



IRRIGATION PROJECTS DOCUMENT REVIEW



EXECUTIVE SUMMARY

**WATER MANAGEMENT SYNTHESIS PROJECT
WMS REPORT 1**

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EXECUTIVE SUMMARY

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All reported opinions, conclusions or
recommendations are those of the
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PREFACE

Great emphasis is being placed worldwide on effective and efficient use of irrigation water. The direct result of improving yields and extending irrigated land area is increased food production.

Conserving the quality and quantity of irrigation water deserves more attention to expand agricultural production. Improving on-farm water management directly benefits more rural poor and landless laborers by increasing income and employment.

This study was conducted as part of the Water Management Synthesis Project, a program funded and assisted by the United States Agency for International Development through the Consortium for International Development. Utah State University and Colorado State University serve as lead universities for the project.

The key objective is to provide services in irrigated regions of the world for improving the design and operation of existing and future irrigation projects and give guidance to USAID for selecting and implementing development options and investment strategies.

For more information, contact the Water Management Synthesis Project for information about the project and any of its services.

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Recognition of this cooperation, however, in no way implies the support or endorsement of these bodies for this study.

EXECUTIVE SUMMARY OF PROJECT DOCUMENT REVIEW

Members of the staff of the USAID-sponsored Water Management Synthesis Project have written this Executive Summary of their project document review to serve as a resource paper indicating general directions of irrigation project investment in developing countries.

The bulk of information presented in this summary was drawn from documents written preliminary to project execution and therefore did not provide an assessment of either ongoing or completed projects. It is thus clear that the conclusions drawn in this summary were arrived at, not from an analysis of projects' actual attainments and shortcomings, but rather, from estimates of individual project costs and projections of their expected benefits.

It is recognized that numerous factors contribute to overall project success. Some essential components may have been provided by programs separate from those described in the project paper or may have been determined to be already in place at the time of project execution. This summary is necessarily limited to review of those components which are discussed in the project documents.

Major emphasis was given to canal construction and improvement and operation, maintenance and administration of irrigation systems. The principal type of irrigation was surface and the dominant crop paddy rice. Although system rehabilitation, water allocation and drainage received considerable emphasis, the major expenditures were for new canals and structures for water conveyance and for their operation, management and maintenance.

Research, resettlement and development of new cropping systems received less emphasis, while land leveling, flood control, sprinkle and drip irrigation and micro hydroelectric received relatively minor consideration when compared with the other categories.

Past development trends are not, however, presented as a guide for future projects, but as a basis for further analysis that may lead to improved integration of all inputs required for optimizing agricultural production on irrigated lands.

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USE OF TABLES

The documents included in this review are organized first by country and then by donor organization. Thus, for example, R-W stands for Bangladesh-World Bank, while T-A refers to Thailand-USAID. A further grouping is made on the basis of geographical region, according to the four following divisions:

Appendix A: The Indian Subcontinent:

India, Pakistan, Afghanistan, Nepal, Bangladesh and Sri Lanka

Appendix B: East Asia:

Indonesia, the Philippines, Thailand and Malaysia

Appendix C: Near East and Africa:

Egypt, Jordan, Morocco, Tunisia, Chad, Senegal and Cape Verde

Appendix D: Central and South America:

Chile, Guatemala, Haiti, Guyana, El Salvador and Peru

Table 1 is a breakdown of the distribution of keywords by region. Twenty-three keywords, or word combinations, were used in the project classification process. This table shows how these keywords were distributed in each of the five geographical areas into which the projects have been grouped. The reader may infer the degree of emphasis placed on various project components within each region and may, in turn, examine how these priorities vary from region to region.

Table 2 indicates project size, average farm size and project costs by country and donor. Table 3 summarizes similar information by region and donor. Tables 4 through 14 present a summary of the costs of project components by regions and donors.

Of the 40 projects which contribute to the cost tables, 25 are projects discussed in World Bank appraisal reports and 15 are USAID projects. Of the 25 World Bank projects, 22 belong in either the Indian subcontinent or East Asian regions, as do eight of the USAID projects. Because of the concentration of projects in Asia, it is only for this continent that these tables may be said to represent

regional spending patterns. In looking at the Asia tables, two elements appear to be common to all of the projects in this region. The first element is a high level of spending on canals and other water conveyance structures, and the second is the requirement of providing funds for project administration and management.

Approximately 40 percent of the USAID funding in East Asia and the same percentage of World Bank funding on the Indian subcontinent is allocated to canal improvement and construction, while approximately 20 percent of the USAID funds on the Indian subcontinent and 30 percent of the Bank funds in East Asia fall in the same category. This compares to management and administration costs which run from 25 percent in the Bank's East Asian projects to 10 percent in USAID's East Asian endeavors. While not all of the projects call for construction of dams and the installation of wells, water source development is a significant cost (sometimes the major cost) in projects which undertake this kind of work. Likewise, on-farm development is not a task which all projects tackle; however, those which do plan to carry out this activity frequently budget a large per hectare cost to on-farm development.

CREDIT

In only 10 of 63 projects worldwide did credit to farmers appear to be a feature central to the overall project design. Thus, while credit is a component in a large percentage of the projects, it is generally of little significance relative to other project components. Appendices B, C and D all placed approximately equal emphasis on credit with credit appearing to be a significant factor in relation to the overall project in 17 percent of the projects within each region. In Appendix A, the Indian subcontinent, the incidence of this factor was only three percent. Nothing remarkable was observed about credit mechanisms or philosophy.

Of the 40 projects for which cost data were available, seven had credit components. The total expenditure on credit was \$27 million, which comes to 11 percent of the funds budgeted for the seven projects having credit components; 1.2 percent of the funds budgeted for all projects for which information is available; and a cost per hectare of \$89 spread over the projects with credit components.

CROPPING SYSTEM

The term "cropping system" is used to refer to a package of services required to introduce new crops to a project area. The

introduction of new crops appeared to be a significant factor in six of the 63 projects studied and of negligible importance to the others. Appendices A and B emphasized cropping systems in about six percent of their projects, while this emphasis reached nine percent in the Middle East, 18 percent in South America, and fell to zero percent in Africa. No information is available on cropping system cost.

LAND CONSOLIDATION

The term "land consolidation" in this paper means the consolidation of farmers' scattered or irregularly-shaped holdings into a single, regular parcel of the same value as the original holding. This concept was emphasized in only two of the project documents, appearing to be of significance in view of the overall project in nine percent of the Middle Eastern projects, five percent of the East Asian projects and of no significance in the other regions.

Cost information on land consolidation was not included in the Document Review.

OPERATION AND MAINTENANCE

Although operation and maintenance were recognized as important components of almost all of the projects reviewed in this study, in only two instances were they major foci of project design. Operation and maintenance appeared to be significant factors in relation to the overall project in nine percent of the Middle Eastern projects and in five percent of the East Asian projects. In general, water user charges were expected to furnish a major portion of the revenues required for project operation and maintenance.

RESEARCH

Research appears to be a significant factor in relation to the overall project in seven of 63 projects worldwide. While research is a component of other projects, it is generally subordinate to other project features. Research appears to be of significance in 13 percent of the Indian subcontinent projects, nine percent of the South American projects and 18 percent of those in the Middle East.

Cost information on research was not included in the Document Review.

RESETTLEMENT

Resettlement of farmers from overpopulated areas of a country to less populous regions is a major consideration in the planning of irrigation projects in some of the countries which were studied, and thus proved to be of significance in nine of the 63 projects studied. Resettlement was a goal of about 14 percent of the projects in Appendices A and B and Africa, and of nine percent of the projects in South America. No figures are available for the relative costs of resettlement.

SOIL CONSERVATION

Under certain topographic conditions, soil conservation can become a major aspect of project design. Soil conservation figured as a significant factor in relation to the overall project in about three percent of the projects in Appendices A and B, but was not considered to be of particular importance in the other regions.

Cost information on soil conservation was not included in the Document Review.

TRAINING

Institution of an extension and training program appeared to be a major factor in the overall design of five of the 63 projects reviewed, while constituting a feature of lesser importance in many of the remaining projects. Training appeared to be a significant factor in relation to the overall project in approximately six percent of the Indian subcontinent and East Asia projects and in 27 percent of the projects in South America.

Of the 40 projects for which cost data were available, 19 had training and extension components. The total expenditure on training and extension was \$28 million, which represents three percent of the funds budgeted for the 19 projects having training components and one percent of the funds budgeted for all projects for which information was available. The cost per hectare for training was \$25 spread over the projects having training components.

WATER MANAGEMENT

The term "water management" could be applied, in some sense or another, to all of the projects reviewed in this summary. However,

in this case, several of the project reports raised interesting questions of water allocation and distribution and it was these projects which were assigned the keyword "water management." Following this philosophy, 19 of the projects reviewed were found to have water management aspects which were central to project design. The distribution of this factor showed water management to be significant in 30 percent of the projects in Africa and East Asia, 55 percent of the projects in South America and nine percent of the projects in the Middle East.

Cost information on water management was not included in the Document Review.

WATER USE ALLOCATION

Organization of water users into cooperative associations was a significant feature of eight of the 63 projects reviewed. Thirty-three percent of the projects in East Asia and nine percent of those in the Middle East viewed the organization of water users' associations as being an important part of project development. No cost information is available on this process.

PADDY

Of the modes of irrigation employed by projects covered by this study, an important one was flood irrigation of lowland rice referred to here as "paddy irrigation." Paddy irrigation was a significant component in 34 of the projects, including 76 percent of those in East Asia, 50 percent on the Indian subcontinent, 18 percent in South America and 14 percent in Africa.

No cost information on paddy irrigation was included in the Document Review.

UPLAND SURFACE

The type of irrigation prevalent in the projects reviewed in this paper was upland surface irrigation or surface irrigation of any crop except lowland rice. Upland surface irrigation was a significant component in 42 of the projects including 82 percent of the projects in South America, 63 percent of those in Appendix A, 57 percent in Africa, 38 percent of the projects in Appendix B and 18 percent in the Middle East.

No cost information on upland surface irrigation was included in the Document Review.

SPRINKLE

Although sprinkle irrigation was not considered to be suitable technology for most of the projects reviewed in this study, it did play a major role in six of the 63 reports covered. Forty-five percent of the projects in the Middle East planned to use sprinkle irrigation, as did 14 percent of the projects in Africa.

Cost information on sprinkle irrigation was not included in the Document Review.

TRICKLE

Like sprinkle, trickle irrigation was not considered to be a suitable technology for most of the projects reviewed in this study. Only two of the 63 projects reviewed intend to use trickle irrigation. This includes 14 percent of the projects in Africa and nine percent of those in the Middle East.

No cost information on trickle irrigation was included in the Document Review.

CANALS

Canal design and construction was a component of many of the 63 projects reviewed and was of particular significance relative to other components in five of these projects. Thirteen percent of the project papers from the Indian subcontinent and five percent of those from East Asia placed particular emphasis on canals.

Of the 40 projects for which cost data were available, 32 had major canal construction or rehabilitation as a component. The total expenditure on canals was \$740 million, which represents 37 percent of the funds budgeted for all projects for which information was available. The cost per hectare for canal construction and rehabilitation was \$84 spread over the projects having canal components.

PUMPS

Pumping water from either deep or shallow wells was an important

technique in 12 of the 63 projects reviewed. Approximately 15 percent of the projects in Appendices A and B and South America emphasize pumping of irrigation water, as do 29 percent of the projects in Africa and nine percent of those in the Middle East.

Of the 40 projects for which cost data were available, seven had low lift pump components. The total expenditure on low lift pumps was \$23 million, which represents 15 percent of the funds budgeted for the seven projects having low lift pump components and one percent of the funds budgeted for all projects for which information was available. The cost per hectare for tubewell construction was \$296 spread over the projects having tubewell components.

LAND LEVELING

In only four of the projects reviewed was land leveling identified as an important aspect of overall project design. Thus, while land leveling is a component of a large percentage of projects, it is generally of little significance relative to other components. The Indian subcontinent placed significance on land leveling in approximately seven percent of its projects, while land leveling was significant in 18 percent of the projects in South America.

SYSTEM REHABILITATION

The rehabilitation of existing systems as a cost-effective means of improving irrigation is a strategy which is obviously limited to areas where the opportunity to upgrade existing systems presents itself. System rehabilitation, therefore, plays a role in only 11 of the 63 systems evaluated, although certainly in all 11 of these projects it appeared to be a significant factor in relation to the overall project. Ten percent of the projects in Appendix A and about 25 percent of those in Appendix B and South America relied on system rehabilitation as a strategy.

Cost information on system rehabilitation was not included in the Document Review as a column heading; however, per hectare costs of rehabilitation schemes run about \$330, while costs of new projects in the same regions are expected to run about \$670 per hectare.

DRAINAGE

Drainage appeared to be a significant factor in relation to the overall project in 12 of 63 projects worldwide. While drainage is a

component of other projects, it is generally subordinate to other project features. Drainage appears to be of significance in 27 percent of the Middle Eastern projects, 14 percent of the African projects, 10 percent of those in East Asia and 20 percent of those on the India subcontinent.

Of the 40 projects for which cost data were available, 20 had drainage components. The total expenditure on drainage was \$98 million, which represents six percent of the funds budgeted for the 20 projects having drainage components and four percent of the funds budgeted for all projects for which information was available. The cost per hectare for drainage was \$72 spread over the projects having drainage components.

FLOOD CONTROL

Flooding is a not a hazard to many irrigation projects, however, in regions where periodic floods threaten either an irrigation system or villages and land in the neighborhood of that system, flood control may become a critical element in project design. Flood control appears to be a significant factor in relation to the overall project in five of the 63 projects studied and in 10 percent of the projects in Appendix A, five percent of those in Appendix B and 14 percent of those in Africa.

Of the 40 projects for which cost data were available, four had flood control components. The total expenditure on flood control was \$21 million, or seven percent of the funds budgeted for the four projects having flood control components, and one percent of funds for all projects for which information was available. The cost per hectare for flood control was \$10 over the projects with flood control components.

MICRO HYDROELECTRIC

In no instance was the conjunctive use of a water delivery system for both irrigation supply and for power generation a central component of a project. Nevertheless, on-site generation of power does introduce interesting possibilities, and, as such, has been included in the keyword list as micro hydro. Four of the 63 projects reviewed intended to try this technology, with all four trials taking place in the Indian subcontinent regions. These four projects constitute 13 percent of all East Asian reports studied.

Cost information on micro hydroelectric was not included in the Document Review.

The appendices listed in the beginning of this Executive Summary are available in four separate volumes on request from the Water Management Synthesis Project at Utah State University. The project documents are summarized as set out in these four appendices, respectively. The summary for each project is indicated by country and donor. For example, B-W-1 represents Bangladesh-World Bank-1. B-F-1 is an FAO project and B-A-1 a USAID project.

TABLE 1.--KEYWORD DISTRIBUTION - PERCENTAGE OF PROJECTS HAVING THE KEYWORD.

Region	Number of Projects	Credit	Crop System	Land Condition	O & M	Reset	Soil Conserv.	Training	Water Management
Indian Subcont.	23	3	7	0	0	13	7	7	30
E. Asia	19	19	5	5	5	14	14	5	5
S. & C. America	7	15	18	0	0	9	0	27	55
S.S. Africa	5	14	0	0	0	14	0	0	29
N.E. & N. Africa	9	18	0	9	9	0	0	0	9

Region	WUA ¹	Paddy	Upland Surface	Sprinkle	Trickle	Canals	Pumps	Dams	Tubewells
Indian Subcont.	0	50	63	0	0	13	13	3	13
E. Asia	33	76	38	0	0	5	14	14	10
S. & C. America	0	18	82	0	0	0	18	0	9
S.S. Africa	0	14	57	14	14	0	29	14	14
N.E. & N. Africa	9	0	18	45	9	0	9	18	0

Region	Land Level	System Rehab.	Drainage	Flood Control	Micro Hydro	Research			
Indian Subcont.	7	10	20	10	13	13			
E. Asia	0	24	10	5	0	0			
S. & C. America	18	27	0	0	0	9			
S.S. Africa	0	0	14	14	0	0			
N.E. & N. Africa	0	0	27	0	0	18			

¹WUA = Water Users Associations

TABLE 2.--PROJECT SIZE AND COST BY COUNTRY AND DONOR.

Country	Donor	No. of Projects	Ave. Proj. Size (1000 Ha)	Ave. Farm Size (Ha)	Ave. Proj. Cost (\$ Million)	Ave. Cost Per Ha (US \$)
Afghanistan	AID ¹	1	13 K	5	26	1615
Bangladesh	AID	1	240 K	1	22.6	94
Bangladesh	W.B. ²	4	84.5 K	1	35.2	416
Cape Verde	AID	1	0.6 K	1.2	2.5	4228
Chad	AID	2	0.5 K	1.0	3.66	3853
Chile	AID	1	16 K	4	17.5	1094
Egypt	AID	3	116 K	2.2	105	1110
El Salvador	AID	1	5 K	0.8	5.5	1100
Guatemala	AID	1	20 K	10	29	1400
Guyana	AID	1	21 K	3.7	42.8	2038
Guyana	W.B.	1	32 K	5.6	15.6	488
Haiti	AID	1	9 K	N/A	22.6	2511
India	AID	1	149 K	4.1	215	1443
India	W.B.	5	172 K	3.9	148	856
Indonesia	AID	3	63 K	1.0	42.4	671
Indonesia	W.B.	3	199 K	0.8	65.7	329
Jordan	AID	3	3.2 K	3.3	15.7	4950
Malasia	W.B.	2	59 K	1.5	67.0	1155
Morocco	W.B.	1	16.6 K	6.6	121	7289
Nepal	W.B.	5	60.7 K	1.5	24	398
Pakistan	AID	1	172 K	2	44.4	258
Peru	AID	1	30 K	1.6	23.5	367
Philippines	AID	3	23.4 K	1.6	15.9	680
Senegal	AID	1	1.8 K	N/A	8.0	4444
Senegal	W.B.	1	3.3 K	3.0	35.0	10600
Sri Lanka	AID	1	46 K	1.2	81.2	1765
Sri Lanka	W.B.	4	39 K	0.7	11.5	294
Thailand	AID	2	127 K	4.6	26	205
Thailand	W.B.	6	266 K	2.6	101	380
Tunisia	AID	2	4 K	1	6.6	1638

¹AID = Agency for International Development²W.B. = World Bank

TABLE 3.--PROJECTS BY REGION AND DONOR.

Region	Donor	No. of Projects	Total Area (1000 Ha)	Ave. Project Area (1000 Ha)	Ave. Farm Size (Ha)	Total Investment (\$ Million)	Ave. Project Investment (\$ Million)	Ave. Cost Per Ha (US \$)
Indian Subcont.	AID ¹	5	620	124	2.7	389	78	1035
Indian Subcont.	W.B. ²	18	1658	92	1.9	1047	58	506
E. Asia	AID	8	513	64	2.1	227	28	558
E. Asia	W.B.	11	2311	211	1.9	938	85	507
S.S. Africa	AID	4	3.35	0.84	1.1	17.8	4.5	4095
S.S. Africa	W.B.	1	3.3	3.3	3.0	35	35	10600
S. & C. America	AID	6	101	16.8	4.0	141	23.4	1418
S. & C. America	W.B.	1	32	32	5.6	15.6	15.6	488
N.E. & N. Africa	AID	8	362	45	2.2	375	46.9	2682
N.E. & N. Africa	W.B.	1	16.6	16.6	6.6	121	121	7289

¹AID = Agency for International Development

²W.B. = World Bank

TABLE 4.--COST OF PROJECT COMPONENTS: ALL PROJECTS.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	40	2708	2200	812
Low-lift Pumps	7	121	23	190
Dams	6	418	131	313
Credit	7	306	27	88
Canals	32	2623	800	305
Training	19	1142	28	25
Drainage	20	1362	98	72
Tubewells	6	54	16	296
Flood Control	4	195	21	108
On-farm Development	23	1749	368	210
Machinery & Vehicles	24	1621	132	81
Roads & Other				
Infrastructure	29	2271	157	69
Admin. & Management	36	2676	399	149

TABLE 5.--COST OF PROJECT COMPONENTS: INDIAN SUBCONTINENT - AID.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	2	218	126	576
Low-lift Pumps	0	0	0	0
Dams	0	0	0	0
Credit	1	46	11	236
Canals	2	218	23	105
Training	2	218	6	25
Drainage	0	0	0	0
Tubewells	0	0	0	0
Flood Control	0	0	0	0
On-Farm Development	2	218	43	198
Machinery & Vehicles	1	46	14	307
Roads & Other				
Infrastructure	1	46	12	251
Admin. & Management	2	218	17	80

TABLE 6.--COST OF PROJECT COMPONENTS: INDIAN SUBCONTINENT - WORLD BANK.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	13	1051	784	746
Low-lift Pumps	1	27	4	155
Dams	2	174	36	209
Credit	0	0	0	0
Canals	10	886	311	351
Training	4	339	10	30
Drainage	9	617	40	64
Tubewells	4	85	23	271
Flood Control	1	66	4	55
On-farm Development	7	828	153	184
Machinery & Vehicles	8	467	27	59
Road & Other Infrastructure	9	899	66	73
Admin. & Management	13	1051	110	104

TABLE 7.--COST OF PROJECT COMPONENTS: E. ASIA - AID.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	6	260	175	673
Low-lift Pumps	2	68	7	97
Dams	0	0	0	0
Credit	3	234	13	55
Canals	6	260	71	273
Training	6	260	8	32
Drainage	1	13	2	132
Tubewells	0	0	0	0
Flood Control	1	13	13	1021
On-farm Development	4	247	7	30
Machinery & Vehicles	2	24	30	1208
Road & Other Infrastructure	4	207	6	27
Admin. & Management	5	249	19	75

TABLE 8.--COST OF PROJECT COMPONENTS: E. ASIA - WORLD BANK.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	9	1113	851	765
Low-lift Pumps	1	19	2	91
Dams	2	195	79	404
Credit	0	0	0	0
Canals	9	1113	260	234
Training	3	317	5	15
Drainage	6	693	54	78
Tubewells	0	0	0	0
Flood Control	2	116	8	72
On-farm Development	4	395	157	397
Machinery & Vehicles	7	993	54	54
Roads & Other Infrastructure	7	812	28	35
Admin. & Management	9	1110	204	185

TABLE 9.--COST OF PROJECT COMPONENTS: S.S. AFRICA - AID.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	3	3	17	5454
Low-lift Pumps	2	3	2	715
Dams				
Credit	1	1	0	372
Canals	2	3	5	1919
Training	3	3	1	317
Drainage	1	1	0	260
Tubewells	1	1	1	1763
Flood Control				
On-farm Development	2	2	2	672
Machinery & Vehicles	2	2	1	406
Roads & Other Infrastructure	3	3	2	742
Admin. & Management	3	3	3	933

TABLE 10.--COST OF PROJECT COMPONENTS: S.S. AFRICA - WORLD BANK.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	1	3.3	35	10600
Low-lift Pumps	0	0	0	0
Dams	0	0	0	0
Credit	0	0	0	0
Canals	1	3.3	17	4918
Training	0	0	0	0
Drainage	1	3.3	4	1229
Tubewells	0	0	0	0
Flood Controls	0	0	0	0
On-farm Development	1	3.3		386
Machinery & Vehicles	1	3.3	3	793
Roads & Other Infrastructure	1	3.3	1	437
Admin. & Management	1	3.3	10	2837

TABLE 11.--COST OF PROJECT COMPONENTS: N.E. and N. AFRICA - AID.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	3	141	53	376
Low-lift Pumps	2	136	23	180
Dams	0	0	0	0
Credit	1	5	1	203
Canals	1	5	1	203
Training	1	5	0	23
Drainage	1	3	0	66
Tubewells	1	3	1	183
Flood Control	0	0	0	0
On-farm Development	1	3	3	916
Machinery & Vehicles	2	138	3	22
Roads & Other Infrastructure	1	133	17	125
Admin. & Management	2	8	4	446

TABLE 12.--COST OF PROJECT COMPONENTS: N.E. AND N. AFRICA - WORLD BANK.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	(\$/Ha)
Total	1	17	121	7289
Low-lift Pumps	0	0	0	0
Dams	1	17	14	834
Credit	0	0	0	0
Canals	1	17	60	3651
Training	0	0	0	0
Drainage	0	0	0	0
Tubewells	0	0	0	0
Flood Control	0	0	0	0
On-farm Development	0	0	0	0
Machinery & Vehicles	0	0	0	0
Roads & Other				
Infrastructure	1	17	23	1384
Admin. & Management	1	17	24	1420

TABLE 13.--COST OF PROJECT COMPONENTS: S. & C. AMERICA - AID.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	(\$/Ha)
Total	2	20	29	1400
Low-lift Pumps	0	0	0	0
Dams	0	0	0	0
Credit	1	20	2	100
Canals	0	0	0	0
Training	0	0	0	0
Drainage	0	0	0	0
Tubewells	0	0	0	0
Flood Control	0	0	0	0
On-farm Development	1	20	2	83
Machinery & Vehicles	1	20	6	276
Roads & Other				
Infrastructure	1	20	10	513
Admin. & Management	1	20	9	428

TABLE 14.--COST OF PROJECT COMPONENTS: S & C. AMERICA - WORLD BANK.

Component	No. of Projects	Areas in Region (1000 Ha)	Total Cost (\$ Million)	Cost (\$/Ha)
Total	1	32	15	488
Low-lift Pumps	0	0	0	0
Dams	1	32	2	56
Credit	0	0	0	0
Canals	1	32	6	199
Training	0	0	0	0
Drainage	1	32	5	164
Tubewells	0	0	0	0
Flood Control	0	0	0	0
On-farm Development	1	32	1	31
Machinery & Vehicles	0	0	0	0
Roads & Other				
Infrastructure	1	32	1	38
Admin. & Management	0	0	0	0