

PROJECT EVALUATION SUMMARY (PES) - PART I

1. PROJECT TITLE Gujarat Medium Irrigation (AID Loan No. 386-T-223)			2. PROJECT NUMBER 386-0464	3. MISSION/AID/W OFFICE India
5. KEY PROJECT IMPLEMENTATION DATES			4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No, Beginning with No. 1 each FY) 81-5	
A. First PRO-AG or Equivalent FY 78	B. Final Obligation Expected FY 78	C. Final Input Delivery FY 83	<input checked="" type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION	
6. ESTIMATED PROJECT FUNDING			7. PERIOD COVERED BY EVALUATION	
A. Total \$215,000,000			From (month/yr.) 8/78	
B. U.S. \$30,000,000			To (month/yr.) 10/80	
			Date of Evaluation Review 12/80	

B. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., program, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
<p>1. Attached is the Mid-Term Status Report dated December 23, 1980. The report does not follow the format as described in the PES Part II, however it does cover all the essential project elements.</p> <p>2. The purpose of the report was to determine the magnitude of the outputs to date, the disbursements to date, identify constraints to progress, and determine the planned program up to June 30, 1983 (PACD).</p> <p>3. The physical and financial progress was determined to be considerably behind schedule. Constraints were identified in the areas of staffing, materials, quality control and planning. Five recommendations were made for removing the identified constraints to provide the project with the capability of meeting its PACD. The Government of Gujarat (GOG) was advised in a letter dated January 29, 1981 that unless the constraints were removed in the near future the PACD would not be met.</p> <p>4. The PES scheduled for December 1981 will reflect the results of GOG efforts to remove the constraints and determine if the PACD can be met.</p>	Edwin D. Stains	December 1981

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT	
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input checked="" type="checkbox"/> Other (Specify) GOG financial allocations	A. <input checked="" type="checkbox"/> Continue Project Without Change	
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	<input type="checkbox"/> Other (Specify)	B. <input type="checkbox"/> Change Project Design and/or	
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C		<input type="checkbox"/> Change Implementation Plan	
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P		C. <input type="checkbox"/> Discontinue Project	

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)		12. Mission/AID/W Office Director Approval	
Edwin D. Stains, Engineering Advisor		Signature <i>[Signature]</i>	
Shanker Iyer, OSO, Gujarat Irrigation Department		Typed Name Richard M. Brown Acting Director	
		Date July 22, 1981	

3860464

UNITED STATES GOVERNMENT

# Memorandum

DS/DIU

PD-AAE-859

3860464

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TO : MO/PAV. Room B-930 NS, AID/W

DATE: July 22, 1981

*RB*

FROM : Richard M. Brown - USAID/New Delhi

SUBJECT: Project Evaluation Summary (PES) # 81-5:  
Gujarat Medium Irrigation Project (386-0464),  
AID Loan # 386-T-223.

Attached is the original PES face sheet, six pages of narrative part, eight pages of four exhibits (tables), and eight pages of Attachment A, together with a 2-page letter to the Government of Gujarat State, on the subject project.

Transmitted for reproduction and standard distribution in AID/W.

Encl: PES

cc: ASIA/BI  
ASIA/PD  
DS/DIU ✓

USAID

GUJARAT MEDIUM IRRIGATION PROJECT

(Loan 386-0464)

Mid Term Status Report

December 23, 1980

Project Summary

The Gujarat Medium Irrigation Project is a five year irrigation sector support project. The project was designed to provide financial support to 33 of Gujarat's Medium Irrigation Projects (MIP). New, on-going, and projects planned for modernization were included. On August 26, 1978 a project loan agreement was executed between AID and the GOI to provide \$30 million in financial support for Gujarat MIP's. In addition, the GOI entered into an agreement with the World Bank to provide \$85 million for the same project. The project assistance completion date under each of the loans is June 30, 1983.

Purpose of the Review

Because the World Bank is the lead donor for this project, there was no formal mid-term review called for by AID in the project paper. However, an informal mid-term review was suggested in AID's long range evaluation schedule to assess the project's progress, identify constraints, and estimate expected expenditures through the end of the project. The objectives of this mid-term review were to review the magnitude of the outputs to date, the disbursements to date, identify constraints to progress, and determine the planned program up to 30 June 1983. The planned outputs as identified in the project logical framework included increased acreage under irrigation, construction of new MIP's, modernization of existing MIP's, establishment of a network of automatic discharge measuring stations, and development of agricultural plans for each MIP completed. As no MIP's have been completed to date, this review concentrates on status of each of the on-going components of the project.

Project Status

Physical Progress. The project paper called for the following achievements to be made:

- (1) 13 new and 20 improved MIP's covering 149,000 ha of irrigated land.
- (2) Establishment of a network of automatic river gauging stations.
- (3) Development of agricultural plans for each MIP.
- (4) Establishment of demonstration plots within each MIP.
- (5) Preparation of baseline socio-economic studies for

each MIP.

- (6) Establish a program to carry out water loss measurements in several of the MIP's.

Currently it appears that approximately 23 new projects and seven modernization projects with a combined CCA of over 257,000 ha will be executed under this project (Exhibit 1). As currently planned there will be a significant increase in the irrigated area under this project over that originally planned.

The physical progress of eight of the 14 projects currently approved for funding is behind schedule (See Item 6 of Exhibit 2). For those eight cases, the progress lags from between 12 and 38 percentage points behind the planned level. In general, the actual construction progress is focused on the head works with the progress on the distribution system lagging the farthest behind.

The river gauging stations have been installed on 23 out of the 30 proposed projects (Exhibit 1). The river gauging networks are being established by the Water Resource Investigation Circle with the assistance of a World Bank consultant. All of the planned imported equipment has been received in good order and the stations are being established in an excellent manner.

During the short mid-term review very little information was available on the completeness of the agricultural plans for each MIP and the status of plans for establishing a demonstration plot within each MIP. This information is being collected but it is expected to show that additional effort is required to assure that the agricultural plans and demonstration plot implementation is coordinated with the establishment of the irrigation infrastructure.

The socio-economic studies have been completed on 24 of the projects thus far (Exhibit 1). The canal seepage loss measurements have been started in several canal command areas. However, the initial results indicate that additional improvement of methodology and data handling is required. A World Bank Consultant is assisting the Irrigation Department in developing a sound and reliable program for canal seepage loss measurements on both lined and unlined channels.

Project Preparation. At the present time 14 of the 30 projects<sup>1/</sup> posed for financial assistance have been approved by the Appraisal Committee (AC) of the Central Water Commission (Exhibit 1). Of

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<sup>1/</sup> The original number of projects was increased from 33 to 34. However, four projects have been dropped as they don't qualify under the terms of the AID/IPA agreements.

the remaining twenty projects; 12 have been submitted to the AC for approval, four are under preparation by the GOG and four have been dropped from consideration for technical reasons. Of the 12 projects pending with the AC, two are ready for clearance, two are being held up pending clarification on ecology and inter-state water allocations questions, and six are pending clarification on water availability and economic viability.

The GOG plans to submit the remaining four projects to the AC by 1 January 81.

Financial Status. Exhibit 2 provides a summary of the financial status of the 14 projects currently approved for IDA/AID financing. Approximately 35% of the total funds allocated to the approved 14 projects have been spent to date. In general the current expenditure rate is considerably behind the planned rate due to constraints that will be discussed in the next section. The low expenditure rate is consistent with the low physical progress except on three projects (Amli, Sukhi and Machanalla). This indicates that on these three projects a budget revision may be required for project completion.

During the AID fiscal years 79 and 80 the total amount spent on the 30 projects, including non-eligible expenditures, was approximately \$45 million (Exhibit 3). Approximately 70 percent of the total expenditures qualify for partial financing by IDA/AID financing or \$31 million which is well below the planned amount of \$47 million for those two years. The total amount of loan funds disbursed through September 1980 was \$3.4 million by AID and \$11.2 million by IDA. During FY 79 and 80 actual AID project disbursements were 11 percent as compared to a planned amount of 40 percent.

#### Planned Financial Program to 30 June 1983

The GOG has increased the financial allocations of the 30 projects proposed for AID/IDA financing. For the GOG 1980/81 fiscal year, the original budget has been increased from Rs. 426 to Rs. 584 million (Exhibit 4). The budget for the remaining years of this project provides substantial allocations to insure that there will be no financial constraint during the remaining life of the project. The revised planned disbursement rate shown in Exhibit 3 gives a large jump in FY 81 and 82 due to the anticipated approval of the remaining 16 projects from the date of the signing of the loan agreements. Although the project completion date is June 30, 1983, there will be some billing (\$ 1.6 million to AID) during 1984 for costs incurred prior to June 30, 1983.

### Project Constraints

During the initial stages of the project, numerous constraints developed with staffing, funding, technical approvals, material procurement and contractor selection. To a large extent most of these constraints have been successfully removed by the GOG. The major constraints still affecting project progress and possible constraints that may appear in the near future are discussed below:

Staff. The main constraint that has had a detrimental affect on project progress is the number of divisions and sub-divisions provided to carry out the planning, design and execution of the project works. During all of the appraisal committee reviews of the first 12 projects to be approved, this constraint has been identified again and again on each and every project (Exhibit 1). We have been repeatedly assured by GOG that the staffing constraint would be solved shortly and in fact approvals for sanctioned strength had been agreed to in principle. However, the orders have yet to be issued for increasing the staff to the required strength, and the project progress is suffering. The progress of the remaining 18 projects appear to be suffering from similar staff shortages. The major effect of the staff shortage has been to reduce significantly the project progress on the canal systems and has also affected the work, to a lesser extent, on the headworks. Although the GOG has had the foresight to allocate sufficient funds during the next three years to assure project completion, it will not be possible to expend those funds without sufficient staff on the project to assure timely planning, design and contract preparation for the works to be carried out.

Materials. At the present time, there is essentially no constraint with the supply of steel, cement and other required materials for the project construction. However, once the required staff are placed on the projects and the implementation rate increases care should be taken to assure that sufficient materials are procured in time to prevent a delay of construction.

Quality Control. To date quality control has not been an actual constraint to the progress of any of the projects. Participants on brief visits by both AID and IDA Missions during the last two years, were pleased with the high standard of quality control on the major headworks of the projects. At the present time, substantial amount of canal lining has been started on only two of the sub-projects: Panam and Watrak. On these two projects, the quality of the lined channels, in many areas, is not up to desirable standards. There appear to be several aspects of quality control on canals and watercourses lining that require improvement. For example, it appears that the underlying earth is not being thoroughly compacted or wetted prior to placing the thin concrete canal lining, that the local contractors are not working the concrete sufficiently on the sides of the canals prior to finishing, that proper curing procedures are not being followed and that improper mortaring

procedures on portions of the block lined sections has led to failure in some cases. Precast tiles used on some small channels are of insufficient strength and size. These shortcomings appear to result from the lack of experience of the local contractors in the construction of small concrete structures in contrast to massive concrete ones where they have exhibited high quality performance. During the next construction season, it is anticipated that a major lining effort will be carried out on approximately 20 projects. To head off possible serious problems, procedures need to be developed to assist local contractors to provide high quality canal and watercourse lining.

Planning. The progress of the planning and design of the minor distribution networks has suffered due to the lack of accurate maps and layout procedures. The World Bank (Attachment A) has been assisting the Irrigation Department in establishing improved procedures to remove this constraint. The procedures recommended by the Bank should improve the quality of designs and layouts and eliminate the need for adjustments in the irrigation system after construction.

#### Recommendations

1. In order to utilize the available credit prior to the completion date of the project, it is imperative that the GOG take immediate action to assure that the recommended staffing patterns for each of the 30 projects are in place within the next few months.
2. In order to insure compliance with the agricultural support criteria, it is strongly recommended that a coordination group be formed between the Ministry of Irrigation and the Ministry of Agriculture to insure that the required agricultural development plans and the demonstration projects are established in each of the 30 projects and coordinated with the completion of the irrigation works.
3. In order to assure acceptable quality control for the canal and watercourse lining program, it is recommended that the GOG:
  - (a) Carry out workshops for all the Assistant and Junior Engineers involved with the construction supervision of the canal lining. Each workshop would not need to be more than a week long and should be limited to approximately fifteen to twenty persons. The focus of the workshop would be proper procedures of concrete handling, placement, and curing to assure a high quality product and procedures to assure proper compaction of the banks supporting the lining.

- (b) Form a task force to make an on-site detailed inspection of all lining carried out over the last two years under the IDA/AID projects. The task force would identify reaches of the lining that need to be replaced to meet minimum quality requirements.
  - (c) Expand the Quality Control Circle of the Irrigation Department to provide additional XEN's to inspect the construction quality for the MIPs and particularly of lining. These XEN's should participate in the training exercises outlined above. At present two XENs are assigned to inspect all of the on-going major and medium irrigation projects in Gujarat.
  - (d) Discontinue the use of the 5 x 30 x 30 cm compressed sand-cement tiles as a lining material. A high degree of failure with this lining material due to its fragile nature and the difficulty of assuring strong mortared joints has been noted. The World Bank has suggested possible ways to improve the quality (Attachment A). However, because of the increase in cost that will result from the proposed improvements and difficulties envisioned in the placement of the tile, their continued use is discouraged.
4. In order to improve the planning and designs of the minor distribution networks the recommendation of the World Bank (Attachment A) should be implemented on a large scale.
  5. In order to expedite the appraisal committee approval of the 12 projects pending with them, efforts need to be made to intensify communication between the appraisal committee and the necessary Irrigation Department officials to clear these projects.
  6. In order to comply with the requirements under Article B, Section B 8 of the AID Loan Agreement and Item VI C of Implementation Letter No 1 sign boards need to be prepared and installed at each Project Site identifying the USAID as providing financial assistance.

ARD:E.D.Stains:la:12/23/80

Distribution: D, DD, PRO, PD, ARD

GUJARAT MEDIUM IRRIGATION PROJECT  
PROJECTS POSED FOR IDA/AID ASSISTANCE  
STATUS AS OF 30 OCTOBER, 1980

Project	CCA (Ha)	AC Action date submi- tted	Date Approved	Months required for approval	Socio-Econ study date completed	River gauging est.	Project Staffing		Date last Progress Report	Major Constraints
							Dvn	Sub.Dvn		
							Proposed by AC 1979-80	Actual 1979-80		
1. Panam	41,116	9.12.77	22.5.79	17	17.4.78	X	8 --	7 --	7.4.80	Staff
2. Amfi	3,644	9.2.78	19.4.79	14	6.10.78	X	-- 8	-- 5	21.6.80	Staff, Contractor
3. Sukhdi	20,860	18.3.78	19.4.79	13	4.8.78	X	9 --	3 --	30.10.80	Staff, land
4. Machhannala	3,084	23.2.78	6.4.79	14	5.9.78	X	-- 8	-- 3	8.4.80	Staff, Re- settlement
5. Kalubhar	5,830	12.1.78	18.6.79	17	30.9.78	X	-- 7	-- 5	14.6.80	Staff
6. Sukhbhadar	7,400	28.12.77	20.6.79	18	21.8.78	X	-- 7	-- 4	15.6.80	Staff
7. Machhundri	8,095	20.12.77	19.6.79	18	18.9.78	X	-- 6	-- 3	13.6.78	Staff
8. Watrak	18,341	29.6.79	13.3.80	9	4.12.78	X	2 --	2 --	26.8.80	Staff, Contractor
9. Deo	7,207	30.6.79	13.3.80	9	29.1.78	X	-- --	2 --	30.10.80	Staff, land, Acquisition
10. Und	10,920	4.9.79	7.5.80	7	4.12.78	X	-- --	-- 5	24.10.80	Staff, Cement

11.Wenu-II	5,253	15,11.79	7.5.80	5	29.12.78	X	-- --	--3	25.10.80	Staff,Vehicle
12.Madaf	5,238	3.1.80	7.5.80	4	11.2.79	X	-- --	--3	27.10.80	Staff
13.Jhuji	5,810	9.4.80	11.8.80	4	8.2-80	X	-- --	--1	--	
14.KelMin	3,468	9.4.80	11.8.80	4	22.1.80	X	-- --	--1		
15.ZanKhandi	24,202	6.5.80			1.3.80	X				
16.Dandi III	2,437	24.8.80			5.1.80	X				
17.Guhad	6,827	1.9.80			15.3.79	X				
18.Bhadar	6,600	30.6.80			20.2.80	X				
19.Kharicut(mod)	1,304 <sup>2/</sup>	10.4.80			UP					
20.Jatewadi(mod)	9,662 <sup>2/</sup>	23.2.80			UP					
21.Bhadar(mod)	4,518 <sup>2/</sup>	12.11.79			15.9.80					
22.Machhu(mod)	4,739 <sup>2/</sup>	25.10.79			UP					
23.Shetrunji(mod)	196 <sup>2/</sup>	15.9.79			15.10.80					
24.Dantiwada	4,896 <sup>2/</sup>	10.4.80			UP					
25.Hathmati(mod)	4,250 <sup>2/</sup>	Dec.80 <sup>3/</sup>			UP					
26.Sipu	23,451	16.10.80			27.2.79	X				
27.Aji-III	6,615	29.10.80			27.2.80	X				
28.Aji-II	2,384	Dec.80 <sup>3/</sup>			UP	X				
29.Mazam	6,325	Dec.80 <sup>3/</sup>			23.2.80	X				
30.Uben	2,430	Dec.80 <sup>3/</sup>			11.2.79					
<b>Total</b>	<b>257,402</b>				<b>24</b>	<b>25</b>				

**Note :**

- 1) Cultivable Command Area
  - 2) Additional potential due to modernization
  - 3) Planned
- U.P.=Under preparation
- 4) Identified by CWC

GUJARAT MEDIUM IRRIGATION PROJECT

PROJECTS APPROVED FOR IDA/AID ASSISTANCE

( 30 October, 1980 - Cost in Rs.Million )

Discription	Panam	Amla	Watrak	Deo	Sukhi	Machhanalla
1. Project Cost						
a) Total planned	413.63	64.42	240.79	160.59	324.90	47.29
b) Planned from July 78 to project end	250.95	54.07	240.79	160.10	309.45	39.53
2. Accrued expenditure to 30 Oct.80	273.37	26.16	75.62	32.54	96.90	20.00
3. Accrued expenditure from July 78 to 30 Oct.80	67.32	22.19	23.19	32.05	90.96	12.90
4. Expenditure qualifying for reimbursement	72.96	12.35	8.58	12.18	31.13	7.57
5. Total billings to IDA/AID	34.84	6.61	4.03	5.73	15.16	3.06
6. Percent Complete						
a)Physical works-						
i)Planned )	95.0	63.0	70.00	21.00	52.00	51.00
ii)Actual )	83.5	25.0	34.50	15.00	17.00	17.50
b)Total cost	66.1	40.6	31.4	20.3	27.1	42.3
7. Estimated to complete from 1 Nov.80						
a) Planned completion date	Mar 82	Mar 82	Mar 83	June 83	June82	June 82
b) Months	17	29	29	32	20	17
c) Total cost from 1 Nov.80to end of project	140.26	38.26	168.69	128.06	260.91	28.92

Kalubhar	Sukhbhadar	Machhundri	Haduf	Venu-II	Und	Kelia	Jhuj	Total
63.09	58.83	73.40	78.60	89.21	150.60	61.66	100.38	1927.39 <sup>2/</sup>
58.59	45.86	57.97	77.42	88.06	148.80	61.66	100.38	1693.63
21.05	18.8	31.23	6.38	20.61	37.75	9.84	2.24	672.49 <sup>2/</sup>
16.55	10.75	15.37	5.20	19.44	35.50	9.84	2.24	363.52
7.18	7.70	13.42	3.17	13.71	15.43	3.31	0.07	208.76
3.37	3.62	6.35	1.49	6.53	7.25	1.55	0.03	99.62
47.00	71.00	66.75	26.00	25.00	33.00	19.50	1.00	--
38.00	50.10	52.50	11.00	23.50	32.50	10.00	0.00	--
33.4	32.0	42.5	8.1	23.1	25.1	15.9	2.2	34.9
June 82	June 82	March 82	March 83	June 83	March 84	March 84	March 84	
20	20	17	29	32	44	44	44	--
42.04	40.06	42.17	72.22	68.60	112.85	51.82	98.14	1293.00

1/ Project schedule extended one year bringing value down to 79.5      2/ Totals inconsistant

## GUJARAT MEDIUM IRRIGATION PROJECT

PROJECT DISBURSEMENT SCHEDULE

( Million US \$ )

<u>1/</u> Year	<u>2/</u> Planned				<u>3/</u> Revised on October 1980			
	AID	GOI	IDA	TOTAL	AID	<u>4/</u> GOI	IDA	TOTAL
FY 79	6	4	3	13	0.9		3.9	
FY 80	6	15	13	34	2.5	32.2	7.3	45
FY 81	7	20	17	44	8	61	21	90
FY 82	7	23	19.5	49.5	9	64	24	97
FY 83	4	24	20	48	8	39	21	68
FY 84	0	14	12.5	26.5	1.6	38.8	7.8	50
Total	30	100	85	215	30	<u>4/</u> 235	85	350

1/ 1 Oct - 30 Sept2/ Logical Framework, AID Project Paper3/ FY 79 and 80 are actual for AID + IDA on the 14 approved projects and approximate for GOI on 30 Projects. FY 81 to 84 planned on all 30 Projects. All Numbers approximate for use as trend indication only.4/ GOI share after reimbursement (approximate) and include uneligible costs

GUJARAT MEDIUM IRRIGATION PROJECT  
ESTIMATED COSTS AND SCHEDULE OF EXPENDITURE  
30 OCTOBER 1980<sup>1/</sup>  
 ( Million Rupees )

Name of Scheme	Original Estimated Cost	Revised Estimated Cost	Total Expdr upto 3/80	Spill over to VIth Plan	Phasing of outlay during 1980-85 <sup>2/</sup>					Total for VI Plan
					1980-81	1981-82	1982-83	1983-84	1984-85	
1. Panam	351.0	413.6	247.5	166.1	60.0	50.0	56.1	--	--	166.1
2. Amla	64.4	64.4	29.2	35.2	21.2	14.0	--	--	--	35.2
3. Sukhi	324.9	324.9	104.1	220.8	73.5	91.2	37.5	18.6	--	220.8
4. Machhanala	47.3	47.3	18.9	28.4	17.2	11.2	--	--	--	28.4
5. Kalubhar	63.1	63.1	23.7	39.4	21.3	15.0	3.1	--	--	39.4
6. Sukhbhadar	58.8	58.8	18.4	40.4	15.2	16.0	9.2	--	--	40.4
7. Machhundri	68.3	73.4	53.3	38.1	21.8	16.7	--	--	--	38.1
8. Watrak	244.0	240.9	88.1	152.8	55.0	55.4	42.3	--	--	152.8
9. Deo	160.6	160.6	27.7	132.9	26.7	62.5	24.5	19.2	--	132.9
10. Und	150.6	150.6	28.7	121.9	27.7	35.8	31.3	27.1	--	121.9
11. Venu-II	89.2	89.2	17.0	72.2	18.4	21.3	32.5	--	--	72.2
12. Badaf	74.5	78.6	6.9	71	16.7	36.4	18.6	--	--	71.7

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Name of Scheme	Original Estimated Cost	Revised Estimated Cost	Total Expdr upto 3/80	Spill over to Vith Plan	Phasing of outlay during 1980-85					Total for VI Plan
					1980-81	1981-82	1982-83	1983-84	1984-85	
13. Jhuj	100.4	100.4	2.2	98.2	16.5	33.6	40.2	7.9	--	98.2
14. Kelia	61.4	61.7	4.2	57.5	14.1	22.8	19.0	1.6	--	57.5
15. Zankhari	343.4	344.3	12.5	331.8	0.5	66.3	82.9	83.0	99.1	331.8
16. Demi-11	56.9	56.9	8.6	48.3	6.0	22.9	41.0	5.4	--	48.3
17. Guhai	142.8	142.8	2.5	140.3	10.0	40.9	40.7	25.4	23.3	140.3
18. Bhadar	138.1	138.1	27.7	110.4	33.0	34.9	42.5	--	--	110.4
19. Kharicut (mod)	633.0	633.0	65.3	667.7	87.2	145.5	131.8	120.0	68.1	552.6
20. Fatewadi (mod)										
21. Bhadar (mod)										
22. Machhu-I (mod)										
23. Shetrunji (mod)										
24. Dantiwada (mod)										
25. Hathmadi (mod)										

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Name of Scheme	Original Estimated Cost	Revised Estimated Cost	Total Expdr upto 3/80	Spill over to Vith Plan	Phasing of outlay during 1980-85					Total for VI Plan
					1980-81	1981-82	1982-83	1983-84	1984-85	
26. Sipu	226.2	226.2	10.4	215.8	15.0	25.0	40.0	50.0	40.0	170.0 <sup>4/</sup>
27. Aji-II	31.9	31.9	3.0	28.9	0.2	5.0	6.0	8.0	9.7	28.9
28. Aji-III	62.5	62.5	10.9	51.6	12.0	15.0	15.0	8.0	1.6	51.6
29. Mazam	39.9	39.9	4.9	35.0	5.0	8.0	10.0	8.0	4.0	35.0
30. Uben	38.1	38.1	9.9	28.2	10.0	10.0	8.2	—	—	28.2
31. Niruna(mod)		DROPPED - DO NOT MEET CRITERIA								
32. Rudramata(mod)		..	..	..						
33. Machhu-II(mod)		..	..	..						
34. Shatunji(mod)		..	..	..						
<b>T O T A L</b>	<b>3754.5</b>	<b>3641.2</b>	<b>307.6</b>	<b>2933.6</b>	<b>583.8</b>	<b>855.4</b>	<b>705.4</b>	<b>382.2</b>	<b>245.8</b>	<b>2272.7</b>

1/ Information provided by PPM Cell

2/ 1 April through 31 March

3/ Budget recently revised to 375.45 to allow additional funding to projects 14 + 15 and reduction to modernization.

4/ There will be spillover to 1985-86

C O P Y

ATTACHMENT - A

WORLD BANK/INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

DATE: November 27, 1980

TO C. J. Perry, NDO

FROM L. Shanan (C)

Subject :Gujarat Irrigation Project (Credit 808 -IN) - Water Management Area - Review Mission, November 1980.

1. According to the TOR dated October 6, 1980 Mr. Henkin and I visited Gujarat to review the progress of the Pilot Water Management Area.
2. Attached is an Aide Memoire summarizing the main issues discussed with the ID, a draft letter for the Secretary of Irrigation, and a list of principal officials met.
3. I suggest that the next review should be sometime during the period March to May 1981. I would spend about a week in Gujarat and Mr. Henkin about two weeks.

Enclosures:

LS:jn

CC-Messrs Tibor, Rodger (o/a), Lung (o/a), Reidinger, Henkin

Gujarat Irrigation Project

Panam Project

Water Management Area

Review Mission November 1980

AIDE MEMOIRE

1. During November 3-11, 1980 Messrs L. Shanan and E. Henkin (Consultants) visited the project area to review progress of the Pilot Water Management Area. Mr. Henkin, remained on in the area till November 21, 1980. This Aide Memoire summarizes the main issues discussed with the Irrigation Department (ID) and the CAD.

Surveying Methods

2. Following the recommendations of the September 1980 Review Mission, the ID used a photostat to enlarge the 1:5000 SOI map of the Morva Distributary Area (11,400 acres) to a scale of 1:660 and compared it to the pantograph enlargement that had been used for the layout of the network. The Bank was informed that the comparison revealed significant inaccuracies in the pantograph enlargement. These inaccuracies are probably the main reason for unsatisfactory alignment of some sections of the minor network and the accuracy of the pantograph enlargement is not adequate for the minor network layout.

3. The contour lines of the photographic enlargement were also compared to the contours obtained from strip topography prepared for the design of a minor 4 kilometer in length. The enlarged map elevations were found to differ by as much as 50 cms from the field survey. While the SOI map is adequate for the design of the major network, a more accurate map is required for the minor network design.

4. The Bank was informed that the ID is able to prepare a satisfactory topographic map by taking spot elevations at all "survey number" corners and plotting them on 1:660' village maps. It was agreed that ID would prepare a sample map using this method for a 5000 acre area (subsequently selected in the Sansoli distributary, see below). Where necessary, additional points will be taken

## C O P Y

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- at the center of "survey number" plots larger than 1 ha;
- at intermediate points where plot corners are more than 120 m apart;
- at steps in terraced paddy fields and in the bottom of nullahs.

An average of about 6-8 points will be taken per hectare. ID estimated that a subdivision, comprising five survey parties can complete 5000 acres (including office work) in less than one month. ID will ensure that the work is carried out under the supervision of a competent surveyor. The final map will be prepared with 25 cm contours and examined to see whether it is adequate for designing not only the minor network but also the field channels so that CAD would not have to carry out a time consuming and costly 50' grid survey.

### Minor Network Design Procedures

5. A randomly selected file of a typical minor (Dhayka Minor serving about 2700 acres) was reviewed. The following improvements in design procedures were suggested by the Bank:

- longitudinal sections plotted to a vertical scale of 1 cm: 2.5 m, cannot show clearly top of embankment, FSL, bottom of ditch, and existing ground elevations on the same drawing; the scale should be changed to 1 cm: 1 m;
- control structures, culverts, field road crossings, are not indicated with their main dimensions on plans or sections; these should be shown;
- ground elevations on strip topography and on L-sections are given to the nearest mm; these should be given to the nearest 1 cm;
- FSL at an outlet point is often less than 10 cms above ground level (see for example km 1900 of 27 R); this is insufficient to control the adjoining areas; at other sections, FSL is designed 40-60 cm below ground level (see for example km 2900-km 3000) and does not control the adjoining CCA; FSL in all cases inspected, could have been designed 20-40 cms above the ground level without any significant increase in construction cost;
- hydraulic design is laboriously pursued for

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each section with detailed calculations of the wetted perimeter, cross sectional area, hydraulic radius; velocity (m/sec) and discharge (cfs) are calculated to the third decimal place; earthwork depths (m) are also given to the third decimal (i. e. mm) and earthwork quantities calculated in cubic meters to the third decimal; all the calculations are then typed; these procedures should be simplified by using tables and nomographs; velocity (m/sec), depths (m) and quantities (m<sup>3</sup>) should be given to the second decimal only; all resulting estimates should be recorded directly on the L-section so that the elevations and data do not have to be copied every time a new calculation is performed; although required depths of flow was only 30 cms to 50 cms, freeboard was 30-45 cms and in many sections freeboard was greater than the depth of flow; free-board can be reduced in a lined system and the hydraulic calculations for the small 1-5 cfs minors should be replaced by tables showing discharge of standard cross-sections for various gradients.

6. Many of the present procedures are carryovers from major network design and are based on a published "course of lectures" dated 1961. There is a need for preparing a minor network design manual and it was agreed that the ID will appoint a competent engineer in the CDO to prepare the framework of this manual. It is envisaged that the handbook will deal with survey, design and construction of the distributaries below the 100 cfs level and a first draft should be ready within two years.

### Chak Design

7. Inspection of the minor network showed that in many cases the FSL does not control fields included in the CCA and chak inlets are not located satisfactorily, and chaks varying in size from 3 ha to 25 ha - although chak size in the MIP project should be about 8 ha. It was agreed that ID will review its chak design procedures and set up design procedures for ensuring that chak inlets are located correctly and that chak size does not vary more than 1.5 ha from the agreed 8 ha. It was

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also agreed that in the pilot area, existing chaks greater than 9 ha would be subdivided into smaller chaks by constructing additional outlets and/or subminors.

### Roads and Cart Tracks

8. Present planning does not include the construction of additional field roads and cart tracks. These are essential to raise production targets and operate the system satisfactorily. It was agreed that ID will examine the possibility of constructing 4 meters wide field roads parallel to distributaries and 3 meters wide cart tracks along minors in the pilot area so that farmers will have direct access to their chaks. Turn-around points, 6-8 mts wide would be required because the strip allocated at present to borrow pits could be used for the field roads and tracks, and the minor network constructed with earth hauled in from Government land, waste-land and nullahs. The additional cost for earthwork would be about Rs. 2-3/m<sup>3</sup>. Assuming a requirement of about 1-1.5 m<sup>3</sup>/m for the minor network construction and a network density of about 25m/ha, the field roads would result in an additional expense of about 60-100 Rs/ha (compared to the overall project investment of 10,000 - 15,000 Rs/ha and a watercourse lining investment of 1000-1500 Rs/ha).

### Minor Network Construction

9. Inspection of the minor network showed that in many sections the pressed concrete tiles are already falling off. In order to improve the standard of construction it was agreed that ID would;

- review the tile specifications and evaluate whether to improve the quality of the tiles by introducing 1/8" wire reinforcing into the tiles or increasing the amount of cement;
- establish procedures for quality control of tiles delivered to the fields (instead of factory testing);
- improve the quality of the mortar used to join the tiles (1:3 mx instead of 1:6 mix) and establish procedures for quality control of the jointing;
- establish specifications and procedures for constructing the minor network ditches by compacting wet earth embankments with small vibrating rollers now available in India

10. The bank was informed that the costs of lining are as follows:-

pressed tile (1'x1'x1")	:	17 Rs/m <sup>2</sup>
pressed block (2'x1'x2")	:	25 Rs/m <sup>3</sup>
brick lining	:	30 Rs/m

Brick linings are the sturdiest and also suited to the soils of the pilot area. Until the standard of tile lining has been improved the Bank recommends that in the pilot areas the minor network below the 12 cfs level be constructed with brick lining.

11. It was also agreed that percolation tests (ponding) would be carried out on randomly selected lengths of the minor network in order to measure losses in the existing network and in the network constructed according to the new standards.

#### Monitoring

12. It was agreed that two areas (one in the pilot area and one outside the area) would be selected for monitoring water delivery and agricultural production. Each area would be divided into three zones (head, middle and tail) and each zone would be divided into 3 subzones (head, middle and tail). In each subzone 3 chaks would be selected for detailed monitoring, making a total of 54 chaks (27 in and 27 outside the pilot area).

13. Actual flows delivered to each chak would be monitored to calculate daily and seasonal deliveries. Cropping patterns, farmers inputs and yields would also be monitored.

14. It was agreed that in the pilot area, ID will construct control and measuring structures at all take off points, so as to be able to distribute the flows according to predetermined plan. ID will also establish suitable measuring flumes at the inlet to the 54 selected chaks.

15. Mr. Henkin discussed with the Agricultural Faculty of the Anand University and with the Engineering Research Institute in Baroda their possible cooperation in the monitoring program. In line with the above framework, these agencies will propose research and monitoring activities in the pilot area for review by the ID and the Bank.

Distributing Reservoirs

16. Although most of the network in the Morva Pilot area has already been constructed, the Mission examined the possibilities of integrating existing tanks into the system. Mr. Henkin selected six tanks (see attached table) and ID will prepare detailed plans for integrating them into the Morva network to serve 2000 acres of the pilot area. Preliminary estimates indicate that they would store about 3-5 days supply and serve the pilot areas by gravity flow.

17. Because the construction of the network had been completed before the Morva Pilot area had been selected, many proposed improvements cannot be integrated into the existing pilot area. It was agreed that an additional pilot area, where design and construction have not yet started, is needed for establishing a more advanced water management program. The main additions to the system in the new area would be an improved layout and design of the minor network and full integration of distribution tanks into the system. For this purpose the Sansoli distributary covering 10,000 acres was selected. It was agreed that 5,000 acres of this area will be planned on the basis of a 1":600' map prepared by ID using spot elevations taken at the corners of survey number plots (see para 4 above). At the same time the CAD will prepare a detailed soil survey of the area.

LS:jn

Gujarat Irrigation Project

( Credit 808-IN )

Water Management Area

Review Mission . Nov. 1980

Tanks to be Integrated in Morva Block 1

<u>Tank</u>	<u>Location</u>	<u>Supply Sources</u>	<u>Estimated Storage m</u>	<u>CCA controlled by tank</u>
1. Morva (1)	Tail of SMII.	24 R; SMIL	40000	MR 5 (156 ha) ML 6 ( 63 ha)
2. Gokulpur	Tail of MR 5	MR 5	n. a.	MR 7
3. Murvada	Confluence of SM4L & MR 3			SM 4L (135 ha) MR3 (832 ha)
4. Tank 57	Tail MR 3	MR 3	n. a.	Area to be designed
5. Kharoli Tank 39	Kharoli Sub- division	MR 3	n. a.	Area to be designed
6. Sarangpur Tank(i)	Tail of SMIL	MR 24; SMIL	400,000	Balancing for main canal and for 32,000 ha of Norva System

January 29, 1981

Mr. H. K. L. Capoor  
Chief Secretary  
Government of Gujarat  
Sachivalaya, Gandhinagar 382010  
Gujarat State

Dear Mr. Capoor:

Subject: Gujarat Medium Irrigation Project - AID Loan No. 306-T-223

The above project agreement was executed between the Government of India (GOI) and the United States Agency for International Development (AID) on August 26, 1978. The agreement has a project assistance completion date of June 30, 1983, as such we have now reached the mid-point of the project life. Our Project Manager has completed a mid-term review of the project (attached).

We are pleased to note that the Government of Gujarat (GOG) has allocated sufficient funds to accelerate the implementation of the planned projects to assure completion on schedule. However, our report indicates that there are a few serious shortcomings that are hampering the progress of the project. Unless these shortcomings are overcome in the near future, it is questionable whether the Government of Gujarat will be in a position to utilize all of the available funds by the completion date of the loan.

In brief, our reports indicate that immediate action is required on the following matters. (See pages 5 and 6 of attached report for details.)

1. Staffing patterns recommended by Central Water Commission (CWC) and the Irrigation Department for each of the 39 projects being financed by AID should be approved and in place within the next few months. Unless this action is taken, there will be insufficient staff to plan, design and supervise construction of sufficient works to utilize the budgeted funds.
2. Certain steps are required to assure improved quality control for the canal lining program, such as providing

short workshops for field supervisors and contractors, additional staff and support for the Quality Control Circle of the Irrigation Department, and detailed inspection of the lining already carried out to identify sections requiring repair or replacement.

3. Communication between the GOG Irrigation Department and the GOG Agricultural Department needs to be improved to assure compliance with the agricultural criteria.
4. Communication between the GOG Irrigation Department and CWC should be intensified to clear the remaining 14 projects through the Appraisal Committee.
5. Minor distribution networks should be planned and designed following the suggestions of consultants, Mr. Shanin and Mr. Henkin (Review Mission Aide Memoire, November 1980).

We feel that the implementation of the above recommendations would improve the quality and speed the construction of medium irrigation projects in Gujarat. We feel that these recommendations should be brought directly to your attention for, although the solutions required may not be complicated, high level action is required to assure their realization within a workable time frame.

We appreciate your concern with the smooth functioning of the Project and if you or other officials of GOG need any clarification or assistance, our Project Manager is available to meet with you at your convenience.

Sincerely yours,

*[Signature]*

Priscilla M. Boughton  
Director

CC: Mr. Yogesh Chandra x  
Mrs. R. M. Shroff x  
Mr. H. G. Shah x  
Mr. J. F. Mistry x  
Mr. Shankar Iyer x  
Mr. J. R. Khanna x  
Mr. C. Perry x  
Mrs. P. Singh x

AND E.P. States. la 1/22/81 *[Signature]*

Clearance: F.E. Riggs *[Signature]*