

Islamic Republic of Pakistan
 Government of Balochistan
 Local Government and
 Rural Development Department
 Water Supply and Sanitation Cell

Government of the Netherlands
 Ministry of Foreign Affairs
 Directorate General for International Cooperation

**BALUCHISTAN
 RURAL WATER SUPPLY
 AND SANITATION PROJECT
 (BRUWAS)**



INTERNATIONAL REFERENCE OFFICE
 WATER & SANITATION ENGINEERING
 ROTTERDAM, THE NETHERLANDS

MISSION REPORT

WATER & SANITATION ENGINEERING

(5 - 27 May, 1993)

IWACO

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In cooperation with:

- UNICEF
 Quetta - Pakistan
- Agri-Bi-Con International (Pvt) Ltd
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THE ABOVE INFORMATION REFERENCE
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1. BACKGROUND OF THE MISSION

This report has been prepared upon completion of a 3 weeks mission by Mr. B. Blankwaardt, Sanitary Engineer with IWACO B.V. to the Balochistan Rural Water Supply and Sanitation Project (BRUWAS) in Quetta, Pakistan.

This project is executed by the Baluchistan Local Government and Rural Development Department (LGRDD) under financing by the Government of Pakistan and the Netherlands. Technical assistance is provided by IWACO B.V. of Rotterdam, the Netherlands, in cooperation with UNICEF Quetta and with AGRI-BI-CON of Islamabad, Pakistan.

The mission was carried out from 5th till 27th May, 1993 with the aim of providing technical backstopping to the project; while IWACO was in the process of recruiting a suitable candidate for the function of Technical Advisor which had become vacant due to the illness of Mr. W. Lindeyer.

At an earlier date in February/March 1993, Mr. M. Chapman, Water Supply and Sanitation expert with IWACO, had given technical support to the project in the form of a series of training session for the then available staff of the Quetta-based water and Sanitation Cell (WSC) of LGRDD.

Terms of Reference were prepared for the Pakistani W&S Technician (see Annex 12) who started in the consultants team as per 17th May 1993.

2. TERMS OF REFERENCE AND ITINERARY

The tasks to be carried out during this mission are described in the attached Terms of Reference (Annex 1). These TOR have been followed as closely as possible. However, given the fact that field operations had not yet started, it was impossible to make a proper assessment of the training needs of the LGRDD staff in Cell and Districts (point 2 of ToR)

Moreover, in the course of time it became apparent that some additional time would have to be devoted to the general operational aspects of starting up the field activities of the project in Loralai District.

As itinerary of the mission is given in Annex 2. There were two special events during this mission: a visit organized by UNICEF to the manufacturers of AFRIDEV handpumps and accessory pvc pipes in Karachi, and the first visit of LGRDD Cell and Consultants staff to Loralai District, in preparation of the Water Supply and Sanitation programme there.

The Terms of Reference were discussed with Mr. W. J Plantinga of the Royal Netherlands Embassy, who visited the project immediately upon his return from the Netherlands during the first week of the mission. It was further decided in consultation with Mr. Plantinga, that debriefing of the mission at the Embassy in Islamabad would not be required.

3. PRESENTATION OF FINDINGS

3.1 Introduction

Given the backstopping character of this mission, and the different types of subjects dealt with, it was agreed with Mr. B. Huizinga, Chief Technical Advisor, that an appropriate way to present the findings and results of this mission, would be in the form of a short report with references to more elaborated annexes.

The Sequence of the different issues may not be fully in line with their chronological appearance in the itinerary but this is mainly due to the fact that a number of conclusions could only be drawn after the visits to Karachi and Loralai, which took place towards the end of the mission.

3.2 Starting up the water supply programme

The Inception Report prepared by the consultants was approved by the Pakistan and Balochistan authorities in the period of the mission. A Memorandum of Understanding on the major project issues was signed by these authorities, UNICEF and the Royal Netherlands Embassy. This gave the formal "green light" to proceed with the execution of the proposed programme in the Districts.

Although originally Zhob and Qila Saifullah Districts had been selected as starter districts (see also mission reports Groen and Reyerkerk), the security situation in that area would not allow for the frequent travelling of project keystaff which will be required in the early stages of project execution.

Therefore, in consultation with LGRDD and P&D, Loralai District was selected instead, having the advantage for the project of, apart from being at relatively short distance from Quetta, being the seat of the Commissioner of Zhob Division. The Division covers the districts of Loralai, Zhob, Qila Saifullah, Barkhan and Musakhel, which are featuring in this sequence in the tentative project planning (see Annexes 7,8,9). This planning is a kind of "worst case scenario" based on 1 handpump per village, operations in all Union Councils of each district, and an as yet limited role for the direct supply.

Based on this planning a schedule has been set up for the delivery of handpumps to the capitals of the different core districts of the project, to be communicated via UNICEF Quetta to UNICEF Islamabad. The schedule takes into account a minimum required production of 100 pumps per month for the factory to operate the production line in a feasible manner. The schedule was discussed with UNICEF staff of Quetta and Islamabad, who saw no difficulty in complying with it (see discussions in Karachi, Annex 3). A point of attention may be the price of handpumps: cost estimates based on recent factory prices, and including transport costs and UNICEF handling charges may differ too much from what is charged to the Netherlands Government.

During a meeting with the AD/LGRDD Loralai at the project office in Quetta, the project objectives and strategies were explained and preparations were made for a first visit to Loralai, which took place on 23-25 May, and in which all WSC keystaff and consultants participated.

According to the AD/LGRDD, during the proceeding and still ongoing UNICEF-supported WATSAN and ACWATSAN programmes, 94 handpumps have been installed sofar in Loralai District, out of a total of 160 supplied (note that the figure provided by UNICEF is 190: it is not clear why there is a difference; may be due to delivery to Division capitals, rather than District capitals).

A general observation should be noted here: nobody of the LGRDD staff reported to have been given, nor had felt any clear-cut responsibility for the execution of these earlier programmes.

Moreover, the responsible staff had been lacking the tools (transport, funds) for a proper implementation. This situation should be avoided in the future; clear and commonly agreed upon project procedures, job descriptions, provision of tools, e.g. motorbikes on loan-basis, should be taken care of, either by the project or by the LGRDD itself.

Some of the installed handpumps and latrines were visited during short field trips. For a report see Annex 4. General impression was reasonable construction work, but room for improvement of quality and efficiency. Oldest pump was from 1991. No repairs had been required yet, which is in line with overall experience on AFRIDEV pump: virtually no maintenance required in first 2-3 years. Hygiene education was clearly lagging behind: in terms of sanitary conditions at well site, storage of water in the house, personal hygiene, etc. there is much left to be desired.

Also, a competition (or perhaps non-coordination, or perhaps political pressure) could clearly be observed

where schemes of PHED, LGRDD, WAPDA, town council, and even privately-owned schemes exist next to each other, for sometimes exactly the same target group.

The knowledge gained from a proceeding visit by a number of project staff to Karachi (UNICEF and pump manufacturers see also Annex 3) appeared to be useful for the discussions in Loralai on supply logistics.

The stores of LGRDD in Loralai still contain approx. 65 handpumps with accessories and 110 latrine pans of the strap type. For a short report on the stores situation, reference is made to Annex 5.

It can be expected that the reported complaints of LGRDD will become less: some arrangements have been made by UNICEF for improved packaging by manufacturer, and districts will in future be informed about shipments.

3.3 Some reflections on the sanitation programme

During this mission not much attention has been given as yet to the sanitation component of the project, because it was considered more essential to get the handpump programme started: availability of water will be a first requirement for the type of latrines that will in the first instance be promoted by the project.

Nevertheless, the experiences in the field and discussions with the Quetta Sewerage and Sanitation project have given sufficient reason for putting a few remarks on the subject on paper.

From what has been observed in the field (not only during the mission in Loralai, but also on other occasions in other districts) it may tentatively be concluded that in the set-up of the previous programmes, too much hope has been vested in the self-propagating effect of a limited number of demonstration latrines within one village.

A second conclusion is that the framework of a sanitation programme must be very strictly defined - and possibly with some conditions attached to it - in order for the programme to be successful.

Such conditions could for instance be:

- clearly demonstrated willingness of the community as a whole to participate in the project, resulting in a 60 to 70 % target coverage.
- the construction/installation programme must be accompanied by a hygiene education programme which will have the means (staff) and a guarantee of access to the target groups (especially women).

3.4 Coordination with other agencies

Public Health Engineering Department (PHED)

Complete lists were received from PHED in Quetta on the schemes installed by that department during the last 10 15 years in Baluchistan, Not clear, however, is the operational condition of all these schemes. PHED is presently working on such an inventory.

PHED is facing a change in government policy: operation and maintenance will be brought under responsibility of the users of the systems. This has clear consequences for the design of the schemes: small, compact schemes with short transport lines and limited pumping stages will be applied in order to get O&M costs in a range acceptable and payable for the user.

This may mean that smaller hamlets, which could formerly be supplied by a (long) branch from a bigger scheme, would now not be supplied anymore by PHED. For such hamlets handpump schemes would be much more appropriate.

UNICEF

Although details were not yet fully known at the time of the mission, UNICEF-Quetta has clear intentions to continue its programmes in the water and sanitation sector. Several project documents are available which have considerable focus on health education and community development. Apart from that, a training programme has been planned for caretakers in districts where pumps have been installed before.

Proper arrangements will have to be made about e.g. the total input of WSC key staff as planned by UNICEF in its training programme, otherwise this crucial staff might not be available for the BRUWAS project in districts where main activities are going on.

Moreover, where discrepancies exist between the approaches of BRUWAS and the UNICEF-sponsored programmes, these may possibly be reconciled, resulting in a unanimous voice toward the client and the public, thereby making use of the established UNICEF staff.

ANNEXES

TERMS OF REFERENCE

Position : Expatriate Water Supply Engineer

Introduction

The Balochistan Rural Water Supply and Sanitation Project (BRUWAS) is a joint project of the Governments of Pakistan and the Netherlands and UNICEF with the objective to introduce replicable approaches for rural water supply and sanitation based on principles of community-based management and to install some 2,000 handpumps and 10,000 latrines in rural Balochistan. The project is scheduled for the period of 3 years (August 92 to July 95). Within the Consultants Team the following assignment of an expatriate Water Supply Engineer is planned:

Tasks

1. The Water supply Engineer will review the procedures already prepared by the project on technical aspects and prepare an outline of the technical parts of the necessary manuals for rural water supply and sanitation.
2. The Water Supply Engineer will identify the training needs of the technical staff of the executing agency, i.e. the Cell of LGRDD Balochistan and its District Offices;
3. The Water Supply Engineer will review the local production capacity of handpumps and establish a list of required materials and equipment for 1993; he will set out the requirements of a logistical system including planning, storage, monitoring, and training of the necessary staff.
4. The Water Supply Engineer will set up a detailed working programme for a Pakistani Consultant (W&S Technician) to assist in executing the activities indicated above.

Position

The Water Supply Engineer will operate under the direct responsibility of the Chief Technical Advisor. He will collaborate closely with his counterpart, the Head of the Water Supply and Sanitation Technology Section and Pakistani Consultant (W&S Technician)

Timing May 1993 (3 weeks)

MISSION ITINERARY

Wednesday, 5 May 1993

- Travel Amsterdam - Karachi

Thursday, 6 May 1993

- Travel Karachi - Quetta
- Briefing by Mr Huizinga on state of affairs BRUWAS project
- Introduction to LGRDD Cell staff and Consultant's team
- Discussion with Mr Tuinhof and Mr Huizinga on project issues and strategies

Friday, 7 May 1993

- Study of relevant reports
- Discussion with Mr Boomsma, management advisor to BWASA

Saturday, 8 May 1993

- Discussion on Terms of Reference and mission workplan
- Inventory and study of available technical training material
- Study material of training course conducted by Mr Chapman

Sunday, 9 May 1993

- Project meeting with Consultants' team and LG&RDD W&S Cell staff
- Start preparation outline technical manuals

Monday, 10 May 1993

- Meeting with DG/LGRDD; discussions on UNICEF training Kharan 15-20 May, visit pump factory Karachi, status MoU on Inception Report
- Meeting with Mr J. Stofkoper of Quetta Sewerage and Sanitation Project; discussions on QSSP latrine programme experiences, availability of training material
- Prepare staff meeting 11-05

Tuesday, 11 May 1993

- Project staff meeting: planning and assignment of activities prior to field implementation in Loralai District.
- Work on outline technical manuals
- Interview Mr Munir Ahmed, sanitary engineer
- Discussion with Mr Tuinhof and Mr Huizinga
- Dinner with Mr W.J. Plantinga of RNE; discussions on BRUWAS and BWASA-MAS projects

Wednesday, 12 May 1993

- Visit Mr Plantinga to project; discussions on MoU inception report, contract NL-UNICEF, ToR Mr Blankwaardt, project progress and planning
- Discussion with technical staff LGRDD Cell on education, working experience and further required training
- Final discussion with Mr Tuinhof, who departs for the Netherlands

Thursday, 13 May 1993

- Elaboration of technical field operation procedures and set-up of tentative hand-pump implementation programme
- Meeting with Mr Akber Sher Babar of UNICEF-Quetta
- Inventory of all training/education material collected by Consultant's team

Saturday, 15 May 1993

- Visit to Survey of Pakistan, branch office Quetta
- Discussion with Mr Huizinga on project execution strategies and planning

Sunday, 16 May 1993

- Visit to WAPDA Hydrogeological Directorate: collect hydrogeological reports on Loralai, Musakhel and Barkhan Districts, discuss possible assistance in hydrogeological surveys
- Visit to PHED-Quetta: discussions with Mr Marchand and Mr Ferguson of World Bank financed RWSS Project, collection of data on PHED schemes in BRUWAS Districts
- Interview with Mr Harold Lockwood
- Check water quality testing equipment in BRUWAS office
- Prepare field equipment (Consultant) and handpumps (UNICEF) order lists
- Prepare meeting with A/D LGRDD Loralai

Monday, 17 May 1993

- Meeting with A/D LGRDD Loralai at project office; preparation of fieldtrip and Loralai programme
- Prepare order for topographical maps

Tuesday, 18 May 1993

- Travel Quetta - Karachi with Mr Babar of UNICEF-Quetta and LGRDD Cell staff

Wednesday, 19 May 1993

- Karachi:
 - * Meeting with UNICEF-Islamabad and -Karachi staff at UNICEF office, discussion of supply procedures
 - * Visit to Engineering Concern (PVT) Ltd, manufacturer of AFRIDEV hand-pumps

Thursday, 20 May 1993

- Karachi:
 - * Visit DADEX Eternit Ltd, manufacturer of uPVC pipes
 - * Discussion with UNICEF and manufacturers on BRUWAS' required supply schedule, and on set-up of direct supply lines

Friday, 21 May 1993

- Travel Karachi - Quetta

Saturday, 22 May 1993

- Travel Quetta - Loralai

Sunday, 23 May 1993

- Loralai:
 - * Meetings with resp. Divisional Commissioner, District Commissioner, LGRDD-Loralai staff and with Union Council Chairmen and Secretaries
 - * Field visits to several (AC)WATSAN-supplied villages
 - * Dinner hosted by A/D LGRDD-Loralai

Monday, 24 May 1993

- Loralai: inspection of LGRDD stores
- Travel Loralai - Quetta
- Report writing

Tuesday, 25 May 1993

- Wrap-up meeting project staff
- Report writing
- Preparation ToR Mr Ahmed Munir

Wednesday, 26 May 1993

- Debriefing mission Mr Blankwaardt
- Travel Quetta - Karachi

Thursday, 27 May 1993

- Travel Karachi - Amsterdam

SHORT REPORT ON VISIT TO KARACHI 19-20 MAY 1993

A. MEETING AT UNICEF OFFICE KARACHI 19-05-93

Present: see attached attendance list.

Supply procedures UNICEF (explanation by Mr Jef Groby)

- a) 1 wk UNICEF-Quetta: establishes supply list indicating: items, quantities, specifications, budget prices
- b) 1 wk UNICEF-Islamabad:
Prepares Supply Call Forward (SCF) indicating: total amount + transport + target dates + delivery address(es)
- c) 3-4 wks Obtains Local Purchase Authorisation (LPA) from UNICEF Supply Division Copenhagen, for orders > USD 10,000. Supply Division checks competitiveness with world market prices.
- d) 5 wks Issues tender for supplies; prices to be valid for period of one year. Invitation to tender is restricted to companies registered with UNICEF. Only once a year required.
- e) 2 wks Evaluation of tender, and recommendation by Chief Supply to Contracts Review Committee (CRC) (advisory panel consisting of UNICEF Islamabad staff) for approval.
- f) 1 wk Prepares Purchase Order (PO) = contract with supplier
- g) 2-3 month Production of pumps + inspection report from quality controller
- h) 2 wks UNICEF-Islamabad: arranges transport to the districts

Total minimum time on UNICEF side (steps a) through f)): 13 wks = 3 months

Manufacturers of AFRIDEV handpumps in Pakistan

<u>Name, location of firm</u>	<u>Max. present cap.</u>
1. Engineering Concern (PVT) Ltd, Karachi	5-7,000/yr
2. Elecmech, Lahore (small workshop)	500/yr
3. KSB Pumps, Hassanabdal (40 km from Rawalpindi) (problems in timely delivery due to subcontracting)	500/yr
4. DAKAR, Swabi (2 hrs N.E. of Peshawar) (good performance: 800 pumps ordered early 1993, mid may 600 ready for inspection)	5-7,000/yr

Two more companies in Lahore have shown interest in production of the pump.

Transport companies presently engaged by UNICEF

1. Naroz Goods Forwarding Company (UNICEF has good experience with them)
2. Global Packers

UNICEF has agreements with these firms on transport rates, fixed for 1 year for 8 places of departure to about 80 different destinations.

Some typical rates:

Karachi - Quetta: Rs. 5-7,000 per truckload (indep. of tonnage)
Karachi - Gwader: Rs. 15,000 " "

One truckload may typically contain:

- 70-80 handpumps, or
- 325 casing pipes (3 m length), or
- 450-500 riser pipes.

The latter will normally be combined (riser in casing) if possible.

Quality control on manufacturing of handpumps

Quality control was formerly contracted out to Crown Agents. Due to their office being located in Dhaka (B'desh) they could not sufficiently quick respond to suppliers' needs.

As per 1-1-93 contract has been awarded by UNICEF to the Pakistan subsidiary of Societe General de Surveillance (SGS) of Switzerland. UNICEF is quite content with their performance.

Note: UNICEF has made arrangement with SGS for technical field monitoring of pump components in order to further improve the design of AFRIDEV, which is now produced according to SKAT revision No.2 (copy available at BRUWAS).

B. VISIT TO ENGINEERING CONCERN (PVT) LTD 19-05-93

Production of AFRIDEV started in 1988: few pumps were brought in from Kenya. Co-operation with Pakistan Council for Appropriate Technology (PCAT). Major problems concerned production of plastic and rubber parts, dimensioning of steel parts, galvanizing. In 1989, 500 pumps were produced for UNICEF. Now the capacity is 5,000 to 7,000 per annum. For reasons of efficiency, quality guarantee and regularity of supply, the entire production (steel, plastic, rubber parts) has been brought under one roof, except for 1 brass part, which comes from Wah Industries.

UNICEF still not 100 % satisfied with performance (timely delivery) but sees progressive improvement.

Engineering Concern (EC) makes impression of having genuine interest in development of the pump. However, in the Pakistan commercial context they face the following problems:

- general public opinion in favour of non-Pakistani products;
- customer-determined prices, which make it difficult to keep up with international quality standards.

A photographic impression of production and testing is given in appendix.

EC is presently working on improvement of packaging for transport to the districts: pump heads and pumprods come unpacked but all smaller items and spares in wooden crates (formerly in carton, see also report on visit Loralai).

All pumps are provided with a serial number. Packing lists (see appendix) will in future mention these numbers, and factory keeps track of production dates and versions.

Price of pump (excl. PVC riser/casing): Rs. 6,500.
Present stock at factory is 30 handpumps.

BRUWAS' demand of approx. 100 pumps per month can easily be dealt with. According to management, this would be the minimum quantity for feasible line production.

EC has no commercial outlets in the region as yet, but is well prepared to cooperate in this, if market becomes available. Agreement was reached on visit of factory management to Quetta in week of 12 June. "Utility Corporation" was mentioned as a possibility. In this light it should be noted that some individual customers from Baluchistan had been served by EC (supply of several single handpumps). EC has also undertaken training of trainers, for which purpose they have produced a useful videotape on installation and maintenance. Copy of the tape will be sent to UNICEF Quetta, together with a pricelist for all spare parts.

C. VISIT TO DADEX ETERNIT LTD 20-05-93

Factory in Karachi started with production of asbestos-cement pipes in license of Eternit Belgium in 1965. Raw material mainly from Canada, S. Africa, Russia. Major customer is PHED for water pipes. DADEX also produces AC building materials such as the new Nalidar beam of 24' free span.

Production of uPVC pipes started in 1991 under exclusive license from Wavin Overseas, the Netherlands. High quality pipes upto 6" dia. Presently one extrusion production line with a capacity of 300 pipes (6 m length) per day.

Total annual output of PVC amounts to 2,000 tonnes. Production of fittings will start this year. There is a rapidly growing market for uPVC pipes, given the environmental problems of production and application in water supply of AC pipes.

A second uPVC production line for pipes upto 10" dia. is under installation.

DADEX produces the risers (OD 63 mm) and casing/screen pipes for the AFRIDEV handpump. There are two more manufacturers in Pakistan, but according to UNICEF, DADEX products have the best quality at a reasonable price: Rs. 60-80 per meter.

The pipe production process is fully automatic. Sockets of appr. 10 cm are formed manually with a special dye, after dumpling in hot glycerine. Dimensioning is almost perfect.

For an impression of the company's production, see the photos in appendix.

Formally, DADEX has a branch office in Quetta: Sirki Road, opposite Industrial Police Station, but the office is not yet fully operational.

Management of DADEX has agreed to join Engineering Concern on their visit to Quetta, in order to investigate the establishment of outlets for commercial sales of handpumps and spare parts.

D. DOCUMENTS RECEIVED AND IN BRUWAS LIBRARY

1. Fernando Mujica/Peter Wurzel: Presentation to the Handpump Meeting on AFRIDEV Pump Field Experience, 24 June 1991, UNICEF Islamabad
2. Fernando Mujica: Presentation to the Kakamega Handpump Workshop, 6-12 November 1992
3. AFRIDEV Deep Well Handpump, Technical specifications for UNICEF Supply Call Forwards, January 1993, UNICEF Islamabad
4. AFRIDEV Handpump Installation Manual (Urdu version)
5. AFRIDEV Handpump Maintenance Manual (Urdu version)
6. DADEX Eternit Ltd Brochure on uPVC Pipe Systems

SHORT REPORT ON FIELDTRIPS IN LORALAI DISTRICT

Date: 24-05-1993

Participants:

LGRDD - Loralai : Mr. Shahbaz Khan Assistant Engineer
 Mr. Amman Ullah Khan Development Officer
 Mr. Saeed Ahmed Sub- Engineer
LGRDD - WSC : Mr. Abdul Khaliq Engineer Sanitation
IWACO/AGRI-BI- : Mr. Bob Blankwaardt Sanitary Engineer
CON : Ms. Shagufta Ara District Coordinator
 Mr. Edward Arthur District Coordinator
 Mr. Munir Ahmed W & S Technician

General

The following villages in 3 different Union Councils were visited, where handpumps and latrines have been installed under the UNICEF - sponsored programmes that have been carried out in the District: demonstration phase, WATSAN and ACWATSAN programmes. Some photographs of handpumps and latrines are shown in an appendix to this short report.

Village	Union Council	# Inhab	Dist Loralai
Marzak Nasaran Zhob	Uryagei	20-25,000	4m, dir
Kach Amackzai	Kach Amackzai	3,000	15m, dir Q.Saifulah
Pathan Kote	Punga	100?	...m, dir Ziarat

Nasaran village (UC Uryaqi)

Water Supply Situation

One quarter in the town (about 70 houses, or 840 people) gets water from an AFRIDEV handpump, recently installed (1992) on an upgraded existing well, and freely accessible to the public. Well was properly closed and water quality seemed OK (EC 655 us/cm). depth of well measured at 51.5 ft. However, only 1.5 ft height of water column.

People said they wanted 2-3 more handpumps, willing to pay for them. There was no caretaker; people would not be able (yet) to repair the pump. However, training programme UNICEF for caretakers has been scheduled also for Loralai.

There is a PHED water supply scheme, completed in 1987. Presently once in the morning water is supplied in parts of the town only. Illegal connections were reported, which may contribute to this situation, but there might be many other reasons for the present supply shortages. Contact PHED for further information.

Most inhabitants reported to have open dug wells within the compound, which were said to be polluted. The water from these wells is generally not used for drinking/cooking purposes.

Three "kareez"'s (underground aqueducts) run in straight lines through the town, from mountains about 10 km away towards orchards on the other side of the town. Every 2030m there are dug holes which give access to the kareez for maintenance work. Although water conducted by the kareez is intended for private irrigation, some people are allowed to draw water from the holes. Water quality is good (EC 540 us/cm).

Health and Sanitation

Latrines have been installed in the village, of which 1 was visited, consisting of 2 pans and 2 pits. Not in use yet (no superstructure), nobody there to construct. Instead, the traditional small stinking defecation field alongside a compound wall was used. Total inhab. compound about 50.

Compound made unhealthy general impression. No ventilation in rooms. Most important diseases: diarrhoea, coughing (pneumonia?).

Socio-economic conditions

Town has electricity supply. However, no health post, there is a primary boys school, but no teacher.

Kach Amackzai village (UC Kach Amachzai)

Water supply situation

3 Handpumps have been installed:

- * 1991, WATSAN, serving 3 compounds, depth well 40, cover blocked, no measurements, yield OK.
- * 1992, ACWATSAN, in schoolyard, depth well 48', water level at 40', EC 1, 400 us/cm. Some seasonal fluctuations, but always enough water.
- * 1992, ACWATSAN, for 2 compounds, in small orchard, depth well 41', water level 37', EC 1,400 us/cm.

Many houses have electrically driven pumps on their own compound wells. However, in case of power failure, many people use the schoolwell.

Sanitation

5 Latrines were constructed in this village, of which 2 were visited. Both of them were used for storage of fuel wood, no superstructure. People said that latrine would be taken in proper use after completion of the entire house.

Health

There is a BHU building in bad condition, staffed by an old traditional birth attendant, who has access to all households in the village, but who is deaf, and therefore not an ideal communicator of hygiene messages.

Socio-economic conditions

Electricity supply, quite a number of television antennae, a middle school, an animal husbandry dispensary. There is also a field officer for agriculture.

Pathan Kote " village" (UC Punga)

The village consists of one big fortified compound, surrounded by rich orchards.

Water supply situation

In the immediate surrounds of this compound water appeared to be available from 4 different sources.

- * Water from a kareez is shared with some other orchard owners;
- * Gravity supply from a nearby spring of large yield, which used to supply the entire cantonment area of Loralai;
- * Large diameter dug well with centrifugal pump driven by tractor (system financed from MPA funds);
- * a handpump installed in July 1991, just outside the compound walls, serving about 8 families for their drinking water.

A family member explained that they also wanted to have a well with handpump inside the compound for reasons of self reliance in case of tribal animosities.

Sanitation

One latrine has been installed inside the compound, but the pan appeared to be covered with mud and the pits destroyed.

Some general observations on the wells

- All wells are completely unlined; it might be useful (although more expensive) to line the upper part for obtaining higher structural strength; moreover it might result in a smaller diameter of the well build-up.
- All wells have been constructed in a circular shape. For easier dimensioning of the reinforcement network of the well over, some trials could be done on rectangular shapes.
- The steel manhole covers are sunk too deep into the concrete well cover; a simple modification in design will be the remedy.
- In all cases observed, the spout ended just at the rim of the well cover; in this situation a receiving bucket can neither be put on the cover, nor on the apron. Slight rotation of the pump, or shortening of the spout, could be a remedy for this problem.
- In most observed cases the finishing of the concrete work and the plastering left to be desired, particularly at the connection of well wall and cover, and at the drain - if available at all.

SHORT REPORT ON STORES LGRDD LORALAI

Date: 25-05-1993

1. LGRDD Loralai has two rooms of 3 x 4 m each in use for the storage of handpumps and latrines with accessories.
Stores not owned by LGRDD but temporarily borrowed from District Commissioner.
Present stock: 65 handpumps, 110 latrine pans.
2. Total storage area of 24 sq.m is clearly not sufficient: although riser pipes have been properly stacked, there is not sufficient space not are there any provisions (e.g. shelves) for storage of latrine pans and pump parts.
3. Presently i/c of stores is the office assistant. The D.O has suggested to have the task of storekeeping officially assigned to the sub-engineer of Loralai sub-division, who should receive a training for that purpose.
4. According to LGRDD staff (D.O., A.Eng. Office assistant) the following adverse conditions have much contributed to this situation:
 - LGRDD does not receive any information on shipments; they may come in the night;
 - unloading is done by the truckdriver, who arranges for some labour in town; N.B on the other hand LGRDD would not have the funds available to organize unloading by herself;
 - LGRDD is not given sufficient time for counting and checking of the delivered goods; no packing lists, just an indication of the number of complete sets of handpumps.
5. Biggest problem in handpump parts: the supplied plastic bottles with cleaning solution, and the tins with solvent for the UPVC pipes arrive mostly empty.

6. Porcelain latrine pans and traps come three by three in packages of straw. A lot of breakage was reported: during transport factor-district about 15%, another 10% during transport from stores to final destination.

7. The required storage space will be in the order of 60 sq.m., or about 600 sq.ft. Construction cost is roughly estimated at Rs.180,000. Technical assistance in design, cost estimates, lay-out and stores management training would be much appreciated. LGRDD to try and make funds available for construction.

COST ESTIMATES OF HANDPUMPS AND LATRINES

On basis of data obtained from UNICEF-Islamabad, Engineering Concern (PVT) Ltd Karachi and DADEX Eternit Ltd Karachi

1. Cost calculation of handpumps (av. 30 m depth, delivery Loralai)

Handpump (Engineering Concern)	Rs. 6,500	
Rising main (DADEX) 30 m @ Rs. 70	Rs. 2,100	
Spareparts (estimated maximum)	Rs. 100	

Materials		Rs. 8,700
Transport pumps approx. Rs. 9,000/60	Rs. 150	
Transport risers approx. Rs. 9,000/45	Rs. 200	

Transport		Rs. 350
Subtotal		Rs. 9,050
UNICEF handling fee 8%		Rs. 725

Total per handpump		Rs. 9,775
	Say	Rs.10,000
		=====

2. Cost calculation latrine pans (delivery Loralai)

Latrine pan + trap (Punjab, Gujranwallah)	Rs. 130	
Transport pans approx. Rs. 9,000/225	Rs. 40	

Subtotal		Rs. 170
UNICEF handling fee 8%		Rs. 15

Total per latrine		Rs. 185
	Say	Rs. 200
		=====

Quetta, 25 May 1993

CONSTRUCTION OF WELL AND INSTALLATION OF HANDPUMP

"TRAIN OF FIELD ACTIVITIES"

No.	Activity	Estim. time (in weeks)
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On level of cluster of Union Councils

	A. CLUSTER PREPARATION	4 weeks
1.	Selection Union Councils	
2.	Training UC Secretaries and HEA's	
3.	Execution baseline survey	
4.	Selection villages in UC's	

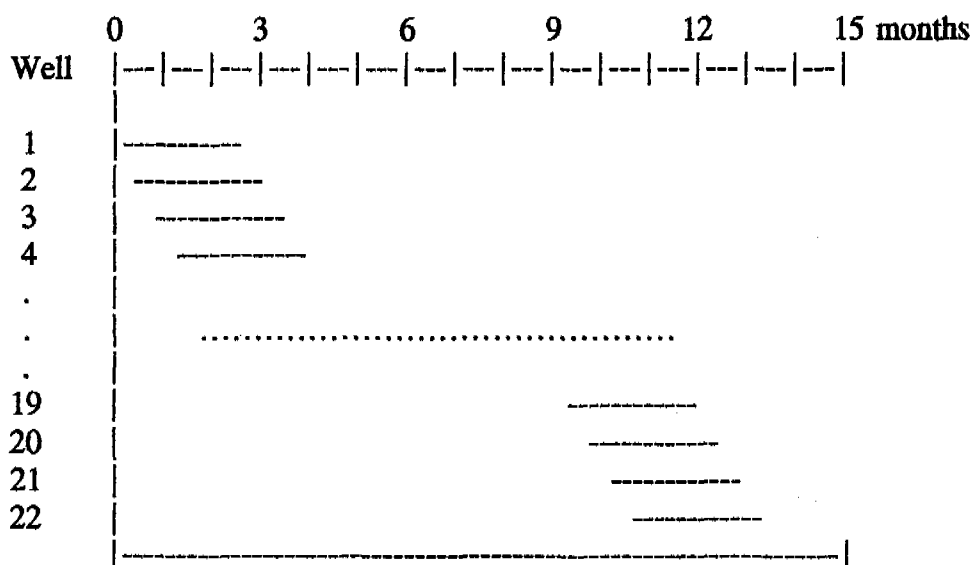
On village level

	B. INFORMATION, DECISION MAKING	4 weeks
5.	Village information meetings	
6.	Decision taking process (site, O&M)	
	C. DESIGN OF WELL	1 week
7.	Well inspection	
8.	Design, bill of quantities, cost estimate	
	D. PREPARATION FOR CONSTRUCTION	2-4 weeks
9.	Contract village-LGRDD	
10.	Collection building materials / handpump	
	E. CONSTRUCTION, INSTALLATION	3 weeks
11.	Construction of well	
12.	Construction of additional facilities	
13.	Installation of handpump	
14.	Training of caretaker(s)	
15.	Delivery test	

Average total time on village level 12 weeks

**DISTRICT-WISE PLANNING OF CONSTRUCTION ACTIVITIES
IN AVERAGE UNION COUNCIL**

A. SEQUENCE OF WELL CONSTRUCTION IN A UNION COUNCIL



B. CALCULATION OF AVERAGE TOTAL LAPSE TIME PER UNION COUNCIL

District	Pop. est. 1993	% pop.	# HP	# UC's	# HP/UC	Constr. time/UC (months)
Loralai	219,600	12	180	18	10	10
Zhob	301,400	16	240	17	14	12
Q. Saifulla	212,900	12	180	11	16	13
Kharan	156,800	9	140	10	14	12
Panjgur	297,300	16	240	11	22	15
Musakhel	182,500	10	150	10	15	12
Barkhan	159,500	9	140	7	20	15
Chagai	162,400	9	140	12	12	9
Jhal Magsi	138,200	7	110	8?	14?	12
Totals	1,830,800	100	1,520	96		

TENTATIVE PLANNING OF HANDPUMP PROGRAMME IN 9 CORE DISTRICTS

22-05-1993

DISTRICT	1993					1994					1995													
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
LORALAI	4	40																						
	0	7	70									7	70											
ZHOB		6	80									0												
	0		6	80								0												
Q. SAIPULLAH		6	100									5	80											
	0			5	70							0												
KHARAN				5	70							5	70											
				0								0												
PANJGUR				6	180							5					60							
				0								0												
MUSAKHEL							5	80																
				0								5	70											
BARKHAN							7	70						70										
				0								6	70											
CHAGAI																	6	70						
																	0							
JHAL MAGSI								110	8															
								*	0															
# New UC's	4	19		17			12	5	15	14	12		6											
# UC's completed								4			7		6	6	11				14	11		17	20	16
Activ. in # UC's	4	23		40			52	53	68	82	87			81	70				64	53		36	16	0
# HP's to be delivered		40		250			330		260		230	70	140	70	130									

PROPOSED HANDPUMP DELIVERY SCHEDULE AT DISTRICT CAPITALS

No.	Ultimate delivery date	No. of pumps	To be delivered in
1.	01-08-93	40	Loralai
2a.	01-11-93	70	Loralai, or alternatively for 1 and 2a:
2b.	-do-	110	Loralai
3.	-do-	80	Zhob
4.	-do-	100	Qila Saifullah
5.	01-02-94	80	Zhob
6.	-do-	70	Kharan
7.	-do-	180	Panjgur
8.	01-05-94	80	Musakhel
9.	-do-	70	Barkhan
10.	-do-	110	Jhal Magsi
11.	01-07-94	80	Zhob
12.	-do-	80	Qila Saifullah
13.	-do-	70	Kharan
14.	01-08-94	70	Chagai
15.	01-09-94	70	Loralai
16.	-do-	70	Musakhel
17.	01-10-94	70	Barkhan
18.	01-11-94	60	Panjgur
19.	-do-	70	Chagai
TOTAL		1,520	

MEETING NOTE

Visit to : WAPDA Hydrogeological Directorate, Quetta
By : Mr Abrar Ahmed Khan, Mr Blankwaardt
Date : 16-05-93
Contact : Mr Muzaffar Iqbal, General Director, tel. 40828
Mr Sayed Asim Ali, Director Field Operations, tel. 44788
Subject : Hydrogeological information Loralai

1. Following hydrogeological reports can be made available to BRUWAS by WAPDA after official request from Secretary P&D:
 - "Exploration and Development of groundwater in Barkhan Area, District Loralai"
Hydrogeological project WAPDA, Quetta, January 1990
 - "Exploration and Development of groundwater in Musakhel Bazar Area, District Loralai"
Hydrogeological project WAPDA, Quetta, June 1990
 - "Groundwater of the Nari River Basin", Technical report No. 2 Ground water studies in selected areas of Baluchistan
Ref. DP/UN/PAK - 73-032/2 PAKISTAN, United Nations

These reports give an overall view of the groundwater development potential in (parts of) Loralai, Barkhan and Musakhel Districts.

2. According to WAPDA staff, groundwater quality in general in these districts is good: EC not more than 1,200 $\mu\text{S}/\text{cm}$. Possibly some problems in Barkhan shale formations.
3. Given the full agenda of WAPDA hydrogeologists, it may be difficult for WAPDA to provide assistance to BRUWAS in assessment of the areas' suitability for construction of dug wells. This is contrary to what is mentioned in the mission report of Mr Groen.
4. In case of construction of new hand-dug wells, WAPDA would have a small rig available for exploratory drilling. Maximum attainable depth approximately 120 feet at 3.5" diameter. Telescopic drilling possible.
Production approx. 30-40 feet per day.
The rig may be rented from WAPDA at a cost of Rs. 350 per foot (screen not installed). Price includes mobilization and staff.

MEETING NOTE

Visit to : Survey of Pakistan, Quetta
By : Mr Abrar Ahmed Khan, Mr Blankwaardt
Date : 15-05-93
Contact : Mr Noroz Ali, survey officer, tel. 71860
Subject : Topographical maps for BRUWAS

1. A number of topographical mapsheets is already available in the BRUWAS Office. For the complete coverage of Zhob Division (Loralai, Musakhel, Barkhan, Zhob and Qila Saifullah Districts) the following mapsheets are still required:

Topo maps 1:50,000:

2x 34-M-14, 15, 16 (restricted);
2x 39-A-2, 3, 6, 10, 14 (restricted);

2x 34-J-16;
2x 34-N-4, 15;
2x 39-B-3, 7, 8, 11, 12, 13, 14, 15, 16;
2x 39-E-2, 5, 6, 7;
2x 39-F-3, 4, 7, 8, 11, 15;
2x 39-G-5, 6, 9, 10, 13;
2x 39-J-1, 2.

Topo maps 1:250,000:

4x 34-M, N;
4x 39-A, B, E, F, G, I, J.

2. Some of these mapsheets are "restricted", and can only be requested with special Indent Forms (available at SoP-Quetta office). The forms must be signed by LGRDD Officer-in-charge and countersigned by Secretary LGRDD. Cost per mapsheet is 40 Rs. Indicated maps will thus cost 4,400 Rs. of which 640 Rs. for the restricted maps.

3. Filled and signed indent forms, and accompanied by crossed cheque, to be sent to:

Director Map Publication
Survey of Pakistan
Murree Road, Faizabad
P.O. Box 10, RAWALPINDI
Tel. 840136

4. Additional information from Mr Noroz:
District maps on scales varying from 1:250,000 to 1:800,000 are in preparation at Survey of Pakistan, Rawalpindi, and may be available within one year from now.

TERMS OF REFERENCE FOR WATER AND SANITATION TECHNICIAN

1. Design proper stores handling and administration system, complete with standard forms for reception and issue of goods, etc. (also: what to do in case of breakage, incomplete delivery etc.)
Prepare and conduct short training course for storekeeper LGRDD Loralai.
Assist AD/LGRDD Loralai in preparing low-cost design, layout and cost estimate for new stores to be constructed.
2. Inventorize and evaluate all wells equipped with handpumps and at least 50% of all latrines in Loralai District, in close collaboration with LGRDD Cell and District staff, and consultant's District Coordinators.
On basis of this evaluation, propose improvements in construction procedures and methods, and prepare type drawing of improved design.
Design should be flexible and adaptable to e.g variable diameter of existing wells. Prepare cost estimates.
3. Inventorize installed numbers of handpumps and latrines under UNICEF programmes (demonstration phase, WATSAN and ACWATSAN programmes), and still available stocks of same in all BRUWAS core districts.
4. Assist, on the basis of provided outlines, in the preparation of modular technical training manuals with handouts for different target groups. Use should be made as much as possible of existing material of proven quality, e.g.
 - BWASA training material
 - UNICEF " "
 - Pump installation and O&M manuals
 - Textbooks for technical staff
 - UNICEF India material
 - training material prepared by Chapman
5. Assist in training of field executive LGRDD staff at district-level in technical subject, with an open eye for community development, and advise District LGRDD staff on physical implementation of handpump and latrine programmes.

The Water and Sanitation Technician will report to CTA/TA, and will work under direct guidance and supervision of the Technical Advisor.

Initial period of assignment: 6 months from May 17th, 1993, onwards.

Quetta, 25 May 1993

SUGGESTIONS FOR TECHNICAL MONITORING OF WELLS

A. BASIC DATA

General

- Names of District, Union Council, village, hamlet
- X and Y coordinates [°, ', "'] (use GPS) for recording on topo maps
- 1:50,000 Mapsheet number
- LGRDD number of well
- ...etc.

Data on existing well

Diameter	[m]
Total well depth	[m -GL]
Water level	[m -GL]
Electr. conductivity (EC)	[uS/cm]
Total Dissolved Solids (TDS)	[mg/l]
pH
Temperature	[° C]
Colour	[describe]
Taste	-do-
Odour	-do-
E. Coli per 100 ml (optional)	
before constr.
after pump install/chlorination
Distance to center users group	[m]

Data on well construction

Start construction	[date]
Finish construction	[date]
Well deepened	Y/N
Total depth after deepening	[m -GL]
Shape of well	round/square
If round, diameter cover	[m]
if square, length of side	[m]
Diameter apron	[m]
Drain installed	Y/N
Length of drain	[m]
Soakpit installed	Y/N
Washing place installed	Y/N
Distance from well	[m]
Cattle trough installed	Y/N
Distance from well	[m]

Data on material use

Bags of cement	[number]
Mild steel (... mm dia.)	[kg]
Chicken mesh	[ft]

Data on pump installation

Installation date	[date]
Serial number of pump
Manufacturer
Casing installed in well	Y/N
Total length	[m]
Depth of intake	[m -GL]
Number of riser pipes of 3 m
Well disinfected	Y/N
Max. yield of pump	[liters/hr]
Caretaker(s) trained	Y/N

B. REGULAR MONITORING (PREFERABLY END DRY AND RAINY SEASON):

Date of monitoring [date]

Measure:

Water level (for preparation of hydrographs)	[m -GL] (measure early morning)
Total well depth	see above
EC	-do-
TDS	-do-
pH	-do-
Temperature	-do-
Color	-do-
Taste	-do-
Odour	-do-
E.Coli (optional)	-do-

Ask:

Have repairs been carried out by community? Which? Reason?

Pump still being used? If not, why? If yes, still same users or changes?

Observe:

Condition concrete work (cracks, plaster coming off);

Cleanliness apron, drain, soakpit;

(Drain) water used for gardening?

Is manhole cover locked?

Functioning of pump (water coming at first stroke?, pump handle not coming down?)

Condition bearing bushes, tightness of bolts, wear and tear.

Etc.