

CHAPTER 3 IMPLEMENTATION PLAN

THE UNIVERSITY OF CHICAGO

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.

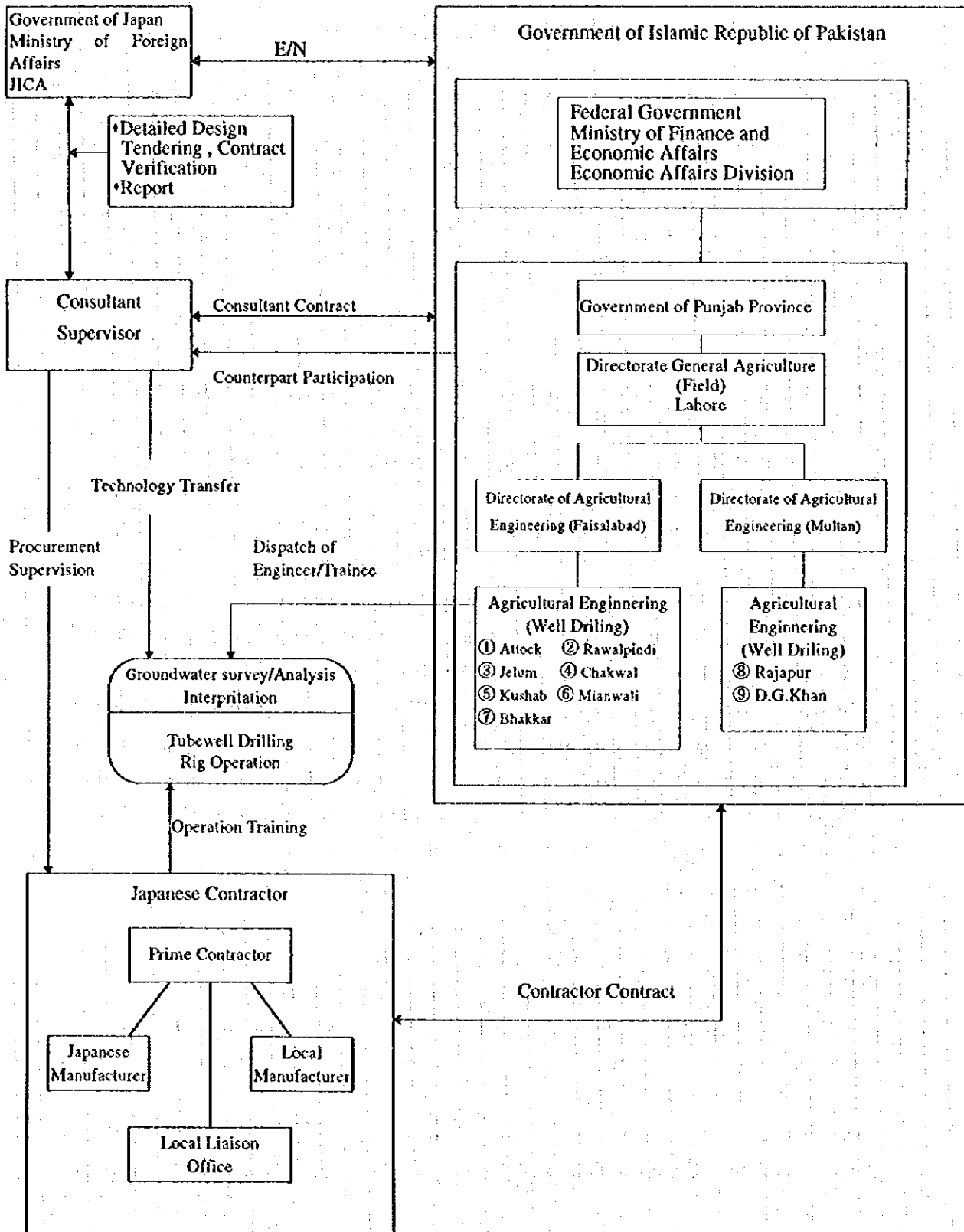
The organization for implementation of this project is depicted in Fig. 3-1.

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

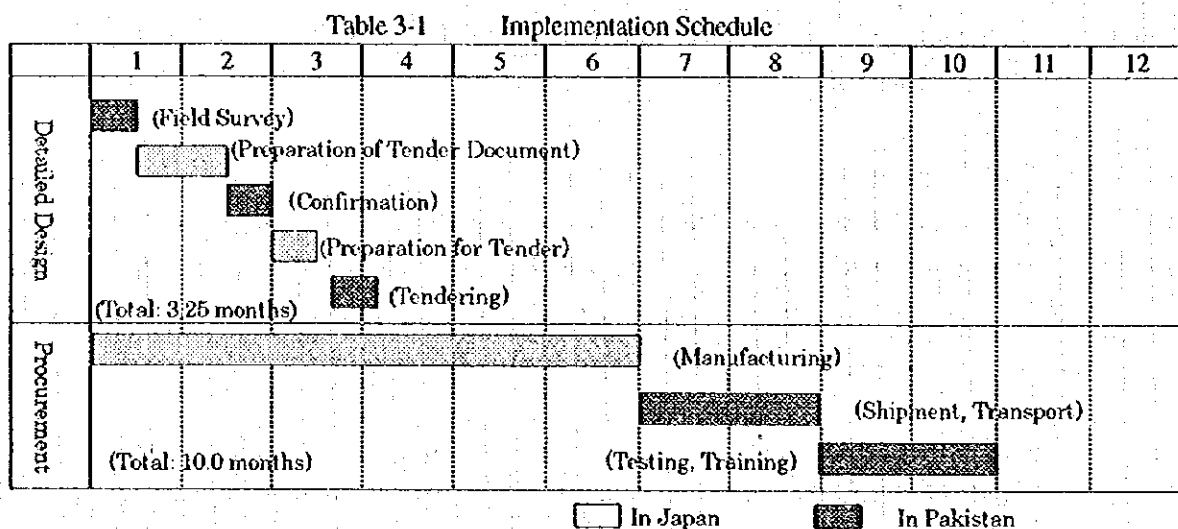
The project starts when the E/N is exchanged between the Government of Japan and the Government of Pakistan for the grant aid of the project, and is necessary to be completed in the Japanese fiscal year.

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) |
|----------------|-------|--------------|-------------------|-----------------------|-----------------|--------|--------------|
| | | Basic Salary | Housing allowance | Commutation allowance | Medical expense | Bonus | Total Salary |
| 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

| Table 5.4: Annual Equipment Operation Cost (unit rig/month) | | | | | | | | | | |
|---|--------------|-----------|----------------|---------------------|-------------|-----------------|-----------|--------------------|-----------|------------|
| Equipment | Q'ty | | Working System | (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 | (1)+(2) | |
| | 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 | 4,604 | 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

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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 |

| | | |
|--|---|---|
| Therefore, agricultural productivity in the Barani is unstable due to the harsh climate. | be supplied to the farmers all year round. | improved throughout the year. The present agricultural intensity of 50 to 90% will be increased to 120 to 150%. |
| 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. | • 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 | • 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. |
| 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. | • The newly installed tubewells will provide stable water for irrigation and drinking, and shorten the distance between houses and the water source. | • After the completion of tubewells, stable and clean water can be supplied so that the living environments of the Barani areas will be improved. |

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

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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. Mujtaq Ahmad | Deputy Secretary |
| 2. Mr. Zaka Ullah | 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 Tusei | 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. Mubeen 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. Mahr Rab Nawaz | Agricultural Engineer (Buldozer) |
| 3. Dr. Muhammad Yasir | 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

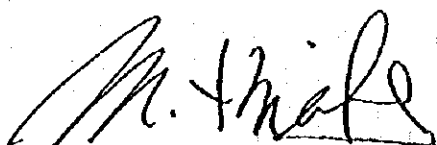
In response to the request from Government of Pakistan, the Government of Japan decided to conduct a Basic Design Study on the Project for Exploitation of Groundwater at Province of Punjab in the Islamic Republic of Pakistan (hereinafter referred to as "the Project"), and entrusted the study to the Japan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

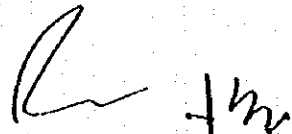
- (2) The quantity of each equipment will be decided by further studies.

- (3) The followings were requested by Pakistani side.

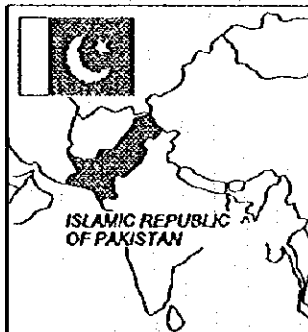
1) Spare parts for drilling rigs so far procured under Japanese Grant Aid.

2) Training for drilling rig operation and tubewell construction.

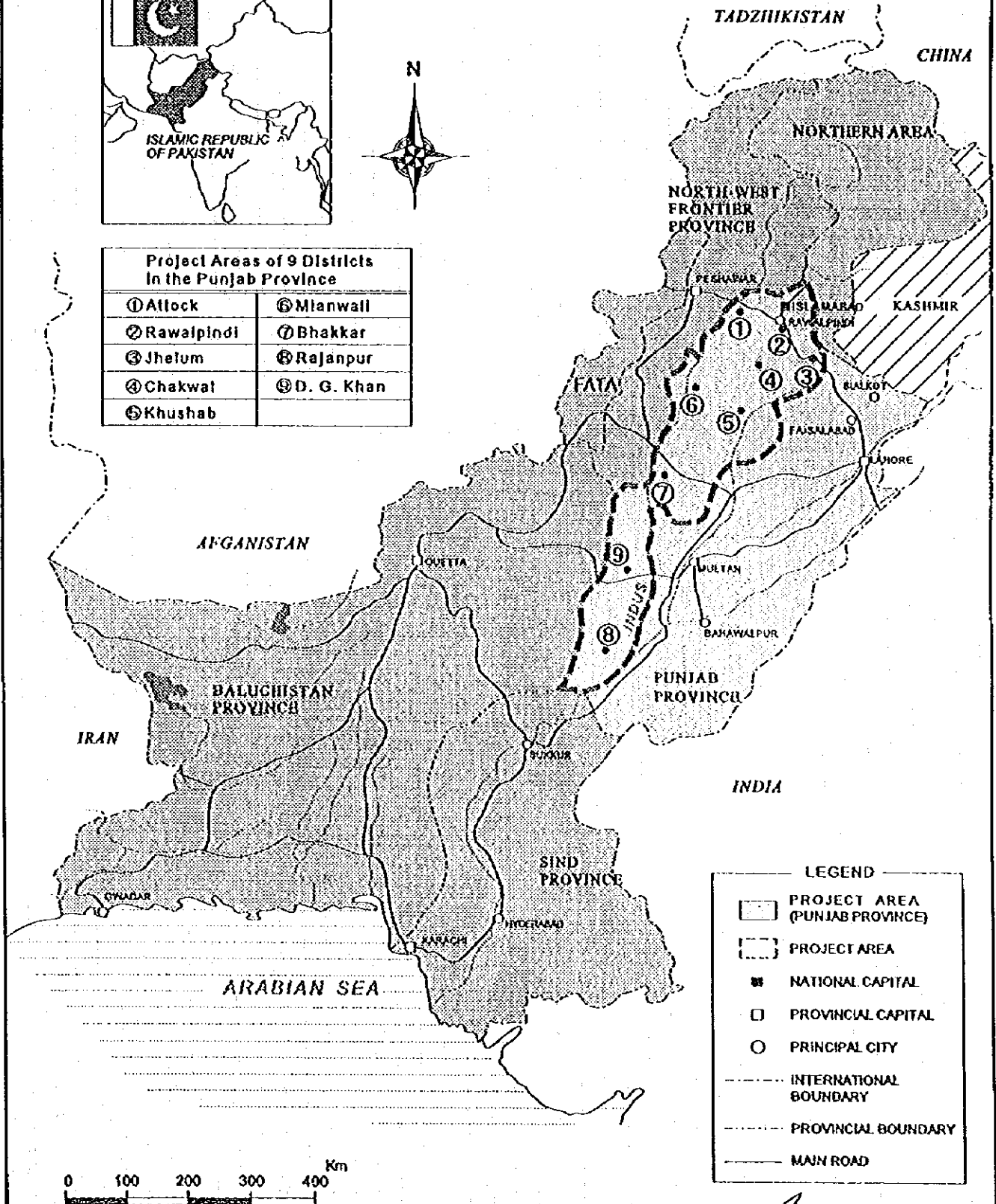
3) Internal transportation.



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 | |



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ANNEX-II

Items requested by the Pakistani side

Items Requested by the Pakistan 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 | | - | A |
| 1. Drill Pipe | - | - | |
| 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.

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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.

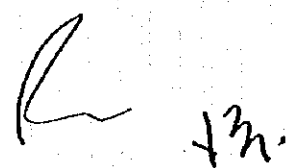
Fourthly, the Project, once approved by the Cabinet, with the Exchange of Notes signed by the Governments of Japan and the recipient country.

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)

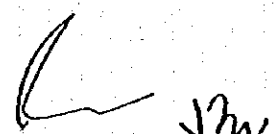
5) Necessity of "Verification"

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.

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.

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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..

**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**

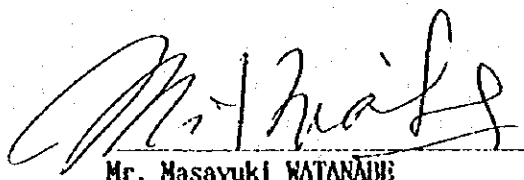
**MINUTES OF DISCUSSIONS
ON
BASIC DESIGN STUDY
ON
THE PROJECT FOR EXPLOITATION OF GROUNDWATER
AT
PROVINCE OF PUNJAB
ISLAMIC REPUBLIC OF PAKISTAN
(CONSULTATION ON DRAFT REPORT)**

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

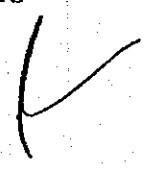


Mr. Masayuki WATANABE
Leader, Basic Design Study Team
JICA



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

Mr. Shahid Hunayun
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.

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-Bajri | 58.00 | - | - | - | - |
| 2 | | | Burhan | 2 | 1989/90 | 240 | 58.00 | × | 29.00 | - | - | - | - | Clay-Bajri | 58.00 | - | - | - | - |
| 3 | | | Burhan | 3 | 1989/90 | 184 | 55.00 | - | 39.00 | 48.00 | 9.00 | - | 10 | Clay-Bajri | 55.00 | - | - | - | - |
| 4 | | | Hassan Abdal | 1 | 1990/91 | 240 | 67.00 | - | 20.00 | 36.00 | 16.00 | * | - | Clay-Bajri | 67.00 | - | - | - | - |
| 5 | | | Hassan Abdal | 2 | 1990/91 | 340 | 67.00 | - | 20.00 | 36.00 | 16.00 | - | 18 | Clay-Bajri | 67.00 | - | - | - | - |
| 6 | | | Mirza | 3 | 1990/91 | 240 | 89.00 | - | 18.00 | - | - | * | - | Clay-Bajri | 89.00 | - | - | - | - |
| 7 | | | Mirza | 4 | 1990/91 | 184 | 89.00 | - | 18.00 | 58.00 | 40.00 | - | 19 | Clay-Bajri | 89.00 | - | - | - | - |
| 8 | | | Patch Jang | 1 | 1991/92 | 240 | 123.00 | × | 4.00 | - | - | - | - | Clay | 123.00 | - | - | - | - |
| 9 | | | Patch Jang | 2 | 1991/92 | 240 | 67.00 | - | 18.00 | 45.00 | 27.00 | - | 12 | Clay | 67.00 | - | - | - | - |
| 10 | | | Niko | 3 | 1991/92 | 240 | 78.00 | - | 4 | - | - | - | - | Clay | 78.00 | - | - | - | - |
| 11 | | | Niko | 4 | 1991/92 | 240 | 73.00 | × | 5.00 | - | - | - | - | Clay | 73.00 | - | - | - | - |
| 12 | | | Kalo-Pind | 5 | 1991/92 | 240 | 93.00 | × | 5.00 | - | - | - | - | Clay | 93.00 | - | - | - | - |
| 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 | - | - | - | - |
| 16 | | | Dhak Jougian | 9 | 1991/92 | 240 | 92.00 | - | 58.00 | 70.00 | 12.00 | - | 33 | Clay | 92.00 | - | - | - | - |
| 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 | - | - | - | - |
| 22 | | | Faqir Abad | 6 | 1992/93 | 109 | 120.00 | - | 49.00 | 139.00 | 90.00 | - | 34 | Clay-S | 120.00 | - | - | - | - |
| 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 | - | - | - | - |
| 26 | | | Khujia Nagar | 2 | 1993/94 | 240 | 102.00 | - | 17.00 | - | - | * | - | Clay | 102.00 | - | - | - | - |
| 27 | | | Khujia Nagar | 3 | 1993/94 | 109 | 102.00 | - | 17.00 | - | 37.00 | - | 24 | Clay | 102.00 | - | - | - | - |
| 28 | | | Taqi Khalo | 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 | - | - | - | - |
| 31 | | | Dhok Surfa | 7 | 1993/94 | 240 | 92.00 | - | 8.00 | - | - | * | - | Clay | 92.00 | - | - | - | - |
| 32 | | | Dhok Surfa | 8 | 1993/94 | 109 | 67.00 | - | 8.00 | 46.00 | 38.00 | - | 12 | Clay | 67.00 | - | - | - | - |
| 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 | - | - | - | - |
| 35 | | | Dhok Surfa | 11 | 1993/94 | 184 | 76.00 | - | 8.00 | 49.00 | 41.00 | - | 12 | Clay | 76.00 | - | - | - | - |
| 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 | - | - | - | - |
| 40 | | | Lubi Guard | 2 | 1994/95 | 184 | 80.00 | - | 20.00 | 52.00 | 32.00 | - | 9 | Clay | 80.00 | - | - | - | - |
| 41 | | | Lub | 3 | 1994/95 | 240 | 76.00 | - | 17.00 | - | - | * | - | Clay | 76.00 | - | - | - | - |
| 42 | | | Lub | 4 | 1994/95 | 109 | 78.00 | - | 15.00 | 39.00 | 24.00 | - | 19 | Clay | 78.00 | - | - | - | - |
| 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 | | | Isa Lam Pura | 7 | 1994/95 | 240 | 86.00 | - | 15.00 | 39.00 | 24.00 | - | 24 | Clay-S | 86.00 | - | - | - | - |
| 46 | | | Salik Abad | 8 | 1994/95 | 240 | 55.00 | - | 43 | - | - | - | 21 | Clay | 55.00 | - | - | - | - |
| 47 | | | Bahatar | 9 | 1994/95 | 240 | 106.00 | - | 17.00 | - | - | * | - | Clay-S | 106.00 | - | - | - | - |
| 48 | | | Bahatar | 10 | 1994/95 | 109 | 70.00 | - | 17.00 | 43.00 | 25.00 | - | 21 | Clay | 70.00 | - | - | - | - |
| 49 | | | Jhang | 11 | 1994/95 | 240 | 110.00 | - | 43.00 | - | - | * | - | Clay-S | 110.00 | - | - | - | - |
| 50 | | | Jhang | 12 | 1994/95 | 184 | 95.00 | - | 43.00 | 67.00 | 18.00 | - | 24 | Clay | 95.00 | - | - | - | - |

| 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 (%) | EC (μs/cm) | pH | Cl- (ppm) |
|-----|------------|----------|----------------------|--------------|-------------------|----------------|----------------|-----------------------------------|------------------------|-------------------------|--------------|--|------------------|-----------|-------------------|---------------------|------------|------|-----------|
| 51 | | | Bahlot | 1 | 1995/96 | 240 | 89.00 | - | 27.00 | 59.00 | 32.00 | - | 24 | Clay-R.S. | 89.00 | Fit for irrigation. | - | - | - |
| 52 | | | Nika | 2 | 1995/96 | 240 | 130.00 | - | 7.00 | - | - | * | - | Clay | 130.00 | Fit for irrigation. | - | - | - |
| 53 | | | Nika | 3 | 1995/96 | 293 | 130.00 | - | 7.00 | 81.00 | 74.00 | - | 58 | 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 | 1999/90 | 544.16 | 82.29 | 50.94 | 25.90 | 67.05 | 41.15 | 1.24 | 10.06 | - | - | 18.90 | 370 | 7.20 | 7.50 |
| 57 | | | Jhanabad | 4 | 1999/90 | 244.28 | 48.77 | - | - | - | - | - | - | - | - | - | - | - | - |
| 58 | | | Lab Thatha [Slampur] | 25 | 1999/90 | 244.28 | 91.44 | 50.94 | 17.07 | 52.42 | 35.35 | 1.44 | 18.29 | - | - | - | 321 | 7.60 | 7.78 |
| 59 | | | Lab Thatha | 26 | 1999/90 | 244.28 | 13.10 | - | - | - | - | - | - | - | - | - | - | - | - |
| 60 | | | Lab Thatha | 27 | 1999/90 | 244.28 | 74.67 | - | - | - | - | - | - | - | - | - | - | - | - |
| 61 | | | Lab Thatha | 36 | 1999/90 | 244.28 | 91.44 | - | - | - | - | - | - | - | - | - | - | - | - |
| 62 | | | Lab Thatha | 37 | 1999/90 | 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 Gujran | 16 | 1990/91 | 244.28 | 50.90 | - | - | - | 36.57 | - | 14.81 | Bairi | 105.15 | 18.70 | 390 | 7.44 | 7.96 |
| 66 | | | Dhoke Gujran | 17 | 1990/91 | 244.28 | 109.72 | - | - | - | - | - | - | - | - | - | - | - | - |
| 67 | | | Dhoke Lakhia | 28 | 1990/91 | 244.28 | 117.35 | 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 | 105.15 | 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 | | | Buchal | - | 1991/92 | 244.43 | 84.42 | X | - | - | - | - | - | - | - | - | - | - | - |
| 73 | | | Chak Amral | - | 1991/92 | 374.36 | 97.53 | 25.47 | 21.33 | 60.96 | 36.93 | 0.94 | 19.5 | S.Stone | 97.53 | 18.90 | 368 | 7.40 | 7.79 |
| 74 | | | Chak Khass | 74 | 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 | 81.38 | - | - | - | - | - | - | - | - | - | - | - | - |
| 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 Beghwell | 33 | 1994/95 | 744.26 | 121.92 | X | - | - | - | - | - | - | - | - | - | - | - |
| 100 | | | Mera Beghwell | 40 | 1994/95 | 764.25 | 76.20 | X | - | - | - | - | - | - | - | - | - | - | - |

| 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) |
|-----|------------|---------|-----------------------|--------------|-------------------|----------------|----------------|-----------------------------------|------------------------|-------------------------|--------------|--|------------------|----------|-------------------|---------|------------|------|-----------|
| 101 | | | Chak Shahzad | 45 | 1994/95 | 744.28 | 91.44 | - | - | - | - | * | - | - | - | - | - | - | - |
| 102 | | | Chak Shahzad | 46 | 1994/95 | 544.16 | 91.44 | 50.94 | 3.65 | 25.60 | 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 | - | - | 25.90 | 22.86 | - | 9.14 | 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 | 18.59 | 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 | 7.34 | 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 | | | Bojar | 47 | 1995/96 | 244.28 | 25.90 | X | - | - | - | * | - | - | - | - | - | - | - |
| 115 | | | Roisar | 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 | 152.40 | - | - | - | - | * | - | - | - | - | - | - | - |
| 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 | - | - | - | - | * | - | - | - | - | - | - | - |
| 122 | | | Sehala | 57 | 1989/90 | 244.28 | 121.52 | X | - | - | - | * | - | - | - | - | - | - | - |
| 123 | | | Pind Gondal | 2 | 1990/91 | 374.36 | 97.53 | 101.83 | 17.36 | 36.57 | 19.21 | 5.30 | 32.91 | Boulder | 97.53 | 18.52 | 357 | 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 Miana | 4 | 1991/92 | 244.28 | 106.68 | X | - | - | - | * | - | - | - | - | - | - | - |
| 131 | | | Por Miana | 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 | - | - | - | - | - | - | - | - | - | - | - | - |
| 140 | | | Chak Shahzad | 4 | 1992/93 | 444.16 | 87.17 | 50.94 | 8.53 | 32.30 | 23.77 | 2.14 | 31.59 | 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 | - | - | - | - | - | - | - | - | - | - | - | - |
| 143 | | | Bayec | 7 | 1992/93 | 244.28 | 82.29 | - | - | - | - | - | - | - | - | - | - | - | - |
| 144 | | | Hasan Abdal | 13 | 1992/93 | 244.28 | 171.90 | - | - | - | - | * | - | - | - | - | - | - | - |
| 145 | | | Kachia | 14 | 1992/93 | 244.28 | 137.16 | - | - | - | - | - | - | - | - | - | - | - | - |
| 146 | | | Dakhli Mohri | 15 | 1992/93 | 244.28 | 90.22 | - | - | - | - | - | - | - | - | - | - | - | - |
| 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 | - | - | - | - | * | - | - | - | - | - | - | - |

| 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 | 138.98 | - | +3 | - | - | - | - | - | - | - | - | - | - |
| 152 | | | Hasan Abda | 6 | 1993/94 | 244.28 | 29.26 | X | - | - | - | * | - | - | - | - | - | - | - |
| 153 | | | Bayec | 9 | 1993/94 | 244.28 | 137.16 | - | +4 | - | - | - | - | - | - | - | - | - | - |
| 154 | | | Islampur | 15 | 1993/94 | 244.28 | 83.82 | - | +3 | - | - | - | - | - | - | - | - | - | - |
| 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 | | | Bafraer | 58 | 1993/94 | 244.28 | 175.26 | - | - | - | - | * | - | - | - | - | - | - | - |
| 165 | | | Bafraer | 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 | 85.34 | 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 | 33.52 | 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 | - | - | - | - | * | - | - | - | - | - | - | - |
| 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 Buhooli | 33 | 1995/96 | 244.28 | 99.06 | - | - | - | - | * | - | - | - | - | - | - | - |
| 179 | | | Pindi Buhooli | 39 | 1995/96 | 304.56 | 97.53 | 50.94 | 18.28 | - | - | - | - | Bolder | 97.53 | 18.20 | 321 | 7.25 | 7.41 |
| 180 | | | Pindi Buhooli | 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 J.R-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 | | | Labacel Islampur | - | 1990/91 | 244.28 | 91.44 | - | - | - | - | * | - | - | - | - | - | - | - |
| 190 | | | Labacel Islampur | 2 | 1990/91 | 544.4 | 96.51 | 50.44 | 3.65 | 25.6 | 21.95 | 2.30 | 16.45 | Bolder | 96.51 | 15.65 | 385 | 7.83 | 7.68 |
| 191 | | | 7-10/3 Islamabad | 4 | 1990/91 | 244.28 | 104.54 | - | - | - | - | * | - | - | - | - | - | - | - |
| 192 | | | 7-10/3 Islamabad | 12 | 1990/91 | 380.71 | 88.00 | 25.47 | - | 67.05 | 19.81 | - | - | Bolder | 88.00 | 18.31 | 391 | 7.13 | 7.69 |
| 193 | | | Islampur Tamila | 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 Tamala | - | 1990/91 | 374.36 | 77.41 | 50.94 | 18.28 | 57.91 | 39.63 | 1.29 | - | Bolder | 84.73 | 18.13 | 378 | 7.31 | 7.36 |
| 197 | | | Labacel | - | 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 | 60.96 | 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 (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) | SC (µs/cm) | ph | Cl- (ppm) |
|-----|----------|---------|--|--------------|-------------------|----------------|----------------|-----------------------------------|------------------------|-------------------------|--------------|--|------------------|-------------------|-------------------|---------------------|------------|------|-----------|
| 201 | | | Lala Zair Kawalpindi | 24 | 1990/91 | 374.36 | 53.64 | X | - | - | - | * | - | - | - | - | - | - | - |
| 202 | | | 1/12 Islamabad | 3 | 1991/92 | 244.28 | 121.92 | - | - | - | - | * | - | - | - | - | - | - | - |
| 203 | | | Sirag Kadoon | 8 | 1991/92 | 244.28 | 28.04 | X | - | - | - | * | - | - | - | - | - | - | - |
| 204 | | | Sirag Kadoon | 15 | 1991/92 | 244.28 | 121.92 | X | - | - | - | * | - | - | - | - | - | - | - |
| 205 | | | Phok Ramzan Tema | 23 | 1991/92 | 244.28 | 137.16 | X | - | - | - | * | - | - | - | - | - | - | - |
| 206 | | | 1/12 Islamabad | 27 | 1991/92 | 244.16 | 95.31 | - | - | - | - | * | - | - | - | - | - | - | - |
| 207 | Jhelum | JR-6 | Taric Mahood 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. | 38.1 | 7.13 | 7.93 |
| 208 | | | Taric Mahood 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 | | | Mohd. Qbal Vill. Lillah | 3 | 1989/90 | 250 | 152.00 | X | - | - | - | - | - | - | - | - | - | - | - |
| 210 | | | Mohd. 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 | | | Mohd. 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 | | | Basir Ahmad S/O Abdul Malik R/O Garh Mahr | 11 | 1990/91 | 250 | 56.00 | 76.50 | 1.00 | 1.00 | - | - | - | - | - | - | - | - | - |
| 218 | | | Basir Ahmad S/O Abdul Malik R/O Garh Mahr | 12 | 1990/91 | 450 | 56.00 | 76.50 | 1.00 | 1.00 | - | - | - | - | - | - | - | - | - |
| 219 | | | Adm. Municipal Committee Dng. | 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 | | | Mian Basir Ahmad S/O Abdul Malik R/O Bala | 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 | | | Mian Basir Ahmad S/O Abdul Malik R/O Bala | 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 | | | Zafar Qbal R/O Maidaave | 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. Anwar S/O Qaim Din R/O Jarami | 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. Anwar S/O Qaim Din R/O Jarami | 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. Anwar S/O Qaim Din R/O Jarami | 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, Shinder | 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 | | | Mohd. Anwar S/O Mohd. Talib 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 | | | Mohd. Anwar S/O Mohd. Talib 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 Mohd. 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 | | | Shafiat 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 | | | Shafiat 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 Ali S/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 Ali S/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 | 183.00 | 45.91 | 5.00 | 42.00 | 37.00 | 1.24 | 13 | Hard S. | 183.00 | Fit for irrigation. | - | - | - |
| 239 | | | Shoukat Ali S/O Nazam Ali R/O Gorian | 33 | 1995/96 | 250 | 122.00 | X | - | - | - | - | - | - | - | - | - | - | - |
| 240 | | | Mohd. Anwar S/O Sardad Ali R/O Bala | 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. Anwar S/O Sardad Ali R/O Bala | 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 Bakh 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 Bakh 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 Bakh 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 | | | Qul. Muhammad S/O Patch Muhammad R/O Mara | 39 | 1995/96 | 250 | 41.00 | X | - | - | - | - | - | - | - | - | - | - | - |
| 246 | | | Qul. Muhammad S/O Patch Muhammad R/O Mara | 40 | 1995/96 | 250 | 27.00 | 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 (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 (mg/l) | 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 | | | Chakwal | 13 | 1989/90 | 250 | 152.00 | 68.00 | 21.00 | 30.00 | 9.00 | 7.33 | - | Clay Silt | 152.00 | - | - | - |
| 253 | | | Chakwal | 15 | 1989/90 | 375 | 152.00 | 68.00 | 21.00 | 30.00 | 9.00 | 7.56 | 46 | Clay Silt | 152.00 | - | - | - |
| 254 | | | Dhrabi | 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 Silt | 146.00 | - | - | - |
| 256 | | | Dhub | 16 | 1990/91 | 250 | 99.00 | 68.00 | 15.00 | 22.00 | 7.00 | 9.71 | - | Clay with Bolder | 99.00 | - | - | - |
| 257 | | | Dhub | 22 | 1990/91 | 450 | 97.00 | 68.00 | 15.00 | 22.00 | 7.00 | 9.71 | 40 | Clay with Bolder | 97.00 | - | - | - |
| 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 | | | Minaro | 16 | 1991/92 | 450 | 60.00 | X | - | - | - | - | - | - | - | - | - | - |
| 264 | | | Beshal Kala | 16 | 1992/93 | 250 | 121.00 | 51.00 | 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 | | | Khailir 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 | | | Anah | 20a | 1992/93 | 250 | 76.00 | - | - | - | - | - | * | - | - | - | - | - |
| 270 | | | Belawal | 20b | 1993/94 | 250 | 91.00 | X | - | - | - | - | - | - | - | - | - | - |
| 271 | | | Aceyila | 26 | 1993/94 | 250 | 54.00 | 68.00 | 45.00 | 54.00 | 9.00 | 7.56 | 21 | Clay with Bolder | 54.00 | - | - | - |
| 272 | | | Behan | 27 | 1993/94 | 250 | 91.00 | 68.00 | 38.00 | 54.00 | 15.00 | 4.53 | 30 | Clay S. | 91.00 | - | - | - |
| 273 | | | Behan | 31 | 1993/94 | 375 | 91.00 | 68.00 | 39.00 | 54.00 | 15.00 | 4.53 | 39 | Clay S. | 91.00 | - | - | - |
| 274 | | | Dukei 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 | - | - | - |
| 276 | | | Jang | 41 | 1993/94 | 375 | 149.00 | 68.00 | 27.00 | 42.00 | 15.00 | 4.53 | 45 | Clay Silt | 149.00 | - | - | - |
| 277 | | | Bala Hgal | 9 | 1994/95 | 250 | 152.00 | 68.00 | 27.00 | 57.00 | 30.00 | 2.27 | 50 | Clay Silt | 152.00 | - | - | - |
| 278 | | | Minra | 30 | 1994/95 | 250 | 66.00 | 68.00 | 57.00 | 72.00 | 15.00 | 4.53 | 15 | Clay with Bolder | 66.00 | - | - | - |
| 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 Bolder | 21.00 | - | - | - |
| 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 Bolder | 45.00 | - | - | - |
| 283 | | | Minara | 11 | 1995/96 | 250 | 121.00 | 68.00 | 57.00 | 66.00 | 9.00 | 7.56 | - | Clay Silt | 121.00 | - | - | - |
| 284 | | | Minara | 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 | - | - | - |
| 286 | | | Toha Mehran Khan | 47 | 1995/96 | 250 | 134.00 | - | - | - | - | - | - | - | - | - | - | - |
| 287 | | | Tolagang | 36 | 1995/96 | 450 | 134.00 | 68.00 | 21.00 | 36.00 | 15.00 | 4.53 | 50 | Clay Silt | 134.00 | - | - | - |
| 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 | - | - | - |
| 294 | Chakwal | JR-9 | Khata Tamen | 1 | 1989/90 | 375 | 99.00 | 51.00 | 21.00 | 36.00 | 15.00 | 3.40 | 38 | Clay with Bolder | 99.00 | - | - | - |
| 295 | | | Lati Bahon | 4 | 1989/90 | 250 | 152.00 | 51.00 | 18.00 | 39.00 | 21.00 | 2.43 | 60 | Clay with Bolder | 152.00 | - | - | - |
| 296 | | | Lati Dukkmal | 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 | - | - | - |
| 298 | | | Bokai Khun | 10 | 1989/90 | 250 | 106.00 | 51.00 | 21.00 | 51.00 | 30.00 | 1.70 | 45 | Clay with Bolder | 106.00 | - | - | - |
| 299 | | | Bokai Khun | 14 | 1990/91 | 250 | 53.00 | 51.00 | 21.00 | 51.00 | 30.00 | 1.70 | 30 | Clay with Bolder | 53.00 | - | - | - |
| 300 | | | Bokai Khun | 17 | 1990/91 | 250 | 68.00 | 51.00 | 21.00 | 51.00 | 30.00 | 1.70 | 37 | Clay S. | 68.00 | - | - | - |

| 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 (%) | EC (μs/cm) | pH | CL- (mm) |
|-----|----------|----------|--------------------|--------------|-------------------|----------------|----------------|-----------------------------------|------------------------|-------------------------|--------------|--|------------------|------------------|-------------------|---------|------------|----|----------|
| 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 bolder | 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 | | | Moneday | 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 | 129.00 | - | - | - | - |
| 317 | | | Chocra Jadingharah | 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 | | | Purnmed | 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 | | | Neulkuwa | 29 | 1992/93 | 250 | 152.00 | 68.00 | 18.00 | 21.00 | 3.00 | 22.67 | - | Clay silt | 152.00 | - | - | - | - |
| 325 | | | Neulkuwa | 30 | 1992/93 | 250 | 152.00 | 68.00 | 18.00 | 21.00 | 3.00 | 22.67 | - | Clay silt | 152.00 | - | - | - | - |
| 326 | | | Kongial | 32 | 1992/93 | 250 | 125.00 | X | - | - | - | - | - | - | - | - | - | - | - |
| 327 | | | Kongial | 33 | 1992/93 | 375 | 125.00 | 68.00 | 21.00 | 24.00 | 3.00 | 22.67 | - | Clay silt | 125.00 | - | - | - | - |
| 328 | | | Kongial | 36 | 1992/93 | 250 | 134.00 | X | - | - | - | - | - | - | - | - | - | - | - |
| 329 | | | Kongial | 38 | 1992/93 | 250 | 131.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 330 | | | Kongial | 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 | - | - | - | - | - | * | - | - | - | - | - | - |
| 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 | | | Jabair Pur | 27 | 1995/96 | 250 | 121.00 | X | - | - | - | - | - | - | - | - | - | - | - |
| 339 | | | Jabair Pur | 29 | 1995/96 | 250 | 129.00 | 68.00 | 26.00 | 32.00 | 6.00 | 11.33 | - | Clay silt | 129.00 | - | - | - | - |
| 340 | | | Jabair Pur | 48 | 1995/96 | 450 | 105.00 | 68.00 | - | - | - | - | - | Clay silt | 105.00 | - | - | - | - |
| 341 | | | Thirpal | 10 | 1995/96 | 250 | 147.00 | 68.00 | - | - | - | - | - | Clay silt | 147.00 | - | - | - | - |
| 342 | | | Thirpal | 32 | 1995/96 | 250 | 91.00 | 68.00 | 16.00 | 19.00 | 3.00 | 22.67 | - | Clay silt | 91.00 | - | - | - | - |
| 343 | | | Thirpal | 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 | | | Numei | 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 (μ s/cm) | pH | Cl- (ppm) |
|-----|----------|----------|--------------------|--------------|-------------------|----------------|----------------|-----------------------------------|------------------------|-------------------------|--------------|--|------------------|---------|-------------------|---------|---------------------|----|-----------|
| 351 | | | Numei | 4 | 1992/93 | 375 | 31.00 | 31.00 | 10.00 | 15.00 | 5.00 | 5.17 | 20 | Clay | 21.00 | - | Fit for irrigation. | - | - |
| 352 | | | Bakim Khal | 8 | 1992/93 | 250 | 33.00 | 33.00 | - | 11.00 | - | - | * | Clay | 22.00 | - | - | - | - |
| 353 | | | Bakim Khal | 9 | 1992/93 | 250 | 33.00 | 33.00 | - | 11.00 | - | - | * | Clay | 22.00 | - | - | - | - |
| 354 | | | Bakim Khal | 10 | 1992/93 | 250 | 33.00 | 33.00 | - | 12.00 | - | - | * | Clay | 146.00 | - | - | - | - |
| 355 | | | Bakim Khal | 11 | 1992/93 | 450 | 23.00 | 23.00 | 11.00 | 19.00 | 8.00 | 2.88 | 18 | Clay | 12.00 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 360 | | | Kawab Khal | 26 | 1992/93 | 250 | 33.00 | - | 11.00 | - | - | - | * | Clay | 22.00 | - | - | - | - |
| 361 | | | Kawab Khal | 27 | 1992/93 | 450 | 27.00 | 75.00 | 11.00 | 23 | 12.00 | 6.25 | 20.00 | Clay S. | 16.00 | - | Fit for irrigation. | - | - |
| 362 | | | Greedy | 30 | 1992/93 | 250 | 43.00 | - | 15.00 | - | - | - | * | Clay | 28.00 | - | - | - | - |
| 363 | | | Greedy | 1 | 1993/94 | 450 | 43.00 | 65.00 | 15.00 | 23 | 8.00 | 8.13 | 25.00 | Clay S. | 28.00 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 366 | | | Kawab Khal | 9 | 1993/94 | 250 | 43.00 | - | 12.00 | - | - | - | * | Clay | 31.00 | - | - | - | - |
| 367 | | | Kawab Khal | 10 | 1993/94 | 450 | 43.00 | 65.00 | 12.00 | 21 | 9.00 | 7.22 | 20.00 | Clay S. | 31.00 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | Kata | 12 | 1999/90 | 375 | 100.00 | 90.00 | 18.00 | 29.00 | 11.00 | 8.18 | 27 | Hard S. | 100.00 | - | Fit for irrigation. | - | - |
| 392 | | | Kufri | 13 | 1999/90 | 250 | 27.00 | - | 18.00 | - | - | - | * | - | - | - | - | - | - |
| 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 | - | Fit for irrigation. | - | - |
| 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 | 6.87 | 33 | Hard S. | 100.00 | - | Fit for irrigation. | - | - |
| 397 | | | Assa | 12 | 1990/91 | 250 | 100.00 | - | 90.00 | - | - | - | * | - | - | - | - | - | - |
| 398 | | | Kata | 5 | 1991/92 | 250 | 80.00 | - | 30.00 | - | - | - | * | - | - | - | - | - | - |
| 399 | | | Kata | 7 | 1991/92 | 250 | 117.00 | - | 20.00 | - | - | - | * | - | - | - | - | - | - |
| 400 | | | Kata | 8 | 1991/92 | 250 | 114.00 | - | 40.00 | - | - | - | * | - | - | - | - | - | - |

| 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 (%) | 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 | - | - | - | * | Hard S. | - | - | - | - | - |
| 404 | | | Kotly | 19 | 1992/93 | 250 | 88.00 | - | - | - | - | - | * | - | 61.00 | Fit for irrigation. | - | - | - |
| 405 | | | Kotly | 20 | 1992/93 | 450 | 96.00 | 46.00 | 35.00 | 46 | 11 | 4.18 | 30.00 | Hard S. | - | - | - | - | - |
| 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 | | | Mardwari | 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 | | | Mardwal | 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 | Patah Pur | 1 | 1989/90 | 250 | 129.00 | - | 37.00 | - | - | - | * | Clay | 32.00 | - | - | - | - |
| 433 | | | Kurhar | 2 | 1989/90 | 450 | 116.00 | - | 24.00 | 36.00 | 12.00 | - | * | Clay | 33.00 | - | - | - | - |
| 434 | | | Khata Saghal | 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 Saghal | 4 | 1989/90 | 250 | 79.00 | - | 27.00 | - | - | - | * | Hard S. | 52.00 | - | - | - | - |
| 436 | | | Khata Saghal | 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 | | | Dawal | 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 | - | - | - | - |
| 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 | 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 (%) | EC (μs/cm) | pH | Cl- (ppm) |
|-----|----------|----------|--------------|--------------|-------------------|----------------|----------------|-----------------------------------|------------------------|-------------------------|--------------|--|------------------|-----------|-------------------|---------|------------|----|-----------|
| 450 | | | Kufri | 72 | 1991/92 | 250 | 92.00 | - | 50.00 | - | - | - | * | Hard S. | 42.00 | - | - | - | - |
| 451 | | | Kufri | 11 | 1991/92 | 250 | 82.00 | - | 26.00 | - | - | - | * | hard S. | 55.00 | - | - | - | - |
| 452 | | | Kufri | 12 | 1991/92 | 375 | 82.00 | 85.00 | 26.00 | 38.00 | 12.00 | 7.08 | 55 | Caly | 56.00 | - | - | - | - |
| 453 | | | Kufri | 13 | 1991/92 | 250 | 92.00 | - | 20.00 | - | - | - | * | H.S. | 72.00 | - | - | - | - |
| 454 | | | Kufri | 14 | 1991/92 | 375 | 108.00 | 70.00 | 28.00 | 40.00 | 12.00 | 5.83 | 82 | H.S. | 80.00 | - | - | - | - |
| 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 | | | Kufri | 5 | 1992/93 | 250 | 7.00 | - | 3.00 | - | - | - | * | Clay | 4.00 | - | - | - | - |
| 458 | | | Kufri | 6 | 1992/93 | 250 | 100.00 | - | 27.00 | - | - | - | * | Clay | 73.00 | - | - | - | - |
| 459 | | | Kufri | 7 | 1992/93 | 438 | 78.00 | 85.00 | 27.00 | - | - | - | 15 | Clay H.S. | 51.00 | - | - | - | - |
| 460 | | | Kufri | 14 | 1992/93 | 250 | 117.00 | - | 27.00 | - | - | - | * | Clay | 90.00 | - | - | - | - |
| 461 | | | Kufri | 15 | 1992/93 | 250 | 100.00 | - | 27.00 | - | - | - | * | Clay | 73.00 | - | - | - | - |
| 462 | | | Kufri | 16 | 1992/93 | 375 | 100.00 | 70.00 | 27.00 | 39.00 | 12.00 | 5.83 | 26 | Clay | 73.00 | - | - | - | - |
| 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 | 60.00 | - | - | - | - |
| 465 | | | Ochali | 28 | 1992/93 | 250 | 63.00 | - | 3.00 | - | - | - | * | Clay H.S. | 80.00 | - | - | - | - |
| 466 | | | Karadhi | 29 | 1992/93 | 250 | 107.00 | - | 27.00 | - | - | - | * | Clay H.S. | 26.00 | - | - | - | - |
| 467 | | | Karadhi | 31 | 1992/93 | 375 | 107.00 | 75.00 | 27.00 | 39.00 | 12.00 | 6.25 | 83 | Clay H.S. | 93.00 | - | - | - | - |
| 468 | | | Ochali | 3 | 1993/94 | 250 | 113.00 | - | 20.00 | - | - | - | * | H.S. | 93.00 | - | - | - | - |
| 469 | | | Kufri | 8 | 1993/94 | 375 | 120.00 | 75.00 | 27.00 | 39.00 | 12.00 | 6.25 | 87 | Clay | 93.00 | - | - | - | - |
| 470 | | | Kufri | 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 | | | Kufri | 13 | 1993/94 | 250 | 87.00 | - | 27.00 | - | - | - | * | Clay | 60.00 | - | - | - | - |
| 473 | | | Kufri | 14 | 1993/94 | 375 | 87.00 | 80.00 | 27.00 | 40.00 | 13.00 | 6.15 | 80 | Clay | 60.00 | - | - | - | - |
| 474 | | | Kufri | 16 | 1993/94 | 250 | 100.00 | - | - | - | - | - | * | - | - | - | - | - | - |
| 475 | | | Kufri | 28 | 1993/94 | 250 | 100.00 | - | - | - | - | - | * | - | - | - | - | - | - |
| 476 | | | Kufri | 24 | 1993/94 | 375 | 100.00 | 85.00 | 27.00 | 39.00 | 12.00 | 7.08 | 70 | Clay | 78.00 | - | - | - | - |
| 477 | | | Kufri | 25 | 1993/94 | 450 | 100.00 | 80.00 | 27.00 | 39.00 | 12.00 | 6.67 | 70 | Clay | 73.00 | - | - | - | - |
| 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 | - | - | - | - |
| 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 | - | - | - | - |
| 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 | - | - | - | - |
| 484 | | | Kufri | 15 | 1994/95 | 250 | 100.00 | - | 27.00 | - | - | - | * | Clay | 73.00 | - | - | - | - |
| 485 | | | Kufri | 10 | 1994/95 | 375 | 100.00 | 80.00 | 27.00 | 39.00 | 12.00 | 6.77 | 27 | Clay | 73.00 | - | - | - | - |
| 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 | - | - | - | - |
| 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 | - | - | - | - |
| 491 | | | Khtay | 8 | 1995/96 | 250 | 100.00 | - | - | - | - | - | * | - | - | - | - | - | - |
| 492 | | | Khtay | 15 | 1995/96 | 375 | 100.00 | 80.00 | 23.00 | 34.00 | 11.00 | 7.27 | * | - | 77.00 | - | - | - | - |
| 493 | | | Khtay | 3 | 1995/96 | 250 | 100.00 | 80.00 | 23.00 | - | - | - | * | - | 77.00 | - | - | - | - |
| 494 | | | Khtay | 6 | 1995/96 | 250 | 100.00 | 80.00 | 23.00 | - | - | - | * | - | 77.00 | - | - | - | - |
| 495 | | | Khtay | 7 | 1995/96 | 250 | 100.00 | 80.00 | 23.00 | - | - | - | * | - | 77.00 | - | - | - | - |
| 496 | | | Khtay | 9 | 1995/96 | 250 | 57.00 | 85.00 | 16.00 | - | - | - | * | - | 41.00 | - | - | - | - |