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AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

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MEMORANDUM

February 29, 1988

TO: Distribution

FROM: ANE/PD, Ronald F. Venezia 

SUBJECT: Pakistan - Bolan Dam Project (391-0505)  
Asia and Near East Project Advisory Committee

The ANPAC meeting to review subject PID will be held on Wednesday, March 2 from 10:00 AM to 12:00 noon in room 4440 N.S.

Participation in accordance with ANE Bureau guidelines is invited.

Attachments: Issues Paper  
PID

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## ISSUES PAPER

### PAKISTAN: BOLAN DAM PROJECT (391-0505)

#### PROJECT IDENTIFICATION DOCUMENT

LOP USAID Funding (ESF Grant)    \$15.52 Million

Initial FY:    1988

Final FY:     1989

PACD:         1991

#### A. Summary Project Description

The purpose of the proposed project is to reconstruct the Bolan Dam and rehabilitate the present irrigation system. The construction of the Bolan Dam, to tap the flood waters on the Bolan River for purposes of irrigation, was first undertaken in 1953. The International Cooperation Agency (ICA), the predecessor organization to USAID, provided \$75,000 in support of engineering services at that time. The ICA assistance to the project was terminated in 1954 due to differences of opinion concerning technical features in the plans for the dam. Construction nevertheless went forward. The dam began functioning in the late 1950's and remained operational until 1976, when it was overtopped in a flood and destroyed.

The Bolan Dam project is one of a series of projects planned for Pakistan in support of the Mission's lagging areas strategy. Major components of the project include: 1) reconstruction of the dam embankment to 23 meters in height with a gross storage capacity of 75,000 acre feet; 2) rehabilitation of the 65,000 meter long irrigation network; 3) construction of a 37 km approach road; and 4) training of 30 people in the operations and maintenance of the dam and irrigation system.

#### B. Issues Discussed in Project Committee

##### 1. Linking Dam Reconstruction to Agricultural Production

Issue: The primary economic benefits of the project as presented in the PID are based on agricultural outputs. The PID, however, does not provide sufficient background on the agricultural and irrigation issues affecting the achievement of these outputs, and on complementary efforts which may be needed in support of sustainable agricultural production in the project area.

Discussion: The Mission representatives to the PRC discussed the Mission's intention to link implementation of the Bolan Dam project to existing irrigation and other agriculture programs of the Government of Baluchistan (GOB) and to specific ongoing USAID/Pakistan agricultural projects, including the Forestry Planning and Development Project (391-0481), the Command Water Management component of the Irrigation Systems Management Project (391-0467), and the Marketing of Agricultural Research and Technology Project (391-0489). It is the intent of the Mission that these projects will, among other things, provide watershed protection inputs, assist Bolan area farmers in the formation of water user associations, and support appropriate cropping patterns mix and research in the Bolan Dam command area.

Recommendation: It is the consensus of the PRC that the ANPAC should request the Mission to address these linkages explicitly in the PP, in order to determine how best to ensure their effective inclusion in the project. Specifically, it is recommended that the Mission's Office of Agriculture and Rural Development (O/ARD) assume responsibility for providing complementary agriculture sector support to the Bolan Dam project. This can be accomplished by a number of means, including: linkage (as appropriate) of the Mission's ongoing irrigation sector projects to the design and implementation of the Bolan Dam project; application of relevant Government of Pakistan (GOP) and GOB knowledge of the agricultural sector; and other appropriate mechanisms, including other donor activities. Additional technical assistance for the project design process is available through the centrally-funded Forestry/Fuelwood Research and Development Project (498-0276) and the regional Irrigation Support Project for Asia and the Near East (398-0289).

### C. Concerns Discussed in Project Committee

#### 1. Coordination Among GOB Implementing Agencies

Concern: The PRC notes the importance of close coordination between the various GOB line agencies which will be involved in implementation of the Bolan Dam project, including agricultural support, and considers it essential that the Bolan Dam project design include provisions for maximizing such coordination.

Recommendation: The PRC strongly recommends that the Mission, during the course of project design, undertake discussions with the GOB Planning and Development Department to formalize its role in coordinating the activities of the GOP/GOB line agencies having implementation responsibilities for the Bolan Dam project.

## 2. Economic Viability

Concern: The economic analysis presented in the PID indicated an economic internal rate of return (EIRR) of 9.66 percent (the opportunity cost of capital in Pakistan is currently 14 percent). If the EIRR were to remain at this level, there would be a policy issue concerning the basic economic viability of the project.

Discussion: At the PRC, the Mission presented the results of a more detailed analysis conducted subsequent to submission of the PID which projects an EIRR of 18 percent and a benefit-cost ratio of 1.89. A sensitivity analysis was also conducted which results in an EIRR of 21 percent and 22 percent and benefit-cost ratios of 2.25 and 2.54, respectively. As stated by the Mission representatives, a further and more detailed economic analysis will be performed in conjunction with project design which will take into account secondary and tertiary benefits associated with the construction of an approach road, health and nutritional improvement, etc.

Recommendation: The PRC concurs with the intent to perform a more detailed economic analysis at the PP stage. Based on what is known now, it appears reasonable to expect that a favorable EIRR relative to opportunity cost will be confirmed. Should this not be the case, the Mission should consult AID/W on this point prior to project authorization. In addition to performing the customary macro-economic analysis, the PRC requests that the Mission assess the affordability, for the individual household unit, of farming under irrigated conditions. The latter analysis should specifically include affordability of water charges, input packages, etc.

## 3. Policy Reform

Concern: Given the history of insufficient water user charges to cover operation and maintenance costs of irrigation systems in Pakistan in general and the likelihood that a similar problem will occur in the case of the Bolan Dam and irrigation system, the PRC is of the view that the Mission should address this concern within the context of the current USAID/IBRD/GOP policy dialog on this issue. The approach taken on this project should be consistent with that taken on the Irrigation Systems Management project (ISM).

Recommendation: The PP should lay out Mission strategy on water user charges and O&M funding (cost recovery for O&M) in the project and its relation to the approach taken on the ISM project.

#### 4. Design Team Composition

Concern: The PRC expressed concern as to the adequacy of agricultural and rural development expertise, specifically in water management, presently available in the composition of the design team.

Discussion: At present the multidisciplinary environmental assessment team includes, among others, the following professionals: agricultural economist, agronomist, soil scientist, and crop protection specialist. The Mission has also contracted an additional agricultural economist to work on the design of the project. The social soundness assessment will be conducted by Hugh S. Plunkett, an S&T direct-hire anthropologist and South Asia expert.

Recommendation: The PRC recommends that the Mission review the proposed skills mix of its design team taking into consideration issue No. 1 above. If additional contractor assistance is required to address this concern, a ready source would be the regional ISPAN project.

#### 5. Reliability of Capital Cost Estimates

Concern: The PRC recognizes the importance of accurate cost estimates to successful design and implementation of a project involving major infrastructure construction in a remote area.

Discussion: Mission representatives indicated that the cost estimates in the PID are based on estimates prepared by NESPAK (a Pakistani A/E firm which prepared the detailed engineering design and cost estimates for reconstruction of the Bolan Dam and irrigation system). During preparation of the PID the NESPAK estimates were revised by the Mission's Office of Engineering to account for inflation, contingencies, and the estimated costs of secondary infrastructure items such as the approach road. These cost estimates will be analyzed by a U.S. A/E firm during a technical review of the dam and irrigation system design to be carried out as a part of the comprehensive environmental assessment of the project. Further engineering analysis, as required (including re-examination of the capital cost estimates), will be performed by an A/E firm to be contracted for technical services during project implementation.

Recommendation: The PRC concurs with the Mission's plans for independent evaluation of project capital costs. ANE/PD/ENG will provide technical assistance to the Mission as requested.

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D. Project Committee Recommendation

The PRC recommends that the ANPAC approve the PID and authorize the Mission to proceed with detailed project design and PP approval.

E. Project Committee Members

ANE/PD/ENV, G.R. Whaley, Chairman  
ANE/PD, B. Odell  
ANE/PD/ENG, A. Grayson  
ANE/SA, J. Manley  
ANE/PD/ARD, H. Gunther  
ANE/DP, A. Silver  
PPC/PDPR, J. Atherton  
GC/ANE, H. Morris

Clearance: ANE/TR/ARD, HGunther [draft]

ANE/PD/SA:GRWhaley:2/24/88:0966e

USAID/PAKISTAN

BOLAN DAM

PROJECT IDENTIFICATION DOCUMENT

January 1988

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

**1. TRANSACTION CODE**      Revision No.      **DOCUMENT CODE**  
 A      A = Add      \_\_\_\_\_      1  
 C = Change  
 D = Delete

**2. COUNTRY/ENTITY**      **3. PROJECT NUMBER**  
 ISLAMIC REPUBLIC OF PAKISTAN      391-0505

**4. BUREAU/OFFICE**      **5. PROJECT TITLE (maximum 40 characters)**  
 ASIA AND NEAR EAST      A. Symbol      B. Code      THE BOLAN DAM PROJECT  
    ANE      04

**6. ESTIMATED FY OF AUTHORIZATION/OBLIGATION/COMPLETION**      **7. ESTIMATED COSTS (\$000 OR EQUIVALENT, \$1 = 17 )**

FUNDING SOURCE		LIFE OF PROJECT
A. AID		15,520
B. Other U.S.	1.	
	2.	
C. Host Country		
D. Other Donor(s)		
<b>TOTAL</b>		15,520

A. Initial FY    8 | 8  
 B. Final FY    8 | 9  
 C. PACD        9 | 1

**8. PROPOSED BUDGET AID FUNDS (\$000)**

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. 1ST FY <u>88</u>		E. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ESF	219	063		3,300		15,520	
(2)							
(3)							
(4)							
<b>TOTALS</b>				3,300		15,520	

**9. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)**      **10. SECONDARY PURPOSE CODE**  
 064

**11. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)**

A. Code	BS						
B. Amount	15,520						

**12. PROJECT PURPOSE (maximum 480 characters)**

To reconstruct the Bolan Dam and rehabilitate the present irrigation system

**13. RESOURCES REQUIRED FOR PROJECT DEVELOPMENT**

**Staff:** The following categories of consultants will be required for approximately two months to perform an Environmental Assessment and to assist in the preparation of the Project Paper:

a) Environmentalist; b) Capital Projects' Economist; c) Ecologist  
 d) Irrigation/Drainage Specialist; e) Plant Protection Expert;  
 f) Public Health Specialist; g) Anthropologist

Funds Approximately \$387,000 is required from PDI Fund (391-0470) to support the above consultants

<b>14. ORIGINATING OFFICE CLEARANCE</b>	Signature <i>Eugene S. Staples</i> Eugene S. Staples	<b>15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION</b>
	Title Director, USAID/Pakistan	
	Date Signed MM DD YY 01   06   88	MM DD YY

**16. PROJECT DOCUMENT ACTION TAKEN**      **17. COMMENTS**

S = Suspended      CA = Conditionally Approved  
 A = Approved      DD = Decision Deferred  
 D = Disapproved

<b>18. ACTION APPROVED BY</b>	Signature	<b>19. ACTION REFERENCE</b>	<b>20. ACTION DATE</b>
	Title		
			MM DD YY

BOLAN DAM

PROJECT IDENTIFICATION DOCUMENT

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ATTACHMENTS:

- I - Logical Framework
- II - Financial Tables
- III - Contracting Plan

Acronyms

AID	See USAID
DA	Development Assistance
EIRR	Economic Internal Rate of Return
ESF	Economic Support Fund
GOB	Government of Baluchistan
GOP	Government of Pakistan
ICA	International Cooperation Agency
IPD	Irrigation and Power Department
ISM	Irrigation System Management
Km	Kilometer
UN	United Nations
UNDP	United Nations Development Program
USAID	United States Agency for International Development
ha	Hectares
mm	Millimeter

(i)

I. SUMMARY

- A. Cooperating Country The Islamic Republic of Pakistan
- B. Implementing Agency Planning and Development Department, Government of Baluchistan (GOB), Irrigation & Power Dept.
- C. Proposed Amount of Project AID Grant \$15,520,000
- D. Project Assistance Completion Date 9/30/1991
- E. Goal of Project To increase agricultural production, farm income and rural employment in Baluchistan.
- F. Purpose of Project To reconstruct the Bolan Dam and rehabilitate the present irrigation system
- G. Summary Description The construction of the Bolan Dam and irrigation system was first undertaken in 1953. During a violent flood in 1976, the dam was overtopped and destroyed. The reason for failure is traced to the under-construction of the dam, the lack of a spillway and poor maintenance. The Bolan Dam Project will provide assistance to the GOB to (1) reconstruct the dam embankment, spillway, escape structure and outlet tunnel, (2) rehabilitate the canal system, (3) construct an approach road, (4) provide training in operations and maintenance of dam and irrigation systems and possible (5) agricultural technical assistance.

## II. BACKGROUND OF THE PROJECT

From the conventional point of view of development planning, resources in Baluchistan, both human and natural, are sparse, irregular and unreliable. Settlements throughout the province are few and far between, depending on the coincidence of cultivable soil and relatively reliable surface water or shallow ground water. Of a total land area of 34.7 million hectares (ha), the cultivated area is estimated at 1.45 million ha, with an annual net sown area of about 640 thousand ha and the remaining area in fallow. The low and irregular rainfall, with an average annual rate of 125-150 millimeters (mm), makes it difficult to support rainfed agriculture. The extensive use of tubewells has depleted ground water aquifers. Coupled with this, recharge is slow and does not match depletion rates. Drought is frequent, but rain, when it comes, is often violent and causes severe erosion and damage to property. It is quite common for the total annual rainfall to occur in one or two unpredictable storms. This available surface water, in the form of high runoff and violent flood waters, is a potentially valuable resource that is presently untapped due to the lack of storage dams.

The absence of adequate and predictable water supplies has shaped the lifestyle of the population. Until recently, the basic economic orientation of the province was pastoralism. Crop cultivation, however, is becoming increasingly important. Presently about 67 percent of the total labor force derives a portion of its livelihood from agriculture while approximately 56 percent of the province's gross domestic product is provided by agriculture. Agricultural output levels however, are low relative to national averages. Fertilizer and improved seed usage are negligible. Baluchistan accounts for less than one percent of the total fertilizer used nation-wide and approximately 1.5 percent of improved seed. Agricultural extension services cover only a small proportion of the area. Yet, there are indications that agricultural production levels can be raised particularly with the harvesting of existing water resources. Specifically, increasing amounts of high value fruits and vegetables are being exported from the province. Baluchistan is also producing an estimated 0.47 million tons of wheat for an annual estimated provincial demand of 0.55 million tons. Water is presently the most inhibiting factor to the development of the province.

Baluchistan thus presents a picture of a rugged, barren land with isolated patches of agriculture found on three major plains, of which the Kachhi Plain falls within the proposed area. The Bolan River is located on the Kachhi Plain and derives its water source from the Kalat Mountain Range. Agriculturally, the Kachhi Plain has some of the best cultivable land in Baluchistan and has become the most productive part of the province since the recent introduction of an irrigation canal from the Indus River. This irrigated area now produces the largest proportion of the province's wheat, rice and sorghum.

(iii)

The construction of a Bolan Dam, to tap the flood waters on the Bolan River for purposes of irrigation, was first undertaken by the Central Engineering Authority of Pakistan in 1953. The International Cooperation Agency (ICA), the predecessor organization to USAID, provided \$75,000 in support of engineering services at that time. The ICA assistance to the project was terminated in 1954 due to differences of opinion concerning technical features in the plans for the dam. Construction nevertheless, went forward and in 1958 the responsibility for the dam was handed over to the Government of West Pakistan. In 1970, the management of the Bolan Dam moved to the Irrigation Department, Government of Baluchistan. The dam began functioning in the late 1950s and remained operational until it overtopped on September 5, 1976 and was destroyed.

### III. PROGRAM FACTORS

#### A. Conformity with Recipient Country Strategy

The Government of Pakistan (GOP)'s Sixth Plan Strategy (1983-1988) emphasizes balanced regional development, a theme that has been consistent in Pakistan since the 1950s. Baluchistan is singled out to receive special attention, including the largest amount of the federal development outlays on a per capita basis, in order to redress past neglect and to draw the province into the mainstream of the national economy. It is an explicit GOP strategy to realize the full economic potential of Baluchistan, particularly the agricultural potential of that province. This is a difficult undertaking because of the limited availability of perennial water flows and intense evaporation rates.

Since the main limitation on the exploitation of the provincial land resources is water, the Sixth Plan awards the highest priority to the development of this critical resource. The GOP strategy for the water sector has elements for expanding the present surface irrigation by constructing dams and expanding of canal discharge, remodeling of irrigation works and recharging of underground water.

#### B. Relationship to USAID/Pakistan Strategy Statement

During the 1988 to 1993 period, USAID's strategy will be to support GOP efforts to "bolster political stability and national integration through programs to support equitable economic growth and improved social development". This approach will underscore the importance of ensuring balanced regional welfare as a mechanism to strengthen national unity. The underdevelopment of large parts of Northwest Frontier Province, Baluchistan and Sind, and the political importance of these provinces, has encouraged USAID to devote substantial resources to help integrate these "lagging areas".

The lagging areas strategy was initiated under the FY 1982-FY 1987 program and will continue to be followed through 1993. In order to foster national cohesion and to reduce long-standing regional disparities, USAID plans to fund projects that will enhance levels of economic opportunity in the lagging areas. Many of these projects will focus on the improvement of basic infrastructure, initiatives that have heretofore been neglected and that have contributed to feelings of disenfranchisement. USAID funded projects will include roads, bridges and dams. They will improve access to remote areas, dispel perceptions of government neglect, provide a means to bring the population into the economic and political mainstream of the country and help Pakistan to ameliorate regional differences.

Of the three lagging areas, Baluchistan is considered by all sources to be the most relatively deprived. Yet, Baluchistan is a geographically

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strategic province. Bordering Afghanistan and Iran, it accounts for 40 percent of Pakistan's total land area and is populated by five million people. In addition to ecological and physical limitations, the province also suffers from social constraints which are a result of years of neglect under British, and later Pakistani rule. Before Independence, the British only invested in the areas they administered directly--the access routes to Afghanistan--and then only to a limited extent. The interior of the territory, which was less of a political priority to the British, received scant attention.

While post-independent Pakistan strove for balanced regional development in economic planning, the first two decades of planning effectively bypassed Baluchistan. The reasons for this are generally acknowledged as the extra-constitutional status of the province and the lack of readily exploitable natural resources, particularly perennial water flows. In addition, central government's preoccupation with East-West parity and the preemption of the country's resources by the Indus Basin potential, moved Baluchistan further to the periphery of the main development stream. The result was that the average development outlays for the province during the first three Five-Year Plans (1955-1970) are estimated to have been \$1.5 million, of which nearly 40 percent was surrendered as unutilized.

It is not an exaggeration to say that the economic development in Baluchistan began only in the late 1970s. This, in turn, had ramifications on the political integration of the province into the nation state of Pakistan, which remains a particularly thorny problem. Baluch nationalism is among the most intractable of the ethnic challenges that threaten the integrity of multiethnic Pakistan. Contemporary Baluch nationalism has been steadily germinating since the incorporation of the Baluch into the new country of Pakistan in 1947. The Baluch have waged an on-again, off-again guerrilla struggle ever since the departure of the British, culminating in the mid-1970's in a brutal confrontation with the Bhutto regime. Since nearly all the Baluch felt the impact of the central government's authority, the Baluch population is now politicized to an unprecedented degree. Today it is estimated that 5,000 Baluchis are in Afghanistan, waiting to "liberate" the province from Pakistan.

In addition to the potential volatility of Baluch nationalism, today Baluchistan is sheltering 800,000 of the country's 3.1 million registered Afghan refugees. This influx has altered the ethnic balance of the province between Baluch and Pushtun, and has increased ethnic tension. The results are simmering ethnic confrontations that have flared up with progressively increasing intensity.

The proposed project for the restoration of the Bolan Dam in Baluchistan and the rehabilitation of its canal system is one of a series of development initiatives planned in Baluchistan to foster internal stability within Pakistan, encourage national integration and avert ethnic discord. The USAID initiatives are expected to lessen regional

disparities and perceptions of disenfranchisement by providing income and further development opportunities to a province that by any standards of comparison -- economic, technological and social indicators -- is the most underdeveloped in Pakistan.

C. Relationship to AID Policy

The proposed Bolan Dam project, while primarily an infrastructure project, also has major implications for agricultural production and land reclamation and conforms with AID policy. In order to achieve broadly-based economic growth, it is an AID policy to support "efforts to intensify the economically viable use of existing land resources devoted to agricultural production, and to bring into economically viable production those resources which currently lie dormant".\* This policy determination specifically supports increased productivity of land as a factor of production in a context of equality of opportunity for access to land.

The Bolan Dam project is not intended to be an agricultural or rural development project. However, during project design efforts will be made to coordinate agricultural inputs from other donors, specifically the World Bank and the United Nations Development Program (UNDP), and to utilize the technical advice of the USAID funded Command Water Management Project. Furthermore, a budgetary line is included in the document to support possible technical assistance for agriculture.

AID policy regarding the financing of physical infrastructure is more flexible in an Economic Support Funded (ESF) country such as Pakistan, than it is in most Development Assistance (DA) countries. Nevertheless, even abiding by the strict policies of DA, the proposed Bolan Dam project conforms with AID policy in that the prospective social benefits are relatively high (compared to the costs) and will begin to be realized rather quickly. Furthermore, the anticipated benefits will accrue primarily to the poor. It is also expected that the construction and operation will contribute to temporary job creation, utilization and upgrading of local materials and skills, institution-building and a general enhancement of the environment.

D. Other Donor Input

In 1987 there were approximately six projects in Baluchistan that were expected to increase agricultural production through minor irrigation and command development works, raising the height of small dams, small irrigation schemes and improvement of water courses and canals. The external contribution for these projects totalled an estimated \$21,800,000 in grant funds and \$146,500,000 in loan funds, and included such donors as Kuwait, Netherlands, World Bank, United Kingdom, and the Asian Development Bank.

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\* Land Tenure Policy Determination 1986:1

The World Bank is also providing \$8,300,000 for a Baluchistan Agricultural Extension and Adaptive Research Project. The aim of this project is to increase agricultural production in four districts of Baluchistan, including Kachhi district, through strengthening and reorganizing extension service on the lines of the Training and Visiting Program. At present there is one agricultural extension agent in the project area out of 22 agents in Kachhi. Provincial agricultural officials have informed USAID that if the Bolan Dam is reconstructed and the irrigation canals rehabilitated, 26 additional agricultural extension agents, presently being trained under the World Bank funded project, will be assigned to the project area.

Another potential area of donor coordination arises from a proposal by the UNDP to provide short and long term technical assistance of a complementary nature to USAID projects. The provision of UN funded agricultural technical assistance to the Bolan Dam project is presently under discussion.

#### IV. PROJECT DESCRIPTION

##### A. Perceived Problems

By any yardstick Baluchistan is clearly Pakistan's most impoverished province. The average monthly household income in Baluchistan is approximately 25 percent lower than in Sind and Northwest Frontier Province. Its official literacy rate is 15.2 percent for males and 4.3 percent for females, the lowest in Pakistan. Only 29 percent of Baluchistan's rural population is within an 8 kilometer radius of a public or semi-public health institution. The province is remote, access is difficult and infrastructure investments are minimal. Out of a total road network of 10,861 kms. in length, a mere 2,112 kms. are paved. Only 19 percent of Baluchistan has access to electricity, compared to 73 percent for Sind and 81 percent for the Northwest Frontier Province. There is a general agreement among the population that they are underrepresented in civil service jobs and have little to say in government decisions that shape their economic lives. Baluchistan, in development terminology, is peripheral to the development mainstream.

Politically, the province is of strategic importance to Pakistan. It borders Afghanistan and Iran, and commands 760 km. of the Arabian Sea coastline. Apart from its neighbors, internal relations within the province are far from stable. Political dissidence is present and manifests itself in Baluch nationalism. Nationalist guerilla warfare has flared up on a recurring basis since 1948, with the 1973-1977 insurgency being particularly violent. Ethnic tension is acute and conflict has progressively intensified within the last year. Tribalism is present and rival groups jockey for limited economic and political positions. All of these elements effectively threaten Pakistan's national integration.

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The GOP is committed to the effective incorporation of Baluchistan into the economic and political mainstream. However, unlocking the economic potential of Baluchistan is far from resolved. There is general agreement, supported by numerous studies, that the development of water resources is key to this problem. However, there are no quick fixes. A logical approach is to have a diversified program that includes the development of tubewells, small storage dams, the implementation of irrigation schemes, complemented by agricultural inputs and water usage education. The proposed Bolan Dam Project, for the restoration of a dam and the rehabilitation of a canal system, will be one key component in this diversified program.

B. Project Goal and Purpose

The goal of this project is to increase agricultural production, farm income and rural employment in Baluchistan.

The purpose of this project is to reconstruct the Bolan Dam and rehabilitate the present irrigation system.

C. Expected Achievements/Accomplishments

The project is designed to achieve the following major outputs:

1. A dam embankment of an estimated 23 meters in height, an irrigation network approximately 65,000 meters long, and 37 kilometers of approach road built on sound engineering design and maintainable standards;
2. An estimated 30 persons trained in the operation and maintenance of the dam and irrigation system.
3. An increase of 34,000 acres of cultivated land in the Baluchistan Province.

D. Outline of the Project and How It Will Work

The proposed project involves the reconstruction of the Bolan Dam, with an estimated gross storage capacity of 75,000 acre feet, which will provide irrigation water to about 34,000 acres of land. The original earth filled dam was built in the late 1950s and remained operational until September 5, 1976 when it was destroyed by overtopping during a flood of unprecedented size. The failure of the dam is attributed to a number of factors which include the non-existence of an adequate spillway, poor operation and maintenance, under-construction of the dam and lack of proper access road.

The major elements of the project will include the construction of a dam embankment, concrete spillway and escape structure, outlet tunnel, construction and rehabilitation of the canal network, an approach road, training of the provincial Irrigation and Power Department officials in

the operation and maintenance of dams and possibly agricultural technical assistance in support of other donor funded extension services.

1. Dam Embankment

The proposed dam consists of approximately 510 meters long, 22.56 meters high earth filled embankment, the core of which will consist of sandy and clayey silt.

The dam embankment is designed to protect against erosion and wave action by rip rap covering a sand and gravel blanket. The core of the dam will form an impervious fill which will be protected by a sand and gravel filter on the downstream side. In addition, provisions will be made for the inclusion of a horizontal gravel filter drain with a sand filter drain on either side.

The Project will also provide funds for the demolition of the remnants of the old dam.

2. Spillway and Escape Structure

One of the primary reasons for the failure of the old dam was the lack of an adequate spillway. The present design calls for an open cut/ungated spillway which will provide a sheet flow on both upstream and downstream sides. The spillway will consist of a concrete section with stone aprons on both upstream and downstream sides. Cut-off walls will be provided to protect the concrete structures.

Located on the left bank is an existing damaged escape structure for diverting water from the tunnel. This structure will be plugged and a new one will be constructed upstream from the present site.

3. Outlet Tunnel

The existing outlet tunnel and related structures are in a damaged state and will require extensive repair, including remedial measures to the tunnel lining and repair of the tunnel outlet structure. The sink holes which have developed above the tunnel will be filled with compacted material.

The damaged tunnel gate and the hoisting arrangement will be removed and a new gate with hoisting device installed. The new tunnel gate and hoisting device have been designed to operate with minimal maintenance and operation effort. New screw operated regulation gates for the main canal will be installed to regulate the flow of water into the main canal.

4. Canal System Rehabilitation

The canals will be designed to provide irrigation water to approximately 34,000 acres of land with a cropping intensity of 50 percent. The

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channels will be redesigned to accommodate peak period discharge. The design of the main canal and the distributaries will take into account the seepage and evaporation losses for each reach of the canal system.

On most outlets, the old outlet structures will be retained. New outlets will be constructed wherever the old outlets are beyond repair.

5. Approach Road

The Bolan Dam Project will finance the construction of approximately 37 kms. of approach road from Dhadar to the dam site to provide access for the operation and maintenance of the dam. The approach road will also provide most of the villages in the project area easy access to markets and other development inputs.

6. Training

After the completion of the project, operation and maintenance will be carried out by the Baluchistan Irrigation and Power Department (IPD). In order to augment the capacity of IPD to carry out effective maintenance and operation of the dam, the project will support the short-term training of an estimated 30 IPD employees in U.S. universities or institutions in the operation and maintenance of storage and irrigation systems. Third country training, however, which meets the standards of Handbook 10, chapter 7, paragraph 7E, remains an option.

7. Agricultural Technical Assistance

USAID anticipates agricultural extension agents and technical assistance to be provided by the World Bank and the UNDP, respectively. Details of this inter-donor coordination to support Bolan Dam activities are under discussion and will be finalized during project design. However, in the event complementary assistance is not provided by other donors, a line item is included in the budget to support agricultural technical assistance.

8. Implementation Plan

The Project Design and Implementation Fund will be used to carry out the Environmental Assessment, Social Soundness Analysis, Economic Analysis and review of the detailed design. The project will fund technical assistance for the design of an approach road, any design revision on the dam and irrigation system and construction supervision. It is anticipated the technical assistance will be provided by a Pakistani, U.S. or joint venture Architect and Engineering firm and that construction services will be provided by a U.S./Pakistani joint venture.

V. FACTORS AFFECTING PROJECT SELECTION AND FURTHER DEVELOPMENT

A. Social Considerations

The project area is located within the Kachhi District of the Nasirabad Civil Division and the dam itself is approximately 37 kilometers from the market town of Dhadar. There are 20 villages within the project area. Prior to the failure of the Bolan Dam, the population was cultivating wheat, barley, mustard and vegetables. Today, many of the villages in the project area have been abandoned because of lack of water. It is estimated that 20,000 people have emigrated. Those people that have left the area have gone in search of seasonal, agricultural labor (primarily to the Sind) or opportunities in the wage labor market in surrounding towns. There is an estimated 16,000 people remaining in the project area.

There are 17 major Baluch tribes in Baluchistan, each headed by a sardar and there are some 400 tribal sub-groupings headed by lesser chieftains. The project area is populated by Brahui, Baluchi and Sindi-speaking people, who are in spite of the linguistic differences, culturally quite homogeneous. The area was settled by nomads who traditionally provided the dominant economic activity in the area. Although external government influences are present, it is the tribal power structure that is of paramount influence in this area.

1. Land Ownership

There are three major economic groups in the project area: landowner-farmer or khudkasht, ancestral tenants or bazgar, and nomads or shoawan. Most individuals in the area own small plots of land, e.g. 25-50 acres. However, since land is assessed by individuals in terms of a kinship unit, land owned by members of a family may be considerably larger. Nevertheless, land ownership is not concentrated in the hands of a few individuals/families or powerful sardars. The majority of residents have access to land and have an equal opportunity to put it to productive use. Tribalism is a strong factor in determining tenancy patterns. Bazgars inherit their right to utilize a particular parcel of land, a right which is protected by tribal law. After deducting the expenses for an agricultural season, approximately 75 percent of the profit goes to the tenants and 25 percent to the owner-farmer. Shoawan continue to migrate through the area. In the past, symbiotic relationships existed between these nomads and the sedentarized population, providing benefits to both. Nomads rented land from the cultivators for purposes of grazing and bought grain from them to supplement their diet. Nomads also operated as transport agents for the cultivators, taking excess crops to neighboring towns to be purchased by merchants.

2. Water Rights

Water rights are determined on the basis of land ownership. The larger land holdings have access to greater amounts of water while smaller holdings have a more limited access. The ownership of land and water

rights is transferred together. The distribution of water was previously legalized in the proposed project area when the dam was operative. The Department of Irrigation and Power arranged the actual distribution of water based on the amount of land owned. Water was divided on the basis of shares and hours of flow. This system will be continued when the dam is renovated.

### 3. Social Impact

Since this is an area in which a previous dam existed, indications are that no one will lose land due to flooding, nor will there be any issue of resettlement, or the necessity for compensation. At present a large portion of the perennial water from the Bolan River is diverted upstream to the Bolan Weir. The river, therefore, has but a small flow much of the year with the exception of those periods in which there are floods. The downstream water supply during those flood periods will naturally be affected by the proposed dam. However, since there are no downstream dams, these areas will benefit from the Bolan Dam as it will prevent the destructive forces of flood water from damaging property.

In the project area, there is no discrimination against small landowners, as most of the land is in small parcels. Tenancy is inherited and protected by tribal law. Given that many of the tenants that migrated to Sind are employed as landless laborers, it is expected that once there is water they will return to the project area. They will be attracted by security in terms of tenancy, plus 75 percent of the profits from the land. Additionally, tribal bonds are strong; the desire to be reunited with families and tribesmen will be a powerful attraction to return.

### B. Economic Considerations

#### 1. Appropriateness of Investment in Selected Sector

Pakistan is committed to the economic and political integration of Baluchistan into the mainstream of the country. Economically, the major limitation on the exploitation of provincial arable land resources is water. Economic rationality demands that the the perennial water flows in the form of rivers, which are extremely scarce yet punctuated by violent floods, be wisely and economically used.

The problem this project proposes to address is clearly a national, provincial and economic priority and the resources applied will be well spent. Without the investment of development resources into the renovation of the Bolan Dam and the rehabilitation of its irrigation system, the federal government will be dealt a setback to balanced regional development and the province will not be able to attain the basic objectives of the Baluchistan Five Year Plan, which are to assign top priority to water development and agricultural projects. More importantly, one of the three major agricultural areas in Baluchistan, will be left without sufficient water to bring it to its potential. Finally, the investment in the proposed physical infrastructure will result in an immediate and visible change in the socio-economic conditions and quality of life of the inhabitants of the project area.

## 2. Selection of the Appropriate Type of Analysis

A rigorous economic analysis of the project will be undertaken at a later stage. In it, the measurable benefits and costs of the project will be compared in order to determine that net benefits exceed costs. In order to further assess economic viability, the net present value of the project will be calculated. Finally, the economic internal rate of return will be calculated to ensure that the economic return to capital is greater than the social cost of capital, also known as the discount rate.

### a. Benefits

For purposes of this document, some preliminary analyses have been conducted. The most important measurable benefits will result from increased agricultural production, once the available land has been irrigated with water provided by the dam. Benefits have been quantified by multiplying the production of each crop by its respective economic farmgate price, where production is crop yield multiplied by crop area. Crop yields were projected after taking into consideration such factors as existing crop yields under rainfed and irrigated conditions, yields obtained by progressive farmers in adjoining irrigated areas, and those obtained under controlled research conditions.

The cropping pattern and intensities have been estimated after considering the following factors: (1) existing agro-climatic conditions, (2) crop and soil suitability, (3) crop water requirements, (4) future availability of irrigation supplies, (5) food requirements of farm population, (6) marketing and transportation facilities, (7) absorptive capacity and skill of the farmers, and (8) socio-economic features of the project area. The project area will comprise 34,000 acres with a total cropping intensity of 50 percent (i.e. 1/2 of the land will lie fallow on a rotational basis). The crops to be grown in the summer season are millet (23 percent) pulses, sesame, fodder, and melons/vegetables, each at about 1-2 percent, respectively. The winter crops are expected to be wheat (13.8 percent), and barley, oilseeds, fodder, and vegetables/gram, each at about 1-2 percent intensity, respectively. These crops were grown in the project area until 1976 when the dam overtopped. The remaining farmers therefore have the necessary knowledge and experience to grow these crops.

Benefits have been estimated for a period of 45 years, which is believed to be the useful life of the dam. The Government of Pakistan developed the original data on benefits using 1982-85 as the base period. These have been updated to the current period by utilizing the 9.4 percent increase in the wholesale price index.

### b. Costs

The different cost categories include costs of construction, technical assistance and evaluation during the four years construction period of the dam. Operational and maintenance costs are assumed to be constant at US \$0.05 million each year for the 45 year life of the dam.

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c. Results

The preliminary economic internal rate of return (EIRR) is 9.66, without computing secondary and tertiary benefits such as the proposed road which will provide access to the dam and cropping area. This will promote more efficient marketing of surplus crops, the development of a small scale fishing industry, and an increased economic and social exchange between communities. This EIRR is slightly lower than the commonly used 10-12 percent discount rate, which is considered to be the opportunity cost of capital in Pakistan. However, there is a political imperative to undertake significant projects in Baluchistan and this project was selected from a limited number of options. The present project was the most attractive of the ones potentially available in terms of economic rates of return, which implies that the opportunity cost of capital in Baluchistan is lower than in the more densely populated areas of Pakistan.

d. Sensitivity Analysis

Assumptions have been made about different scenarios concerning costs, benefits, and the life of the project. The results show that the EIRR will increase to the 10.5 to 11.5 percent range if (a) benefits increase by 15 percent, and (b) benefits increased by 15 percent and costs decline by 10 percent. Alternatively, the EIRR declines to the 8.0 to 9.0 percent range under conditions where (a) contingency costs (at 20 percent) are included for the three year implementation period, (b) benefits decrease by 15 percent, (c) benefits decline by 15 percent and costs increase by 10 percent, the extreme case where the inclusion of contingency costs of 20 percent combined with a 15 percent reduction in benefits lower the EIRR to 7.1 percent.

There may be substantial benefits that presently are non-quantifiable. Considerable side-benefits will derive from the construction of the approach roads, whose cost is included in the analysis. Although these benefits generally are not included in the economic analysis of a dam project, they can be discussed in the present context of a politically sensitive and underdeveloped area.

C. Relevant Experience with Similar Projects

USAID/Pakistan has a long history with water resource projects. The largest single water resource project was the Indus Basin Project, at a cost of \$2.5 billion. The U.S. contributed \$727.6 million to the project directly. This project included the Mangla Dam, the Tarbela Dam, eight link canals to transfer water from the western to the eastern river irrigated areas, five new barrages on different rivers, one inverted syphon and a power generation scheme. Additional USAID experience in water related projects included initiatives for ground water surveys and tubewell development, barrages and link canals and projects promoting water management and use-efficiency.

In USAID/Pakistan's contemporary project portfolio there are a number of projects which are linked to water resources. Irrigation Systems

Management (ISM) is increasing water use efficiency by funding civil works on approximately 14,000 kilometers of canals and 3,500 kilometers of surface drains and improving institutional capabilities for canal and drain rehabilitation through technical assistance and training. The Command Water Management Project, a component of ISM, is increasing agriculture production through improved water management and necessary agricultural support services and non-water inputs. The Baluchistan Area Development Project intends to construct approximately 47 small and one medium size delay action dam. This project is also providing for karez and water course improvements. The Tribal Areas Development Project is constructing irrigation schemes, installing tubewells and improving water courses. Finally, the Northwest Frontier Area Development Project is rehabilitating 20 major irrigation canals and improving on-farm water distribution systems.

D. Host Country Implementing Agency

The Bolan Dam Project Grant Agreement will be signed by USAID with the Economic Affairs Division, Ministry of Finance and Economic Affairs. The Host Country Implementing Agencies for the Bolan Dam Project will be the Planning and Development Department, Government of Baluchistan (GOB) for policy matters, Irrigation and Power Department, GOB for all construction activities, and the Agriculture Department, GOB for agricultural extension services.

The IPD is responsible for the construction, operation and maintenance of all irrigation systems in the Baluchistan Province. It has sufficient experience in implementing similar projects to undertake the implementation of the Bolan Dam Project.

A coordination committee, composed of the Additional Chief Secretary, Planning and Development Department (GOB), Secretary, Irrigation and Power Department (GOB), Secretary, Agriculture Department (GOB), and USAID will meet regularly to discuss progress and resolve issues related to the implementation of the Bolan Dam Project.

E. AID Support Requirements and Capabilities

USAID/Pakistan will be responsible for project monitoring. The project officer, situated in the Office of Engineering, will serve as the principal liaison with the contractor and will have the overall responsibility for implementation. The Office of Engineering is currently authorized positions for two U.S. Direct Hire and 12 Foreign Service National professionals (10 Engineers and two Program Assistants). The Regional Affairs Office, situated in Quetta, Baluchistan, will provide on-going liaison with Government of Baluchistan officials, logistical support and backup assistance. This office is composed of one U.S. Direct Hire, and three Foreign Service National professionals.

F. Evaluation Considerations

A formal evaluation plan will be developed during the project design. This will provide information for (1) mid-course corrections in project

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implementation, (2) project impact and socio-economic assessment, and (3) implications for future projects.

Three major types of evaluations are presently anticipated for the Bolan Dam Project. They are biannual internal project reviews, a mid-term external evaluation and a final evaluation.

G. Estimated Costs and Methods of Funding

The proposed Bolan Dam Project is estimated to cost \$15,520,000, distributed over approximately three years. Assumptions made in preparing the budget include a compounded 5 percent annual inflation rate for goods and services procured in the United States and a 10 percent compounded per annum inflation rate for goods and services procured in Pakistan. This results in an overall 9.3 percent weighted average annual inflation rate (rounded to 10 percent) for the budget items, reflecting 86 percent of AID's proposed contribution in local costs (\$13,344,000) and 14 percent of AID's budget (\$2,176,000) directed to procurement of goods and services from the United States. Finally, a 20 percent contingency factor was selected to cover unexpected changes.

The key cost components of the proposed project will be : Dam Embankment (\$5.8 million), Canal Systems Rehabilitation (\$1.3 million), and Approach Road (\$2.6 million). Table I presents the summary draft budget. Table II and Table III located in Annex B present backup details for project costs by calendar year and project component, respectively. Fiscal year 1988 obligation requirements are estimated to be \$3.3 million and fiscal year 1989 are estimated to be \$12.2 million.

Table I  
BOLAN DAM PROJECT  
Illustrative Budget by  
Expense Category  
(in U.S. Dollars)

<u>Expense Category</u>	<u>Total</u>
Technical Assistance	1,152,000
Training	800,000
Commodities	0
Construction	7,720,000
Evaluation	110,000
Inflation	3,151,000
Sub-Total:	12,933,000
Contingency	2,587,000
TOTAL:	15,520,000

H. Design Strategy

Four major analytical works will be undertaken during the design of the Project Paper. They include the following:

1. An environmental assessment of the project area.

2. A social assessment of the project area, including an analysis of agricultural implications, past water utilization practices and recommendations for educational activities in agriculture and water utilization. The social assessment will also analyze tribal social structure and intertribal relationships and the impact they may have on water distribution.
3. A review of the detailed engineering design and projected cost estimates which have been developed by a local A/E firm. This will also include a reassessment of the existing hydrological data.
4. An economic analysis as described in Section V.B.

It is the intent of USAID/Pakistan to contract the environmental, economic and social assessment as well as a review of the engineering designs with a U.S. IQC. This will be part of the project design team effort. In addition, the project team will include technical experts from USAID/Pakistan and AID/W.

The estimated project design schedule is as follows:

PID Submitted to AID/W	January 15, 1987
PID Approved by AID/W	February 30, 1988
PP Design Team Arrives	March 30, 1988
PP Reviewed by USAID/Pakistan	July 01, 1988
PP Authorized by USAID/Pakistan	July 15, 1988
Project Grant Agreement Signed	September 30, 1988
Implementation Begins	October 01, 1988

I. Recommended Environmental Threshold Decision

Pursuant to 22 CFR 216, "A.I.D. Environmental Procedures," section 216.2, "Applicability of Procedures," paragraph (d), "Classes of Actions Normally Having a Significant Effect on the Environment," the proposed Bolan Dam Project falls under category (ii), "Irrigation or water management projects, including dams and impoundments."

In compliance with 22 CFR 216.2)d referenced above it has been found that the proposed project will have a significant effect on the environment. A positive threshold decision is hereby made pursuant to 22 CFR 216.3(a)(2), "Threshold decision." The project design process will include the preparation of a full environmental assessment in conformance with 22 CFR 216.6, Environmental Assessments, the findings of which will be incorporated into the Project Paper. The scope of work and budget for technical assistance in project design will reflect the requirement for the preparation of an environmental assessment.

J. Project and Programmatic Issues

1. Project Issue: If there is a lean period in rainfall for several years, will this alter project assumptions and negate project investments?

Discussion: The hydrological data available for the design of this document was computed from flows downstream of the Bolan Weir during the period of 1965 to 1973. In addition, calculations were made from rainfall data drawn during the period of 1948-1971.

2. Project Issue: Since one of the reasons for the failure of the previous Bolan Dam was lack of proper maintenance, has the IPD improved their capacity to operate and maintain systems of this nature?

Discussion: Presently, IPD has a generalized training program in the maintenance and operation of irrigation systems. To supplement this, the project has included a specific line item in the budget for the additional training of IPD officials in dam maintenance. Furthermore, during the design of the project, an investigation will be made of IPD's present maintenance equipment to determine if additional equipment is required.

3. Project Issue: The useful life of the dam is 45 years based on an estimated rate of silt deposition. If the silt deposition rate is higher than estimated, this could considerably reduce the useful life of the dam.

Discussion: The presently available detailed design is based on the preliminary investigation carried out by a local A/E firm. In order to ensure that the design assumptions are realistic, USAID will conduct a design review by a U.S. A/E firm to ascertain the adequacy of the design and identify areas of additional investigations and subsequent design revisions, if required.

4. Project Issue: With limited available water, is it be wise to implement the option of constructing an irrigation network to irrigate 34,000 acres of land with a cropping intensity of 50 percent, instead of 13,000 acres with a cropping intensity of 65 percent.

Discussion: The option to irrigate 34,000 acres of land instead of 13,000 acres is based on a higher economic rate of return, social and economic benefits for a larger population with relatively small additional cost. USAID intends to conduct a detailed review of the two options by a U.S. A/E firm as part of the technical analysis of the project to ensure that the most viable option is implemented.

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Table II

BOLAN DAM PROJECT  
Illustrative Budget by  
Expense Category and Calendar Year  
(in U.S. Dollars)

<u>Expense Category</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>Total</u>
Technical Assistance	135,000	252,000	505,000	260,000	1,152,000
Training		260,000	270,000	270,000	800,000
Commodities					
Construction		2,300,000	3,820,000	1,600,000	7,720,000
Evaluation		55,000		55,000	110,000
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Sub-Total:	135,000	2,867,000	4,595,000	2,185,000	9,782,000
Inflation	14,000	602,000	1,521,000	1,014,000	3,151,000
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Sub-Total:	149,000	3,469,000	6,116,000	3,199,000	12,933,000
Contingency	30,000	694,000	1,223,000	640,000	2,587,000
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TOTAL:	179,000	4,163,000	7,339,000	3,839,000	15,520,000
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Table III

BOLAN DAM PROJECT  
 Illustrative Budget  
 by Project Component  
 (in U.S. Dollars)

<u>Project Component</u>	<u>Grant</u>		<u>Total</u> <u>USAID</u>	<u>Other</u> <u>Donors</u>	<u>GOP</u>	<u>Total</u>
	<u>Fx</u>	<u>Lc</u>				
<u>Dam Embankment</u>						
Technical Assistance		680,500	680,500			680,500
Training	465,000	60,000	525,000			525,000
Commodities			0			0
Construction	606,000	3,960,000	4,566,000			4,566,000
Evaluation	18,334	18,334	36,668			36,668
Sub-Total:	1,089,334	4,718,834	5,808,168	0	0	5,808,168
<u>Canal System Rehabilitation</u>						
Technical Assistance		137,300	137,000			137,300
Training	245,000	30,000	275,000			275,000
Commodities			0			0
Construction		922,000	922,000			922,000
Evaluation	18,333	18,333	36,666			36,666
Sub-Total:	263,333	1,107,633	1,370,966	0	0	1,370,966
<u>Approach Road</u>						
Technical Assistance		334,200	334,200			334,200
Training			0			0
Commodities			0			0
Construction		2,232,000	2,232,000			2,232,000
Evaluation	18,333	18,333	36,666			36,666
Sub-Total:	18,333	2,584,533	2,602,866	0	0	2,602,866
Sub-Total:	1,371,000	8,411,000	9,782,000	0	0	9,782,000
Inflation	442,000	2,709,000	3,151,000	0	0	3,151,000
Sub-Total:	1,813,000	11,120,000	12,933,000	0	0	12,933,000
Contingency	363,000	2,224,000	2,587,000	0	0	2,587,000
TOTAL:	2,176,000	13,344,000	15,520,000	0	0	15,520,000

CONTRACTING PLAN

USAID, with the assistance of the Contracting Officer, will upon approval and authorization of the project, begin the contracting process to select an A/E firm for the design of the approach road, possibly revision of the presently available detailed engineering design for the dam and irrigation system, and full time construction supervision. It is anticipated that this A/E firm will be Pakistani, U.S. or a joint venture. Local firms have wide experience in the design and construction supervision of small to medium size dams. The construction contractor is anticipated to be a U.S./Pakistani joint venture. The procurement of the A/E and construction services will follow the standard competitive contracting process. It is anticipated that this procurement process will take approximately 12 months.

Considering the nature of the specialized services required, the proposed project is not considered appropriate for an 8 (a) sole sourcing or set aside. In this case, publication in the Commerce Business Daily, and the Request for Proposals will contain the following language prescribed by CIB 85-21 regarding the use of Gray Amendment Entities:

"AID encourages the participation to the maximum extent possible of small business concerns, small disadvantaged business concerns, and women owned small business concerns, in this activity as prime contractor or subcontractors in accordance with Part 19 of the Federal Acquisition Regulations. In this respect, it is anticipated that AID will make every reasonable effort to identify and make maximum practicable use of such concerns. All selection evaluation criteria be found equal, the participation of such concerns may become a determining factor for selection."

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## LOGICAL FRAMEWORK

Project Title & Number: Bolan Dam Project

Life of Project: \$15,520,000  
 From FY 88 to FY 91  
 Total U.S. Funding \$15,520,000  
 Date Prepared: January 1988

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To increase agricultural production, farm income and rural employment in Baluchistan.</p>	<p>Measures of Goal Achievement:</p> <ul style="list-style-type: none"> <li>-less dependence on import of agricultural goods from other provinces</li> <li>-transition from nomadism to sedentarized farming</li> <li>-decrease in emigration from Baluchistan</li> <li>-increase of inflow of goods and services to project area</li> <li>-increase in agricultural production</li> <li>-increase in per capita income</li> </ul>	<ul style="list-style-type: none"> <li>-Agricultural Economic statistics</li> <li>-Development statistics of Baluchistan</li> <li>-Census</li> <li>-Economic Survey</li> </ul>	<p>Assumptions for achieving goal targets:</p> <ul style="list-style-type: none"> <li>-USAID program continues in Pakistan</li> <li>-GOP remains committed to the economic integration of Baluchistan into nation state</li> <li>-GOP is able to maintain political stability in Baluchistan</li> </ul>
<p>Project Purpose:</p> <p>To reconstruct the Bolan Dam and rehabilitate the present irrigation system</p>	<p>Conditions that will indicate purpose has been achieved.</p> <p>End of Project Status.</p> <ul style="list-style-type: none"> <li>-completion of a dam, spillway irrigation network and access road</li> <li>-increase in the cultivated acreage by approximately 34,000 acres</li> </ul>	<ul style="list-style-type: none"> <li>-Site visits</li> <li>-Final Completion Report by A/E firm</li> <li>-Final Inspection Report by USAID</li> <li>-Agricultural Statistics of Baluchistan</li> </ul>	<p>Assumptions for achieving purpose:</p> <ul style="list-style-type: none"> <li>-Provincial officials remain committed to the project</li> <li>-Irrigation &amp; Power Dept. is willing to operate and maintain Dam and irrigation network</li> <li>-Normal rainfall pattern continues</li> <li>-People return to abandoned lands</li> <li>-Provincial officials remain committed to providing agricultural extension agents</li> </ul>

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Output:</p> <ul style="list-style-type: none"> <li>-Earth filled Storage Dam</li> <li>-Irrigation Network</li> <li>-Maintenance and operation systems for the Dam and distribution of irrigation water</li> <li>-Increased acreage under cultivation</li> </ul>	<p>Magnitude of Outputs:</p> <ul style="list-style-type: none"> <li>-One storage dam with a gross reservoir capacity of approx. 75,000 acre feet</li> <li>-Approximately 65,000 meters long irrigation network system</li> <li>-Approx. 37 kilometer approach road</li> <li>-Approx. 30 people trained in maintenance and operation of Dam and irrigation networks</li> <li>-Approx. 34,000 acres under cultivation</li> </ul>	<ul style="list-style-type: none"> <li>-Project Records</li> <li>-Finan Completion Report by A/E firm</li> <li>-Final Inspection Report by USAID</li> <li>-Agricultural Statistics of Baluchistan</li> </ul>	<p>Assumptions for achieving outputs:</p> <ul style="list-style-type: none"> <li>-Population willing to accept project</li> <li>-Provincial government participates activity in the sustainability of the Dam and irrigation network</li> <li>-Appropriate courses identified and qualified candidates available</li> <li>-GOP commitment to provide agricultural extension services</li> </ul>
<p>Inputs:</p> <ul style="list-style-type: none"> <li>-Technical Assistance, Training</li> <li>-Construction</li> </ul>	<p>Implementation Target (Type and Quantity):</p> <p>As stated in project budget</p>	<p>AID records</p>	<p>Assumptions for providing inputs:</p> <ul style="list-style-type: none"> <li>-AID funds provided on timely basis</li> <li>-Technical Assistance contractor able to field appropriate personnel on timely basis</li> <li>-Construction costs in line with estimates</li> <li>-All locally required inputs are available</li> </ul>