by the Government, IFAD and AFESD.

APPENDIX V

PROJECT ORGANIZATIONAL STRUCTURE



FINANCIAL AND ECONOMIC ANALYSIS

A. Financial Analysis

1. Financial models have been prepared for all the key crops under the different production conditions relevant to the project interventions. In addition, representative farm models have been developed to illustrate incremental incomes at the farm level due to the various project interventions. These models represent: (i) the installation of modern irrigation systems within a *falaj* system based on a typical *falaj* holding of 0.4 *feddan* dominated by date palms with understorey cropping with vegetables; (ii) the conversion of a small-scale well-irrigated commercial farm of 2.5 *feddan* from flood irrigation to modern pressurized irrigation systems to reduce water utilization in the cultivation of dates, vegetables and fodder. Investments in the MIS are accompanied by improved crop husbandry practices increasing yields and product quality; and (iii) a small farm of one *feddan* where one greenhouse and a modern irrigation system for the cultivation of dates and fodder are provided to make the farm a viable unit. The results, as shown below, indicate that household income from agricultural activities (without labour, which is assumed to be provided by the family) will increase by 28% to 130% and returns to family labour will be well above the market wage rate.

		Farm Family Benefit			Return per Person/day		
	Unit	WOP	WP	Increase	WOP	WP	Increase
F-M 1 – MIS in *falaj*	OMR	155	268	113	5.6	9.7	4.1
F-M 2 – Flood to MIS	OMR	2 188	2 790	602	18.9	25.3	6.4
F-M 3 – Greenhouse/MIS	OMR	780	1 801	1 021	16.2	20.1	3.9

2. The impact of the installation of MIS accompanied by improvements in crop husbandry is to significantly increase the returns to water with the gross margin per cubic meter of water, ranging from an increase of 60% for fodder production to a fourfold increase for date palms.

B. Economic Analysis

3. The economic viability of the project has been evaluated over a 20-year period to reflect the economic life of the major project investments. Given the open nature of the Oman economy and the absence of taxes and duties on agricultural equipment and inputs, financial prices are representative of economic prices.

4. Economic analysis has been undertaken separately for the major project interventions where benefits can be quantified, viz. (i) installation of MIS within the *aflaj* system; (ii) conversion of flood irrigation to MIS on farms irrigated by wells; (iii) adoption of greenhouse production by small farm families; (iv) *aflaj* rehabilitation where it is assumed that crop yields will continue to decline in the future if urgent repairs are not carried out to restore the water flow and enable the productivity of the date palms to return to their previous levels; and (v) recharge dams and other water conservation structures. These models include identification of the water savings through the adoption of MIS. It is assumed that 25% of the water saved by the adoption of MIS will have contributed to aquifer recharge in any event and 75% represents additional water savings available for use. Since the project interventions will be targeted at areas of water deficit and declining agricultural productivity, the water saved is assumed to contribute to sustaining and stabilizing agricultural production and hence has been valued on the basis of the average gross margin per unit volume of water according to the average cropping pattern prevailing in the project area.

5. The rate of return on the installation of MIS within the *falaj* is 13% whereas the conversion from flood to MIS for irrigation from well irrigation generates a rate of return of 23%. The combination of MIS and the establishment of a greenhouse yields a rate of return of 23%, while *aflaj* rehabilitation generates a rate of return of 24%. The total additional water made available through the project interventions for improved utilization and water conservation amounts to around 7 million m^3 of which 5.9 m^3 is due to conversion to drip irrigation. In common with other experience in Oman, the investment in water conservation structures is found not to be justified solely on the potential production benefits of the additional water being stored. There are, however, significant social benefits as these structures will be strategically targeted at communities that are facing critical water shortages both for domestic use and to maintain livestock, which represents a significant source of income to these communities. In the final analysis, the cost of bringing water from elsewhere will entail very high costs. Following the approach adopted in other feasibility studies a higher crop value of water has been adopted as a proxy for these social benefits generating a rate of return of 4% on water conservation structures.

6. The overall economic rate of return of the project is 14%. The rate of return is remarkably stable with a 10% increase in costs reducing the rate of return to 11% and a 10% decrease in benefits reducing the IRR to 12%. A delay in the benefit stream by one year will reduce the IRR to 11%.