

CHAPTER 3 IMPLEMENTATION PLAN

1998-1999

CHAPTER 3

IMPLEMENTATION PLAN

3-1 Implementation Plan

If the project is executed under the Japanese Grant Aid System, the implementation plan will be as follows.

3-1-1 Implementation Concept

This project will be executed in Punjab Province, Islamic Republic of Pakistan, under the Japanese Grant Aid System. The implementation concept and schedule should be settled after due deliberation of the Japanese Grant Aid System, especially of the schedule.

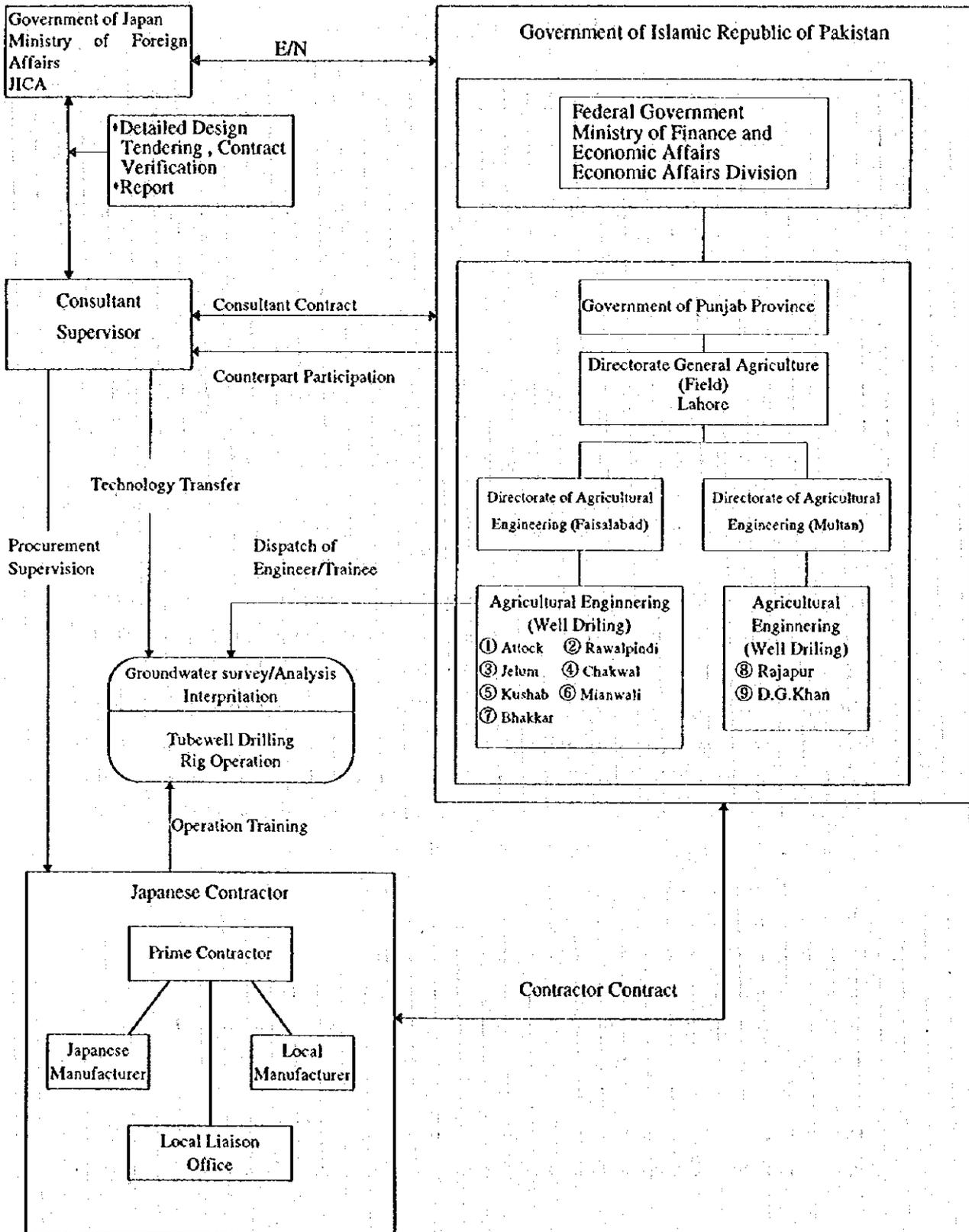
The organization for implementation of this project is depicted in Fig. 3-1.

The executing agency for implementation of the project is Directorate General Agriculture (Field) of Agricultural Department, the Government of Punjab, and it will be responsible for procedures from detailed design to equipment delivery, as well as the operation and maintenance of the procured equipment and materials. After the Exchange of Notes (E/N) made between both governments, a Japanese consultant firm will enter into a consultancy agreement with executing agency regarding the detailed design, the procurement and technology transfer. Then, a Japanese consultant will carry out a tender for the procurement of the equipment under this project. As a result of evaluation on the tendering, Director General Agriculture (Field) Punjab Lahore (DGA) will enter into a supply contract with a contractor.

In accordance with the guideline of the Japanese grant aid system, the principal contractor shall be a Japanese firm. For procuring equipment and materials, the contracting firm must possess an abundance of experience in dealing with groundwater development as well as possess sufficient understanding of relevant detail.

The contractor shall procure the equipment in accordance with the supply contract, and ship the equipment to the locations specified in the contract within the period contracted. Also the

Fig. 3-1 Organization for Project Implementation



contractor shall dispatch engineers to the specified places for the rating test for the equipment as per the contract. Test-run, training to give operating instructions, and rating test are included in his task.

Concerning the training for drilling operation and maintenance of tubewell drilling equipment, the contractor shall dispatch an engineer to give on-the-site training on operation for about two months, based on the training manual which will be prepared by the contractor. For groundwater development survey including interpretation of geoelectric prospecting, training shall be given by the consultant during the supervision of the site.

3-1-2 Implementation Conditions

Inland Transportation

As for equipment to be procured from Japan, the port of delivery will be Karachi. Then, the equipment must be transported inland from Karachi to Faisalabad and Multan where the executing agency's field office are located. The operation training will be held in the Barani areas, Punjab Province, at distances of 400 km - 500 km from Faisalabad and Multan. So the inland transportation cost from Karachi to Faisalabad and Multan shall be borne by the Japanese side, and that from Faisalabad and Multan to the project Barani areas shall be borne by the executing agency.

3-1-3 Scope of Works

1) Responsibilities of the Japanese side

- The consultant services necessary for implementation of this project
- The procurement of equipment and materials for drilling tubewells
- The ocean transportation cost and marine insurance of equipment and materials from the port in Japan to Karachi port, and inland transportation cost and insurance from Karachi port to Faisalabad and Multan
- The dispatch of an engineer for testing and giving instructions on operation and maintenance of the equipment and groundwater development.

2) Responsibilities of the Pakistani Side

- The provision of parking and storage space necessary for the equipment and materials to be procured by the project
- Bearing commissions to the foreign exchange bank in Japan for the banking services based upon the banking arrangement
- Smooth enforcement of administrative measures necessary for the implementation of the project such as obtaining exemption or paying taxes and taking necessary measures for custom clearance of the equipment, and furnishing data and information
- Arranging tax exemption related to the Japanese personnel dispatched from Japan for the implementation of the project and protecting them by all possible means during their stay in Pakistan
- Preparation of an appropriate management, operation, and maintenance organization with personnel and budget required for proper functioning of the equipment to be procured

3-1-4 Consultant Supervision

The consultant will enter into the consultancy agreement with DGA for the services described below after the E/N is exchanged between the Governments.

- 1) The detailed design for the procurement of the equipment and the preparation of the tender documents for the project.
- 2) The tendering assistance and the evaluation on the tendering.
- 3) The support and advice during the tendering process from opening the tender to the contracting.
- 4) The scheduling supervision on the procurement, transport, equipment testing, and operation guidance performed by the engineer dispatched from Japan.
- 5) Inspection of the equipment.
- 6) Reporting.

3-1-5 Procurement Plan

If quality and procurement of a certain quantity is not a hindrance, then procurement of equipment from the Pakistani market can be considered. Furthermore, in consideration of maintenance and after-sales services, products other than Japanese-manufactured ones are considerable. The present situation of local procurement is explained below.

1) Rotary Drilling Equipment and its Accessories

Japanese-manufactured rotary drilling equipment mounted on trucks procured from Japan have been the main stream in Pakistan to replace worn out American or Australian-manufactured equipment. Some Chinese-manufactured equipment have been used during road construction work by Chinese contractors. Directorate of Agricultural Engineering expect to continue to use Japanese-manufactured rotary rigs due to their superior quality in performance and operation. Furthermore, third country procurement will also be considered.

2) Computer

Products manufactured in Singapore, Taiwan, and Malaysia have dealers in the main cities, and in addition their prices, qualities, after sales services are adequate. Therefore, local and Japanese manufactured procurement will be considered.

3) Compressor

Products with low air delivery used for mostly vehicle repairs are manufactured generally in Pakistan. However, when high air delivery or specialized structure are required, foreign products take the lead in this country. So procurement of compressors from Japan or a third country will be considered.

4) Pick-up Trucks

Dealers of Japanese model trucks for each manufacturer are available in Karachi. Chassis of some of them can be assembled in Karachi, but the models are limited and each manufacturer handles classes different from each other. In view of obtaining spare parts or maintenance, procurement from local dealers will be considered.

In reference to the above situation, local procurement of computer and pick-up truck will be considered. As for tubewell drilling equipment and compressor, local and third country procurement have possibility.

3-1-6 Implementation Schedule

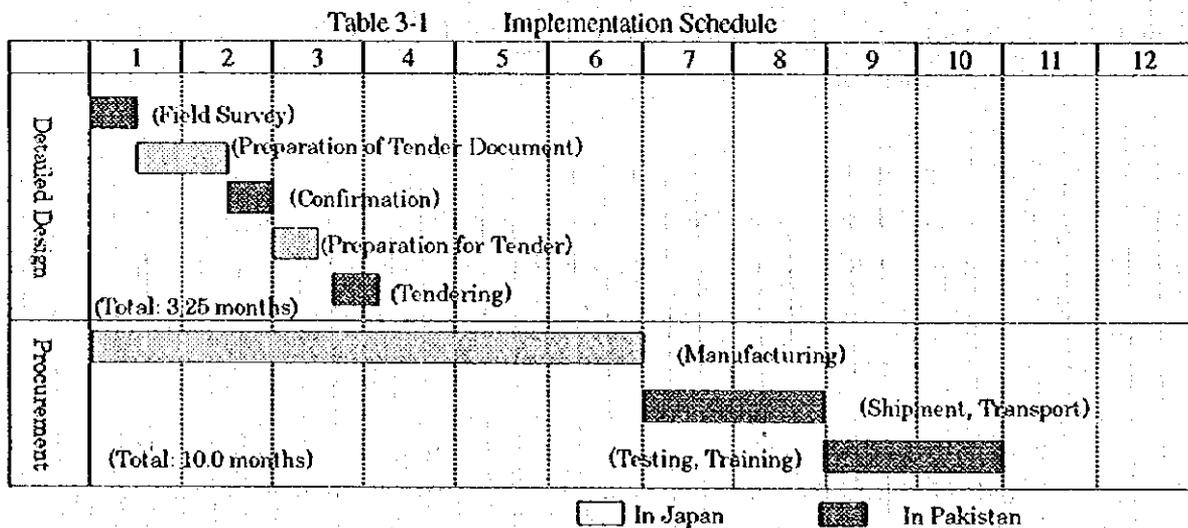
The project starts when the E/N is exchanged between the Government of Japan and the Government of Pakistan for the grant aid of the project, and is necessary to be completed in the Japanese fiscal year.

As the executing agency, DGA is to enter into a consultant agreement with a Japanese consultant firm for the project. The consultant firm will conduct the detailed design and prepare the tender documents after the verification of the consultant agreement by the Japanese Government, and carry out the tendering on behalf of DGA in Japan after the approval of the tender documents by both Governments. The consultant firm will conduct procedures from the tendering to the contracting for procurement, supporting or on behalf of DGA. During this period, the firm will carry out the whole services of the tendering; the evaluation of the tendering; the negotiation between DGA and the successful tender; and the signing of the procurement contract.

The procurement contract will become effective after the verification by the Government of Japan. After signing of the procurement contract, the firm will carry out intermediate inspection, final inspection, receiving inspection, start-up test and delivery.

The contractor will start procurement of the equipment after the verification of the procurement contract. The contractor may need about 6.0 months for delivery, 2.0 months for ocean transport, customs clearance and inland transport, and 2.0 month for testing and training on operation of the equipment.

The implementation schedule is shown in Table 3-1.



3-1-7 Obligation of Recipient Country

If the government of Japan decides to implement this project under the grant aid, the government of Pakistan must take necessary measures for the smooth implementation of this project with regard to the items listed below.

1. To provide data and information necessary for the Project.
2. To provide the land for access road, a temporary site office, warehouse and stock yard during implementation of the Project.
3. To provide necessary facilities for the Project such as warehouse for spare parts, drilling accessories and other incidental facilities.
4. To bear advising commission of Authorization to Pay (A/P) and payment commission to a Japanese foreign exchange bank for the banking services based on the Banking Arrangement (B/A).
5. To exempt taxes, to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation and to make effort to carry out inland transportation of the equipment efficiently and smoothly.
6. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Pakistan with respect to the supply of the products and services under the verified contracts.
7. To accord Japanese nationals whose services may be required in connection with supply of the products and services under the verified contracts, such facilities as may be necessary for their entry into Pakistan and stay therein for the performance of their work.
8. To assign properly the necessary staff for operation and maintenance of the drilling rigs and relevant equipment.
9. To maintain and use properly and effectively the equipment procured under the Grant Aid.
10. To ensure the necessary budget and personal for the proper and effective implementation of the Project, including operation and maintenance of the equipment procured under the Grant.

3-2 Operation and Maintenance Plan

3-2-1 Organization

If new drilling rigs are introduced, the operators can be arranged through personnel reallocation in DAE and training. But it is required to recruit two to twenty-nine personnel, because DGA plans to have a two-shift system for tubewell drilling in the future.

Table 3-2 Required Number of Drilling Rig Crew

Classification	Scale	Total
Driller	9	1.0
Driller Helper	6	2.0
Driver	4	0.5
Welder	5	0.5
Mechanic	7	0.5
Total	-	4.5

The driver, welder and mechanic should be in charge of 2 machines per person.

If the total manpower required for the project operation is assumed to be 4.5 persons per one drilling rig, then the salary of DGA staff is based on pay scales indicated below.

Table 3-3 Pay Scales of Drilling Rig Crew

Classification	Scale	Unit (Rs)					Total Salary
		Basic Salary	Housing allowance	Commutation allowance	Medical expense	Bonus	
Driller	9	3,060.00	1,377.00	93.00	90.00	214.20	4,834.20
Driller Helper	6	2,535.00	1,140.75	93.00	90.00	177.45	4,036.20
Driver	4	2,230.00	1,033.50	93.00	90.00	156.10	3,572.60
Welder	5	2,390.00	1,075.50	93.00	90.00	167.30	3,815.80
Mechanic	7	2,695.00	1,212.75	93.00	90.00	188.65	4,279.40

3-2-2 Operation and Maintenance Costs

The annual cost required for the operation and maintenance is estimated in the following way in order to judge whether the project is financially feasible or not.

1) Operation Cost

This cost is estimated on the basis of such precondition that the number of daily operation hours would be 6 for tubewell drilling and other equipment, and also transportation hours is accounted. Costs of fuel, oil and labor are the key components in this connection. Fuel consumption is calculated if horse power and fuel consumption rate are properly specified for each equipment. Table 3-4 shows a summary of unit cost for fuel and oil consumption, and cost for labor are summarized in Table 3-5, respectively.

Table 3-4 Unit Cost of Fuel and Oil Consumption (per unit tubewell)

Equipment		Fuel Consumption Rate (lit./hr.)	Operation Hours (hr./day)	Operation Days	Unit Cost (Rs)	Total Amount(Rs)
Drilling equipment	Running	10.12	6	2	7.6	923
	Drilling	32.13	6	20	7.6	29,303
Welder		5.27	8	1	7.6	321
Compressor		17.05	18	4	7.6	9,330
					Total	39,877

In consideration of two-sift system for tubewell drilling, sixteen tubewells should be constructed per year. The cost of fuel is calculated to be about Rs 638 thousand.

Table 3-5 Labor Cost for Equipment Operation (Unit/Month)

Classification	Scale	Manpower (Unit/person)	Unit Cost(Rs)	Total Amount(Rs)
Driller	9	1.0	4,834.20	4,834.20
Driller Helper	6	2.0	4,036.20	8,072.40
Driver	4	0.5	3,572.60	1,786.30
Welder	5	0.5	3,815.80	1,907.90
Mechanic	7	0.5	4,279.40	2,139.70
Total		4.5	-	18,740.50

Table 3-6 Annual Equipment Operation Cost

Equipment	Q'ty		(1) Labor Cost (Rs)		Q'ty	(2) Fuel Cost (Rs)		Total (Rs)		
	No. of Rigs	No. of month	Unit cost	Amount		No. of Rigs	No. of tubewell		Unit cost	Amount
	9	12	2	18,740	4,017,840	9	16	39,877	5,742,288	9,790,128

Thus, annual operation and maintenance costs are estimated at Rs. 9.79 million, of which the fuel and oil consumption will be accounting for 58.6% (see Table 3-6).

2) Maintenance Cost

The maintenance cost is calculated based on records of year 1991-1995, which are shown as per below (Table 3-7). According to this table, the total maintenance cost for one tubewell drilling rig is to be about Rs. 85 thousand. Thus, for 9 rigs, it will be Rs. 0.765 million per year for one-shift and Rs. 1.53 for two-shift covering all expenses necessary for mechanical inspection and repair.

Table 3-7 Cost of Repair and Spare Parts for 9 Drilling Rigs, 1991-1995

District	Rig No.	1991-92		1992-93		1993-94		1994-95		Total	Average
		Repair	Spare	Repair	Spare	Repair	Spare	Repair	Spare		
Rawalpindi	JR-7	0	65,312	580	72,322	599	84,495	600	292,104	516,012	129,003
	JR-10	0	90,310	1,030	98,216	1,355	106,602	1,050	36,271	334,834	83,709
Attock	JR-5	680	73,720	1,005	85,490	1,121	85,623	3,425	79,811	330,875	82,719
Chakwal	JR-1	0	120,494	0	42,228	12,000	183,857	12,640	0	371,219	92,805
	JR-9	0	122,700	0	324,427		172,084	15,000	0	634,211	158,553
Jhelum	JR-6	893	24,715	515	24,280	8,540	122,710	3,050	28,403	213,106	53,277
Khushab	JR-2	12,283	55,379	10,205	23,830	12,440	81,792	4,780	19,407	220,116	55,029
	JR-3	20,220	87,466	31,305	64,530	45,375	36,416	0	4,694	290,006	72,502
	JR-4	0	28,952	0	36,182	0	71,021	2,140	2,347	140,642	35,161
Total		34,076	669,048	44,640	771,505	81,430	944,600	42,685	463,037	3,051,021	84,751

Repair: Private repair shop, near site

Spare: Cost for using spare parts from workshop and repair in workshop

3) Budget and Project Cost for Management, Operation and Maintenance

The annual management, operation and maintenance cost for this project is, (1) about Rs.9.79 million as rotary drilling rig operation cost, (2) about Rs. 1.53 million as maintenance cost, and (3) a total of Rs. 11.32 million. Through the Project for Increase of Food Production (KR- II), 140 bulldozers (Komatsu D-50-A-17) were procured in 1991/92, and 113 bulldozers (71 of Komatsu D-50-A-17 and 42 of Caterpillar D-4-H) were procured in 1992/93. Rs. 68.1 million in 1991/92 and Rs. 67.9 million in 1992/93 of the budget were appropriated as operation and maintenance costs for these bulldozers, and records show their sufficiency. The budget of DGA in 1996/97 is about Rs.548 million, and the operation and maintenance cost for 9 drilling rigs is calculated as Rs. 11.32 million which is about 2.1% of the budget. Consequently, if 9 rotary drilling rigs are procured by this project, the cost for management, operation and maintenance in relation to the budget should present no problems.

**CHAPTER 4 PROJECT EVALUATION AND
RECOMMENDATIONS**

THE UNIVERSITY OF CHICAGO
LIBRARY

CHAPTER 4

PROJECT EVALUATION AND RECOMMENDATIONS

4-1 Project Effects

This project aims to improve the present state of decrepit drilling rigs and shortage of rigs for groundwater development under DGA (Field) and to promote the construction of irrigation tubewells based on the application of farmers. In the Barani areas, agriculture is dependent only on rainwater. However the farmers want to promptly construct tubewells to maintain a stable irrigation agriculture. The Barani area is 1,157,000 ha, which is a vast area corresponding to about 10% of the farming area of Punjab province (12 million ha according to the agricultural statistics of 1995).

This project will implement the irrigation plan through groundwater development in order to increase the agricultural production, which is the objective of the Punjab government, by increasing the unit crop yield of agricultural production and agricultural income through cultivation of cash crops such as cotton, sugar cane or rice. The basic industry of Pakistan is agriculture. The improvement of agricultural productivity in Barani areas, which is included in this project, is clearly shown in the Eighth Five Year Plan (1993 to 1998). The government of Punjab has a long experience and history in establishing a subsidy system to reduce the burden on farmers in constructing irrigation tubewells and installing pumps. Thus the necessity and effect of the subsidy system have already been demonstrated. As similar projects for groundwater development in Punjab province, two implementation confirmation studies were conducted, one as a 2KR project for the DGA of the Agriculture Department in 1988/89 and another for WAPDA for 1992/93. It was confirmed that development equipment is being sufficiently utilized in both projects. This project is expected to contribute to the improvement of agricultural productivity, to the economic benefit of farmers, and to the improvement of hygienic environment related to drinking water. From the reasons shown below, this project is determined to be feasible implementation under the grant aid of Japan.

- a. The beneficial effects of this project extend to the farmers doing the agricultural works in the 1,157,000 ha Barani areas in Punjab, which is assumed to number 264,000 persons.
- b. The farmers in Barani areas want to have the stable operation and improve the agricultural

productivity through irrigated farming by promptly implementing groundwater development. If the tubewells are completed, they will contribute not only to the irrigation of farms but to the supply of the drinking water in the community as well, which will lead to improvement of the living hygienic environment.

- c. The groundwater development will be implemented by the Well Drilling Section of the DAE when the farmers apply for it. The DAE operates and maintains the equipment including the rotary drilling rigs and has enough human resources and technical level. The completed irrigation tubewells and motorized pumps are operated and maintained by the farmers. In addition, a training programme for the farmers is also available from the DAE. Thus the operation and maintenance of tubewell facilities for irrigation are being conducted sufficiently.
- d. Implementation of this project is clearly assigned in the Eighth Five Year Plan (1993 to 1998) and the subsidy system has been established by the government of Punjab from 1972. Thus the project is appropriated in the through-year budget and the development budget (Tameer - E - Punjab Programme), which corresponds to the objectives of the national development plan.
- e. As for the environmental effects due to the implementation of this project, it is determined that effects such as excess pumping of water, subsidence, or water contamination will not occur because the facilities are of small scale. However the DGA must provide instructions to farmers and conduct environmental monitoring in relation to continuous groundwater development.

Table 4-1 Effects and Degree of Improvement due to Project Implementation

Present Situation and Problems	Measures to be Taken in the Project	Effects and Degree of Improvement of Project
1. Tubewell drilling equipment of DAE are in shortage and deteriorated so that drilling works cannot be sufficiently carried out. Presently, farmers must wait several months to several years after making the request for drilling to DAE.	• The procurement of drilling equipment can reinforce the drilling activities of DAE.	• The DAE drilling works due to the newly procured rotary drilling rigs will be reinforced. The farmers' waiting time after requesting tubewell constructions can be reduced. Irrigated Barani land can be increased every year in the Punjab Province.
2. The Barani areas are located in semi-tropical arid climate which receive an estimated annual precipitation of 100 to 800mm.	• As the result of implementation of the project, groundwater development in the Barani can be carried out and irrigation water can	• The agriculture of the Barani will be improved by groundwater irrigation. Therefore, the agricultural productivity will become stable and

<p>Therefore, agricultural productivity in the Barani is unstable due to the harsh climate.</p>	<p>be supplied to the farmers all year round.</p>	<p>improved throughout the year. The present agricultural intensity of 50 to 90% will be increased to 120 to 150%.</p>
<p>3. Agricultural productivity for the project area is low and unstable due to low precipitation. Therefore, farmers' incomes in the Barani areas are lower than those of other Punjab farmers.</p>	<p>The agricultural pattern can be changed due to groundwater irrigation for this project. Cash crops of cotton, sugarcane and rice can be cultivated to increase the incomes of farmers</p>	<p>The poverty line of Pakistan was calculated at 2,550 cal/cap/day for the minimum calorie intake requirement and the income in 1990/91 was 280 Rs/cap/month. On the other hand, the average income for Pakistani farmers is 2,931 Rs/household/month. Presently (1996), the income for Barani farmers is 22,000 to 83,000 Rs/household/year. After the implementation of the project, the income is expected to increase by more than three times. Therefore, the farmers can save their own money to construct tubewells for irrigation. The completed tubewells can be maintained by the farmers since the operation and maintenance costs can be met through income from their agricultural products.</p>
<p>4. In the hilly plateau and saline problem areas, where drinking water is in shortage, women and children handle the work of fetching water. In these dry areas, the time consuming and long distance water transporting are a heavy burden on the women and children.</p>	<p>The newly installed tubewells will provide stable water for irrigation and drinking, and shorten the distance between houses and the water source.</p>	<p>After the completion of tubewells, stable and clean water can be supplied so that the living environments of the Barani areas will be improved.</p>

4.2 Recommendations

The project is expected to contribute to the stability of agricultural activities, improvement of productivities and upgrading of the living environment in such basics as drinking water. However, the following points must be considered for further effective performance of the groundwater development and efficient operation of the procured equipments, for maintaining a stable rural life.

- 1) The drilling department of DAE, under the DGA, is implementing groundwater development based upon the requests from farmers and the principle of farmers pays. Even for

hydrogeologically difficult areas, actual tubewell drillings are often carried out with hydrogeological and geophysical surveys being kept to a minimum. According to the records of DAE in the Barani areas, the average success rate of tubewell constructions from 1988 to 1996 was 81%. However, the project districts of Attock, Chakwal and Rawalpindi have low success rates of 60% to 70%. Therefore, careful surveys before tubewell constructions are needed to improve the success rates of the area. Throughout the implementation of this project, on-the-job site training for geoelectric survey including interpretation of survey data is recommended for reinforcement and standardization of technologies.

- 2) At the same time, training for drilling operation is also recommended for systematic operation and skills improvement of the DAE drillers. After the request of farmers, the DAE carries out the field surveys including hydrogeological and geophysical surveys and registers the requests. The DAE informs the farmers on the schedule for construction and requests them to prepare the tubewell construction materials such as well screen and casing. Training on this process for tubewell constructions is needed. In the training, a manual should be prepared to standardize this procedure as well as operation and maintenance of drilling technologies.
- 3) From the view point of social development, the beneficiaries of this project are the farmers in the Barani areas of Punjab province. However, since groundwater development and irrigation planning are being promoted through farmers' requests and cost sharing, the wealthier farmers might take advantage of their economic priority for cost sharing and receive all the benefits. Therefore, the executing agency should give consideration to the social aspects of the beneficiaries. For example, priorities should be given to the smaller, poorer farmers when they make requests on a group basis. In this respect, the implementation of the project needs to be carried out under the policies of the Eighth Five-Year Plan (1993-1998) to eradicate poverty and impartiality.

APPENDICES

APPENDIX -1 Member List of the Survey Team

Basin Design Survey		
Name	Position	Affiliation
Mr. Masayuki WATANABE	Team Leader	Development Specialist, Institute for International Cooperation Japan International Cooperation Agency (JICA)
Mr. Shokichi SAKATA	Project Coordinator	First Study Division Grant Aid Study & Design Development JICA
Mr. Shigeyoshi KAGAWA	Consultant Leader/ Hydrogeologist	Japan Techno Co., Ltd.
Mr. Kenichiro KONDO	Irrigation Water Utilization Planner	Japan Techno Co., Ltd.
Mr. Naoki TAIRA	Equipment Planner/ Maintenance and Operation Planner	Japan Techno Co., Ltd.
Mr. Akihiko UCHIYAMA	Social Study	Japan Techno Co., Ltd.

Explanation of Draft Basic Design		
Name	Position	Affiliation
Mr. Masayuki WATANABE	Team Leader	Development Specialist, Institute for International Cooperation Japan International Cooperation Agency (JICA)
Mr. Shigeyoshi KAGAWA	Consultant Leader/ Hydrogeologist	Japan Techno Co., Ltd.
Mr. Naoki TAIRA	Equipment Planner/ Maintenance and Operation Planner	Japan Techno Co., Ltd.

APPENDIX - 2 Survey Schedule

Basic Design Survey

No.	Date	Day	Activity
1	1 June	Sat	Depart Tokyo by JA717 to Islamabad
2	2 June	Sun.	Arrive Islamabad by PK797, Courtesy call to EOJ, JICA, and EAD, Submission and explanation of Inception Report to DGA
3	3 June	Mon.	Field survey, Rawalpindi, Attock
4	4 June	Tue.	Leave for Lahore by PK385, Courtesy call to AD and Explanation of Inception Report, Workshop survey
5	5 June	Wed.	Drive to Faisalabad, Meeting with DAE, Faisalabad and Workshop survey
6	6 June	Thu.	Meeting with Sargodah and Khushab office and Field survey, Khushab
7	7 June	Fri	Drive to Multan
8	8 June	Sat	Field survey, D. G. Khan and Taunsa
9	9 June	Sun.	Meeting with DEA, Multan, Agricultural Mechanization Research Institute and Office of Chief engineer Irrigation Multan Zone, Workshop survey
10	10 June	Mon.	Leave Multan for Lahore by PK386, Drafting of Minutes of Meeting
11	11 June	Tue.	Meeting with DAE and Discuss Minutes of Meeting
12	12 June	Wed.	Signing of Minutes of Meeting Leave for Islamabad by PK614 (Government team)
13	13 June	Thu.	Report to EOJ, JICA and leave for Tokyo (Government team) Data collection (Consultant team)
14	14 June	Fri	Data organization and analysis
15	15 June	Sat	Arrive Tokyo by JL792 (Government team) Drive to Islamabad and Field survey, Jhelum (Consultant team)
16	16 June	Sun.	Field survey, Rawalpindi and Data collection
17	17 June	Mon.	Field survey and workshop survey, Rawalpindi
18	18 June	Tue.	Field survey, Attock
19	19 June	Wed.	Field survey, Chakwal
20	20 June	Thu.	Field survey, Mianwali
21	21 June	Fri	Field survey, Bhakkar
22	22 June	Sat	Data organization, analysis and reporting
23	23 June	Sun.	Meeting with DAE, Multan
24	24 June	Mon	Workshop survey, Rajanpur
25	25 June	Tue.	Field survey, D.G. Khan, Meeting with WAPDA
26	26 June	Wed.	Data collection and Meeting with DEA, Faisalabad
27	27 June	Thu.	Data collection and Meeting with DEA, Faisalabad
28	28 June	Fri	Meeting within team
29	29 June	Sat	Drive to Lahore, Data organization and analysis
30	30 June	Sun.	Meeting with DGA and WAPDA
31	1 July	Mon.	Meeting with DGA
32	2 July	Tue.	Meeting with DGA and related organizations
33	3 July	Wed.	Meeting with DEA, Leave for Islamabad by PK614
34	4 July	Thu.	Report to JICA/EOJ
35	5 July	Fri	Leave Islamabad for Bangkok by PK792
36	6 July	Sat	Arrive Tokyo by JL734

Explanation of Draft Basic Design

No.	Date	Day	Activity
1	26 Aug.	Mon.	Depart Tokyo by PK735 to Islamabad
2	27 Aug.	Tue.	Courtesy call to EOJ, JICA, and EAD
3	28 Aug.	Wed.	Islamabad to Lahore by PK385 Courtesy call to Government of Punjab, DA and Meeting with DEA
4	29 Aug.	Thu.	Meeting with DGA
5	30 Aug.	Fri.	Signing of Minutes of Meeting Leave for Islamabad by PK615
6	31 Aug.	Sat.	Meeting within Team and Field Survey, Potwar Area
7	1 Sep.	Sun.	Field Survey, Barani and Pothwar Area Data Organization
8	2 Sep.	Mon.	Meeting with JICA Geoscience Research Center Report to JICA, EOJ and EAD
9	3 Sep.	Tue.	Field Survey, Barani and Pothwar Area Meeting with JICA Geoscience Research Center Leave for Lahore by PK615
10	4 Sep.	Wed.	Arrive Tokyo by TG640

- EOJ : Embassy of Japan
 JICA : Japan International Cooperation Agency
 DGA : Directorate General Agriculture (Field)
 EAD : Economic Affairs Division, Ministry of Finance and Economic Affairs
 AD : Agriculture Department
 DAE : Directorate of Agriculture Engineering
 WAPDA : Water and Power Development Authority

APPENDIX - 3 List of Party Concerned in the Recipient Country

Embassy of Japan

1. Mr. Kawakami Takao Ambassador Extraordinary and Plenipotentiary
2. Mr. Hiroshi Fukada Minister
3. Mr. Koji Yamada First Secretary
4. Mr. Mitsuyoshi Nakada First Secretary

JICA Pakistan Office

1. Mr. Akira Murata Resident Representative
2. Mr. Noriaki Nishimiya Deputy Resident Representative
3. Mr. Masatoshi Murao Assistant Resident Representative
4. Mr. Mahomood A. Jilani Chief Programme Officer

Economic Affairs Division, (EAD), Ministry of Finance and Economic Affairs

1. Mr. Shahid Humayun Deputy Secretary

Planning & Development Board, Government of Punjab

1. Mr. Tanvin Jafri Secretary
2. Mr. Riaz Ahumad Khan Member
3. Mr. Nawaz Khan Senior Chief (ECD)
4. Mr. Narim Riaz Assistant Chief (ECD)

Government of Punjab (Civil Secretariat, Lahore)

1. Mr. Shafqat Ezdi Shah Secretary

Punjab Agriculture Department

1. Mr. Mujataq Ahmad Deputy Secretary
2. Mr. Zaka Ullam Chief Engineer, Planning & Evaluation
3. Mr. Mushtaq A. Gill Director General Agriculture (Water Management)
4. Mr. Ghulam Rasool Divisional Engineer, Agricultural Engineer, Lahore
5. Mr. Abdoul Sattar Malik Soil Scientist, Soil Conservation Directorate
6. Mr. Aman Ullah Khan Niazi Director Soil Conservation, Agriculture Department
7. Mr. Javid Tusci Deputy Director
Planning Directorate, Irrigation Department

Directorate General Agriculture (Field)

- | | |
|-----------------------------|---------------------------------|
| 1. Mr. Muhammad Abid Falooq | Director General |
| 2. Mr. Abdul Hamid Chaudhry | Deputy Director |
| 3. Dr. M. Ghaffar Doggar | Assistant Agricultural Engineer |
| 4. Mr. M. Zafarullah | Assistant Agricultural Engineer |
| 5. Mr. Mobeen Ahsan | Assistant Agricultural Engineer |

Agricultural Marketing Training Institute Punjab

- | | |
|--------------------------------|-----------|
| 1. Mr. Muhammad Nawaz Chaudhry | Principal |
|--------------------------------|-----------|

Directorate of Agricultural Engineering Faisalabad

- | | |
|---------------------------------|---------------------------------------|
| 1. Mr. Muhammad Zaman Akhtar | Agricultural Engineer (Well Drilling) |
| 2. Mr. Maht Rab Nawaz | Agricultural Engineer (Buldozer) |
| 3. Dr. Muhammad Yasin | Agricultural Engineer (Research) |
| 4. Mr. Chaudhry Muhammad Ashraf | Technical Officer |
| 5. Mr. Khalid Mahmood | Assistant Director (Planning) |
| 6. Mr. Moeen-ud-Din | Assistant Agriculture Engineer |
| 7. Mr. Nazir Ahmed Sindhr | Supporting Workshop |
| 8. Mr. Shakir Javed | Assistant Engineer Training |

Directorate of Agricultural Engineering Multan

- | | |
|-----------------------------|---------------------------------------|
| 1. Mr. Ch. Abdoul Salam | Director |
| 2. Mr. Mohammad Ashraf Khan | Agricultural Engineer (Well Drilling) |

Well Drilling Rawalpindi

- | | |
|--------------------------------|---------------------------------|
| 1. Mr. Mubloob Hussain Chaudry | Assistant Agricultural Engineer |
|--------------------------------|---------------------------------|

Well Drilling Attok

- | | |
|-----------------------------|--------------------------------|
| 1. Mr. Muhammad Aslam Ch. | Assistant Agriculture Engineer |
| 2. Mr. Hafiz Muhammad Hayat | Supervisor |

Well Drilling Jhelum

- | | |
|---------------------------|--------------------------------|
| 1. Mr. Zafer Iqbal Sandhu | Assistant Agriculture Engineer |
|---------------------------|--------------------------------|

Well Drilling Chakwal

- | | |
|-----------------------------|--------------------------------|
| 1. Mr. Sheikh Zahid Hussain | Assistant Agriculture Engineer |
|-----------------------------|--------------------------------|

Well Drilling Mianwali

1. Mr. Rana Atta Mohammad Assistant Agriculture Engineer

Well Drilling Bakhar

1. Mr. M. Afzal Khan Assistant Agriculture Engineer

Well Drilling Khushab

1. Mr. Chulam Yasin Assistant Agricultural Engineer

Well Drilling D. G. Khan

1. Mr. Nadeem Iqbal Assistant Agricultural Engineer

Well Drilling Rajanpur

1. Mr. Irshad Ahmad Assistant Agricultural Engineer

Well Drilling Sargodha

1. Mr. Muhammad Zobair Aziz Assistant Agricultural Engineer

Bureau of Statistics

1. Mr. Z. A. Baqai Director
2. Mr. Zafer Ali Ichan Deputy Director

Agriculture Census Organisation, Government of Pakistan

1. Mr. Rana Muhammad Akram Joint Agri. Census Commissioner, Statistics Division
2. Mr. Abdul Ghaffar Livestock Specialist, Statistics Division

University of Arid Agriculture

1. Dr. Muhammad Azam Khan Vice Chancellor
2. Dr. Mushtaq Ahmed Chaudhry Barani Agricultural College, Assistant Professor,
Soil and Water Conservation

Pakistan Water and Power Development Authority (WAPDA),

1. Mr. Haji Muhammad Chaudry General Manager Planning (Water)

Directorate General of Hydrogeology, WAPDA

1. Mr. Kazi Mujib Ashraf Director General
2. Mr. Salah-Ud-Din Sabri Project Director
3. Mr. Afzal Hussain Shah Executive Engineer, Drilling Section
4. Mr. A.J. Abrar Senior Technical Officer

APPENDIX-4 MINUTES OF DISCUSSIONS

4-1 MINUTES OF DISCUSSIONS ON BASIC DESIGN SURVEY

(June 12, 1996)

Attachment

ANNEX-1 Project Location Map

ANNEX-2 Items Requested by the Pakistan Side

ANNEX-3 Japan's Grant Aid System

**ANNEX-4 Necessary Measures to be taken by Government of Pakistan
in Case Japan's Grant Aid is Extended**

**MINUTES OF DISCUSSIONS
ON
BASIC DESIGN STUDY
ON
THE PROJECT FOR EXPLOITATION OF GROUNDWATER
AT
PROVINCE OF PUNJAB
THE ISLAMIC REPUBLIC OF PAKISTAN**

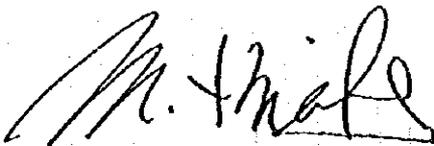
In response to the request from Government of Pakistan, the Government of Japan decided to conduct a Basic Design Study on the Project for Exploitation of Groundwater at Province of Punjab in the Islamic Republic of Pakistan (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Islamic Republic of Pakistan a study team, which is headed by Mr. Masayuki WATANABE, Development Specialist, Institute for International Cooperation, JICA, and is scheduled to stay in the country from June 2 to July 5, 1996.

The team held discussions with the officials concerned of Pakistan and conducted a field survey at the study area.

In the course of the discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study report.

Lahore, June 12, 1996



Mr. Masayuki WATANABE
Leader, Basic Design Study Team
JICA



Mr. Muhammad Abid Farooq
Director General
Directorate General Agriculture (Field)
Government of Punjab, Pakistan

Mr. Shahid Humayun
Deputy Secretary
Economic Affairs Division
Ministry of Finance and Economic Affairs
Islamic Republic of Pakistan

ATTACHMENT

1. Objective

The objective of the Project is to procure the equipment for groundwater development to improve irrigation water supply conditions and increasing agricultural production.

2. Project Area

The project areas are located at the place of administrative nine (9) districts in Punjab Province (namely as Attock, Rawalpindi, Jhelum, Chakwal, Khushab, Mianwali, Bhakkar, Rajanpur and D.G.Khan). (see ANNEX-I)

3. Responsible and Executing Organization

(1) Responsible Organization for the Project is Agriculture Department (AD), Government of Punjab.

(2) Executing Organization of the Project is the Directorate General Agriculture (Field).

4. Items requested by Government of Pakistan

After discussions with the Basic Design Study Team, the items described in ANNEX-II were finally requested by Government of Pakistan.

However, the final components of the Project will be decided after further studies.

5. Japan's Grant Aid System

(1) Government of Pakistan has understood the system of Japan's Grant Aid on ANNEX-III as explained by the team.

(2) Government of Pakistan will take the necessary measures described in ANNEX-IV for the smooth implementation of the Project, on condition that the Grant Aid Assistance by the Japanese Government is extended to the Project.

6. Schedule of the Study

(1) The consultants will proceed to further studies in Pakistan until July 5, 1996.

(2) Based on the Minutes of Discussions and technical examination of the study results, JICA will prepare the draft final report and dispatch a mission in order to explain its contents in the end of August, 1996.

(3) In case that the contents of the report are acceptable in principal by Government of Pakistan, JICA will complete the final report and send it to Government of Pakistan by the end of November, 1996.

7. Other Relevant Issues

(1) The following priority for equipment was confirmed by both sides.

1) Tubewell Drilling Equipment with Drilling Accessories: Priority A

2) Geophysical and Testing Equipment:

a) Resitivity Meter: Priority B

b) Water Quality Testing Unit: Priority C

3) Other Equipment

a) Computer: Priority B

b) Compressor: Priority B

c) Pick-up Truck: Priority B

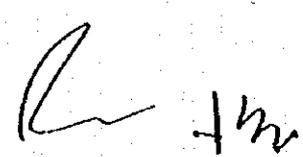
(2) The quantity of each equipment will be decided by further studies.

(3) The followings were requested by Pakistani side.

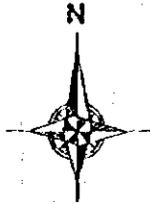
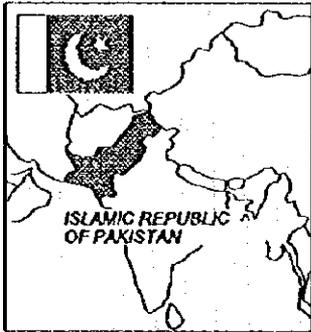
1) Spare parts for drilling rigs so far procured under Japanese Grant Aid.

2) Training for drilling rig operation and tubewell construction.

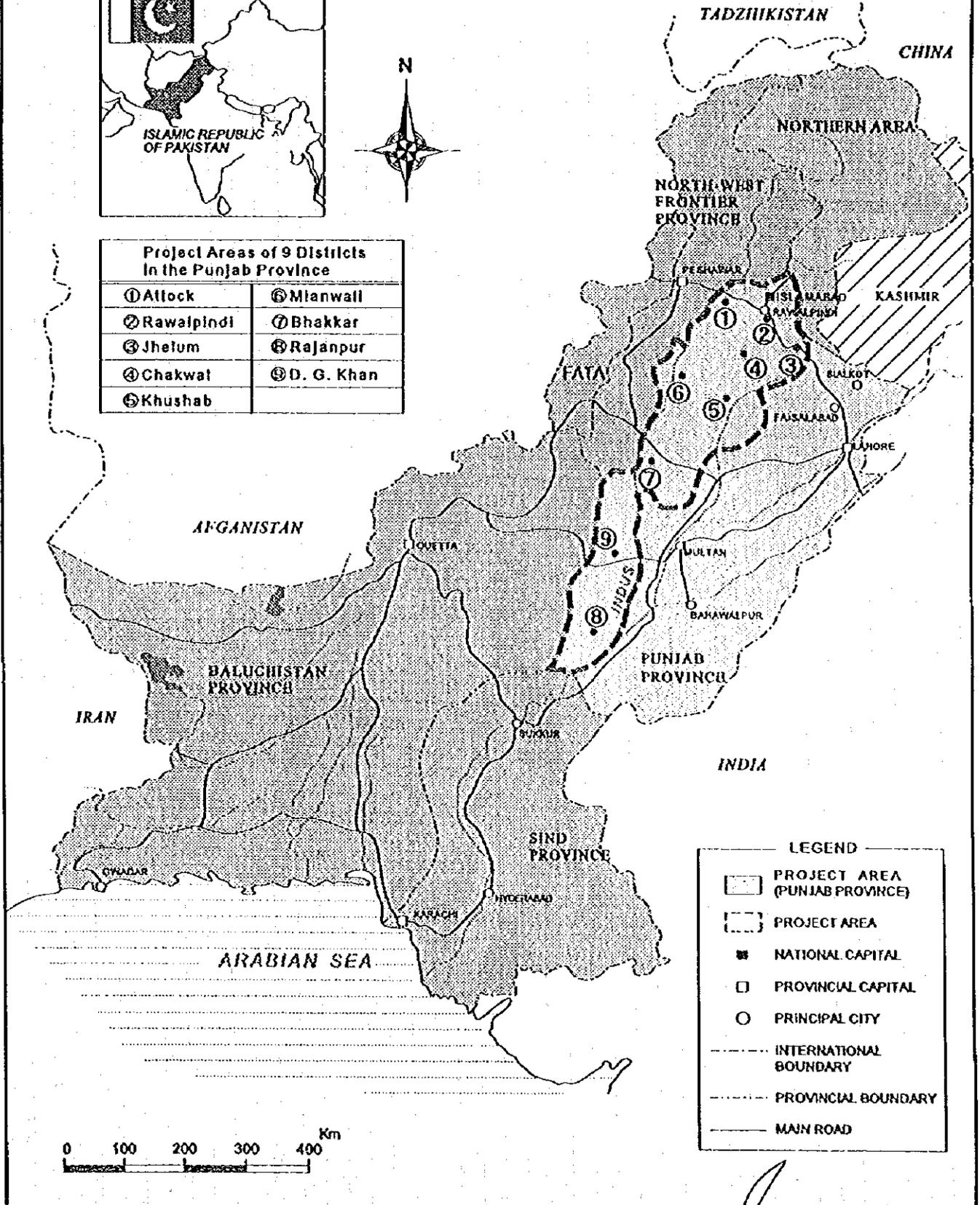
3) Internal transportation.



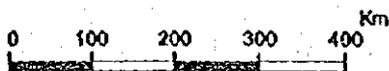
**ANNEX - 1 BASIC DESIGN STUDY ON THE PROJECT FOR
EXPLOITATION OF GROUNDWATER AT PROVINCE OF PUNJAB
IN THE ISLAMIC REPUBLIC OF PAKISTAN**



Project Areas of 9 Districts in the Punjab Province	
① Attock	⑥ Mianwali
② Rawalpindi	⑦ Bhakkar
③ Jhelum	⑧ Rajanpur
④ Chakwal	⑨ D. G. Khan
⑤ Khushab	



LEGEND	
	PROJECT AREA (PUNJAB PROVINCE)
	PROJECT AREA
	NATIONAL CAPITAL
	PROVINCIAL CAPITAL
	PRINCIPAL CITY
	INTERNATIONAL BOUNDARY
	PROVINCIAL BOUNDARY
	MAIN ROAD



[Handwritten signature]

ANNEX-II

Items requested by the Pakistani side

Item	Specification	Quantity *	Priority
Tubewell Drilling Equipment			
1. Straight Rotary Rig, Top Head drive type mounted on rugged heavy 4 x 4 truck	Capacity 200m for 18" dia hole	-	A
Drilling Accessories			
1. Drill Pipe	.	.	A
2. Bit/ Tricone rock bit	.	.	
3. Tubing spider	.	.	
4. Sub of tricone bit	.	.	
5. Rotary tong (complete)	.	.	
6. Centre latch elevator	.	.	
7. Bit breaker	.	.	
8. Engineering tool kit	.	.	
9. Other accessories	.	.	
Geophysical and Testing Equipment			
1. Resistivity Meter	-	-	B
2. Water Quality Testing Unit	-	-	C
Other Equipment			
1. Computer	-	-	B
2. Compressor	-	-	B
3. Pick-up Truck	-	-	B
Spare Parts	Above Equipment	-	-

Remarks:

*: Final quantity shall be decided based on the further studies.

A: First priority.

B: Second priority.

C: Third priority.

ANNEX - III

Japan's Grant Aid System

1. Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

Application:	(Request made by a recipient country)
Study:	(Basic Design Study conducted by JICA)
Appraisal & Approval:	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of	(The Notes exchanged between the Governments of Japan and
Implementation:	the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraise the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the result are then submitted to the Cabinet for approval.

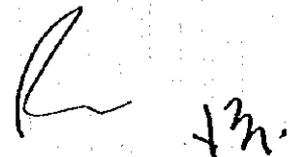
Fourthly, the Project, once approved by the Cabinet, with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the Project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study, conducted by JICA on a requested project is to provide basic document necessary for the appraisal of the project by the Japanese Government. The contents of the Study are as follows:



- a) Confirmation of items agreed on by both parties concerning the basic concept of the project.
- b) Evaluation of the appropriateness of the project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the project.
- d) Preparation of a basic design of the Project.
- e) Estimation of the costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations in the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the study, JICA uses (a) registered consultant firm(s). JICA selects (a) firms(s) based on proposals submitted by interested firms. The firm(s) selected carry (ies) out the Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the study is (are) recommended by JICA to the recipient country to also work on the project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

1) What is Grant Aid ?

The Grant Aid Program provides a recipient country with non-reimbursable funds needed to procure the facilities, equipment, services (engineering services and transportation of the products, etc.) for economic and social development the country under the principals in

accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes Exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant, etc., are confirmed.

3) "The period of the Grant" means the one fiscal year in which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factor such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Government.

4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When both Governments deem it necessary, the Grant may be used for the purchase of the products or services of the third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality)

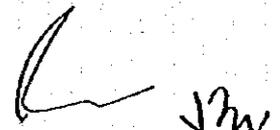
5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of recipient country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the follows:

- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land



prior to commencement of the construction.

- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of products purchased under the Grant.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their works.

7) "Proper Use"

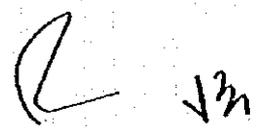
The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from recipient country.

9) Banking Arrangements (B/A)

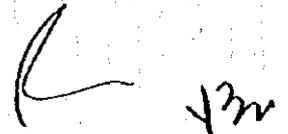
- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan(hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

Handwritten signature and initials in the bottom right corner of the page.

ANNEX-IV

NECESSARY MEASURES TO BE TAKEN BY GOVERNMENT OF PAKISTAN IN CASE JAPAN'S GRANT AID IS EXTENDED.

1. To provide data and information necessary for the Project.
2. To provide the land for access road, a temporary site office, warehouse and stock yard during implementation of the Project.
3. To provide necessary facilities for the Project such as warehouse for spare parts, drilling accessories and other incidental facilities.
4. To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
 - (1) Advising commission of Authorization to Pay
 - (2) Payment Commission
5. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.
6. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Pakistan with respect to the supply of the products and services under the verified contracts.
7. To accord Japanese nationals whose services may be required in connection with supply of the products and services under the verified contracts, such facilities as may be necessary for their entry into Pakistan and stay therein for the performance of their work.
8. To assign properly the necessary staff for operation and maintenance of the drilling rigs and relevant equipment.
9. To maintain and use properly and effectively the equipment procured under the Grant Aid.

Handwritten signature and initials, possibly 'J3m', located in the bottom right corner of the page.

10. To bear all the expenses other than those to be borne by the Grant Aid necessary for the transportation of the equipment.

11. To ensure the necessary budget and personal for the proper and effective implementation of the Project, including operation and maintenance of the equipment procured under the Grant.



Handwritten signature or initials, possibly 'Yhu', located in the bottom right corner of the page.

**4-2 MINUTES OF DISCUSSIONS ON BASIC DESIGN STUDY,
CONSULTATION ON DRAFT REPORT (August 30, 1996)**

Attachment

ANNEX-1 Japan's Grant Aid System

**ANNEX-2 Necessary Measures to be taken by Government of Pakistan
in Case Japan's Grant Aid is Extended**

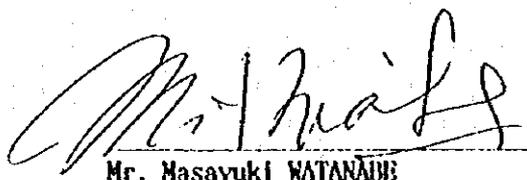
MINUTES OF DISCUSSIONS
ON
BASIC DESIGN STUDY
ON
THE PROJECT FOR EXPLOITATION OF GROUNDWATER
AT
PROVINCE OF PUNJAB
ISLAMIC REPUBLIC OF PAKISTAN
(CONSULTATION ON DRAFT REPORT)

In June 1996, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Exploitation of Groundwater at Province of Punjab (hereinafter referred to as "the Project") to the Islamic Republic of Pakistan, and through discussions, field survey and technical examination in Japan, has prepared the draft report of the study.

In order to explain and to consult the Pakistani side on the contents of the draft report, JICA sent to the Islamic Republic of Pakistan a Basic Design Study Explanation Team, (hereinafter referred to as "the Team") which is headed by Mr. Masayuki WATANABE, Development Specialist, Institute for International Cooperation, JICA, with a schedule to stay in the country from August 26 to September 3, 1996.

As a result of the discussions, both parties confirmed the main items described on the attached sheets.

Lahore, August 30, 1996



Mr. Masayuki WATANABE
Leader, Basic Design Study Team
JICA



Mr. Muhammad Abid Parooq
Director General
Directorate General Agriculture (Field)
Government of Punjab, Pakistan

Mr. Shahid Husayn
Deputy Secretary
Economic Affairs Division
Ministry of Finance and Economic Affairs
Islamic Republic of Pakistan



ATTACHMENT

1. Contents of the Draft Report

The Government of the Islamic Republic of Pakistan has agreed and accepted in principle the draft report proposed by the Team.

2. Japan's Grant Aid System

(1) The Government of the Islamic Republic of Pakistan has understood the System of Japan's Grant Aid explained by the Team, as described in ANNEX I.

(2) The Government of the Islamic Republic of Pakistan will take the necessary measures described in Annex II, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further Schedule

The Team will make the final report in accordance with the confirmed items, and send it to the Government of the Islamic Republic of Pakistan by the end of November, 1996.

4. Other Relevant Issues

The following was confirmed :

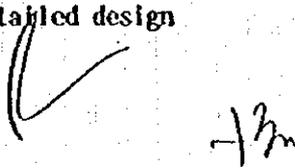
1) Pakistani side will allocate the necessary budget and staff for the operation and maintenance of the equipment procured by the Project.

2) Pakistani side will prepare the garages for the vehicles and warehouse for the spare parts procured by the Project before these equipment will arrive to the Islamic Republic of Pakistan.

3) Pakistani side will make every effort to carry out the custom clearance and inland transportation of the equipment efficiently and smoothly. The cost of the inland transportation will be covered under the Grant for this project due to the limited implementation schedule for technology transfer, but tax exemption is the responsibility of the Pakistani Government.

4) Pakistani side proposed that two(2) power boosters be attached to existing resistivity meters so as to improve their capacity and to raise success ratio of drilling works.

5) The basic design study concepts can not be changed under the detailed design study.



ANNEX I

Japan's Grant Aid System

1. Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

- Application: (Request made by a recipient country)
Study: (Basic Design Study conducted by JICA)
Appraisal & Approval: (Appraisal by the Government of Japan and Approval by the Cabinet)
Determination of Implementation: (The Notes exchanged between the Government of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request. Secondly, JICA conducts the Study (Basic Design Study), using a Japanese consulting firm(s).

Thirdly, the Government of Japan appraise the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the result are then submitted to the Cabinet for approval.

Fourthly, the Project, once approved by the Cabinet, with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the Project, JICA assists the recipient country in such matters as preparing tender, contracts and so on.

2. Basic design Study

1) Contents of the Study

The aim of the Basic Design Study, conducted by JICA on a requested project is to provide basic document necessary for the appraisal of the project by the Japanese Government. The contents of the Study are as follows:

- a) Confirmation of items agreed on by both parties concerning the basic concept of the project.

- b) Evaluation of the appropriateness of the project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the project.
- d) Preparation of a basic design of the Project,
- e) Estimation of the costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations in the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out the Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to the recipient country to also work on the project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds needed to procure facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under the principals in accordance with relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Exchange of Notes by two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant etc., are confirmed.

3) "The period of the Grant Aid" means the one fiscal year in which the Cabinet approves the project for. Within the fiscal year (from April 1 to March 31), all procedure such as exchange of Notes, concluding a contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factor such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When both Governments deem it necessary, the Grant may be used for the purchase of the products or services of the third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of the "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required by the Government of the recipient country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the follows:

(1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.

- (2) To provide facilities for the distribution of electricity, water, supply and drainage and other incidental facilities in and around the sites.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of products purchased under the Grant.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

7) "Proper Use"

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from recipient country.

9) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

ANNEX II

Necessary measures to be taken by the Government of the Islamic Republic of Pakistan on condition that Japan's Grant Aid is executed;

- 1. To provide necessary data and information for the Project.**
- 2. To secure facilities such as garage for vehicles and warehouse for spare parts, procured by the Project.**
- 3. To bear advising commission of Authorization to Pay (A/P) and payment commission to a Japanese foreign exchange bank for the banking services based on the Banking Arrangement (B/A).**
- 4. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port /airport of disembarkation.**
- 5. To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the verified contracts, such facilities as may be necessary for their entry into Islamic Republic of Pakistan and stay therein for the execution of the Project.**
- 6. To provide necessary permission, licenses and other authorization for carrying out the Project.**
- 7. To provide necessary actions to expedite the approval for execution for the Project by the authorities concerned in Islamic Republic of Pakistan.**
- 8. To maintain and use properly and effectively equipment purchased under the Grant. To bear all the expenses other than those covered by the Grant, necessary for execution of the Project.**



Jmr

APPENDIX - 5 Cost to be Borne by the Recipient Country

The cost to be borne by the Pakistan side will be the cost required to prepare the annual operation and maintenance. The cost estimate of annual operation and maintenance for 9 rotary drilling rigs is estimated at Rs. 11.32 million. The breakdown is as follows.

Description	Amount (Rs)
1. Annual Operation Cost	
1) Fuel and Oil Consumption	5,742,000
2) Labor Cost for Equipment Operation	4,048,000
2. Cost of Repair and Spare Parts	1,530,000
Total	11,320,000

APPENDIX - 6 Hydrogeological Evaluation of Tubewells

× Unsuccessful Well * Test Well

No.	District	Rig No.	Name of Site	Tubewell No.	Construction Year	Well Dia. (mm)	Well Depth (m)	Pumping Rate (m ³ /hr)	Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (%)	EC (µs/cm)	pH	Cl- (ppm)
1	Attock	JR-5	Shakar Dara	1	1989/90	240	123.35	×	55.00	-	-	-	-	Clay-Bairi	-	-	-	-	-
2			Burhan	2	1989/90	240	58.00	×	29.00	-	-	-	-	Clay-Bairi	58.00	Fit for irrigation	-	-	-
3			Burhan	3	1989/90	184	55.00	-	39.00	48.00	9.00	-	10	Clay-Bairi	55.00	Fit for irrigation	-	-	-
4			Hassan Abda	1	1990/91	240	67.00	-	20.00	36.00	16.00	*	-	Clay-Bairi	67.00	-	-	-	-
5			Hassan Abda	2	1990/91	240	67.00	-	20.00	36.00	16.00	-	18	Clay-Bairi	67.00	Fit for irrigation	-	-	-
6			Mirza	3	1990/91	240	89.00	-	18.00	-	-	*	-	Clay-Bairi	89.00	-	-	-	-
7			Mirza	4	1990/91	184	89.00	-	18.00	58.00	40.00	-	19	Clay-Bairi	89.00	Fit for irrigation	-	-	-
8			Katch Jang	1	1991/92	240	123.00	×	4.00	-	-	-	-	Clay	123.00	-	-	-	-
9			Katch Jang	2	1991/92	240	67.00	-	18.00	45.00	27.00	-	12	Clay	67.00	Fit for irrigation	-	-	-
10			Niko	3	1991/92	240	78.00	-	4	-	-	-	-	Clay	78.00	Fit for irrigation	-	-	-
11			Niko	4	1991/92	240	73.00	×	5.00	-	-	-	-	Clay	73.00	-	-	-	-
12			Kalo-Pind	5	1991/92	240	98.00	×	5.00	-	-	-	-	Clay	98.00	-	-	-	-
13			Narian	6	1991/92	240	120.00	×	18.00	-	-	-	-	Clay	120.00	-	-	-	-
14			Sanjwal	7	1991/92	240	80.00	-	23.00	-	-	*	-	Clay	80.00	-	-	-	-
15			Sanjwal	8	1991/92	109	80.00	-	23.00	49.00	26.00	-	19	Clay	80.00	Fit for irrigation	-	-	-
16			Dhak Jougian	9	1991/92	240	92.00	-	58.00	70.00	12.00	-	33	Clay	92.00	Fit for irrigation	-	-	-
17			Jand	1	1992/93	240	89.00	×	24.00	-	-	-	-	Clay	89.00	-	-	-	-
18			Salar	2	1992/93	240	49.00	×	18.00	-	-	-	-	Clay	49.00	-	-	-	-
19			Mukhand	3	1992/93	240	30.00	×	9.00	-	-	-	-	Clay	30.00	-	-	-	-
20			Mukhand	4	1992/93	240	48.00	×	30.00	-	-	-	-	H. S. Clay	48.00	-	-	-	-
21			Faqir Abad	5	1992/93	240	120.00	-	49.00	-	-	*	-	Clay-S	120.00	Fit for irrigation	-	-	-
22			Faqir Abad	6	1992/93	109	120.00	-	49.00	139.00	90.00	-	34	Clay-S	120.00	Fit for irrigation	-	-	-
23			Faqir Abad	7	1992/93	240	110.00	×	20.00	-	-	-	-	Clay	110.00	-	-	-	-
24			Faqir Abad	8	1992/93	240	76.00	×	18.00	-	-	-	-	H. Sand	76.00	-	-	-	-
25			Labar Joug	1	1993/94	240	116.00	-	30.00	70.00	40.00	-	10	Clay-S	116.00	Fit for irrigation	-	-	-
26			Khujia Nagar	2	1993/94	240	102.00	-	17.00	-	-	*	-	Clay	102.00	Fit for irrigation	-	-	-
27			Khujia Nagar	3	1993/94	109	102.00	-	17.00	-	37.00	-	24	Clay	102.00	Fit for irrigation	-	-	-
28			Tagi Khailo	4	1993/94	240	116.00	×	13.00	-	-	-	-	Clay	116.00	-	-	-	-
29			Dandi	5	1993/94	240	98.00	×	2.00	-	-	-	-	Clay	98.00	-	-	-	-
30			Dandi	6	1993/94	240	30.00	-	2.00	14.00	12.00	-	7	Clay	30.00	Fit for irrigation	-	-	-
31			Dhok Surfa	7	1993/94	240	92.00	-	8.00	-	-	*	-	Clay	92.00	Fit for irrigation	-	-	-
32			Dhok Surfa	8	1993/94	109	67.00	-	8.00	46.00	38.00	-	12	Clay	67.00	Fit for irrigation	-	-	-
33			Dhok Surfa	9	1993/94	240	32.00	×	8.00	-	-	-	-	Clay	32.00	-	-	-	-
34			Dhok Surfa	10	1993/94	240	72.00	-	8.00	-	-	*	-	Clay	72.00	Fit for irrigation	-	-	-
35			Dhok Surfa	11	1993/94	184	76.00	-	8.00	49.00	41.00	-	12	Clay	76.00	Fit for irrigation	-	-	-
36			Lasa	12	1993/94	240	92.00	×	36.00	-	-	-	-	Clay	92.00	-	-	-	-
37			Lasa	13	1993/94	240	113.00	×	36.00	-	-	-	-	Clay	113.00	-	-	-	-
38			Lasa	14	1993/94	240	61.00	×	15.00	-	-	-	-	Clay	61.00	-	-	-	-
39			Lubi Guard	1	1994/95	240	96.00	-	20.00	-	-	*	-	Clay	96.00	Fit for irrigation	-	-	-
40			Lubi Guard	2	1994/95	184	80.00	-	20.00	52.00	32.00	-	9	Clay	80.00	Fit for irrigation	-	-	-
41			Lab	3	1994/95	240	76.00	-	17.00	-	-	*	-	Clay	76.00	Fit for irrigation	-	-	-
42			Lab	4	1994/95	109	78.00	-	15.00	38.00	24.00	-	19	Clay	78.00	Fit for irrigation	-	-	-
43			Malik Mala	5	1994/95	240	92.00	×	18.00	-	-	-	-	Clay	92.00	-	-	-	-
44			Malik Mala	6	1994/95	240	123.00	×	24.00	-	-	-	-	Clay	123.00	-	-	-	-
45			Issa Lam Pura	7	1994/95	240	86.00	-	15.00	39.00	24.00	-	24	Clay-S	86.00	Fit for irrigation	-	-	-
46			Salik Abad	8	1994/95	240	55.00	-	43	-	-	-	21	Clay	55.00	Fit for irrigation	-	-	-
47			Bahatar	9	1994/95	240	106.00	-	17.00	-	-	*	-	Clay-S	106.00	Fit for irrigation	-	-	-
48			Bahatar	10	1994/95	109	70.00	-	17.00	43.00	25.00	-	21	Clay	70.00	Fit for irrigation	-	-	-
49			Jhang	11	1994/95	240	110.00	-	43.00	-	-	*	-	Clay-S	110.00	Fit for irrigation	-	-	-
50			Jhang	12	1994/95	184	95.00	-	43.00	67.00	18.00	-	24	Clay	95.00	Fit for irrigation	-	-	-

No.	District	Reg No.	Name of Site	Tubewell No.	Construction Year	Well Dia. (mm)	Well Depth (m)	Pumping Rate (m ³ /hr)	Pumping Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (%)	EC (µs/cm)	pH	Cl- (ppm)
51			Bahlot	1	1995/96	240	89.00	-	27.00	59.00	32.00	-	24	Clay-K.S.	89.00	Fit for irrigation.	-	-	-
52			Nika	2	1995/96	240	130.00	-	7.00	-	-	*	58	Clay	130.00	Fit for irrigation.	-	-	-
53			Nika	3	1995/96	293	130.00	-	7.00	81.00	74.00	-	-	Clay	130.00	Fit for irrigation.	-	-	-
54			Chakra	4	1995/96	295	124.00	X	30.00	-	-	-	-	Clay	124.00	-	-	-	-
55			Chakra	5	1995/96	265	123.00	-	35.00	-	-	-	-	Clay	123.00	Fit for irrigation.	-	-	-
56	Rawalpindi	JR-10 Usman Khuter		1	1989/90	544.16	82.29	50.94	25.90	67.05	41.15	1.24	10.06	-	82.29	18.90	370	7.20	7.50
57			Jhanabad	4	1989/90	244.28	48.77	-	-	-	-	-	-	-	-	-	-	-	-
58			Lab Thatha [Islamabad]	25	1989/90	91.44	50.94	50.94	17.07	52.42	35.35	1.44	18.29	-	91.44	-	321	7.60	7.78
59			Lab Thatha	26	1989/90	244.28	13.10	-	-	-	-	-	-	-	-	-	-	-	-
60			Lab Thatha	27	1989/90	244.28	74.67	-	-	-	-	-	-	-	-	-	-	-	-
61			Lab Thatha	36	1989/90	244.28	91.44	-	-	-	-	-	-	-	-	-	-	-	-
62			Lab Thatha	37	1989/90	374.36	73.15	25.47	12.80	41.75	28.95	0.88	30.48	Bairi	73.15	19.00	340	7.23	7.94
63			Sehala	8	1990/91	244.28	152.40	-	-	-	-	-	-	-	-	-	-	-	-
64			Rawalpindi	9	1990/91	244.28	106.68	-	-	-	44.90	-	18.29	S.Stone	94.70	18.60	375	7.30	7.32
65			Dhoke Gufran	16	1990/91	244.28	50.90	-	-	-	36.57	-	14.81	Bairi	105.15	18.70	390	7.44	7.96
66			Dhoke Gufran	17	1990/91	244.28	109.72	X	-	-	-	-	-	-	-	-	-	-	-
67			Dhoke Lakhia	28	1990/91	244.28	117.85	X	-	-	-	-	-	-	-	-	-	-	-
68			Dhoke Lakhia	29	1990/91	544.16	94.79	50.94	26.95	73.15	46.20	1.10	-	-	-	-	-	-	-
69			Rawalpindi	38	1990/91	544.16	05.15	50.94	20.11	56.40	36.29	1.40	-	-	-	-	-	-	-
70			Mahoota	2	1991/92	244.28	149.35	X	-	-	-	-	-	-	-	-	-	-	-
71			Chak Amral	3	1991/92	244.28	103.63	X	-	-	-	-	-	-	-	-	-	-	-
72			Budhal	-	1991/92	244.48	84.42	X	-	-	-	-	-	-	-	-	-	-	-
73			Chak Amral	-	1991/92	374.36	97.53	25.47	21.33	60.96	36.93	0.64	19.5	S.Stone	97.53	18.90	368	7.40	7.79
74			Chak Khass	-	1991/92	244.48	75.28	X	-	-	-	-	-	-	-	-	-	-	-
75			Chak Khass	1	1991/92	244.48	28.95	-	-	-	-	-	-	-	-	-	-	-	-
76			Chak Khass	-	1991/92	374.36	31.08	25.47	1.82	10.97	9.15	2.78	21.33	S.Stone	1.82	19.00	378	7.60	8.00
77			Chak Khass	-	1991/92	244.48	121.92	X	-	-	-	-	-	-	-	-	-	-	-
78			Chak Khass	-	1991/92	244.48	26.21	X	-	-	-	-	-	-	-	-	-	-	-
79			Chak Khass	18	1992/93	274.36	249.93	X	-	-	-	-	-	-	-	-	-	-	-
80			Chak Khass	23	1992/93	244.48	44.19	X	-	-	-	-	-	-	-	-	-	-	-
81			Chak Khass	24	1992/93	244.48	52.42	-	-	-	-	-	-	-	-	-	-	-	-
82			Chak Khass	35	1992/93	374.36	48.76	-	7.62	30.48	22.86	-	16.76	S.Stone	47.24	18.69	315	7.24	7.73
83			Chak Khass	2	1993/94	244.48	182.88	X	-	-	-	-	-	-	-	-	-	-	-
84			Chak Khass	10	1993/94	244.48	43.59	X	-	-	-	-	-	-	-	-	-	-	-
85			H/I Islamabad	14	1993/94	244.48	81.33	-	-	-	-	-	-	-	-	-	-	-	-
86			H/I Islamabad	18	1993/94	544.16	70.10	50.94	9.14	36.57	27.43	1.85	19.81	Bolder	65.83	18.20	399	7.46	7.72
87			Dhoke Nathia	23	1993/94	244.48	115.82	-	-	-	-	-	-	-	-	-	-	-	-
88			Dhoke Nathia	30	1993/94	374.36	109.72	25.47	12.19	41.14	28.95	0.88	20.72	S.Stone	106.07	19.00	370	7.50	7.68
89			Fazabad Rawalpindi	31	1993/94	244.48	67.97	-	-	-	-	-	-	-	-	-	-	-	-
90			Fazabad Rawalpindi	42	1993/94	379.36	61.26	25.47	13.41	42.67	29.26	0.87	21.33	Bolder	59.13	18.70	398	7.40	7.70
91			Fazabad Rawalpindi	55	1993/94	244.48	67.05	-	-	-	-	-	-	-	-	-	-	-	-
92			Fazabad	1	1994/95	374.36	65.53	50.94	13.71	42.68	28.97	1.76	21.94	Bolder	65.53	18.00	318	7.20	7.40
93			Sehala	6	1994/95	244.28	48.76	X	-	-	-	-	-	-	-	-	-	-	-
94			Sehala	10	1994/95	244.28	115.82	X	-	-	-	-	-	-	-	-	-	-	-
95			Sehala	11	1994/95	244.28	42.67	X	-	-	-	-	-	-	-	-	-	-	-
96			Sehala	15	1994/95	444.16	80.43	X	-	-	-	-	-	-	-	-	-	-	-
97			H/S Islamabad	23	1994/95	244.28	117.34	-	-	-	-	-	-	-	-	-	-	-	-
98			H/S Islamabad	27	1994/95	544.16	117.34	25.47	13.71	42.67	28.96	0.88	27.43	Bolder	114.50	8.00	370	7.35	7.80
99			Mera Beshwal	33	1994/95	744.26	121.92	X	-	-	-	-	-	-	-	-	-	-	-
100			Mera Beshwal	40	1994/95	764.25	76.20	X	-	-	-	-	-	-	-	-	-	-	-

No.	District	Rig No.	Name of Site	Tubewell No.	Construction Year	Well Dia. (cm)	Well Depth (m)	Pumping Rate (m ³ /hr)	Static Water Level (a)	Pumping Water Level (a)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (%)	EC (µs/cm)	pH	CL- (ppm)
101			Chak Shahzad	45	1994/95	744.28	91.44	-	-	-	-	*	-	-	-	-	-	-	-
102			Chak Shahzad	46	1994/95	544.16	91.44	50.94	3.65	26.60	21.95	2.32	23.16	S. Stone	87.78	18.00	385	7.42	7.63
103			Chak Shahzad	51	1994/95	244.28	88.69	-	-	-	-	-	-	-	-	-	-	-	-
104			Chak Shahzad	57	1994/95	544.16	60.96	-	-	25.80	22.86	-	-	Boulder	54.55	18.00	315	7.41	7.78
105			Sehala	61	1994/95	244.28	70.10	-	-	-	-	-	-	-	-	-	-	-	-
106			Sehala	2	1995/96	544.16	35.05	25.47	7.00	29.26	22.26	1.14	13.41	Boulder	33.22	18.99	325	7.47	7.96
107			Faizabad	8	1995/96	244.28	86.25	-	-	-	-	-	-	-	-	-	-	-	-
108			Faizabad	9	1995/96	374.26	73.15	50.94	21.33	57.19	35.86	1.42	12.19	Boulder	71.33	18.70	370	7.94	7.94
109			Faizabad	15	1995/96	244.28	85.95	-	-	-	-	-	-	-	-	-	-	-	-
110			Karlot	21	1995/96	244.28	22.86	X	-	-	-	-	-	-	-	-	-	-	-
111			Mera Begwal	28	1995/96	244.28	35.05	X	-	-	-	-	-	-	-	-	-	-	-
112			Sehala	35	1995/96	244.28	50.29	X	-	-	-	-	-	-	-	-	-	-	-
113			Sehala	41	1995/96	244.28	24.38	X	-	-	-	-	-	-	-	-	-	-	-
114			Rojar	47	1995/96	244.28	25.90	X	-	-	-	-	-	-	-	-	-	-	-
115			Roisr	48	1995/96	244.28	108.61	X	-	-	-	-	-	-	-	-	-	-	-
116	Rawalpindi	JR-7	Tarnol	11	1989/90	244.28	48.77	X	-	-	-	-	-	-	-	-	-	-	-
117			Dakhli Mohri	21	1989/90	244.28	52.40	-	-	-	-	-	-	-	-	-	-	-	-
118			Dakhli Mohri	22	1989/90	244.16	152.40	50.94	36.57	88.39	51.82	0.98	34.13	S. Stone	152.40	18.78	390	7.40	7.97
119			Tarnol	28	1989/90	244.28	82.30	X	-	-	-	-	-	-	-	-	-	-	-
120			Sehala	40	1989/90	244.28	19.81	X	-	-	-	-	-	-	-	-	-	-	-
121			Pind Gondal	55	1989/90	244.28	97.53	X	-	-	-	-	-	-	-	-	-	-	-
122			Sehala	57	1989/90	244.28	121.52	X	-	-	-	-	-	-	-	-	-	-	-
123			Pind Gondal	2	1990/91	374.36	97.53	101.83	12.36	36.57	19.21	5.30	32.91	Boulder	97.53	18.62	367	7.30	7.40
124			Boi Char	13	1990/91	244.28	106.68	-	-	-	-	-	-	-	-	-	-	-	-
125			Niku	20	1990/91	244.28	8.39	-	-	-	-	-	-	-	-	-	-	-	-
126			Boi Char	21	1990/91	374.36	121.92	50.94	21.33	64.00	42.67	1.19	-	S. Stone	121.92	18.60	321	7.30	7.90
127			Gella khurd	27	1990/91	244.28	99.06	-	-	-	-	-	-	-	-	-	-	-	-
128			Gella khurd	-	1990/91	444.16	79.24	50.94	9.14	36.57	27.43	1.86	14.63	S. Stone	78.63	18.70	361	7.49	7.67
129			Niku	-	1990/91	244.28	91.44	-	-	-	-	-	-	-	-	-	-	-	-
130			Por Mianna	4	1991/92	244.28	106.68	X	-	-	-	-	-	-	-	-	-	-	-
131			Por Mianna	5	1991/92	380.77	106.68	50.94	27.43	73.15	45.72	1.11	18.23	Boulder	104.54	18.69	320	7.49	7.99
132			Lakhu	9	1991/92	244.28	121.92	X	-	-	-	-	-	-	-	-	-	-	-
133			Lakhu	2	1991/92	244.28	91.48	-	-	-	-	-	-	-	-	-	-	-	-
134			Lakhu	3	1991/92	374.36	91.48	50.94	18.28	54.84	36.56	1.39	23.16	S. Stone	89.50	18.31	390	7.46	7.16
135			Lakhu	4	1991/92	244.28	36.57	X	-	-	-	-	-	-	-	-	-	-	-
136			Lakhu	5	1991/92	244.28	140.20	X	-	-	-	-	-	-	-	-	-	-	-
137			Chak Shahzad	6	1991/92	244.28	79.24	50.94	-	-	-	-	-	-	-	-	-	-	-
138			Chak Shahzad	7	1991/92	444.16	67.05	50.94	10.00	34.44	24.44	2.08	19.5	Boulder	62.17	18.10	317	7.31	7.91
139			Bayec	1	1992/93	244.28	67.05	-	+3	-	-	-	-	-	-	-	-	-	-
140			Chak Shahzad	4	1992/93	444.16	87.17	50.94	8.53	32.30	23.77	2.14	31.89	Boulder	87.17	18.90	321	7.46	7.91
141			Bayec	5	1992/93	244.28	70.10	-	-	-	-	-	-	-	-	-	-	-	-
142			Bayec	6	1992/93	244.28	80.77	-	+2	-	-	-	-	-	-	-	-	-	-
143			Bayec	7	1992/93	244.28	82.29	-	+3	-	-	-	-	-	-	-	-	-	-
144			Hasan Abdal	13	1992/93	244.28	171.90	-	-	-	-	-	-	-	-	-	-	-	-
145			Kaeha	14	1992/93	244.28	137.16	-	+3	-	-	-	-	-	-	-	-	-	-
146			Dakhli Mohri	15	1992/93	244.28	90.22	-	+2	-	-	-	-	-	-	-	-	-	-
147			N.A.R.C. Chak Shahzad	31	1992/93	374.36	45.11	76.64	8.53	32.91	24.38	3.14	5.48	Boulder	45.11	18.91	-	7.47	7.93
148			Dakhli Mohri	43	1992/93	244.28	146.30	-	-	-	-	-	-	-	-	-	-	-	-
149			Chak Shahzad	3	1993/94	244.28	83.82	X	-	-	-	-	-	-	-	-	-	-	-
150			Chak Shahzad	4	1993/94	244.28	105.15	X	-	-	-	-	-	-	-	-	-	-	-

No.	District	Reg. No.	Name of Site	Tubewell No.	Construction Year	Well Dia. (mm)	Well Depth (m)	Pumping Rate (m ³ /hr)	Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (µs/cm)	EC	pH	Cl ⁻ (ppm)
151			Hasan Abda	5	1993/94	244.28	188.98	-	+3	-	-	*	-	-	-	-	-	-	-
152			Hasan Abda	6	1993/94	244.28	29.26	X	+4	-	-	-	-	-	-	-	-	-	-
153			Bayec	9	1993/94	244.28	137.16	-	+3	-	-	-	-	-	-	-	-	-	-
154			Islampur	15	1993/94	244.28	83.82	-	-	-	-	-	-	-	-	-	-	-	-
155			Lab	19	1993/94	244.28	85.36	-	-	-	-	-	-	-	-	-	-	-	-
156			Lab	24	1993/94	444.16	85.34	50.99	8.53	35.35	26.82	1.90	20.72	Bolder	82.90	18.00	-	7.42	7.50
157			Lab	26	1993/94	244.28	97.53	-	-	-	-	-	-	-	-	-	-	-	-
158			Lab	29	1993/94	544.16	97.53	50.94	20.11	52.42	32.31	1.58	28.21	-	97.53	18.40	-	7.45	7.43
159			Niku	37	1993/94	244.28	81.07	-	+3	-	-	-	-	-	-	-	-	-	-
160			Niku	38	1993/94	244.28	67.66	-	+3	-	-	-	-	-	-	-	-	-	-
161			Niku	43	1993/94	244.28	121.92	-	+4	-	-	-	-	-	-	-	-	-	-
162			Niku	47	1993/94	244.28	152.40	-	+4	-	-	-	-	-	-	-	-	-	-
163			Niku	50	1993/94	244.28	84.42	-	+3	-	-	-	-	-	-	-	-	-	-
164			Bafiaer	58	1993/94	244.28	175.26	-	-	-	-	-	-	-	-	-	-	-	-
165			Bafiaer	2	1994/95	244.28	152.40	-	+3	-	-	-	-	-	-	-	-	-	-
166			Pind Ranha	7	1994/95	244.28	121.92	X	-	-	-	-	-	-	-	-	-	-	-
167			Pind Ranha	17	1994/95	244.28	91.49	-	+2	-	-	-	-	-	-	-	-	-	-
168			Pind Ranha	18	1994/95	244.28	91.49	X	-	-	-	-	-	-	-	-	-	-	-
169			Maluka	22	1994/95	244.28	152.40	-	-	-	-	-	-	-	-	-	-	-	-
170			Maluka	28	1994/95	374.36	112.77	50.94	36.57	85.94	48.77	1.04	18.28	Bolder	92.96	18.90	310	7.46	7.50
171			Rawalpindi City	34	1994/95	244.28	129.54	-	-	-	-	-	-	-	-	-	-	-	-
172			Rawalpindi City	41	1994/95	544.16	129.54	50.94	36.57	82.29	48.77	1.04	30.48	Bolder	125.57	18.70	316	7.47	7.43
173			Lab Thatha	47	1994/95	244.28	105.15	-	+1	-	-	-	-	-	-	-	-	-	-
174			Lab Thatha	52	1994/95	374.36	105.15	-	+1	-	-	-	-	-	-	-	-	-	-
175			Lab Thatha	60	1994/95	244.28	79.24	-	+3	-	-	-	-	-	-	-	-	-	-
176			Sehura	1	1995/96	244.28	85.34	-	-	-	-	-	-	-	-	-	-	-	-
177			Sehura	14	1995/96	374.36	85.34	50.94	9.14	-	-	-	-	Bolder	85.34	18.40	399	7.30	7.90
178			Pindi Puhooli	33	1995/96	244.28	99.06	-	-	-	-	-	-	-	-	-	-	-	-
179			Pindi Puhooli	39	1995/96	304.56	97.53	50.94	18.28	-	-	-	-	Bolder	97.53	18.20	321	7.25	7.41
180			Pindi Puhooli	40	1995/96	244.28	85.34	-	+1	-	-	-	-	-	-	-	-	-	-
181			Hasan Abda	46	1995/96	244.28	152.40	-	-	-	-	-	-	-	-	-	-	-	-
182			Sehura	26	1995/96	244.28	79.24	-	-	-	-	-	-	-	-	-	-	-	-
183			Sehura	27	1995/96	304.56	79.24	50.94	9.14	-	-	-	-	Bolder	79.24	18.13	315	7.33	7.42
184	Rawalpindi J8-8		Dhok Chatha	18	1989/90	244.28	198.12	X	-	-	-	-	-	-	-	-	-	-	-
185			Dhok Chatha	31	1989/90	304.56	7.92	X	-	-	-	-	-	-	-	-	-	-	-
186			Dhok Chatha	34	1989/90	244.28	58.52	X	-	-	-	-	-	-	-	-	-	-	-
187			Dhok Chatha	35	1989/90	304.56	13.71	X	-	-	-	-	-	-	-	-	-	-	-
188			Dhok Chatha	41	1989/90	244.28	294.74	X	-	-	-	-	-	-	-	-	-	-	-
189			Labeeel Islampur	-	1990/91	244.28	91.44	-	-	-	-	-	-	-	-	-	-	-	-
190			Labeeel Islampur	2	1990/91	544.4	96.51	50.44	3.65	25.6	21.95	2.30	16.45	Bolder	96.51	16.65	385	7.83	7.68
191			7-10/3 Islamabad	4	1990/91	244.28	104.94	-	-	-	-	-	-	-	-	-	-	-	-
192			7-10/3 Islamabad	12	1990/91	380.71	88.00	25.47	-	-	-	-	-	Bolder	88.00	18.31	391	7.13	7.69
193			Islampur Famlia	26	1990/91	244.28	58.34	-	-	-	-	-	-	-	-	-	-	-	-
194			Chakra Bakra Attock	16	1990/91	244.28	152.40	-	-	-	-	-	-	-	-	-	-	-	-
195			Chakra Bakra Attock	20	1990/91	244.28	132.40	25.47	39.62	88.39	48.77	0.52	-	S. stone	103.63	18.26	375	7.36	7.23
196			Islampur Tamsala	-	1990/91	374.36	77.41	50.94	18.28	57.91	39.63	1.29	-	Bolder	84.73	18.13	373	7.31	7.36
197			Labeeel	-	1990/91	244.28	18.28	X	-	-	-	-	-	-	-	-	-	-	-
198			Pa-tter Attock	-	1990/91	244.28	19.20	X	-	-	-	-	-	-	-	-	-	-	-
199			Pa-tter Attock	-	1990/91	244.28	79.28	-	-	-	-	-	-	-	-	-	-	-	-
200			Pa-tter Attock	-	1990/91	244.28	60.36	25.47	27.45	33.52	6.07	4.20	-	S. stone	60.46	-	-	-	-

No.	District	Sl. No.	Name of Site	Tubewell No.	Construction Year	Tell Dia. (mm)	Tell Depth (m)	Pumping Rate (cu/hr)	Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (cu/hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (%)	SC (lit/cm)	pit	Cl- (ppm)	
201			Lala Zair Kavelpindi	24	1990/91	374.36	53.64	X	-	-	-	*	-	-	-	-	-	-	-	
202			1/12 Islamabad	3	1991/92	244.28	121.92	-	-	-	-	*	-	-	-	-	-	-	-	
203			Sirag Kadooh	8	1991/92	244.28	28.04	X	-	-	-	*	-	-	-	-	-	-	-	
204			Sirag Kadooh	15	1991/92	244.28	121.92	X	-	-	-	*	-	-	-	-	-	-	-	
205			Dhok Ramzan Tema	22	1991/92	244.28	137.16	X	-	-	-	*	-	-	-	-	-	-	-	
206			1/12 Islamabad	27	1991/92	444.16	95.31	-	24.38	51.81	48.76	-	-	-	91.44	18.16	381	7.13	7.93	
207	Jhelum	JR-6	Dario Mohamed S/O M. Fazal R/O Boora Jangle	1	1989/90	250	63.00	61.21	30.00	45.00	15.00	4.08	37	Clay S.	68.00	Fit for irrigation.	-	-	-	
208			Dario Mohamed S/O M. Fazal R/O Boora Jangle	2	1989/90	450	63.00	61.21	30.00	45.00	15.00	4.08	37	Clay S.	68.00	Fit for irrigation.	-	-	-	
209			Kohd: Qbal. Vi. Lillah	3	1989/90	250	152.00	X	-	-	-	-	-	-	-	-	-	-	-	
210			Kohd: Jaz S/O Rehmat Ali R/O Muffian	4	1989/90	250	61.00	61.21	5.00	25.00	20.00	3.06	56	Clay S.	61.00	Fit for irrigation.	-	-	-	
211			Kohd: Jaz S/O Rehmat Ali R/O Muffian	5	1989/90	450	61.00	61.21	5.00	25.00	20.00	3.06	56	Clay S.	61.00	Fit for irrigation.	-	-	-	
212			Ali Akbar S/O Nazam Din R/O Muffian	6	1990/91	250	61.00	61.21	5.00	25.00	20.00	3.06	56	Clay S.	61.00	Fit for irrigation.	-	-	-	
213			Ali Akbar S/O Nazam Din R/O Muffian	7	1990/91	450	61.00	61.21	5.00	25.00	20.00	3.06	56	Clay S.	61.00	Fit for irrigation.	-	-	-	
214			Ali Akbar S/O Nazam Din R/O Muffian	8	1990/91	250	73.00	61.21	26.00	53.00	27.00	2.27	47	Clay S.	73.00	Fit for irrigation.	-	-	-	
215			Ali Akbar S/O Nazam Din R/O Muffian	9	1990/91	250	61.00	61.21	5.00	25.00	20.00	3.06	56	Clay S.	61.00	Fit for irrigation.	-	-	-	
216			Ali Akbar S/O Nazam Din R/O Muffian	10	1990/91	450	61.00	61.21	5.00	25.00	20.00	3.06	56	Clay S.	61.00	Fit for irrigation.	-	-	-	
217			Bashir Ahmad S/O Abdul Malik R/O Garh Mahr	11	1990/91	250	56.00	76.50	1.00	1.00	-	-	14	Clay S.	56.00	Fit for irrigation.	-	-	-	
218			Bashir Ahmad S/O Abdul Malik R/O Garh Mahr	12	1990/91	450	56.00	76.50	1.00	1.00	-	-	14	Clay S.	56.00	Fit for irrigation.	-	-	-	
219			Admn: Municipal Committee Ding.	13	1990/91	250	57.00	45.91	18.00	30.00	12.00	3.83	27	Hard S.	57.00	Fit for irrigation.	-	-	-	
220			Chairman Municipal Committee Jhelum	14	1990/91	250	80.00	76.50	26.00	42.00	16.00	4.78	30	Clay S.	80.00	Fit for irrigation.	-	-	-	
221			Chairman Municipal Committee Jhelum	15	1990/91	450	80.00	76.50	26.00	42.00	16.00	0.69	30	Clay S.	80.00	Fit for irrigation.	-	-	-	
222			Wan Bashir Ahmad S/O Abdul Malik R/O Sara	16	1990/91	250	43.00	61.21	34.00	44.00	10.00	6.12	25	Clay S.	43.00	Fit for irrigation.	-	-	-	
223			Wan Bashir Ahmad S/O Abdul Malik R/O Sara	17	1991/92	450	43.00	61.21	24.00	34.00	10.00	6.12	25	Clay S.	43.00	Fit for irrigation.	-	-	-	
224			Zairat [qba] R/O Maida	18	1991/92	250	62.00	61.21	10.00	33.00	23.00	2.66	12	Clay S.	62.00	Fit for irrigation.	-	-	-	
225			Rehmat Ali S/O Hassan Muhammad R/O Thekria	19	1991/92	250	62.00	76.50	5.00	23.00	18.00	4.25	9	Clay S.	62.00	Fit for irrigation.	-	-	-	
226			Rehmat Ali S/O Hassan Muhammad R/O Thekria	20	1991/92	375	62.00	76.50	5.00	23.00	18.00	4.25	9	Clay S.	62.00	Fit for irrigation.	-	-	-	
227			Mohd: Ammar S/O Qaim Din R/O Haral.	21	1991/92	250	62.00	76.50	18.00	27.00	9.00	8.50	21	Clay S.	62.00	Fit for irrigation.	-	-	-	
228			Mohd: Ammar S/O Qaim Din R/O Haral.	22	1991/92	375	62.00	76.50	18.00	27.00	9.00	8.50	21	Clay S.	62.00	Fit for irrigation.	-	-	-	
229			Mohd: Ammar S/O Qaim Din R/O Haral.	23	1991/92	250	61.00	45.91	18.00	27.00	9.00	5.10	21	Clay S.	61.00	Fit for irrigation.	-	-	-	
230			Natural Food Industries, Shiber.	24	1991/92	250	111.00	38.76	8.00	17.00	9.00	4.31	9	Clay S.	111.00	Fit for irrigation.	-	-	-	
231			Muhammad Akram S/O Kohd: Talhat R/O Chokoh	25	1992/93	250	89.00	38.76	9.00	61.00	52.00	0.75	15	Hard S.	89.00	Fit for irrigation.	-	-	-	
232			Muhammad Akram S/O Kohd: Talhat R/O Chokoh	26	1992/93	450	72.00	38.76	9.00	61.00	52.00	0.75	15	Clay S.	72.00	Fit for irrigation.	-	-	-	
233			Noor Kohd: S/O Allah Wasia R/O Dina.	27	1993/94	250	60.00	45.91	18.00	33.00	15.00	3.06	24	Hard S.	60.00	Fit for irrigation.	-	-	-	
234			Shafiq Ali S/O Inayat Ali R/O Hadilli.	28	1993/94	250	59.00	76.50	18.00	30.00	12.00	6.38	20	Hard S.	59.00	Fit for irrigation.	-	-	-	
235			Shafiq Ali S/O Inayat Ali R/O Hadilli.	29	1993/94	450	59.00	76.50	18.00	30.00	12.00	6.38	20	Clay S.	59.00	Fit for irrigation.	-	-	-	
236			Mair Alis/O Talib Ali R/O Pind Jatta	30	1993/94	250	55.00	61.21	32.00	47.00	15.00	4.08	38	Hard S.	55.00	Fit for irrigation.	-	-	-	
237			Mair Alis/O Talib Ali R/O Pind Jatta	31	1993/94	375	55.00	61.21	32.00	47.00	15.00	4.08	38	Hard S.	55.00	Fit for irrigation.	-	-	-	
238			Shoukat Ali S/O Nazam Ali R/O Gorian.	32	1994/95	250	133.00	45.91	5.00	42.00	37.00	1.24	13	Hard S.	133.00	Fit for irrigation.	-	-	-	
239			Shoukat Ali S/O Nazam Ali R/O Gorian.	33	1995/96	250	122.00	X	-	-	-	-	-	-	-	-	-	-	-	
240			Mohd: Ammar S/O Sarhad Ali R/O Mara.	34	1995/96	250	117.00	61.21	11.00	18.00	7.00	8.74	15	Clay S.	117.00	Fit for irrigation.	-	-	-	
241			Mohd: Ammar S/O Sarhad Ali R/O Mara.	35	1995/96	375	117.00	61.21	11.00	18.00	7.00	8.74	15	Clay S.	117.00	Fit for irrigation.	-	-	-	
242			Bahawal Baluch S/O Patch Muhammad R/O Mara.	36	1995/96	250	52.00	61.21	24.00	30.00	6.00	10.20	30	Hard S.	52.00	Fit for irrigation.	-	-	-	
243			Bahawal Baluch S/O Patch Muhammad R/O Mara.	37	1995/96	250	43.00	61.21	9.00	18.00	9.00	6.80	14	Hard S.	43.00	Fit for irrigation.	-	-	-	
244			Bahawal Baluch S/O Patch Muhammad R/O Mara.	38	1995/96	375	43.00	61.21	9.00	18.00	9.00	6.80	14	Hard S.	43.00	Fit for irrigation.	-	-	-	
245			Gov. Muhammad S/O Patch Muhammad R/O Mara.	39	1995/96	250	41.00	X	-	-	-	-	-	-	-	-	-	-	-	
246			Gov. Muhammad S/O Patch Muhammad R/O Mara.	40	1995/96	250	47.00	X	-	-	-	-	-	-	-	-	-	-	-	-
247	Chakwal	JR-1	Khokh	3	1989/90	250	117.00	-	-	-	-	*	-	-	-	-	-	-	-	-
248			Bhona	5	1989/90	250	152.00	-	21.00	51.00	30.00	*	-	-	-	-	-	-	-	-
249			Bhona	7	1989/90	252	135.00	66.00	19.00	49.00	30.00	2.20	45	Clay with Boulder	135.00	Fit for irrigation.	-	-	-	-
250			Lause	9	1989/90	250	121.00	68.00	19.00	34.00	15.00	4.53	-	-	-	-	-	-	-	-

No.	District	Rtg No.	Name of Site	Tubewell No.	Construction Year	Tell Dia. (mm)	Tell Depth (m)	Pumping Rate (cu/hr)	Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (µs/cm)	pH	Cl- (ppm)
251			Lause	11	1989/90	250	121.00	68.00	19.00	34.00	15.00	4.40	-	Clay Silt	121.00	-	-	-
252			Chakwa	13	1989/90	250	152.00	68.00	21.00	30.00	9.00	7.33	-	Clay Silt	152.00	-	-	-
253			Chakwa	5	1989/90	375	152.00	68.00	21.00	30.00	9.00	7.56	46	Clay Silt	152.00	Fit for irrigation.	-	-
254			Dhrubi	11	1989/90	250	65.00	68.00	18.00	33.00	15.00	4.53	-	Clay Silt	65.00	-	-	-
255			Dhub	113	1990/91	250	146.00	68.00	18.00	33.00	15.00	4.53	-	Clay with Boulder	146.00	-	-	-
256			Dhub	16	1990/91	250	99.00	68.00	15.00	22.00	7.00	9.71	-	Clay with Boulder	99.00	Fit for irrigation.	-	-
257			Dhub	22	1990/91	450	97.00	68.00	15.00	22.00	7.00	9.71	40	Clay with Boulder	97.00	Fit for irrigation.	-	-
258			Dhub	24	1990/91	250	121.00	X	-	-	-	-	-	-	-	-	-	-
259			Dhub	1	1991/92	450	121.00	X	-	-	-	-	-	-	-	-	-	-
260			Dandi	5	1991/92	250	105.00	-	21.00	-	-	-	*	-	-	-	-	-
261			Dandi	12	1991/92	450	105.00	-	21.00	28.00	6.00	-	*	-	-	-	-	-
262			Dandi	6	1991/92	250	106.00	X	18.00	-	-	-	-	-	-	-	-	-
263			Mimaro	16	1991/92	450	60.00	X	-	-	-	-	-	-	-	-	-	-
264			Beshal Kala	16	1992/93	250	121.00	61.00	24.00	39.00	15.00	3.40	-	-	-	-	-	-
265			Bhona	15	1992/93	250	121.00	X	-	-	-	-	-	-	-	-	-	-
266			Bhona	17	1992/93	250	121.00	X	-	-	-	-	-	-	-	-	-	-
267			Khailr Khar	10	1992/93	250	152.00	68.00	21.00	36.00	15.00	4.53	-	-	-	-	-	-
268			Shawal	18	1992/93	250	91.00	X	7.00	14.00	7.00	-	-	-	-	-	-	-
269			Amah	20a	1992/93	250	76.00	-	-	-	-	-	*	-	-	-	-	-
270			Belawal	20b	1993/94	250	91.00	X	-	-	-	-	-	-	-	-	-	-
271			Aewalia	26	1993/94	250	54.00	68.00	45.00	54.00	9.00	7.56	21	Clay with Boulder	54.00	Fit for irrigation.	-	-
272			Behan	27	1993/94	250	91.00	68.00	38.00	54.00	15.00	4.53	30	Clay S.	91.00	Fit for irrigation.	-	-
273			Behan	31	1993/94	375	91.00	68.00	39.00	54.00	15.00	4.53	39	Clay S.	91.00	Fit for irrigation.	-	-
274			Dukhai Phpra	34	1993/94	250	60.00	X	-	-	-	-	-	-	-	-	-	-
275			Jang	37	1993/94	250	149.00	68.00	27.00	42.00	15.00	4.53	45	Clay S.	149.00	Fit for irrigation.	-	-
276			Jang	41	1993/94	375	149.00	68.00	27.00	42.00	15.00	4.53	45	Clay silt	149.00	Fit for irrigation.	-	-
277			Bala Hgal	9	1994/95	250	152.00	68.00	27.00	57.00	30.00	2.27	50	Clay silt	152.00	Fit for irrigation.	-	-
278			Minra	30	1994/95	250	66.00	68.00	57.00	72.00	15.00	4.53	15	Clay with Boulder	66.00	Fit for irrigation.	-	-
279			Minra	36	1994/95	250	21.00	-	-	-	-	-	*	-	-	-	-	-
280			Minra	38	1994/95	450	21.00	68.00	9.00	17.00	8.00	8.50	12	Clay with Boulder	21.00	Fit for irrigation.	-	-
281			Kalar Kahar	46	1994/95	250	121.00	X	-	-	-	-	-	-	-	-	-	-
282			Run Sial	39	1994/95	250	45.00	68.00	18.00	24.00	6.00	11.30	18	Clay with Boulder	45.00	Fit for irrigation.	-	-
283			Minra	11	1995/96	250	121.00	68.00	57.00	66.00	9.00	7.56	-	Clay Silt	121.00	-	-	-
284			Minra	9	1995/96	250	121.00	68.00	-	-	-	-	*	-	-	-	-	-
285			Toha Mehran Khan	32	1995/96	250	121.00	51.00	15.00	27.00	12.00	4.25	30	Clay Silt	121.00	Fit for irrigation.	-	-
286			Toha Mehran Khan	47	1995/96	250	134.00	-	-	-	-	-	-	-	-	-	-	-
287			Talagang	36	1995/96	450	134.00	68.00	21.00	36.00	15.00	4.53	50	Clay Silt	134.00	Fit for irrigation.	-	-
288			Kalar Kahar	28	1995/96	250	137.00	-	-	-	-	-	*	-	-	-	-	-
289			Bhona	11	1995/96	250	121.00	68.00	27.00	42.00	15.00	4.53	-	Clay Silt	121.00	-	-	-
290			Mang Wal	19	1995/96	250	91.00	X	-	-	-	-	-	-	-	-	-	-
291			Taka Mehran Khan	31	1995/96	250	106.00	X	-	-	-	-	-	-	-	-	-	-
292			Huserjan Wal	47	1995/96	250	121.00	-	-	-	-	-	*	-	-	-	-	-
293			Huserjan Wal	53	1995/96	250	121.00	68.00	24.00	54.00	30.00	2.27	36	Clay S.	121.00	Fit for irrigation.	-	-
294	Chakwa	JR-9	Khata Temen	1	1989/90	375	99.00	51.00	21.00	36.00	15.00	3.40	38	Clay with Boulder	99.00	Fit for irrigation.	-	-
295			Laci Bahon	4	1989/90	250	152.00	51.00	18.00	39.00	21.00	2.43	60	Clay with Boulder	152.00	-	-	-
296			Laci Durkama	6	1989/90	250	106.00	X	-	-	-	-	-	-	-	-	-	-
297			Dhub	8	1989/90	450	91.00	51.00	19.00	37.00	18.00	2.83	30	Clay Silt	91.00	Fit for irrigation.	-	-
298			Bokai Khulun	10	1989/90	250	106.00	51.00	21.00	51.00	30.00	1.70	45	Clay with Boulder	106.00	Fit for irrigation.	-	-
299			Bokai Khulun	14	1990/91	250	53.00	51.00	21.00	51.00	30.00	1.70	30	Clay with Boulder	53.00	Fit for irrigation.	-	-
300			Bokai Khulun	17	1990/91	250	68.00	51.00	21.00	51.00	30.00	1.70	37	Clay S.	68.00	Fit for irrigation.	-	-

No.	District	Wig No.	Name of Site	Tubewell No.	Construction Year	Well Dia. (mm)	Well Depth (m)	Pumping Rate (m ³ /hr)	Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (%)	EC (µs/cm)	pH	CL- (ppm)
301			Bokai Khulun	20	1990/91	450	103.00	51.00	21.00	51.00	30.00	1.70	-	Clay S.	103.00	-	-	-	-
302			Temen	23	1990/91	250	134.00	68.00	21.00	33.00	12.00	5.67	36	Clay S.	134.00	-	-	-	-
303			Temen	26	1990/91	450	152.00	68.00	21.00	33.00	12.00	5.67	45	Clay Silt	152.00	-	-	-	-
304			Temen	28	1990/91	450	121.00	21.00	21.00	33.00	12.00	1.75	30	Clay Silt	121.00	-	-	-	-
305			Kotha	33	1990/91	250	137.00	X	-	-	-	-	-	-	-	-	-	-	-
306			Lafi	35	1990/91	250	121.00	-	-	-	-	-	-	-	-	-	-	-	-
307			Lafi	13	1990/91	250	141.00	-	14.00	24.00	10.00	-	-	Clay with Boulder	141.00	-	-	-	-
308			Dhub	21	1990/91	250	158.00	X	21.00	39.00	18.00	-	-	Clay Silt	158.00	-	-	-	-
309			Bushal Kala	2	1991/92	250	121.00	X	-	-	-	-	-	-	-	-	-	-	-
310			Monday	4	1991/92	250	137.00	X	-	-	-	-	-	-	-	-	-	-	-
311			Bulises	9	1991/92	250	121.00	-	-	-	-	-	-	-	-	-	-	-	-
312			Bulises	10	1991/92	250	121.00	-	15.00	30.00	15.00	-	-	Clay Silt	121.00	-	-	-	-
313			Chakwal	13	1991/92	250	109.00	-	25.00	49.00	24.00	-	-	Clay Silt	109.00	-	-	-	-
314			Chakwal	14	1991/92	250	87.00	-	25.00	49.00	24.00	-	-	Clay Silt	87.00	-	-	-	-
315			Dunge	15	1991/92	250	128.00	-	38.00	57.00	19.00	-	-	Clay Silt	128.00	-	-	-	-
316			Dunge	1	1992/93	250	124.00	-	38.00	68.00	30.00	-	-	Clay Silt	124.00	-	-	-	-
317			Chocra Jaddingharah	6	1992/93	250	45.00	X	-	-	-	-	-	-	-	-	-	-	-
318			Khair Khair	11	1992/93	250	76.00	X	-	-	-	-	-	-	-	-	-	-	-
319			Fassined	12	1992/93	250	167.00	-	12.00	-	-	-	-	Clay Silt	167.00	-	-	-	-
320			Purnned	12	1992/93	375	168.00	-	12.00	164.00	152.00	-	-	Clay Silt	168.00	-	-	-	-
321			Minara	16	1992/93	375	60.00	68.00	18.00	21.00	3.00	22.67	-	Clay Silt	60.00	-	-	-	-
322			Minara	23	1992/93	250	63.00	X	-	-	-	-	-	-	-	-	-	-	-
323			Minara	24	1992/93	250	61.00	X	-	-	-	-	-	-	-	-	-	-	-
324			Neulikwa	29	1992/93	250	152.00	68.00	18.00	21.00	3.00	22.67	-	Clay Silt	152.00	-	-	-	-
325			Neulikwa	30	1992/93	250	152.00	68.00	18.00	21.00	3.00	22.67	-	Clay Silt	152.00	-	-	-	-
326			Kongzia	32	1992/93	250	125.00	X	-	-	-	-	-	-	-	-	-	-	-
327			Kongzia	33	1992/93	375	125.00	68.00	21.00	24.00	3.00	22.67	-	Clay Silt	125.00	-	-	-	-
328			Kongzia	36	1992/93	250	134.00	X	-	-	-	-	-	-	-	-	-	-	-
329			Kongzia	38	1992/93	250	131.00	X	-	-	-	-	-	-	-	-	-	-	-
330			Kongzia	1	1994/95	375	131.00	68.00	-	-	-	-	-	Clay Silt	131.00	-	-	-	-
331			Talagang	23	1994/95	250	137.00	X	-	-	-	-	-	-	-	-	-	-	-
332			Talagang	34	1994/95	250	127.00	X	-	-	-	-	-	-	-	-	-	-	-
333			Talagang	47	1994/95	250	91.00	X	-	-	-	-	-	-	-	-	-	-	-
334			Talagang	48	1994/95	450	91.00	68.00	18.00	24.00	6.00	11.33	-	Clay Silt	91.00	-	-	-	-
335			Talagang	52	1994/95	250	129.00	X	-	-	-	-	-	-	-	-	-	-	-
336			Talagang	3	1995/96	250	91.00	X	-	-	-	-	-	-	-	-	-	-	-
337			Talagang	15	1995/96	375	91.00	68.00	15.00	18.00	3.00	22.67	-	Clay Silt	91.00	-	-	-	-
338			Jebair Pur	27	1995/96	250	121.00	X	-	-	-	-	-	-	-	-	-	-	-
339			Jebair Pur	29	1995/96	250	129.00	68.00	26.00	32.00	6.00	11.33	-	Clay Silt	129.00	-	-	-	-
340			Jebair Pur	48	1995/96	450	105.00	68.00	-	-	-	-	-	Clay Silt	105.00	-	-	-	-
341			Thirpa	10	1995/96	250	147.00	68.00	-	-	-	-	-	Clay Silt	147.00	-	-	-	-
342			Thirpa	32	1995/96	250	91.00	68.00	16.00	19.00	3.00	22.67	-	Clay Silt	91.00	-	-	-	-
343			Thirpa	48	1995/96	250	121.00	-	-	-	-	-	-	-	-	-	-	-	-
344	Khushab	JR-2	Khata	10	1990/91	250	150.00	-	57.00	-	-	-	-	Hard. S.	98.00	-	-	-	-
345			Khura	1	1991/92	450	50.00	50.00	-	20.00	-	-	-	Hard. S.	30.00	-	-	-	-
346			Skasar	3	1991/92	250	143.00	143.00	-	7.00	-	-	-	Clay H.S.	136.00	-	-	-	-
347			Skasar	4	1991/92	250	133.00	133.00	-	6.00	-	-	-	Clay H.S.	127.00	-	-	-	-
348			Skasar	9	1991/92	450	87.00	87.00	7.00	19.00	12.00	7.25	30	Hard. S.	80.00	-	-	-	-
349			Chirhwala	15	1991/92	250	167.00	167.00	-	33.00	-	-	-	Hard. S.	134.00	-	-	-	-
350			Numel	1	1992/93	250	33.00	33.00	-	10.00	-	-	-	Clay	22.00	-	-	-	-

No.	District	Fig No.	Name of Site	Tubewell No.	Construction Year	Well Dia. (mm)	Well Depth (m)	Pumping Rate (m ³ /hr)	Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (%)	EC (µs/cm)	pH	Cl- (ppm)
351			Mumel	4	1992/93	375	31.00	31.00	10.00	16.00	6.00	5.17	20	Clay	21.00	-	-	-	-
352			Bakim Kha	8	1992/93	250	33.00	33.00	-	11.00	-	-	*	Clay	22.00	-	-	-	-
353			Bakim Kha	9	1992/93	250	33.00	33.00	-	11.00	-	-	*	Clay	22.00	-	-	-	-
354			Bakim Kha	10	1992/93	250	38.00	158.00	-	12.00	-	-	*	Clay	146.00	-	-	-	-
355			Bakim Kha	11	1992/93	450	23.00	23.00	11.00	19.00	8.00	2.88	18	Clay	12.00	-	-	-	-
356			Dhok Ayub	17	1992/93	250	33.00	-	8.00	-	-	-	*	Clay	25.00	-	-	-	-
357			Dhok Ayub	18	1992/93	450	20.00	80.00	6.00	16	10.00	8.00	12.00	Clay S.	14.00	-	-	-	-
358			Dhok Ayub	23	1992/93	250	33.00	-	11.00	-	-	-	*	Clay	22.00	-	-	-	-
359			Dhok Ayub	24	1992/93	450	33.00	70.00	11.00	20	9.00	7.78	15.00	Clay S.	22.00	-	-	-	-
360			Kawab Kha	26	1992/93	250	33.00	-	11.00	-	-	-	*	Clay S.	22.00	-	-	-	-
361			Kawab Kha	27	1992/93	450	27.00	75.00	11.00	23	12.00	6.25	20.00	Clay S.	16.00	-	-	-	-
362			Greay	30	1992/93	250	43.00	-	15.00	-	-	-	*	Clay	28.00	-	-	-	-
363			Greay	1	1993/94	450	43.00	65.00	15.00	23	8.00	8.13	25.00	Clay S.	28.00	-	-	-	-
364			Mangwa	4	1993/94	250	67.00	-	9.00	-	-	-	*	Clay	58.00	-	-	-	-
365			Mangwa	7	1993/94	450	67.00	70.00	9.00	17	8.00	8.75	30.00	Clay S.	58.00	-	-	-	-
366			Kawab Kha	9	1993/94	250	43.00	-	12.00	-	-	-	*	Clay	31.00	-	-	-	-
367			Nawab Kha	10	1993/94	450	43.00	65.00	12.00	21	9.00	7.22	20.00	Clay S.	31.00	-	-	-	-
368			Jabi	15	1993/94	250	141.00	-	43.00	-	-	-	*	Clay	98.00	-	-	-	-
369			Jabi	17	1993/94	450	120.00	70.00	43.00	53	10.00	7.00	70.00	Clay S.	77.00	-	-	-	-
370			Amioi	19	1993/94	250	200.00	-	68.00	-	-	-	*	Clay	132.00	-	-	-	-
371			Amioi	20	1993/94	450	200.00	90.00	68.00	79	11.00	8.18	133.00	Clay S.	132.00	-	-	-	-
372			Khata	28	1993/94	250	100.00	-	33.00	-	-	-	*	Hard S.	67.00	-	-	-	-
373			Khata	1	1994/95	450	100.00	100.00	42.00	54	12.00	8.33	33.00	Hard S.	58.00	-	-	-	-
374			Kund	3	1994/95	250	125.00	-	68.00	-	-	-	*	Clay	57.00	-	-	-	-
375			Kund	5	1994/95	375	125.00	90.00	68.00	79	11.00	8.18	60.00	Clay S.	57.00	-	-	-	-
376			Kund	7	1994/95	250	66.00	-	9.00	-	-	-	*	Clay	57.00	-	-	-	-
377			Kund	8	1994/95	375	66.00	80.00	9.00	19	10.00	8.00	40.00	Clay S.	57.00	-	-	-	-
378			Ochali	10	1994/95	250	66.00	-	25.00	-	-	-	*	Hard S.	41.00	-	-	-	-
379			Ochali	11	1994/95	375	66.00	90.00	25.00	37	12.00	7.50	30.00	Hard S.	41.00	-	-	-	-
380			Ochali	15	1994/95	250	100.00	-	35.00	-	-	-	*	Clay	65.00	-	-	-	-
381			Ochali	18	1994/95	375	100.00	100.00	35.00	45	10.00	10.00	60.00	Clay S.	65.00	-	-	-	-
382			Kufri	19	1994/95	250	116.00	-	40.00	-	-	-	*	Hard S.	76.00	-	-	-	-
383			Kufri	21	1994/95	250	116.00	-	40.00	-	-	-	*	Hard S.	76.00	-	-	-	-
384			Kufri	23	1994/95	250	100.00	-	30.00	-	-	-	*	Hard S.	60.00	-	-	-	-
385			Kufri	4	1995/96	375	116.00	100.00	20.00	31	11	9.09	83.00	Hard S.	96.00	-	-	-	-
386			Kufri	11	1995/96	250	116.00	-	20.00	-	-	-	*	Hard S.	96.00	-	-	-	-
387			Dera Sher Muhammad	5	1995/96	250	200.00	-	75.00	-	-	-	*	Hard S.	125.00	-	-	-	-
388			Sodi	14	1995/96	375	116.00	30.00	20.00	30	10	3.00	83.00	Hard S.	96.00	-	-	-	-
389			Kufri	16	1995/96	250	73.00	-	20.00	-	-	-	*	Hard S.	53.00	-	-	-	-
390			Ochali	10	1994/95	250	66.00	-	20.00	-	-	-	*	Hard S.	44.00	-	-	-	-
391	Khushab	JR-3	Kara	12	1989/90	375	100.00	90.00	18.00	29.00	11.00	8.18	27	Hard S.	100.00	-	-	-	-
392			Kurar	13	1989/90	250	27.00	-	18.00	-	-	-	*	Hard S.	100.00	-	-	-	-
393			Assa	6	1990/91	250	189.00	-	20.00	-	-	-	-	-	-	-	-	-	-
394			Assa	7	1990/91	450	163.00	75.00	50.00	62.00	12.00	6.25	30	Hard S.	113.00	-	-	-	-
395			Kotly	8	1990/91	250	100.00	-	40.00	-	-	-	-	-	-	-	-	-	-
396			Kotly	9	1990/91	375	100.00	80.00	43.00	55.00	12.00	6.97	33	Hard S.	100.00	-	-	-	-
397			Assa	12	1990/91	250	100.00	-	90.00	-	-	-	*	-	-	-	-	-	-
398			Agda	5	1991/92	250	80.00	-	30.00	-	-	-	-	-	-	-	-	-	-
399			Kara	7	1991/92	250	117.00	-	20.00	-	-	-	*	-	-	-	-	-	-
400			Kara	8	1991/92	250	114.00	-	40.00	-	-	-	*	-	-	-	-	-	-

No.	District	Reg. No.	Name of Site	Tubewell No.	Construction Year	Tell Dia. (mm)	Tell Depth (m)	Pumping Rate (m ³ /hr)	Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (%)	EC (µs/cm)	pH	Cl- (ppm)
401			Khura	5	1991/92	250	141.00	-	20.00	-	-	-	*	-	-	-	-	-	-
402			Khata	2	1992/93	375	87.00	42.00	30.00	42	12	3.50	27.00	Hard S.	57.00	Fit for irrigation.	-	-	-
403			Nali	12	1992/93	250	146.00	-	53.00	-	-	-	*	-	-	-	-	-	-
404			Kotly	19	1992/93	250	88.00	-	-	-	-	-	*	-	-	-	-	-	-
405			Kotly	20	1992/93	450	96.00	46.00	35.00	46	11	4.18	30.00	Hard S.	-	Fit for irrigation.	-	-	-
406			Golewali	25	1992/93	250	161.00	-	88.00	-	-	-	*	-	-	-	-	-	-
407			Golewali	5	1993/94	250	174.00	-	-	-	-	-	*	-	-	-	-	-	-
408			Khna	18	1993/94	250	100.00	-	-	-	-	-	*	-	-	-	-	-	-
409			Khura	21	1993/94	375	103.00	69.00	69.00	81	12	5.75	50.00	Hard S.	46.00	Fit for irrigation.	-	-	-
410			Khura	22	1993/94	250	127.00	-	-	-	-	-	*	-	-	-	-	-	-
411			Khura	29	1993/94	250	151.00	-	-	-	-	-	*	-	-	-	-	-	-
412			Nali	13	1994/95	450	136.00	65.00	53.00	65	12	5.42	36.00	Hard S.	83.00	Fit for irrigation.	-	-	-
413			Khura	4	1994/95	250	150.00	-	-	-	-	-	*	-	-	-	-	-	-
414			Khura	6	1994/95	250	146.00	-	-	-	-	-	*	-	-	-	-	-	-
415			Khura	9	1994/95	250	133.00	-	-	-	-	-	*	-	-	-	-	-	-
416			Wardwaji	12	1994/95	250	83.00	-	-	-	-	-	*	-	-	-	-	-	-
417			Golewali	20	1994/95	250	200.00	-	-	-	-	-	*	-	-	-	-	-	-
418			Khura	22	1994/95	250	75.00	-	20.00	-	-	-	*	-	-	-	-	-	-
419			Golewali	27	1994/95	200	-	-	-	-	-	-	*	-	-	-	-	-	-
420			Wardwal	28	1994/95	250	83.00	-	30.00	42.00	12.00	-	*	-	-	-	-	-	-
421			Golewali	28	1994/95	450	200.00	90.00	73.00	-	-	-	39	Hard S.	127.00	Fit for irrigation.	-	-	-
422			Khodoy	30	1994/95	250	108.00	-	30.00	-	-	-	*	-	-	-	-	-	-
423			Khodoy	31	1994/95	375	108.00	90.00	28.00	-	-	-	36	Hard S.	72.00	Fit for irrigation.	-	-	-
424			Kata	12	1995/96	250	95.00	-	35.00	-	-	-	*	-	-	-	-	-	-
425			Ochali	10	1995/96	250	99.00	-	40.00	-	-	-	*	-	-	-	-	-	-
426			Sigra	3	1995/96	250	62.00	-	30.00	-	-	-	*	-	-	-	-	-	-
427			Sigra	4	1995/96	375	62.00	80.00	18.00	28.00	10.00	8.00	37	Hard S.	25.00	Fit for irrigation.	-	-	-
428			Sigra	1	1995/96	250	83.00	-	20.00	-	-	-	*	-	-	-	-	-	-
429			Sigra	2	1995/96	375	83.00	90.00	26.00	36.00	10.00	9.00	57	Hard S.	26.00	Fit for irrigation.	-	-	-
430			Kafri	7	1995/96	375	100.00	75.00	37.00	-	-	-	70	Hard S.	30.00	Fit for irrigation.	-	-	-
431			Kafri	6	1995/96	250	100.00	-	20.00	-	-	-	*	-	-	-	-	-	-
432	Khushab	JR-4	Fatah Pur	1	1989/90	250	129.00	-	37.00	-	-	-	*	Clay	32.00	-	-	-	-
433			Kurrar	2	1989/90	450	116.00	-	24.00	36.00	12.00	-	*	Clay	33.00	-	-	-	-
434			Khata Saghral	3	1989/90	438	70.00	80.00	27.00	39.00	12.00	6.67	20.00	Hard S.	43.00	Fit for irrigation.	-	-	-
435			Khata Saghral	4	1989/90	250	79.00	-	27.00	-	-	-	*	Hard S.	52.00	-	-	-	-
436			Khata Saghral	5	1989/90	375	76.00	75.00	30.00	43.00	13.00	5.77	26	Hard S.	46.00	Fit for irrigation.	-	-	-
437			Diwal	6	1989/90	250	200.00	-	2.00	-	-	-	*	Clay	198.00	-	-	-	-
438			Jabi	7	1989/90	250	143.00	-	33.00	-	-	-	*	Clay	110.00	-	-	-	-
439			Khata	8	1989/90	250	34.00	-	18.00	-	-	-	*	Hard S.	16.00	-	-	-	-
440			Kufri	9	1989/90	250	70.00	-	8.00	-	-	-	*	Clay	62.00	Fit for irrigation.	-	-	-
441			Kufri	10	1989/90	375	70.00	82.00	8.00	21.00	13.00	6.31	50	Clay	62.00	Fit for irrigation.	-	-	-
442			Khata	11	1989/90	250	100.00	-	18.00	-	-	-	*	Hard S.	82.00	-	-	-	-
443			Khata	12	1989/90	250	40.00	-	4.00	-	-	-	*	Clay	36.00	-	-	-	-
444			Kufri	16	1989/90	375	50.00	70.00	4.00	14.00	10.00	7.00	40	Clay	46.00	Fit for irrigation.	-	-	-
445			Ochali	17	1989/90	250	66.00	-	3.00	-	-	-	*	Hard S.	63.00	-	-	-	-
446			Ochali	18	1989/90	375	58.00	70.00	3.00	15.00	12.00	5.83	34	Clay H.S.	55.00	Fit for irrigation.	-	-	-
447			Kufri	26	1989/90	250	80.00	-	33.00	-	-	-	*	H.S.	57.00	-	-	-	-
448			Kufri	1	1991/92	375	82.00	80.00	20.00	30.00	10.00	8.00	52	H.S. Clay	52.00	Fit for irrigation.	-	-	-
449			Khata	6	1991/92	250	82.00	-	30.00	-	-	-	*	Hard S.	52.00	-	-	-	-

No.	District	R.G. No.	Name of Site	Tubewell No.	Construction Year	Fall Dia. (mm)	Fall Depth (m)	Pumping Rate (m ³ /hr)	Static Water Level (m)	Pumping Water Level (m)	Drawdown (m)	Specific Capacity (m ³ /hr/m)	Screen Depth (m)	Aquifer	Aquifer Depth (m)	TDS (%)	EC (μs/cm)	pH	Cl- (ppm)
450			Kuiri	72	1991/92	250	92.00	-	50.00	-	-	-	*	Hard S.	42.00	-	-	-	-
451			Kuiri	11	1991/92	250	82.00	-	26.00	-	-	-	*	hard S.	55.00	-	-	-	-
452			Kuiri	12	1991/92	375	82.00	85.00	26.00	38.00	12.00	7.08	55	Caly	56.00	Fit for irregation.	-	-	-
453			Kuiri	13	1991/92	250	92.00	-	20.00	-	-	-	*	H.S.	72.00	-	-	-	-
454			Kuiri	14	1991/92	375	108.00	70.00	28.00	40.00	12.00	5.83	82	H.S.	80.00	Fit for irregation.	-	-	-
455			Ochali	16	1991/92	250	113.00	-	20.00	-	-	-	*	Clay	93.00	-	-	-	-
456			Ochali	3	1992/93	250	83.00	-	12.00	-	-	-	*	H.S.	21.00	-	-	-	-
457			Kuiri	5	1992/93	250	7.00	-	3.00	-	-	-	*	Clay	4.00	-	-	-	-
458			Kuiri	6	1992/93	250	100.00	-	27.00	-	-	-	*	Clay	73.00	Fit for irregation.	-	-	-
459			Kuiri	7	1992/93	438	78.00	85.00	27.00	-	-	-	15	Clay H.S.	51.00	Fit for irregation.	-	-	-
460			Kuiri	14	1992/93	250	117.00	-	27.00	-	-	-	*	Clay	90.00	-	-	-	-
461			Kuiri	15	1992/93	250	100.00	-	27.00	-	-	-	*	Clay	73.00	-	-	-	-
462			Kuiri	16	1992/93	375	100.00	70.00	27.00	39.00	12.00	5.83	26	Clay	73.00	Fit for irregation.	-	-	-
463			Ochali	21	1992/93	250	70.00	-	22.00	-	-	-	*	Clay H.S.	48.00	-	-	-	-
464			Ochali	22	1992/93	375	80.00	80.00	20.00	39.00	19.00	4.21	60	Clay H.S.	60.00	Fit for irregation.	-	-	-
465			Ochali	28	1992/93	250	63.00	-	3.00	-	-	-	*	Clay H.S.	80.00	-	-	-	-
466			Karadhi	29	1992/93	375	107.00	-	27.00	-	-	-	83	Clay H.S.	26.00	Fit for irregation.	-	-	-
467			Karadhi	31	1992/93	375	107.00	75.00	27.00	39.00	12.00	6.25	83	Clay H.S.	80.00	-	-	-	-
468			Ochali	3	1993/94	250	113.00	-	20.00	-	-	-	*	H.S.	93.00	-	-	-	-
469			Kuiri	8	1993/94	375	120.00	75.00	27.00	39.00	12.00	6.25	87	Clay	93.00	Fit for irregation.	-	-	-
470			Kuiri	11	1993/94	250	103.00	-	27.00	-	-	-	*	Clay H.S.	76.00	-	-	-	-
471			Ochali	12	1993/94	250	83.00	-	33.00	-	-	-	*	Clay	50.00	-	-	-	-
472			Kuiri	13	1993/94	250	87.00	-	27.00	-	-	-	*	Clay	60.00	-	-	-	-
473			Kuiri	14	1993/94	375	87.00	80.00	27.00	40.00	13.00	6.15	60	Clay	60.00	-	-	-	-
474			Kuiri	16	1993/94	250	100.00	-	-	-	-	-	*	-	-	-	-	-	-
475			Kuiri	28	1993/94	250	100.00	-	-	-	-	-	*	-	-	-	-	-	-
476			Kuiri	24	1993/94	375	100.00	85.00	27.00	39.00	12.00	7.08	70	Clay	78.00	Fit for irregation.	-	-	-
477			Kuiri	25	1993/94	450	100.00	80.00	27.00	39.00	12.00	6.67	70	Clay	73.00	Fit for irregation.	-	-	-
478			Ochali	26	1993/94	250	70.00	-	-	-	-	-	*	-	-	-	-	-	-
479			Ochali	27	1993/94	375	57.00	75.00	27.00	38.00	11.00	6.82	35	H.S.	30.00	Fit for irregation.	-	-	-
480			Kund	31	1993/94	250	133.00	-	-	-	-	-	*	-	-	-	-	-	-
481			Kund	2	1994/95	375	150.00	75.00	20.00	43.00	23.00	3.27	33	Clay	150.00	Fit for irregation.	-	-	-
482			Ochali	13	1994/95	251	70.00	-	23.00	-	-	-	*	Clay	47.00	-	-	-	-
483			Ochali	14	1994/95	375	70.00	80.00	23.00	35.00	12.00	6.67	35	Clay	47.00	Fit for irregation.	-	-	-
484			Kuiri	15	1994/95	250	100.00	-	27.00	-	-	-	*	Clay	73.00	-	-	-	-
485			Kuiri	10	1994/95	375	100.00	80.00	27.00	39.00	12.00	6.77	27	Clay	73.00	Fit for irregation.	-	-	-
486			Ochali	21	1994/95	250	70.00	-	20.00	-	-	-	*	Clay H.S.	50.00	-	-	-	-
487			Ochali	22	1994/95	375	80.00	80.00	20.00	32.00	12.00	6.67	60	Clay	60.00	Fit for irregation.	-	-	-
488			Ochali	28	1994/95	250	63.00	-	3.00	-	-	-	*	H.S.	60.00	-	-	-	-
489			Khura	29	1994/95	250	107.00	-	27.00	-	-	-	*	H.S.	80.00	-	-	-	-
490			Khura	31	1994/95	375	107.00	75.00	27.00	39.00	12.00	6.25	83	H.S.	80.00	Fit for irregation.	-	-	-
491			Khway	8	1995/96	250	100.00	-	-	-	-	-	*	-	-	-	-	-	-
492			Khway	15	1995/96	375	100.00	80.00	23.00	34.00	11.00	7.27	*	-	77.00	-	-	-	-
493			Khway	3	1995/96	250	100.00	80.00	23.00	-	-	-	*	-	77.00	-	-	-	-
494			Khway	6	1995/96	250	100.00	80.00	23.00	-	-	-	*	-	77.00	-	-	-	-
495			Khway	7	1995/96	250	100.00	80.00	23.00	-	-	-	*	-	77.00	-	-	-	-
496			Khway	9	1995/96	250	57.00	85.00	16.00	-	-	-	*	-	41.00	-	-	-	-