

**AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT IDENTIFICATION DOCUMENT
FACESHEET (PID)**

1. TRANSACTION CODE
 A = Add
 C = Change
 D = Delete
 Revision No. _____

DOCUMENT CODE
1

2. COUNTRY/ENTITY
Morocco

3. PROJECT NUMBER
 608-0201 **64237**

4. BUREAU/OFFICE
ANE/USAID Morocco
 A. Symbol _____ B. Code 608

5. PROJECT TITLE (maximum 40 characters)
 High Atlas Watershed

6. ESTIMATED FY OF AUTHORIZATION/OBLIGATION/COMPLETION
 A. Initial FY 9|0|
 B. Final FY 9|5|
 C. PACD 9|6|

7. ESTIMATED COSTS (\$000 OR EQUIVALENT, \$1 = Dhms 8.5)

FUNDING SOURCE		LIFE OF PROJECT
A. AID	ESF	25,000
B. Other U.S.	1.	
	2.	
C. Host Country		21,000
D. Other Donor(s)		
TOTAL		46,000

8. PROPOSED BUDGET AID FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. 1ST FY <u>90</u>		E. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ES	280	066		3,000		25,000	
(2)							
(3)							
(4)							
TOTALS					3,000		25,000

9. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)
 096 099

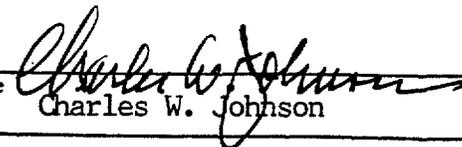
10. SECONDARY PURPOSE CODE

11. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)
 A. Code BS R/AG ENV
 B. Amount 11,000 10,000 25,000

12. PROJECT PURPOSE (maximum 480 characters)

To develop, demonstrate and disseminate improved watershed management practices in the High Atlas Mountains.

13. RESOURCES REQUIRED FOR PROJECT DEVELOPMENT
 Staff: USDH - ENR/AGR, PDPE/PROG, OFM, RLA/RCO, EXEC. MGT - 12 person months total
Contracts - Watershed management planning, mountain agronomy, livestock and range management, soil and water conservation, agricultural economics, forestry and social anthropology expertise - 11.5 person months total
 Funds: USDH - O+E
Contracts - \$150,000 PD+S

14. ORIGINATING OFFICE CLEARANCE
 Signature 
 Charles W. Johnson
 Title USAID Director
 Date Signed MM DD YY
 10 17 89

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
 MM DD YY
 | | | | | |

16. PROJECT DOCUMENT ACTION TAKEN
 S = Suspended CA = Conditionally Approved
 A = Approved DD = Decision Deferred
 D = Disapproved

17. COMMENTS

18. ACTION APPROVED BY
 Signature _____
 Title _____

19. ACTION REFERENCE
20. ACTION DATE
 MM DD YY
 10 30 89

PROJECT IDENTIFICATION DOCUMENT (PID)

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I. SUMMARY AND RECOMMENDATION

A. Summary

With its relatively developed physical and human resources, Morocco has both the motivation and capability to set a regional example on correctly addressing natural resource degradation, deforestation and dryland desertification. The effective management of watershed resources is critically important to Morocco. The low and variable level of rainfall in Morocco has dictated construction of an extensive network of dams and reservoirs throughout the country to capture the erratic precipitation and provide electric power production, irrigation and municipal and industrial water supplies. The effective operation of these infrastructure investments is vital to the overall economy of the country.

The benefits of these dams and associated systems, however, are seriously threatened by siltation of their reservoirs. The accelerating extension of rainfed agriculture onto increasingly steep and marginal lands, the historical neglect of mountain agriculture, the paucity of inputs and techniques for sustainable mountain agriculture production and the over-exploitation of forest lands are leading to watershed degradation and soil erosion far above sustainable levels. While the Government of Morocco has made significant efforts in soil and water conservation over the years, investments in dams and associated downstream systems have far exceeded upstream protective measures. In addition, these efforts have not fully taken into account the integrated nature of watershed management and the need to address socio-economic factors in the mountain areas. A systematic, cost-effective, multi-disciplinary approach to watershed management is urgently required to reduce the threat to Morocco's hydraulic infrastructure.

The seven year High Atlas Watershed Project will develop, demonstrate and disseminate improved watershed management practices within key areas of Azilal Province. This is a region in the High Atlas Mountains which contains the watersheds of three major dam systems and is the source of over 40% of Morocco's total estimated surface water supplies. The project will address resource management: soil and water conservation and reforestation as well the key socio-economic variables affecting resource use in watersheds, including the sustainability of mountain farming systems and promoting community participation. While set in Azilal Province, the techniques and systems developed by the project are intended for eventual application in watershed areas throughout the country.

Under the project, AID and the Government of Morocco will fund technical services in watershed management planning and applied research and demonstration; short and long-term training in key technical areas; research and demonstration equipment; construction or renovation of research and nursery facilities; and a watershed demonstration program with activities in soil and water conservation, forestry and agricultural improvement. Total project cost is \$46,000,000, of which \$25,000,000 (54%) will be AID funded. The key implementing agency will be the Azilal Provincial Office of the Ministry of Agriculture and Agrarian Reform, with the participation of various research, extension and education institutions and local authorities.

By the end of the project, a strengthened regional capacity for integrated land use planning and management will have been developed; soil and water conservation and mountain agricultural production techniques and systems will have been improved and demonstrated; and improved mechanisms for promoting community involvement in sustainable natural resources management and use will have been developed and tested. These outputs will result in a greatly improved capacity in both Azilal Province and throughout the country for cost effective, sustainable management of critical watersheds.

B. Recommendation

USAID Morocco recommends that the AA/ANE approve this Project Identification Document and authorize the Mission to design and approve the ensuing Project Paper for a \$25.0 million ESF grant.

II. PROGRAM FACTORS

A. Conformity with Host Country Strategy

The effective management of the nation's watershed resources is of vital economic importance to Morocco. Due to the country's low and variable rainfall, the GOM has invested heavily since Independence in the construction of an extensive network of dams and reservoirs to capture this erratic precipitation and to distribute the water more evenly over time to the various user groups. Today, some 34 existing large dams in Morocco possess a total storage capacity of almost 10,000 million cubic meters (Mm³) of water. In addition, six new dam systems, comprising an estimated additional 4,600 Mm³ of storage capacity, are planned or under construction. The GOM's current five-year development plan calls for Dirhams 5 billion, or about \$600 million, in dam-related construction and operations and maintenance costs over the 1988-92 period, accounting for some 8% of total planned investments.

Together, these existing dam facilities are capable of irrigating 567,000 ha., generating 1,500 GWH of electric power and providing 500 Mm³ of municipal water supplies. For irrigation, this area represents 68 percent of the total national capacity, accounting for some 30 percent of all agricultural value added and 40 percent of total agricultural exports. Similarly, hydro-power installations account for one-third of the total national power generation capacity and 10-15% of actual production, depending upon annual water availability. In fossil fuel poor Morocco, this hydro-power yields significant direct savings in oil imports and foreign exchange reserves. A reliable source of domestic and municipal water supplies is, of course, also extremely precious in this semi-arid country. The continued effective operation of these substantial investments is critical to the whole economy.

In recognition of these facts, the GOM has devoted considerable resources over the years to soil and water conservation. Since 1951, over 318,000 ha. of farm, range and forest lands have been treated with soil and water conservation measures. However, since Independence, investments in downstream dam and irrigation system construction have far outpaced associated upstream

protective works. In addition, although increasingly effective, these conservation measures have suffered from a lack of appreciation of the integrated nature of watershed management, and of the need to effectively address the various socio-economic factors at play in mountainous areas of the country for sustainable and cost-effective results.

More recently, with evident, mounting population pressure in upstream areas and the resultant siltation of downstream investments, the GOM has come to better appreciate the necessity for an increased emphasis on watershed management. The first tangible evidence of this occurred in January 1988 with the first national watershed management seminar. The seminar highlighted the economic importance of watershed management to Morocco, and stressed that sustainable economic development in mountainous areas is inseparable from the protection of downstream infrastructure investments. His Majesty, Hassan II, subsequently endorsed these recommendations in a preamble to the current 1988-92 national Five-Year Economic Development Plan, directing that special importance must be accorded natural resources and environmental conservation.

Thus, the current five-year plan contains a new policy directive that management of the watershed of each future dam will be considered an integral part of the overall dam project. Recent discussions with the Minister of Agriculture and Agrarian Reform (MARA), directly confirmed the importance the GOM now attaches to this critical aspect of national economic development. In addition, the Minister personally sought USAID assistance in recognition of the U.S.'s comparative expertise in this development area. The Minister wants AID to tackle this toughest of Morocco's natural resources management problems in one of the most neglected provinces in the country.

Analysis of GOM budgetary data indicate a steadily increasing amount of government resources devoted to watershed management. The share of public investments in agriculture being devoted to the forestry sector has risen from 7.3% to 8.5% to 12% over the last three five-year planning periods, i.e., 1973-77, 1981-85 and 1988-92, respectively. Over the 1985-87 period, these investments averaged Dirhams 237 million (\$28 million) per year. At present, the GOM is implementing two priority watershed management projects with its own resources; several other activities are planned to start in the near future. These commitments are in addition to the considerable government resources devoted each year to nation-wide programs in fruit tree planting, reforestation and soil and water conservation works, such as those supported under the USAID's PL 480 Title II Compensatory Food Program (CFP). It should be noted, however, that the proposed project will begin just as the CFP is ending.

Recent World Bank projections indicate that funding allocations for this sector are planned to increase to more than Dirhams 300 million (\$35 million) per year over the current five-year plan implementation period. In fact, the forestry sector has been targeted by the Bank and the GOM as one of the nation's development priorities under Morocco's ongoing structural development program due to its importance to the national economy. It remains to be seen, however, whether the austere GOM budget can fulfill these intentions.

Despite such investments, it has been estimated that it could take up to 200 years, at the present pace, to properly treat the watersheds of the existing dams in Morocco. External support is therefore required, both to complete the necessary remedial works and to assist the GOM to develop improved, cost-effective watershed management measures enlisting the full participation of mountain people.

B. Relationship to the Country Development Strategy Statement

The project will assist the GOM to develop, demonstrate and disseminate improved watershed management practices in key areas of Azilal Province, the source of over 40% of Morocco's total estimated surface water supplies. The integrated nature of this development problem requires a multi-faceted approach to obtain effective results. Thus, in addition to the typical natural resources management concerns of soil and water conservation and reforestation, the project will address the key socio-economic factors affecting resource use in watershed areas of Morocco -- namely, the sustainability of mountain farming and livestock systems, and appropriate mechanisms for promoting community support to improve natural resources management and use. This dual-track approach is based upon the internationally accepted fact that truly sustainable natural resources management can only be achieved by improving the livelihood of the impoverished rural populations in these areas, a fact well-known to the Asia and Near East (ANE) Bureau through experiences in Nepal, Bangladesh and Indonesia.

The project is fully consistent with the Mission's Country Development Strategy Statement (CDSS) and the emerging themes of the new ANE Bureau Natural Resources Management and Agricultural and Rural Development strategies. As indicated in the Bureau's ARD strategy for low-income transitional economies such as Morocco, the project focuses on protecting and enhancing the performance of some of the nation's most valuable economic and agricultural investments. The project will also build upon substantial PL 480 food assistance provided over the past 25 years in the form of budgetary support for forestry under Title I, and various reforestation, agroforestry and soil and water conservation food-for-work activities under the Title II Compensatory Food Program.

Morocco presents an excellent opportunity to help stem the worldwide trend towards natural resource degradation, deforestation and dryland desertification -- topics of global concern due to their serious cumulative negative international environmental and economic consequences. As a result of its relatively favorable physical and human resources, Morocco has both the motivation and capability to set a regional example of the correct manner in which to address these important natural resources management issues. Moreover, its excellent higher educational capacity provides the additional requisite of being able to effectively disseminate achievements to other concerned regional interests.

C. Other Donor Activities

Other donors active in watershed management in Morocco today include the World Bank, the United Nation's Development Program and the Food and Agriculture

Organization (UNDP/FAO), the World Food Program (WFP), the Federal Republic of Germany (GTZ) and Italy.

The World Bank has for quite some time been the major donor in this area. In addition to two recent agricultural sector development loans in 1985 and 1988, which included significant forestry-related components, the Bank has provided funding for five projects with important watershed management objectives, which either have been recently completed, i.e., Gharb-Mamora Forestry I Project, or are still underway, i.e., Loukkos, Fez-Karia-Tissa, Moyen-Atlas and Oulmes-Rommani Projects. The Loukkos and Fez-Karia-Tissa projects are well-known to the Mission and were closely examined during the recent watershed management assessment conducted in April 1989. The others will be examined more closely during the ensuing stages of project design.

Of greater importance is a major new World Bank forestry initiative, Forestry II, estimated at \$50 million which is currently in the final stages of preparation. This project, to be implemented over the same approximate timeframe as the USAID project, provides significant assistance for virtually all areas of forestry sector development in Morocco, including an estimated \$5 million for watershed management. This latter component will extend watershed management activities already started under the Bank's Loukkos project in the northern Rif Mountains of Morocco, and complete watershed management plans, research and physical works for one or two additional, as-yet-unidentified river basins. As such, this activity should both complement, and benefit from, the USAID project. The Mission is closely following the development of this activity with Bank and GOM officials to ensure maximum coordination.

UNDP/FAO assistance for watershed management in Morocco has been provided over the years primarily in the form of technical assistance and training for: (1) completion of specific technical studies; (2) facilitation of other donor sectoral activities; and (3) institutional development for watershed management. Recent discussions with UNDP representatives indicate that this assistance will be continuing with a new institutional strengthening grant in the amount of \$935,000. This new activity will provide technical assistance, training and limited commodities in support of the four new regional watershed management study centers located at Al Hoceima, Fes, Marrakech and Agadir. Accordingly, it will directly support the planned USAID project by augmenting the planning expertise of the Marrakech regional center serving Azilal Province.

In addition, the UNDP is also preparing a \$1.0 million grant for social, agricultural and forestry development activities in 4 communes of the central High Atlas Mountains, three of which are situated within Azilal Province. The three Azilal communes constitute approximately 178,000 ha., or slightly less than one-fifth of the total provincial area, situated at the extreme southeastern provincial boundary along the crest of the Atlas Mountains' divide. Thus, these modest resources will be applied across a significant proportion of the highest and most remote regions of the province. This should prove to be a most challenging pilot experience, providing excellent information and collaborative opportunities for the USAID project. At the

operational level, the almost simultaneous implementation of this higher mountain activity should facilitate USAID project efforts by permitting USAID a greater focus on the more populated and economically important watershed areas located further downstream within the province.

Over the past 25 years, the WFP has assisted watershed management in Morocco by the provision of some \$43 million of food aid to a series of activities throughout the northern Rif Mountain area of the country. The bulk of this assistance has been used to support the GOM's "Soil Restoration and Agricultural Development in the Rif Provinces", or DERRO Project, in the form of farmer compensation and food-for-work rations aimed at promoting improved community participation in project activities. The efficacy of this participatory mechanism will be closely examined during the design of the present project to determine if or to what extent this option might be utilized here. WFP assistance will continue with an additional tranche of food aid expected by 1991.

West German (GTZ) and Italian activities consist of bilateral assistance for specific watershed management projects in northern Morocco. GTZ assistance will be provided for improved management of the upper Oued Srou watershed of the proposed new Dchar El Oued Dam. Italian assistance will be targeted at the Bou Regreg watershed, site of the existing and soon to be enlarged Sidi Mohammed Ben Abdellah dam. The costs of these two latter initiatives are still unknown; however, their distant location suggests that, although related, they will be of less direct importance for the USAID project.

III. PROJECT DESCRIPTION

A. Perceived Problem

The critical importance of Morocco's hydraulic infrastructure was described above. At present, the benefits of these dams and associated systems are being lost at an alarming rate by siltation of their reservoirs resulting from accelerated erosion on their watersheds. To date, 600 Mm³ of the total existing dam storage capacity has been lost to sedimentation. This figure represents the equivalent loss of some 60,000 ha. of downstream irrigation potential and 150,000 ha. of cultivable upstream lands. Three major dams have had to be elevated to regain lost capacity, four others have lost more than half of their original capacity, and several others are filling at such a rapid rate as to be considered seriously endangered. Every cubic meter of sediment deposited diminishes the amount of irrigation and drinking water a dam can hold, the amount of electricity that can be generated and the ability of the dam to control flooding. Most of the best sites for building dams have already been developed. Some dams are irreplaceable; others can be replaced only at great cost.

The causes of this problem include the following:

- The soil loss incurred on the generally highly erodible soils that are put under traditional cultivation systems is far in excess of what can be sustained. Declining productivity and eventual abandonment of old crop lands

and clearing of new lands is the result. The only national study of soil erosion in Morocco (UNDP/FAO, 1975) found that 77% of the 22.7 million ha. studied was susceptible to high or very high erosion risks. The study further estimated that some 5.5 million ha., or 73% of the cultivated land in Morocco, required strict soil conservation measures for sustainable productivity. At present, it is estimated that less than one percent of this area benefits from such remedial measures.

- Continuing population growth results in the extension of rainfed agriculture onto ever steeper slopes, shallower soils and generally more marginal lands. The overall population growth rate in Morocco averages 2.5 percent per year. Although rural population growth is less than the national average due to higher than average infant mortality rates, it is still far greater than the existing resource base can adequately sustain. Increasing resource degradation, deforestation, badlands formation and desertification are the result.

- The historical neglect of mountain agriculture has further reinforced the vicious cycle of extending destructive cropping practices onto marginal lands. The near subsistence-level mountain agricultural economy leaves the farmer little possibility to invest in improving production systems. For example, within Azilal Province, fertilizer consumption averages less than 6 kms. per cultivated ha. of land vs. an 80-100 kgms. per hectare recommended rate. In addition, improved seed varieties are extremely difficult to obtain. In 1984-85, agricultural credit in this region averaged 940 Dirhams (\$107) per farm, of which 71% was for medium-term loans primarily for livestock. Per capita agricultural income in this province averages Dh. 1,345 (\$150) vs. a Dh 1,750 national average. Under such conditions, individual choice is limited, and satisfying immediate family consumption must prevail over national economic and natural resources management concerns.

- The lack of effective management of state forest lands leaves them open to continuing encroachment by farmers, herders and woodsmen. Collective rangelands and state forest lands are exploited as "common lands" with little or no control over herd size, the lopping of branches for browse or fuelwood harvest. Whereas an estimated 80% of state forest lands have been surveyed and legally established, only some 10% are effectively managed. Each year, some 25,000 ha. of forested lands are lost due to the above factors despite large-scale GOM and donor investments. The evidence demonstrates that current watershed resource management practices are inadequate to the task at hand.

- Thousands of subsistence-level watershed farmers and herders have no interest in protecting the downstream reservoirs. Azilal Province contains three of nation's major dam systems -- Bin El Ouidane, Hassan I and Moulay Youssef. Together, these systems comprise some 20% of the nation's total installed reservoir capacity, each year delivering about 800 KWH of hydro-power and providing downstream water supplies for some 175,000 ha. of irrigated agriculture and over a million municipal and domestic consumers. At present, the province receives no benefits in compensation for the provision of this vital regional and national resource. To the contrary, this area has been neglected developmentally, as evidenced by the extremely limited economic and social infrastructure in place.

Severe soil erosion and natural resource degradation are widespread throughout most watersheds of the country. The extension of traditional, rainfed cereal cropping onto increasingly steep and marginal lands is the most serious problem, but overgrazing and over-exploitation of natural woodlands are also pervasive factors degrading the existing resource base. The loss of soil, range and forest resources threatens the production systems of the mountain people whose livelihood depends directly on their crops, their livestock and the firewood and other products they obtain from the forest. Thus, to a great extent, the ways in which Morocco's watersheds are used or abused by mountain farmers and herders determines both the sustainability and productivity of their agricultural systems, as well as the useful life of the dams constructed downstream.

Morocco has a history of investments in soil and water conservation but only limited experience in agricultural development in mountainous regions of the country. The GOM's commitment to watershed management has increased markedly in recent years, as evidenced by the new policy directive aimed at ensuring that all new dam construction investments receive adequate funding for associated upstream watershed protection and conservation works. The government now needs to devote priority attention to translating this important policy commitment into effective on-the-ground results.

Similarly, GOM technicians have demonstrated their ability to implement large-scale watershed management and rural development projects; however, the required multi-disciplinary approach is not yet institutionalized. Recognition of the necessity of addressing the needs and desires of people in development programs has also increased, but the mechanisms for achieving effective community participation have not been developed.

Morocco has yet to establish the information base needed for proper watershed management planning. There is very little information on the sources of the sediment that is filling the reservoirs, and virtually no quantifiable information on the efficacy of the conservation techniques commonly employed. In the absence of good information and evaluation systems, decisions are made subjectively and resources are allocated inefficiently. The recent watershed assessment highlighted the financially unsustainable nature of current Moroccan soil and water conservation techniques.

What is needed is a systematic, integrated approach to watershed management. Quantitative data on the sources of sediment and the physical effects of the different interventions on soil loss and productivity must be developed. The financial and economic attractiveness of alternative interventions cannot be meaningfully analyzed without good estimates of their physical effects. Similarly, the acceptability of potential interventions cannot be determined without a systematic way of gathering and analyzing technical and socio-economic data on the traditional mountain agriculture production systems. Good watershed management planning requires the development of a much better data base and a more methodical and multi-disciplinary approach than that which has been employed in Morocco to date.

B. Project Goal and Purpose

The goal of the project is to improve natural resources management in Moroccan watersheds for improved efficiency, productivity and sustainability of downstream infrastructure investments.

The project purpose is to develop, demonstrate and disseminate improved watershed management practices in the High Atlas Mountains. This purpose will be achieved through the transfer of improved technologies and development and demonstration of improved techniques for:

- integrated watershed land use planning and management;
- soil, water and forest conservation;
- sustainable mountain agricultural production systems; and
- effective community participation in local development activities.

C. Expected Achievements and Accomplishments

The expected project achievements and accomplishments include the following:

1. Strengthened regional capacity for integrated land use planning and management - Resource managers will benefit from improved techniques for integrated watershed resources planning, management and evaluation. This will improve the capability to effect optimal land use decisions based upon an improved knowledge of existing resource conditions and constraints, an expanded array of improved watershed treatment options, and an improved capacity to properly match appropriate watershed treatment options with existing conditions. In addition, Moroccan technical staff will be able to establish better management control over the existing natural resource base through the improved planning information base described above, and a number of socio-economic interventions designed to promote community involvement.
2. Improved soil and water conservation techniques - This accomplishment will result from the soil erosion control research and demonstration program addressing the causes and the impact of erosion in different land use situations, including downstream areas. Based upon this information, resource planners and managers will be able to effect optimal land use decisions employing an expanded array of treatment options developed and demonstrated under the project.
3. Improved, sustainable mountain agricultural production techniques and systems - This achievement will result from an agro-economic development and demonstration component aimed at the provision of technical, financial and other inputs to improve mountain agricultural systems. In addition, this component will carefully examine other related constraints in the agricultural, livestock and forestry areas and develop improved, socially-appropriate mechanisms for placing these production systems on an environmentally sound and economically sustainable basis.

Project success will depend on the efficacy of these technical demonstrations and associated educational programs in convincing the mountain people -- farmers, herders and woodsmen -- of the profitability and environmental necessity of adopting improved and sustainable cultivation systems. Starting with selected entrepreneurs, the project strategy will be to promote an expanding private sector role in the provision of agricultural inputs and on-farm erosion control works, so that at the project's conclusion improved cultivation practices are placed on a largely self-sustaining basis. This approach has already met with success in other regions of the country, such as the World Bank's aforementioned Loukkos and Moyen Atlas projects, where the bulk of the required inputs are now demand-driven and supplied by private sector entrepreneurs.

As the project's agricultural benefits are realized, so will new private sector opportunities in agro-processing industries and cooperative marketing activities. The project will seek to promote these welcome, yet heretofore lacking, additions to the private agricultural economy to the greatest extent possible within the limited implementation timeframe.

4. Improved mechanisms for promoting community involvement in sustainable natural resources management and use - Based upon a thorough examination of the political economy of the farmers, herders and foresters, appropriate mechanisms and techniques will be developed and demonstrated to promote community involvement. These techniques will include a number of social, organizational and financial mechanisms, as well as an intensive grassroots awareness-building and extension training program, designed to increase people's appreciation of the longer-term benefits associated with rational resource management and use. In addition, community participation will be fostered through regional workshops in all phases of project implementation, from the initial land use planning decisions, through on-farm resource management demonstration works, to the final project evaluation.

D. Project Outline And How It Will Work

The project will provide technical services, training, research and demonstration equipment, research and nursery facilities and watershed demonstration activities for the realization of the above goal and purpose. An illustrative description of the key project elements follows:

1. Technical Services - This project element will include Moroccan and expatriate, long-term and short-term advisory services for watershed planning, and implementation of the applied research and demonstration programs. Research topics will include soil and water conservation, mountain agronomy, the economics of mountain agricultural systems, the socio-economics of resource use within target watershed areas, and the costs and benefits of improved resource management in upstream areas on downstream investments.

In the selection of the technical assistance contractor(s) for this project, effort will be made to assure the participation of small, disadvantaged and women-owned business concerns in accordance with Section 19 of the Federal Acquisition Regulations.

2. Training - This element includes the project's long and short-term participant and in-country training programs. Long-term training is planned for each of the project's key technical areas, including watershed management planning, soil and water conservation, mountain agronomy and the socio-economics of sustainable resource use in watershed areas. Short-term training will include selected U.S. and third-country courses, study tours and other appropriate venues. In-country training will be targeted at resource managers and extension personnel, and community participants. In addition to providing information about the various technical aspects of the project, this training will be designed to facilitate interaction among all participants.

3. Research and Demonstration Equipment - A limited amount of equipment will be provided to support the watershed research and demonstration program, such as soil and water sampling and monitoring equipment, and watershed demonstration equipment, materials and supplies.

4. Research and Nursery Facilities - The project will provide for the construction or renovation of key administrative, research and plant nursery facilities for project administration, research and demonstration.

5. Watershed Demonstration - This component will provide materials, equipment and labor for the soil and water conservation, forestry and agricultural improvement demonstration programs. Soil and water conservation activities will include improved land preparation and contour farming practices and various physical and biological erosion control works, such as construction of terraces, banks, walls, gully stabilization and water drainage systems and biological soil stabilization and badlands restoration. Agricultural improvements will address such activities as the provision of selected agricultural inputs and extension expertise, agro-forestry plantings and strip- and double-cropping systems, construction or expansion of simple, small-scale irrigation systems, improved forage and pasturage plantings and livestock and range management systems. Forestry improvement activities will include survey and demarcation activities, management planning and afforestation plantings, as well as the promotion of alternative rural energy supplies.

This component may also provide limited funding for the expansion of forestry management roads in target areas for improved access to and control over provincial resources. In addition, certain community improvements, such as potable water supplies, may be financed under this project component to promote the participation of target area residents. Both of these latter two activities will be carefully targeted and restricted to the minimum required for successful demonstration.

6. Evaluation and Audit - The project will provide funding to meet Agency evaluation and audit requirements. In addition to major mid-term and final project evaluations, funds will be reserved for a selected independent agency to conduct annual monitoring reviews to obtain timely feedback on ongoing activities, addressing any issues not covered by project staff. Key evaluation indicators will include soil erosion rates under the various physical and land use situations, both before and after remedial works, agricultural productivity within the target area and its impact on the

household incomes of farmers, herders and woodsmen. Evaluations will also address local attitudes regarding natural resources management and project interventions, trends in forestry production and destruction, and rates of sedimentation of dam reservoirs and the resultant economic impacts on downstream irrigation, hydro-power and municipal water supply systems. Attention will be devoted in project evaluations to assessing women's participation in and benefits from project activities.

7. Contingency - A contingency factor has been included at the rate of 10% of the estimated project costs.

The project will be implemented in phases commensurate with the long-term nature of this type of natural resources development and demonstration initiative. The major activities and outputs of each of the three implementation phases are as follows:

1. Establishment Phase - During this initial two-year phase, the project will be established within the provincial target area. This phase will include the following major activities and outputs:

- mobilize contractor advisory and Moroccan technical personnel; complete in-country team-building and training of GOM technical staff
- initiate community educational and support promotion activities
- complete land use surveys and assessments and socio-economic studies, and draft watershed management plans
- design and establish applied research and demonstration program; establish existing "baseline" conditions and causes
- establish plant nurseries; negotiate resource use agreements with farmers, herders and woodsmen; initiate soil and water conservation, agricultural and forestry improvement works
- initiate participant training, equipment procurement, and facilities and community improvement activities

2. Implementation Phase - This second three-year phase of the project will be devoted to the full-scale implementation of the watershed demonstration program. Major activities and outputs include:

- complete long-term staff training; phase out long-term advisory personnel and replace with returned long-term participant trainees; continue short-term staff training and community education and extension training as appropriate
- complete all required technical and socio-economic studies
- continue watershed demonstration program, promoting expanded private sector initiative where appropriate

- continue applied resource management research and monitoring program
 - continue facilities and community improvement activities
 - complete mid-term project evaluation
3. Evaluation Phase - This final two-year phase will focus on the completion of all ongoing project activities and the application of the project results. This phase will include the following major activities and outputs:
- complete all ongoing project training and education, applied research and demonstration, and facilities and community improvement activities
 - complete initial analysis of project research and demonstration results; complete planning for future research requirements
 - finalize comprehensive target area watershed management plan
 - complete comprehensive analysis of the costs and benefits of improved resource management both within upstream watershed areas and for downstream infrastructure investments
 - complete cost-effective and locally appropriate guidelines for improved watershed management in Morocco based on all of the above project results
 - complete final project evaluation and close-out

IV. FACTORS AFFECTING PROJECT SELECTION AND FURTHER DEVELOPMENT

A. Social Considerations

1. Socio-Cultural Context - Social considerations will be of paramount importance to project success. As described above, it is primarily the existing use patterns of mountain people which are responsible for the current resource degradation in watershed areas and the resultant downstream infrastructure impacts.

The project target area is Azilal Province, situated in the central High Atlas Mountains of Morocco (see Maps in Attachment 2). The general socio-economic situation within this region may be characterized as follows:

- 90% rural population; 405,000 total population with 1.5% growth rate per year; much higher than average emigration, infant mortality and total fertility rates.
- Agriculture accounts for 71.5% of total production; 75% of total agricultural production is rainfed; extensive livestock holdings.
- Average farm size is 5.4 ha.; 78% of farmers own less than 5 ha. of land (44% of total agricultural holdings), 21% own between 5 to 20 ha. (49% of total), and 1% own greater than 20 ha. (7% of total).

- Per capita income averages 1,720 Dh (\$200) or about one-third of the national average; agricultural income averages 1,345 Dh per capita or \$150, vs. 1,750 Dh national average. Average annual income per household is less than 12,000 Dh (\$1,370), of which 73% is spent on food.
- Social infrastructure is extremely limited - only about 20% of the population has access to safe water supplies; less than 10% have electric lighting; one doctor per 24,000 inhabitants or approximately half the national average; one hospital bed for 3,750 inhabitants; extremely poor road network, i.e., 160 kms of paved roads for 10,000 km² or about 1 million ha. of total land area.

In general, the data indicate a neglected, rural, agrarian, subsistence-level existence heavily dependent upon external resources, e.g., some 23% of total provincial revenues come from external remittances. Land tenure is divided among private agricultural holdings, collective or tribal holdings, and state forests and conservation areas; however, only a small fraction of these holdings enjoy any type of formal registration or demarcation. Local authority exists in both the conventional government and traditional ethnic forms, i.e., tribes, fractions, sub-fractions and lineages.

2. Beneficiaries - Primary beneficiaries will be the people who inhabit the target watersheds and the downstream reservoir user groups. Watershed inhabitants, the poorest segment of Moroccan society, will derive an improved quality of life from increased agricultural productivity in mountain farming and livestock systems, enhanced opportunities for the sustainable utilization of fuelwood and other commercial forest products, and various community improvements. Downstream reservoir user groups will benefit from a reduced risk of flooding and a better performance of dam-related hydro-power, irrigation and potable water supply systems. Secondary beneficiaries will be the rural unemployed, who will gain opportunities for employment through the biological and physical watershed management, agricultural improvement and the facility and community improvement activities. Ultimately, Moroccan society will benefit from the improved performance of significant existing investments in economic infrastructure, reduced environmental degradation of critical watershed areas, and the enhanced conservation of the nation's water, soil and biological resources.

Special efforts will be made to ensure that women participate in and benefit from the project. Each of the various participatory mechanisms outlined in Section IV.A.3. below will be designed to actively promote appropriate female representation in all project activities to the maximum extent possible. While women are expected to share in all project benefits, they will particularly benefit from the project's community improvement, domestic energy supply, and community education and agricultural extension programs. The project monitoring and evaluation plan will highlight an appropriate set of benchmark indicators designed to measure gender-specific participation in and share in the distribution of benefits from the project.

3. Participation - Effective participation of the user population is the key to project sustainability and long-term success. Accordingly, the

project places heavy emphasis on the identification and thoughtful implementation of locally-appropriate mechanisms for mobilizing community support for, and participation in, project activities. Subject to further study, such mechanisms may include some or all of the following:

- community education and awareness-building activities aimed both at achieving a positive orientation towards the project, and a greater appreciation of the long-term benefits associated with improved resource management and use
- community participation workshops designed to actively involve user populations in all decisions regarding provincial resource planning, implementation and long-term management and maintenance
- use of on-farm research trials for the watershed demonstration and agricultural improvement programs
- an expanded agricultural extension program, targeting herders as well as irrigated and dryland farmers
- extensive socio-economic research studies aimed at achieving a better understanding of the various factors affecting resource use and abuse in watershed areas
- negotiation of individual and collective user agreements, stipulating respective resource utilization rights and responsibilities
- land surveys and demarcation to clearly distinguish resource use rights and responsibilities
- use of local labor in implementing the project's watershed demonstration, agricultural improvement and community improvement programs
- use of farmer and herder compensation schemes to offset temporary losses in agricultural production due to project interventions
- training of technical staff in appropriate mechanisms for effective interaction with community residents
- implementation of a community improvement program under the auspices of the project
- formation of local cooperative associations to assist in effective resource management and use, e.g., forest products cooperatives
- substantive community representation in all project evaluation activities

4. Socio-Cultural Feasibility - Despite the considerable efforts identified above to ensure adequate community participation in project

activities, there remain several difficult issues to address regarding the socio-cultural feasibility of the project during the ensuing project design work. These include the following:

- the constructive interaction between official, technical government entities and traditional tribal lines of authority within provincial areas;
- the question of land expropriation and resettlement in biologically important, but marginal areas;
- the role of cash or food compensation schemes in achieving project implementation and long-term resource management objectives;
- inequitable resource allocations between upstream source areas and downstream consumer populations; and
- conflicts among current GOM policies, regarding land ownership and resource use rights, and project objectives.

Although the design effort will seek to resolve as many of these outstanding issues as possible, several of these topics will probably remain the subject of more detailed research during implementation.

B. Economic Considerations

Successful watershed management programs result in on-site and off-site economic benefits. On-site benefits accrue to upstream populations adopting and implementing watershed management practices. Indeed, such practices would not be adopted were it not in the best financial interest of upstream populations. Off-site benefits derive from the economic value of lower sediment loads in downstream water courses and the consequent benefit of increased dam storage capacity and availability of greater volumes of stored water for release for irrigation, power generation, and municipal and industrial uses.

On-site economic benefits are two-fold. First, successful watershed management, by halting soil loss, helps to insure that the resource base for cultivated agriculture and rangeland livestock is conserved for the productive use of future generations. Second, watershed management investments can provide higher financial and economic returns to farmers and herdsmen than current farming and range practices. Preliminary estimates of the economic costs and benefits of a variety of possible erosion control measures have been determined under various World Bank projects in Morocco. These include tree plantings in association with improved perennial forage grasses, e.g., acacia with agropyron, olives on rock terraces with an underplanting of perennial forage grass, forest plantations, e.g., of Canary Island or Maritime Pine, controlled grazing, and other combinations. Benefits of these practices derive from either the increased biomass available as forage for livestock or the value of acacia and pines in terms of timber and firewood, or olives in terms of edible oil. The availability of additional forage reduces expenses for supplemental barley feedings and can contribute, together with animal health improvement, to higher animal productivity in terms of milk and meat production.

Preliminary economic appraisals of a variety of watershed management practices were developed for the recent watershed management assessment. Data on costs for individual watershed management practices and on yields and the resulting value of benefits were drawn primarily from existing forestry and watershed management projects being implemented in Morocco. Labor cost data was converted from market prices to economic shadow prices, assuming that the opportunity cost of unskilled labor was 80% of its market price. The economic rates of return, based solely on on-site benefits, were estimated as shown in Attachment 3 to this document.

Off-site economic benefits derive from the reduction in erosion realized by each watershed management intervention. These were estimated in the watershed management assessment as ranging from a low of 4 tons per hectare per year for controlled grazing to a high of 250 tons per hectare per year for gully stabilization. The resulting reduction in the rate of siltation of downstream reservoirs has a direct economic benefit in that storage capacity that would otherwise be lost due to siltation is conserved. The economic value of such storage capacity can be estimated in terms of the hydro-electricity and agricultural, or municipal and industrial water production maintained by the availability of that storage capacity. Based on irrigation and municipal water project data, as well as estimates of the marginal cost of thermal power generation, the assessment very tentatively estimated the value of conserving one cubic meter of water storage capacity as follows:

Estimated Economic Value of Storage Capacity
(DH per cubic meter)

Irrigation Water	DH 0.81
or	
Municipal Water	DH 0.79
Hydro-electricity	DH 0.05 - DH 0.07
TOTAL	DH 0.84 - DH 0.88

For the purposes of economic analysis the value of storage capacity was estimated roughly at DH 1.00 per cubic meter to take into account not only water and hydro-electric benefits but also less easily quantifiable benefits stemming from reduced levels of sedimentation; notably, lower operations costs for municipal water treatment, lower irrigation canal maintenance costs, and lower turbine maintenance and replacement costs.

Based on the estimates of costs and benefits outlined above, benefit-cost ratios were developed for each watershed management measure. These results are shown in Attachment 3. In summary, at a 15% discount rate, six of the eight watershed management practices were found to have an economic benefit-cost ratio exceeding one, when both on-site and off-site benefits are considered. Again at a 15% discount rate, a specific target area program of interventions was evaluated and shown to have a benefit-cost ratio of 1.5. This computation is also shown in the Attachment 3. Based on these preliminary appraisals, a watershed management project in Morocco can be judged as economically feasible.

Although positive, these results should be considered conservative estimates of the potential economic attractiveness of this project for the following reasons:

- The erosion control benefits included in this analysis assumed using only slightly modified versions of existing conservation techniques currently employed throughout much of Morocco. Thus, the results do not accurately reflect the significant potential increases in effectiveness and economy obtainable through the development and demonstration of improved erosion control measures strategically applied in optimal land use situations.

- The analysis focused on the benefits obtainable through the use of improved watershed management practices in target areas, such as soil and water conservation, range management, agro-forestry and afforestation improvements. It did not, therefore, fully account for the substantial benefits achievable from increased agricultural crop yields in upstream areas. In one recent trial effort, Azilal agricultural staff demonstrated that yield increases of two to five times present levels are achievable for a variety of popular local crops if the appropriate inputs are applied under the right conditions.

- Certain additional "non-monetary" benefits derivable from such a project were also not included in the cost-benefit calculations. These would include increased environmental protection or reduced resource degradation and the conservation of biological diversity, reduction of rural-to-urban migration, and various improvements in social equity not readily quantifiable.

- Finally, the assessment did not take into account the significant potential additional national benefits stemming from the effective application of project demonstration program results to other watershed areas of Morocco. With some 40 major dams existing or planned throughout Morocco, such replicative project benefits could prove to be the most significant economic contribution of the project.

Certain other important economic implications result from the selection of Azilal Province as the project target site. This region was selected through a detailed Mission analysis of all potential project sites in Morocco, based on a comprehensive set of technical, administrative, agro-ecological and socio-economic criteria applied to current USAID and GOM strategic program priorities and objectives. The economic significance of this site selection process is two-fold.

First, the project will be able to benefit greatly from the significant amount of data collection already completed on this region. The detailed social, technical, economic and other data embodied in the recently-completed, two-year, four-volume, UNDP/FAO study entitled "Management and Development of the Central High Atlas Mountain Zones of Morocco" should significantly facilitate initial project planning efforts and reduce the costs required for subsequent project-funded studies.

The second noteworthy distinction of this province results from the fact that it contains the majority of the watersheds of three major Moroccan dam

systems. This situation affords the opportunity for the project to explore a range of possible intervention options, including work on an individual watershed or some strategic combination of any two or all three potential watershed sites (see Attachment 4 figures). While the ultimate decision will of necessity be based on a combination of social, administrative, logistical and other considerations, economic considerations are expected to be of paramount concern. This unique physical opportunity will allow the project design effort to pursue a strategic, least-cost approach to target area selection, thereby ensuring the maximum potential for the efficient and cost-effective application of A.I.D. and GOM resources.

The fundamental project strategy is to demonstrate improved land use management practices in limited, key provincial watershed areas. Thus, the project will not attempt an intensive coverage of provincial areas requiring treatment. Recent GOM estimates, based upon current Moroccan practices and costs, indicate that approximately \$150 million equivalent would be required to meet about 20% of existing provincial treatment requirements. These figures serve to underscore the demonstrative approach being pursued under this project. Positive results gained in this effort can then be replicated with additional resources within other provincial areas and in other watershed regions of the country.

C. Relevant Experience With Similar Projects

1. Country-Specific Experience - This project is the USAID's first direct endeavor in improved watershed management in Morocco. This lack of prior experience was a major reason for the USAID-financed assessment of this subject conducted in April 1989. As described above, the assessment results have provided the Mission with an excellent, up-to-date overview of the current status of national efforts in this sector, emphasizing the technical, economic and social development perspectives.

Another important data source is the recently completed, two-volume UNDP/FAO Preparation Report for the World Bank's Second Forestry Project. Although broader in scope, much of the information contained in this work has been and will continue to be directly applicable to this USAID design effort.

A third source are the proceedings of the Moroccan watershed management conference held in January 1988. These volumes provide valuable insights regarding Moroccan views and perspectives on this subject.

In addition, a great deal of valuable target area-specific information has been obtained under the USAID's Winter Snowpack Augmentation Project (No. 608-0190), including: (1) an extensive historical record of regional precipitation; (2) an adapted computer simulation model for predicting the downstream use allocations of Azilal-source water supplies, i.e., RIVER model; (3) an initial methodology and analysis for computing the downstream economic benefits resulting from increased provincial water supplies; and (4) an established province-wide precipitation monitoring network. All of these outputs should prove most useful in conducting the project's erosion control research and evaluation program.

Finally and, perhaps, most importantly for project purposes, is the wealth of target site-specific information available in the aforementioned "Azilal Report". The significant informational head-start that this work affords ensuing project design efforts cannot be over-estimated.

Project design will also benefit from other sources of information, including the following:

- USAID's substantial assistance over the years to Morocco's key agricultural research and education institutions under the Agronomic Institute (No. 608-0160) and Dryland Applied Agricultural Research (No. 608-0136) Projects will greatly facilitate the design and implementation of the project's applied agricultural research and demonstration program, as well as the effective dissemination of positive program results.

- the ongoing feasibility and design work for the upstream components of the USAID's Supplemental Irrigation Project (No. 608-0197) should provide excellent, additional, first-hand insights into current Moroccan approaches to watershed protection for downstream dam systems.

- USAID's substantial contributions over the years to watershed management-related works through direct PL 480 Title I and II local currency inputs, and, indirectly through various ongoing World Food Program in-country activities, also provide valuable information.

- The Mission's long-term and close working relationship with MARA and other local agricultural research and educational staff under many different bilateral projects will also greatly facilitate the successful design and implementation of this project.

2. World-Wide Experience - In preparation for this design effort, the Mission has requested and received, with PPC/CDIE assistance, a comprehensive literature search concerning world-wide efforts to date in watershed management. The results of this search, covering some 250 Agency, USDA, contractor and other source information and evaluation documents, is currently being reviewed and distilled by the Mission. Particular emphasis is being placed in this effort on examples of successful project design and "lessons learned" evaluation information.

A bibliography of key reference documents for the design of this project is provided in Attachment 7 to this PID.

D. Proposed Grantee and Implementing Agency

The key GOM implementing agency will be the Ministry of Agriculture and Agrarian Reform (MARA). MARA is the main GOM agricultural development agency, with overall responsibility for the nation's agricultural crop and livestock production, research and extension programs in both dryland and irrigated areas. In addition, MARA's Waters and Forests Directorate is responsible for the management and conservation of the national forests, freshwater fisheries, and soil and water resources, and much of the nation's wildlife situated in a network of some 16 existing protected areas, i.e., parks, reserves, sanctuaries and hunting preserves.

At the provincial level, MARA programs are implemented through "Directions Provinciales de l'Agriculture" (DPAs) in dryland areas, and "Offices Régionaux de Mise en Valeur" (ORMVAs) in irrigated areas. As Azilal Province is primarily a dryland production area, the key implementing agency for this project will be the Azilal DPA. Contacts with Azilal DPA staff indicate a capable and dedicated cadre of experienced technicians; however, some additional staff will be required to implement all planned project activities within the 7-year timeframe. As mentioned above, recent discussions with the Minister indicate the Ministry's full support of the project's goal and purpose, and its willingness to undertake whatever measures are necessary to ensure that the project is successfully implemented and placed on a sustainable basis.

Other important national agricultural research, extension and education institutions in Morocco include the National Agricultural Research Institute (INRA) located in Settat, the "Ecole Nationale d'Agriculture" (ENA) in Meknes, the "Institut National Agronomique et Vétérinaire Hassan II" (INAV) in Rabat, and the "Ecole Nationale Forestière d'Ingénieurs" (ENFI) at Salé. The respective roles of each of these various organizations in assisting in the implementation of the project's research and demonstration program will be carefully examined during project development to determine the most appropriate and cost-effective means of achieving the project purpose.

Finally, certain financial and technical support will also be required from the Ministries of Public Works and Public Health, and from the local government authorities and tribal organizations, to successfully implement the project's community improvement and watershed demonstration programs. Their roles and responsibilities in the project will be clearly defined during the course of project design.

E. AID Support Requirements and Capability

The USAID's Office of Energy and Natural Resources will be responsible for the design of this project. Following dissolution of the ENR Office in June 1990, USAID's Office of Agriculture will assume responsibility for the implementation and monitoring of this project. By the onset of implementation, this office will consist of 5 USDH and 2 FSN full-time professional staff and 1 U.S. PSC. Sufficient office resources are thus available to provide for one full-time USDH manager for this project, assisted by FSN professional and clerical staff as required. Additional implementation support will also be available through the services of the USAID's Offices of Financial Management and Project Development and Private Enterprise, and a Regional Contracting Officer and Legal Advisor, both of whom are based at USAID Morocco. Accordingly, existing Mission staff resources are fully capable of meeting the support requirements of this project. To ensure that this is the case, the project will be designed to place the maximum administrative responsibility possible on the technical assistance advisory team, while still maintaining the necessary level of Agency implementation oversight and accountability.

F. Estimated Costs and Methods of Financing

The total estimated A.I.D. project cost is \$25 million of Economic Support Funds over the 7-year timeframe. A illustrative budget breakdown of these costs is presented below, providing preliminary estimates of general types and magnitudes of the planned project components:

<u>Items</u>	<u>Magnitude/Source</u> ((\$000's))		<u>Total</u>
	<u>AID</u>	<u>GOM</u>	
Technical Services	8,000	2,500	10,500
Training	600	200	800
Research and Demonstration Equipment	1,500	2,000	3,500
Research and Nursery Facilities	2,000	3,000	5,000
Watershed Demonstration	10,000	10,000	20,000
Recurrent Costs	-	1,400	1,400
Audit and Evaluation	600	-	600
Contingency	<u>2,300</u>	<u>1,900</u>	<u>4,200</u>
Total Project Costs	25,000 (54%)	21,000 (46%)	46,000 (100%)

A.I.D. costs will generally be for the inputs and activities described in Section III.D. above. GOM project contributions, estimated at a total \$21 million equivalent or 46% of total project costs, will be for GOM counterpart salary and support costs; participant trainees' international travel expenses and in-country training support costs; miscellaneous equipment, materials and supplies; the majority of the facilities upgrading costs; approximately half of the watershed demonstration program costs; recurrent costs for additional staff and facilities operations and maintenance requirements; and, a 10% contingency factor.

Major funding issues to be resolved during the ensuing project design effort include:

- the potential role of farmer compensation schemes in promoting adoption of the project's demonstration program results;
- the respective financial responsibilities of the government and project beneficiaries in the provision of the required watershed demonstration inputs;
- the extent and type of inputs to be provided through complementary GOM and other donor activities and programs; and
- the capability of the various GOM agencies to adequately meet their respective investment and recurrent cost contributions to the project, given already programmed commitments to other host country and donor activities.

G. Design Strategy

The multi-disciplinary nature of the project requires a similar design effort. Accordingly, project design assistance will be secured for the areas of watershed management planning, mountain agronomy, livestock and range management, soil and water conservation, agricultural economics, forestry and social anthropology. Current Mission plans envisage a mixed expatriate and Moroccan design effort contracted through an Agency IQC and other appropriate sources. \$150,000 of PD+S funds have been requested for the provision of these services.

The relatively large amount of available, up-to-date country and target area-specific information will afford the design team maximum opportunity to devote their full attention to substantive design issues rather than to data-gathering activities. Key issues in this regard would include the analysis and recommendation of possible target area treatment options (see Attachment 4); the watershed and agricultural improvement research and demonstration program framework; preferred mechanisms for addressing outstanding project social issues; and the respective roles, responsibilities and financial contributions of the various local beneficiaries and GOM and other agencies participating in the project.

The project development schedule is as follows:

- | | | |
|---|------------------------------|-----------------------|
| - | PID Approval | November 1989 |
| - | PP Design Contract | December 1989 |
| - | In-Country Design Assistance | January/February 1990 |
| - | PP Preparation | March/April 1990 |
| - | PP Authorization | May 1990 |
| - | Bilateral Project Agreement | June 1990 |

H. Recommended Environmental Threshold Decision

All of the project's inputs and outputs are being carefully designed to promote the attainment of its improved watershed resources management objectives. Accordingly, pursuant to Section 216.3(a)(2)(iii) of the Agency Environmental Procedures, a negative environmental threshold determination is recommended for this project based on the fact that it will result in a significant positive effect on the natural and human environment. The Initial Environmental Examination, included as Attachment 5 to this PID, provides a general description of the major environmental characteristics of the Azilal Province project target area which fully supports this recommended threshold decision.

I. AID Policy Issues

1. Outstanding Policy Issues - Outstanding socio-economic and financial project design issues have been identified in the preceding, relevant sections of this document. The following additional issue is presented for AID Washington's consideration:

a. Duration of the A.I.D. Intervention - While the Mission has proposed a seven year project, we fully recognize that attaining goal-level impact will require many more years. Our assessment is that the GOM is prepared to make substantial commitments of its human and financial resources to the proposed intervention in Azilal Province. Yet, it remains very much to be seen what exactly will be the proven wisdom from the Azilal experience seven years hence. The Mission makes these comments in the spirit of dialogue with the ANE Bureau about both the importance of the project in the Moroccan context and the probability that this seven year first effort will not be enough.

2. Waivers - The authorized project AID Geographic Code for the Source and Origin of eligible goods and services will be Code 000, i.e., U.S. only, and Morocco. It is anticipated that approximately \$150,000 of U.S.-financed contractor vehicle support will need to be procured from Code 935 countries, i.e., Special Free World, for in-country spare parts and maintenance considerations. A formal waiver request for this procurement will be provided for AID/W approval prior to project authorization.

Life of Project: 7 years
 From FY 90 to FY 96
 Total U.S. Funding: \$25 million
 Date Prepared: October 1989
 Page 1 of 2 pages

PROJECT DESIGN SUMMARY
 LOGICAL FRAMEWORK

Project Title and Number: High Atlas Watershed, No. 608-0201

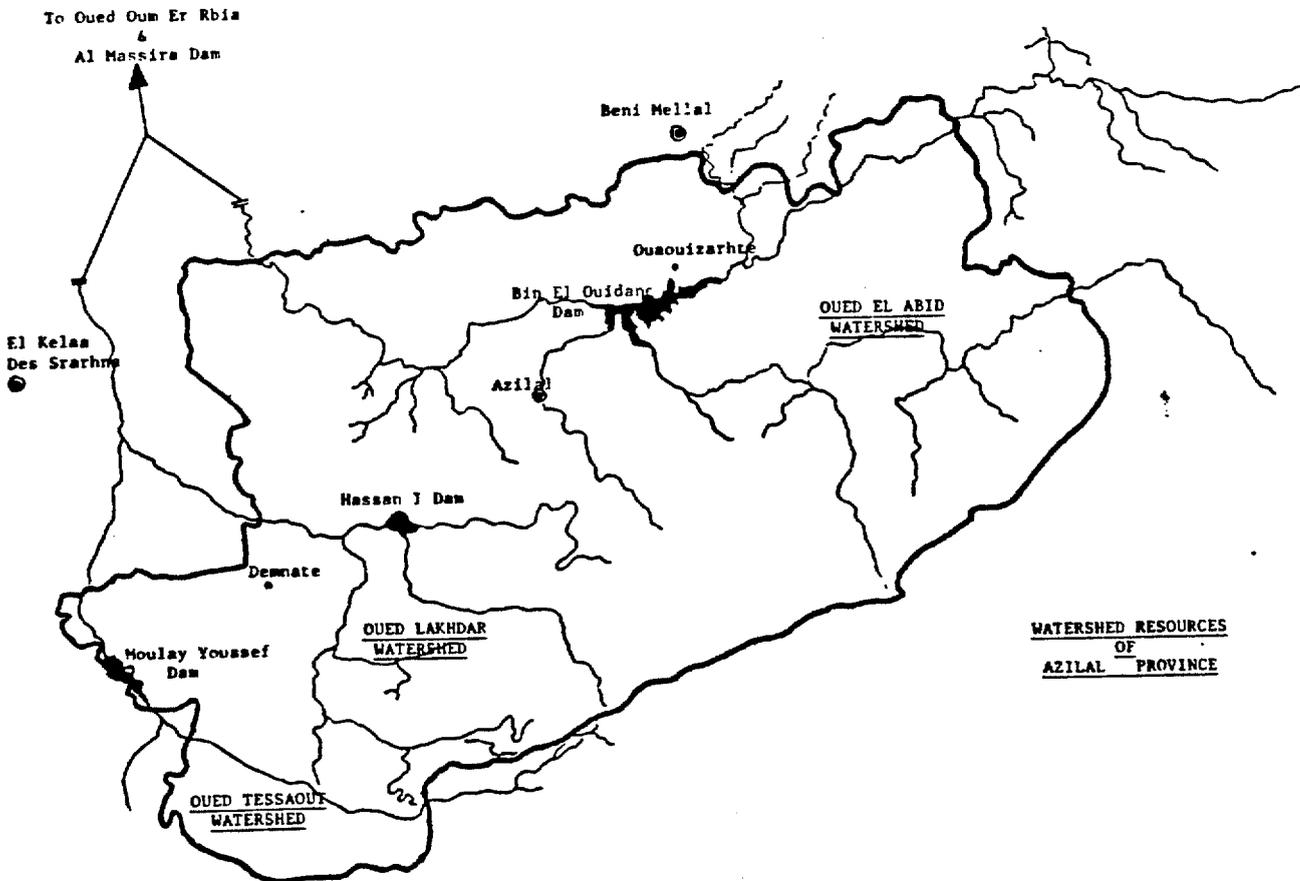
NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>Program Goals</u> Improved natural resources management in Moroccan watersheds for improved efficiency, productivity and sustainability of downstream infrastructure investments	<u>Measures of Goal Achievement</u> Increased soil and water conservation and reduced deforestation in watershed regions of Morocco Increased sustainable agricultural productivity in mountainous regions of Morocco Improved economic performance of downstream dams and reservoirs and associated irrigation, hydro-power and domestic water supply systems	Research results Evaluation Reports GOM agricultural, forestry and water supply statistics	GOM effectively applies project results to additional watershed regions of Morocco
<u>Project Purpose</u> To develop, demonstrate and disseminate improved watershed management practices in the High Atlas Mountains	<u>End-of-Project Status</u> Strengthened regional capacity for integrated land use planning and management Improved soil and water conservation techniques Improved, sustainable mountain agriculture techniques and systems Improved mechanisms for promoting enhanced community involvement in sustainable natural resources management and use.	Project research results Evaluation reports Project monitoring reports Technical and socio-economic studies	

PROJECT LOGICAL FRAMEWORK (cont.)

<u>Outputs</u>	<u>Magnitude of Outputs</u>		
Watershed resource/land use management plans	misc. watershed land use management plans and guidelines completed	Project files	Timing and quality of inputs to specifications
Soil and water conservation and applied mountain agriculture research program results	misc. technical and socio-economic studies completed _____ research facilities established with adequate equipment and trained staff _____ ha. of tree nurseries established at _____ facilities _____ ha. of completed biological erosion control works _____ lin. feet (m) of completed physical erosion control structures	Monitoring reports Trip reports Evaluation reports Provincial/MARA reports Contractor reports	Relatively normal regional climate and rainfall throughout life-of-project
Completed soil and water conservation and agricultural demonstration programs	_____ ha. of reforestation works _____ ha. of completed land use surveys		
Strengthened local resource management capacity	_____ ha. of agricultural demonstration works _____ miles (kms) of roads constructed		
Improved local community services	misc. community improvements (e.g., potable water supplies, etc.)		
Increased staff understanding of the socio-economic constraints to improved natural resource management/use among local user groups	_____ trained and educated local staff and community participants		
Increased appreciation among local user groups of the need for and long-term benefits associated with sustainable natural resources management/use			

<u>Inputs</u>	<u>Magnitude/Source of Inputs (\$000's)</u>				
	<u>AID</u>	<u>GOM</u>	<u>Total</u>		
Technical Services	8,000	2,500	10,500	Project records and reports	GOM budgets forthcoming as planned
Training	600	200	800	GOM budgets	
Research and Demonstration Equipment	1,500	2,000	3,500	Project audits/evaluations	
Research and Nursery Facilities	2,000	3,000	5,000		
Watershed Demonstration	10,000	10,000	20,000		
Recurrent Costs	-	1,400	1,400		
Audit and Evaluation	600	-	600		
Contingency	<u>2,300</u>	<u>1,900</u>	<u>4,200</u>		
Total Project Costs	25,000	21,000	46,000		

Target Area Maps



Attachment 3

Preliminary Economic Analysis Summary*

Ranking of the economic efficiency of erosion control measures using the benefit-cost ratio. In Dh. (\$1.0 U.S. = 8.75 Dhs.)

	Costs	On-Site Benefits		Off-Site Benefits		B/C Ratio		On-Site Economic Rate of Return (%)
		10%	15%	10%	15%	10%	15%	
Controlled grazing	405 405	709 709	458 458	330	166	2.56	1.54	10.4
Plant Acacia with Agropyron	3425 3080	2652 2652	965 965	13370	6760	5.20	2.51	4.1
Plant Acacia only harvest firewood	3900 3510	2809 2809	1715 1715	10696	5408	3.85	2.03	7.9
Olive trees with a forage crop	5100 4710	10748 10748	4824 4824	3086	1560	2.94	1.36	15.2
Plant Acacia cyanophylla only	3900 3510	1401 1401	849 849	10696	5408	3.45	1.78	2.0
Olive trees with barley for 10 yrs.	5100 4710	8503 8503	3802 3802	2468	1248	2.33	1.07	13.5
Canary Island pine	6000 5400	6455 12523	2307 4476	0	0	2.32	0.83	14.0
Maritime pine	6000 5410	2538 4923	781 1515	0	0	0.91	0.28	9.6

Note: The top number of each pair is the financial cost or benefit. The bottom number is the economic cost or benefit.

Summary of costs and benefits for a hypothetical watershed management project.

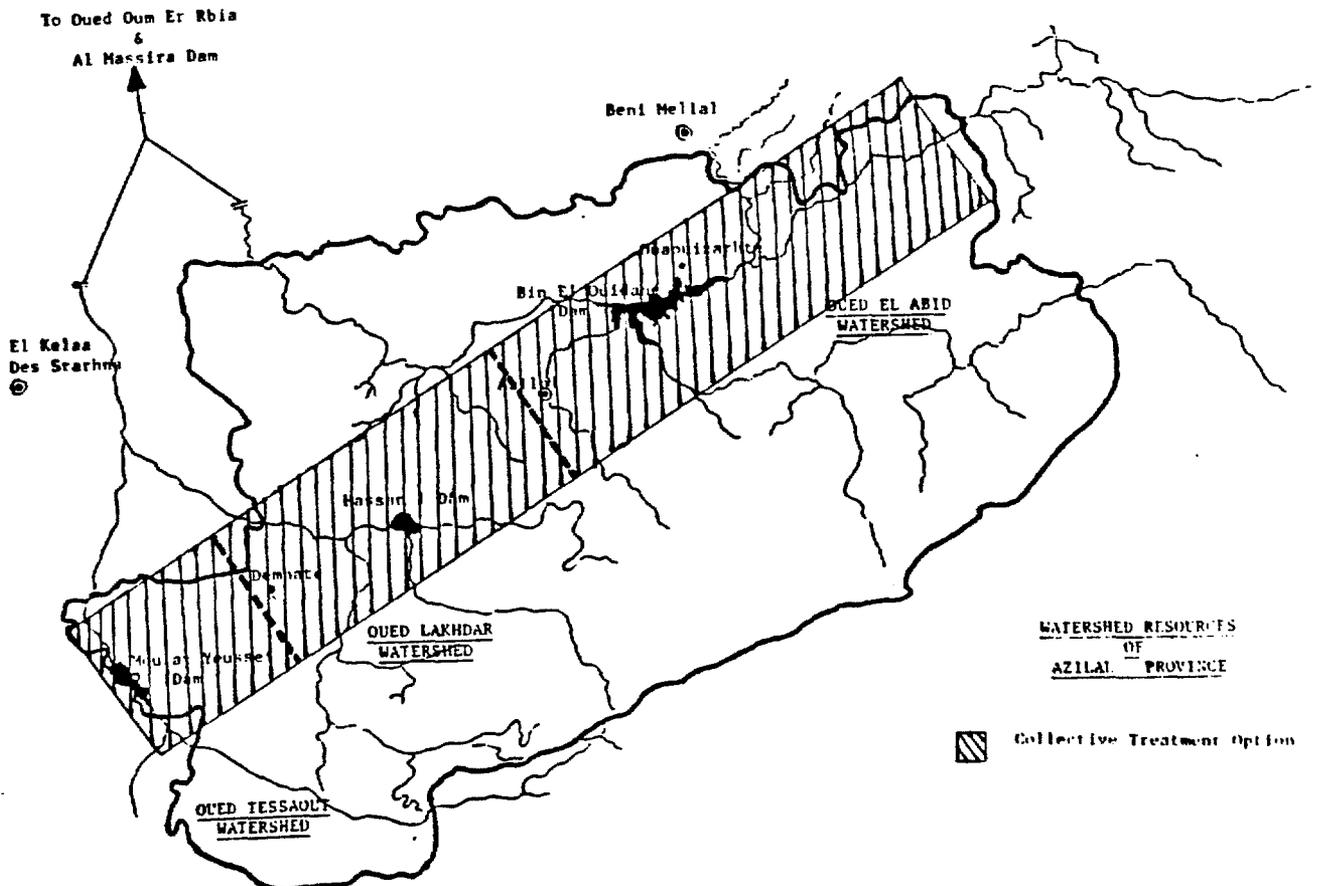
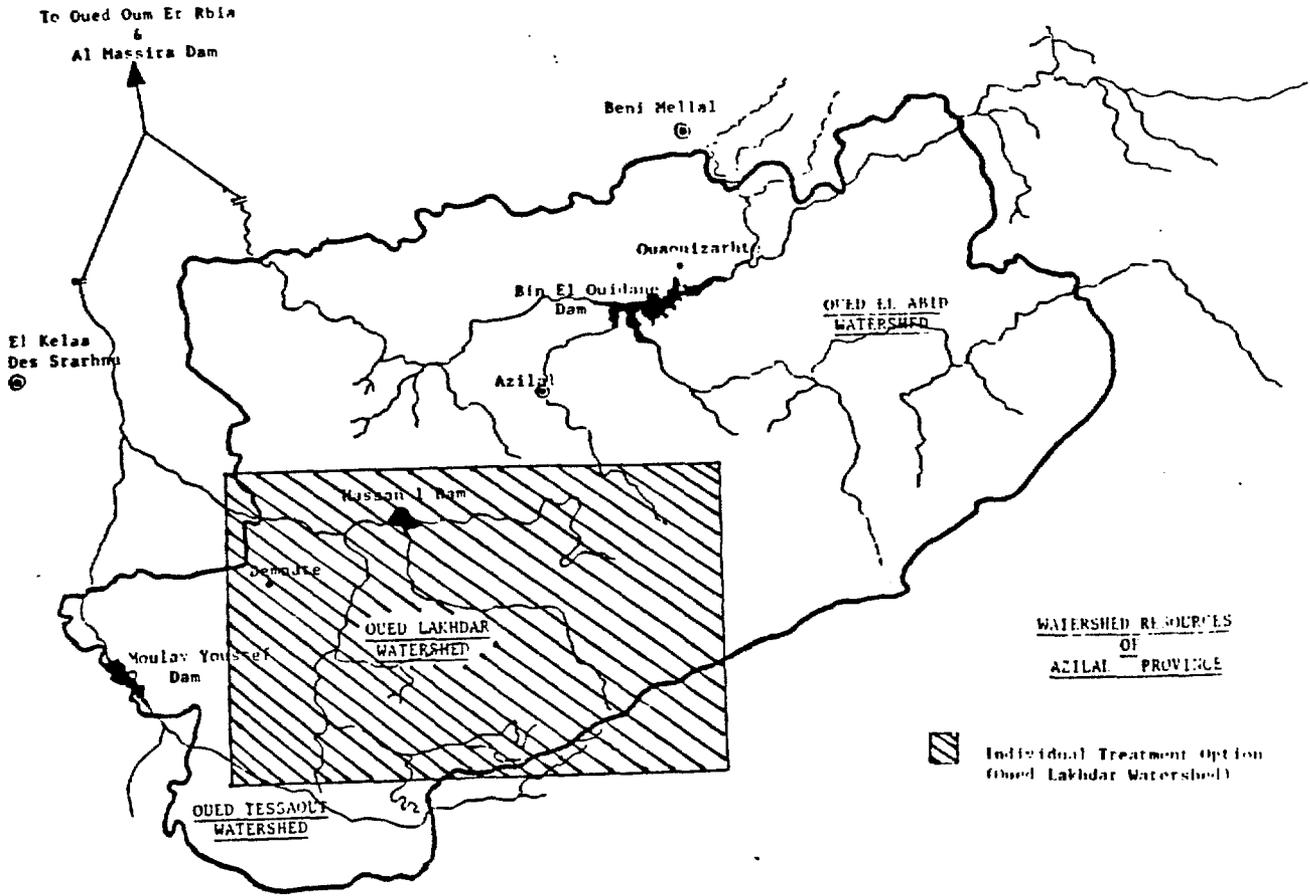
Measure	Area Treated (in ha)	Fin. Cost/ha (in Dh)	Econ. Cost/ha (in Dh)	Total Fin. Cost ('000Dh)	Total Econ. Cost ('000Dh)	On-Site Benefits per ha	Off-Site Benefits per ha	Total Benefits ('000Dh)
Fruit-tree planting	7900	5100	4710	40290	37209	4824	1248	47967
Gully - bio.	200	3900	3510	780	702	1715	10400	2423
Gully - phys.	20	500000	450000	10000	9000	0	1902	38
Badland restoration	7900	3900	3510	30810	27729	1715	5408	56272
Controlled grazing	7900	0	0	0	0	458	166	4930
Pasture improvement	7900	800	720	6320	5688	1015	832	14591
Reforestation	1000	6000	5400	6000	5400	4476	0	4476
	32820			94200	85728			130697

B/C Ratio = 1.52 @ 15% discount rate

28

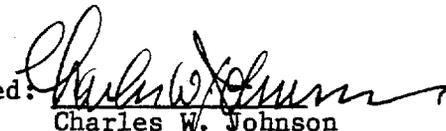
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Target Area Treatment Options



Initial Environmental Examination (I.E.E.)

Project Location:	Morocco
Project Title:	High Atlas Watershed
Project Number:	608-0201
A.I.D. Project Funding:	\$25 million ESF grant
Life of Project:	7 years, FY 1990-1996
I.E.E. Prepared by:	Eric R. Loken, Mission Environmental Officer, USAID/Morocco/ENR <i>ERL</i>
Date Prepared:	September 7, 1989
Recommended Threshold Decision:	Negative Determination

Approved: 
Charles W. Johnson
Director, USAID/Morocco

Date: 10/17/89

Concurred: _____
Molly Kux
Bureau Environmental
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Date: _____

INITIAL ENVIRONMENTAL EXAMINATION

I. INTRODUCTION

The project is fundamentally an improved natural resources management initiative. All of the project's inputs and outputs are being carefully designed to promote the attainment of its primary improved watershed resources management objectives. Accordingly, pursuant the Section 216.3(a)(2)(iii) of the Agency Environmental Procedures, a negative environmental threshold determination is recommended for this project based on the fact that it will result in a significant positive effect on the natural and human environment. The information provided in the following sections of this I.E.E. fully supports and justifies this recommended threshold decision.

II. ENVIRONMENTAL CHARACTERISTICS OF AZILAL PROVINCE

A. General Situation

Azilal Province is situated on a north-south axis along the central High Atlas Mountains of Morocco (see Attachment 2 map). It encompasses an approximately 200 km. long section of the western face of the Atlas chain, extending from the Tadla Plains and the Haouz Plateau to the crest of the Atlas Mountains' divide. The total provincial area measures about 1 million ha. Some 60% of this total area is above 1,000 m. in altitude, and 60% of this latter area is above 1,500 m. in altitude. Due to its mountainous location, the general topography is extremely rough and variable, characterized by massif formations, steep slopes and abrupt plateaus. There are three major synclinal depressions dominating the provincial topography, corresponding to the drainage basins of the three major existing rivers -- the Oueds El Abid, Lakhdar and Tessaout (see Attachment 2 figure). The Oued El Abid watershed extends over most of the northern half of the provincial area, covering some 7,840 Km². This watershed is the principal source of water supplied to the Bin El Ouidane dam and reservoir system. The Oued Lakhdar watershed drains an area of 1,825 km², or approximately 27% of the south-central provincial area. This watershed is the source of water supplied to the recently completed Hassan I dam and reservoir system. The third major watershed, that of the Oued Tessaout, covers an approximate 1,465 km² area along the extreme southwestern portion of the province. It supplies water for the Moulay Youssef dam and reservoir system.

B. Climate and Precipitation

In general, the Azilal climate is mediterranean with strong oceanic and orographic influences. Mean annual temperatures range between 12.7 and 19.1 degrees Centrigade, with extreme variations largely as a function of altitude. Winter duration varies between 3 and 7 months, with frost possible for up to 6 months per year at altitudes exceeding 1,500 m.

Precipitation is concentrated during the Autumn and Winter months, i.e., from September to May, averaging 50 to 70 days per year. Provincial rainfall varies between 300 and 1,000 mm. per year, depending upon location, altitude

and annual climatic variability. In addition, a portion of the precipitation falls as snow, resulting in at least one snowfall per year between 1,000 and 1,500 m. altitude, and 10-20 days of snow per year at altitudes exceeding 1,500 m.

C. Geomorphology and Soils

In general, the existing provincial geology results from the following major formative periods:

1. Primary - Cambrian schists and alternating schist-sandstone formations. Permo-Triassic formations of red clays, dolomites, gypsums and salts.
2. Secondary - At the start of the Atlas Mountains' formation, Jurassic and Cretaceous formations of calcareous and marl-limestone marine deposits.
3. Tertiary - This period marks the formation of the Atlas Mountains, and the end of regional marine inundations.
4. Quaternary - Following completion of the Atlas chain formation, glacial and alluvial terrace formations of sedimentary conglomerates and stony silts.

Provincial geomorphology can be sub-divided into the following five general types of landforms:

- plains and piedmonts (8% of total provincial area)
- hilly areas (14.5% of total area)
- intermediate structural areas (e.g., eroded basins, plateaus, high plains, etc.; 22% of total area)
- medium mountainous areas (500 - 1,500 m. altitude; 29% of total area)
- high mountainous areas (1,500 - 4,000 m. altitude; 26.5% of total area)

Regional soils generally consist of the various geological parent materials described above. Soil quality, depth, permeability, content and stability vary widely throughout the province in accordance with local parent material, surface relief, altitude, climatic exposure and prevailing type and quality of use. Overall, it is estimated that some 55% of this region's soils are unstable, i.e., highly susceptible to erosion. The only available information regarding actual soil erosion rates in this province are solids transport measurements taken at each of the three existing dam sites and extrapolated over the entire respective watershed areas. These figures are: Bin El Ouidane (Oued El Abid) - 558 m³/km²/year; Hassan I (Oued Lakhdar) - 504 m³/km²/year; and Moulay Youssef (Oued Tessaout) - 1,013 m³/km²/year.

D. Land Use

1. General - The predominant provincial land use is agriculture. Over 70% of the total provincial area is currently under some degree of cultivation. Forested area accounts for the second major land use category,

comprising some 22% of the total area. The remainder of the province (7.5%) consists largely of natural wildlands, e.g., rangelands and matorrals, and unvegetated areas. The major characteristics of each of these three types of land use are provided below.

2. Agriculture - Provincial agriculture exists in extensive and intensive varieties of both irrigated and dryland cultivations. In addition, livestock production plays an extremely important role in the regional agricultural economy.

Dryland agriculture predominates throughout the region, accounting for some 75% of total agricultural holdings. Whereas official farm registration statistics indicate a total of 138,240 ha. of provincial dryland agricultural holdings, remote sensing estimates place this figure at 207,900 ha. Thus, officials estimate that up to 55,000 ha. of the existing dryland cultivation is probably occurring illicitly in cleared forest areas. Of the 42,500 farms existing on this 208,000 ha. total dryland area, some 44% of these holding are less than 5 ha. in size, 49% are between 5 and 20 ha. in size, and 7% are greater than 20 ha. in size. The major crops grown on these lands include: cereals (64.5% of area), legumes (4.5%), forage crops (0.2%), arboricultures (10.0%) and fallow areas (20.8%). Approximately 93% of the dryland farmers cultivate barley, 35% cultivate wheat, 10% cultivate legumes, 13% cultivate livestock forage, and 15% cultivate some type of arboriculture, typically olives or almonds. It is estimated that some type of double-cropping, generally a cereal crop cultivated simultaneously under an existing arboriculture, is practiced on about 4% of this cultivated area.

Irrigated agriculture is practiced on some 22,500 ha. This figure includes 6,564 ha. which is a part of one large irrigation system located within the provincial boundaries on the Tadla plains. The remainder of this irrigated area consists of some 260 different perimeters allocated as follows:

<u>Perimeter Size</u>	<u>Irrigation Period</u>				<u>No. of Irrigators</u>
	<u>Perennial</u>		<u>Winter only</u>		
	ha.	% total	ha.	% total	
500 ha.	5345	38	925	52	4200
500-100 ha.	5386	38	500	28	6989
100-50 ha.	1510	11	160	8	2753
50 ha.	<u>1883</u>	13	<u>220</u>	12	<u>9602</u>
Totals	14124		1785		23544

The major crops grown on these lands include cereals (52% of area), vegetables (8%), forage crops (9%) and arboricultures (41%). An average 80 Mm³ of water is used in these systems each year; however, actual annual supplies vary considerably according to climate. Of this total irrigation demand, some 45% of these water supplies are captured through small or medium-sized concrete or stone diversions of surface supplies, and 35% are provided by wells. The remaining 20% of this demand is provided by damming surface water supplies.

Livestock production represents a major source of local agriculture income, accounting for some 28% of total annual provincial agricultural revenues. Some 71% of all provincial farmers practice some type of livestock cultivation. Total livestock numbers include 517,475 goats, 515,451 sheep and 44,730 cattle; and, therefore, small ruminants account for about 75% of local livestock production. The average herd size per cultivator consists of 14 goats, 12 sheep and 1 cow. In general, goats predominate on farms less than 20 ha. in size and sheep predominate on farms greater than 20 ha. Although all types of combinations are observed, the number and species of animals generally increases with farm size, with single-species holdings predominating on small farms. Modest amounts of aviculture and apiculture are also practiced in this region.

3. Forest Resources - The official estimate of total provincial forest cover is 389,000 ha. This total includes some 190,000 ha. (49%) of established continuous forests, 73,000 ha. (19%) of established fragmented forests, and 126,000 ha. (32%) of unsurveyed fragmented forests. Use of remote sensing data, however, results in somewhat revised estimates; including 57,000 ha. of dense forests, 118,000 ha. of medium-dense forests and 92,000 ha. of light cover forests. Major tree species include Aleppo pine, Juniper and Holm oak (chêne vert). These species exist both in mixed, wild stands and in managed plantations. Combination of this information permits the following general provincial forest classification:

- dense broadleaf forests	55,000 ha.
- light broadleaf forests	100,000 ha.
- dense piny forests	40,000 ha.
- light piny forests	72,000 ha.
Total	267,000 ha.

Volumetric estimates indicate that these forests are capable of producing an average of 234,000 steres/year and 118,000 steres/year of broadleaf and pine wood products, respectively. An overall estimate of combined average annual yield is about 70 steres per ha. of living forest.

Current reforestation efforts cover no more than 5,000 ha. per year. Agricultural clearing accounts for a net loss of some 3,000 - 5,000 ha. of provincial forests each year.

4. Wildlands - Although estimates vary, vegetated wildlands, e.g., rangelands and matorrals, cover about 291,000 ha. of provincial territory. These lands contribute some 123 million forage units per year, satisfying about 54% of total provincial livestock food requirements. Average annual productivity of these rangelands is 180 forage units per hectare, although productivity varies widely throughout the region according to climate, accessibility, intensity of use and type of vegetation.

E. Water Resources

As mentioned above, Azilal Province contains the majority of 3 major watersheds -- the Oueds El Abid, Lakhdar and Tessahout. Together, these 3

bassins drain a 12,250 km² area, 9,500 km² of which is situated within the provincial boundaries, eventually converging with the Oued Oum El Rbia farther downstream (see Attachment 2 figure). The total annual water flow into these systems averages 7,090 Mm³, some 40 percent of the nation's total estimated surface water supplies, consisting of 4,312 Mm³ for the Oued El Abid, 1,826 Mm³ for the Oued Lakhdar and 952 Mm³ for the Oued Tessaout. The average water yield rate from these reservoirs measures 5.52 liters/second/km² at Bin El Ouidane (Oued El Abid), 5.38 l/s/km² at Hassan I (Oued Lakhdar) and 7.4 l/s/km² at Moulay Youssef (Oued Tessaout). Within the province, some 411 different surface water sources have been identified; however, many additional sources are believed to exist. With the exception of the wells currently in operation for domestic and irrigation water supplies, little is known about the extent of provincial groundwater supplies.

F. Wildlife Resources

There is a little direct information available on the wildlife resources of Azilal Province. However, based upon studies conducted to date in similar adjacent regions of the High Atlas Mountains, it is possible to provide a fairly accurate picture of the various types of wildlife found in this region.

Although the province contains no protected areas, it provides an excellent and varied habitat for quite a number of important plant and animal species. The following passage on Toubkal National Park, situated less than 100 km. from Azilal Province, was adapted from IUCN's "Directory of the Protected Areas of North Africa (April 1987)". Due to Mt. Toubkal's great proximity and environmental similarity to the Azilal region, it is believed this description accurately portrays the existing flora and fauna of the project target area:

The floral associations are directly influenced by the altitudinal variations of the site and by the Atlantic influence from the northwest. The northern, humid slopes of the mountains are covered by maquis and woodlands consisting of holm oak Quercus ilex and Aleppo pine Pinus halepensis, with an understorey of juniper Juniperus sp., and dwarf pine. At higher altitudes, the forest gives way to juniper and eventually to alpine meadows, steppic vegetation and finally scree slopes. The alpine zone experiences harsh climatic conditions resulting in dominance of dwarf communities with mosses and lichens on the scree and rocks, whilst plants such as Bupleurum spinosa and grasses dominate the shallower slopes. The alpine zone contains numerous endemic plant species such as Narcissus watieri, Arabis josiae, Campanula maroccana, Genista florida var. maroccana, Cirsium chrysacanthum, Euphrasia minima, Prunus prostrata, Erodium atlanticum, and Medicago suffruticosa and acts as a refuge for a number of relict European species. The numerous valleys support a rich flora dominated by oleander with willow Salix sp., two poplar Populus sp., two oak Quercus sp., two hawthorn Crataegus sp., with a ground flora of a blackberry Rubus sp., bracken Pteridium sp., and ivy Hedera sp., Fig Ficus sp., wild vine and walnut Juglans sp..

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Mammals found in this region include Barbary macaque Macaca sylvanus, porcupine Mystrix cristata, Barbary ground squirrel Attantoxerus getulus, and Barbary sheep Ammotragus lervia. Panther Panthera pardus, previously present in the area, has not been recorded for a number of years. The bird fauna, which is predominately Palearctic in composition, does include a number of localised, restricted or endemic species such as bald ibis Geronticus eremita, bearded vulture Gypaetus barbatus, black-winged kite Elanus caeruleus, lanner falcon Falco biarmicus, barbary falcon Falco pelegrinoides, crested coot Fulica cristata, barbary partridge Alectoris barbara, little swift Apus affinis, red-rumped swallow Hirundo daurica, dipper Cinclus cinclus, woodchat shrike Lanius senator, shore lark Eremophila alpestris, alpine accentor Prunella collaris, Moussier's redstart Phoenicurus moussieri, crimson-winged finch Rhodopechys sanguinea, house bunting Emberiza striolata, chough Pyrrhocorax pyrrhocorax, and alpine chough Pyrrhocorax graculus. The invertebrate fauna is particularly rich in butterfly species with Ponto-Mediterranean and other restricted species recorded such the moroccan orange tip, sooty orange tip, cleopatra, spanish festoon, provence hair streak, purple-shot copper, mazarine blue, mountain argus, aetherie fritillary, oriental meadow brown, southern gatekeeper and rosy grizzled skipper. The endemic species include the moroccan copper, martin's blue, atlas blue, moroccan grayling, giant grayling, moroccan meadow brown and vaucher's heath. An indigenous subspecies of salmon Salmo trutta macrostigma is present in the mountain streams up to 2000 m.

It should be noted that many of the plants and animals included above are currently on IUCN's list of rare or threatened and endangered species.

The Peace Corps currently has two volunteers stationed in the northern areas of the province attempting to document the continued existence of the rare barbary panther, last seen in 1983. In anticipation of their eventual success in this endeavor, these volunteers are also assessing the biological importance of different provincial regions with the eventual intent of recommending some type of protected status for one or more critical wildlife habitat areas. The Mission will continue to monitor this work to determine if and when the project might be able to facilitate these important bio-diversity conservation efforts.

G. Touristic Resources

Although little developed or utilized to date, the region has significant touristic, aesthetic and cultural potential. The surrounding High Atlas Mountains provide a great array of panoramic vistas as well as excellent hiking, mountaineering and skiing opportunities. In addition, the province

contains two natural sites of national significance. The more well-known of these sites, the Cascades of Ouzoud, consists of a 100 m. natural waterfall - one of the largest in Morocco. This site is also a favored habitat of the barbary macaque, making it doubly interesting as a potential tourist attraction of biological significance. The other site consists of a 100 m. high natural limestone bridge located at Imi-n-Ifni near Demmate, said to be one of the oldest villages in Morocco. This unique geological structure is rendered even more fascinating by the large numbers of birds nesting in its crevices, its great stalactite formations, and its prominent position in local Berber folklore.

III. DISCUSSION

The above information clearly demonstrates that Azilal Province possesses an abundance of valuable natural resources. While its water resources currently represent the province's most significant regional and national asset, existing agricultural, forest, rangeland, wildlife and touristic resources also hold good promise for making potentially important long-term contributions to the national economy. The above description also shows that the bulk of these resources are being lost or seriously degraded and endangered by a combination of natural and human factors. The following points serve to illustrate this conclusion:

- the rate and amount of soil erosion occurring throughout the provincial area;
- the amount of agricultural cultivation occurring on steep slopes, poor soils and under other marginal or unsustainable circumstances;
- the high percentage of fragmented or otherwise degraded forests and rangelands; and
- the great number of local floral and faunal species which are currently listed as rare, threatened or endangered.

In combination, these factors portray an ecosystem under severe stress. Clearly, significant efforts are required and warranted to conserve and enhance this important natural resource base.

The project will address this situation through the development, demonstration and dissemination of a variety of improved techniques aimed at strengthening existing local land use planning and management practices. The overall objective is to place this valuable regional watershed ecosystem on an environmentally sound and economically sustainable basis. If successful, this initiative could provide an important national and worldwide example in the ongoing fight against global deforestation and dryland desertification.

The most logical alternative to this project -- a more preservationist approach of discouraging future provincial development and encouraging out-migration from this region -- is considered to be both socially and

politically impractical and unrealistic under prevailing local circumstances and constraints. The project, therefore, represents the most viable opportunity to halt the existing cycle of continuing natural resource degradation in this region through effecting real change in prevailing local land use attitudes and practices.

The project proposes a certain amount of local construction activities, such as the facilities upgrading program and the construction of improved management access roads. If improperly planned or implemented, these activities could result in serious adverse environmental consequences. However, in accordance with its improved natural resources management objectives, the project is being designed to ensure that all such environmental considerations are properly addressed during both the initial watershed management planning and subsequent implementation efforts.

The integrated planning and implementation process will be conducted under the close guidance of experienced natural resources management experts. All relevant decisions will be reached only after a thorough "scoping" assessment of their potential environmental implications, with the full participation of all concerned parties. In addition, all such decisions will be properly documented and reviewed in both the Project Paper and the ensuing watershed management plan(s), and systematically monitored and evaluated thereafter throughout project implementation for the timely identification of any required mitigative measures.

The process outlined above is fully consistent with the intent, if not the letter, of current Agency environmental assessment requirements. Accordingly, the Mission believes that these procedures are sufficient to satisfy any environmental concerns regarding this project, and that a more formal Agency environmental assessment is not required in this instance.

IV. CONCLUSIONS

The following conclusions are evident based upon all of the above information:

- Azilal Province possesses an abundance of unique agricultural, forest, rangeland, water, wildlife and touristic resources;
- many of these valuable assets are being lost or seriously degraded and endangered by a combination of natural and human factors;
- significant efforts are required and warranted to conserve and enhance this important resource base, both for the long-term well-being of the local residents and for its significant contributions to the regional and national economy; and
- the proposed project represents the most locally viable approach towards an environmentally sound and sustainable resolution of this priority Moroccan natural resources management need.

Accordingly, this I.E.E. underscores the environmental importance of this project and clearly justifies the negative threshold decision recommended above.

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