

7 1
E S C A P 8 3

FOR PARTICIPANTS ONLY

NR/ITFW(11)/1
16 August 1983

ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

REPORT OF THE INTERAGENCY TASK FORCE ON WATER FOR
ASIA AND THE PACIFIC ON ITS
ELEVENTH SESSION

UNEP
UNITED NATIONS ENVIRONMENTAL PROGRAM
WATER SUPPLY

I. ORGANIZATION OF THE SESSION

1. The eleventh session of the Interagency Task Force on Water for Asia and the Pacific was held at Bangkok on 15 July 1983.

Attendance

2. The session was attended by representatives of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the United Nations Industrial Development Organization (UNIDO), the World Bank (IBRD), the International Labour Organization (ILO), the Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO) and the World Meteorological Organization (WMO).

Opening of the session

3. The Officer-in-Charge of the Natural Resources Division of ESCAP opened the session and welcomed the participants on behalf of the Executive Secretary of ESCAP.

Election of the Chairman

4. The Task Force elected Mr. A.S. Masalac, Officer-in-Charge of the Natural Resources Division of ESCAP, as Chairman.

Adoption of the agenda

5. The Task Force adopted the following agenda:

1. Opening of the session
2. Election of the Chairman
3. Adoption of the agenda
4. Accelerated manufacture of hand pumps for rural water supply
5. Regional network for training in water resources development
6. Other matters

II. DISCUSSION

A. ACCELERATED MANUFACTURE OF HAND PUMPS FOR RURAL WATER SUPPLY

6. The ESCAP representative informed the members that as decided at the tenth session, ESCAP had transmitted the revised project document to United Nations Headquarters for transmittal to and consideration by the

/Steering Committee

Steering Committee for the Decade. The United Nations representatives who participated in the latest session of the Steering Committee which was held at Jamaica had submitted the revised project document to that session as requested but reported that the Steering Committee while taking note of it took no specific action to seek financial support for the project.

7. The ESCAP representative also informed the Task Force members that ESCAP had received a letter from Mr. William T. Mashier, Senior Director, Division for Global and Interregional Projects, UNDP the gist of which implied that there was no need for the Task Force project because the World Bank was executing a UNDP/World Bank global project on rural water supply hand pumps (INT/81/026) which had similar objectives. This letter must have been sent as a result of the decision of the Steering Committee on this matter.

8. In this connection, the World Bank representative informed the members that the field trials of handpumps were currently in preparation in Thailand, China, Philippines and Papua New Guinea. These were part of sixteen developing countries presently participating in the programme. Lab testing and research and development of handpumps were continuing at the consumers' association testing and research facilities in England. The first tangible results in terms of recommended pump types for shallow, intermediate and deep settings were expected in one year's time. A number of pump types now existed that were reasonably durable and which were suitable for manufacture in developing countries. The primary focus now was to foster the development of VLOM (Village Level Operation and Maintenance) pump types, which could be maintained and repaired by trained village caretakers. This development was now going on in a number of industrialized and developing countries. Specific design aims were to make the plunger and footvalve extractable without removing the cylinder, plastic belowground components and easily connected and disconnected light-weight and/or hollow pump rods. Even though it was essential that each developing country standardized on a handful of pump types for the sake of ease of local manufacture and spare parts supply, it was too early for this now. The worldwide experience with rural water supply showed that VLOM characteristics must be part of handpump design. Technical assistance to developing country manufacturers that might be needed should include (1) suitable pump designs and (2) ways of improving and sustaining the quality of manufacturing.

9. The Chairman, however, pointed out that this matter had previously been discussed not only by the Task Force but also between himself and two officers of the World Bank on 28 October 1982 during which he stressed that

the objectives of the two projects were different. That of the World Bank was to test selected handpumps with the objective of selecting and recommending village level operation and maintenance (VLOM) hand pumps while that of the Task Force was to provide immediate assistance to local manufacturers of hand pumps which they were already producing to increase their production capacity and enable the countries to meet their current urgent need for hand pumps. Although the World Bank project intended to provide guidelines to manufacturers, such guidelines were for the VLOM type of pumps which firstly the World Bank would have to select and recommend for adoption and secondly the countries would have to accept and adopt. The period required for this whole process, even assuming without granting that the countries would readily accept and adopt the recommended VLOM type pumps, would be quite long, possibly not less than 3 years, and in the meantime the countries needed urgent assistance to produce the pumps they needed. While the objectives of the World Bank project were laudable in the long term, those of the Task Force were urgent for the short-term. In fact they were not mutually exclusive since the results of any assistance provided under the Task Force project could be useful even when the countries decided to adopt VLOM type hand pumps.

10. It was therefore decided that members would try to determine the extent to which their respective organizations could provide support, if any, to the preparatory phase of the project as indicated in the project document, copy attached.

B. REGIONAL NETWORK FOR TRAINING IN WATER RESOURCES DEVELOPMENT

11. The ESCAP representative informed the members of the results of the questionnaire on country training requirements and capabilities which was circulated to all members and associate members of the ESCAP region on 31 January 1983.

12. The summary of the questionnaire returns from 17 countries (excluding Indonesia) were shown in the Annex of the annotated provisional agenda. Additional information was provided at the session. In the Pacific Island countries and Maldives there was a great demand for training in various fields of water resources development, particularly in the sectors of water supply and sanitation. Since there were very few technical personnel in small island countries, there would not be enough trainees to cover all

/fields

fields of training. Hong Kong and Singapore could provide training in certain fields, but required training in advanced courses. Australia and New Zealand have excessive training capacity in many fields. The returns from Indonesia indicated a very large number (more than 90,000) of personnel required training. It was not clear, however, what period was covered by this requirement.

13. In this connection, the representative of UNEP informed the meeting of a UNEP Governing Council Decision on environment education and training in Asia and Pacific which among others requested the Executive Director to:

- (i) Assist countries of the region, within available resources, to incorporate environmental subjects into curricula of all institutions of learning;
- (ii) Convene, within available resources, a meeting of experts from government, academic and scientific communities within the region to develop programmes for environmental education and training. (Plans were now being made for convening such a meeting in 1985.)
- (iii) Accord high priority to training workshops, programmes and institution building in the areas of water management support for the implementation of objectives of the International Drinking Water Supply and Sanitation Decade (IDWSSD).

14. He also indicated that UNEP expected to receive from concerned agencies informal proposals for implementing the above decision, particularly item (iii) which was very relevant to the agenda item under discussion. He further informed the session that UNEP had available a limited amount of travel fellowship and short-term consultancy funds which could be made available, on request, to countries and agencies.

15. Noting that a number of large countries had not responded to the questionnaire, the ILO representative said that ILO could follow-up on the questionnaire through its representatives in countries which had not replied, like India and the Philippines. The Task Force welcomed and accepted this offer.

16. In this connection, the ILO representative informed the members of an eight-week course on policies and issues to improve the management of national water resources systems in developing countries to be conducted at the ILO Turin Centre from 10 October to 2 December 1983. If this proved to be successful, a similar course might be organized by ILO in the ESCAP region in 1984.

17. The WFO representative informed the members of the three-step programme for Human Resources Development for the IDWSSD to increase awareness at the international, regional and national levels on plans and activities being carried out to achieve the Decade targets. It was agreed that when plans for the organization of seminars at the regional level under this programme had been firmed up, WHO would send the information to ESCAP which would transmit the information to the participating institutions which had been nominated for the regional network for training on water resources development.

18. Once the questionnaire survey was completed, ESCAP would take the necessary action as outlined in the preparatory phase for the establishment of the network which is the assessment of current deficiencies in training facilities to establish definitely the extent of the need for the training network prior to convening an expert group meeting.

C. OTHER MATTERS

19. The representative of WMO informed the participants that under the WMO Hydrological Operational Multipurpose Systems (HOMS) the following workshops and seminars will be conducted in the near future: (a) Workshop on application of real-time data acquisition technology, Jakarta, 18-23 July 1983; (b) Workshop on application of micro-computers to primary processing of hydrological data, AIT, Bangkok, 17-29 October 1983; (c) Technical seminar on seasonal streamflow forecasting, Vientiane, 20-27 October 1983; (d) Workshop on application of micro-computers to hydrological forecasting (jointly with the Mekong Committee), AIT, Bangkok, 7-19 November 1983; (e) Regional seminar on field investigation and modelling for water management in estuaries and deltas (jointly with AIT and Mekong Committee), Bangkok, 21-25 November 1983. It was planned to hold the seventh session of the Commission for Hydrology and Technical Conference on Application of Micro Processes in Operational Hydrology in February 1984 in Manila.

20. It was agreed that the members would exchange information on their work programmes for 1984-1985 at the twelfth session.

/Interagency

Interagency Task Force on Water for Asia and the Pacific
Tenth session, 7 December 1982

ACCELERATED MANUFACTURE OF HAND PUMPS FOR RURAL WATER SUPPLY
PROJECT PROPOSAL FOR ASSISTANCE

Note by the working group (ESCAP, UNDP, UNICEF, UNIDO and WHO)

- I. Project symbol:
- II. Project title: Preparatory survey for accelerated manufacture of hand pumps for rural water supply
- III. Implementing Agency: ESCAP, in co-operation with participating countries, and in association with WHO, UNICEF and UNIDO
- IV. Background and justification:

The provision of potable water for all by 1990 is one of the main goals of the International Drinking Water Supply and Sanitation Decade (1981-1990).

A previous assessment indicated that, of the approximately 70 per cent of the world's population who live in rural areas, only 22 per cent had access to reasonably safe water. Results of a rapid assessment survey in the ESCAP region, which contains 55 per cent of the world's population and covers almost half of the earth, indicated that 11 of the 22 countries surveyed were below the global average of 22 per cent. The relative isolation and backwardness of rural areas aggravate the difficulty of providing drinking water supplies. Moreover, statistics on water facilities which require maintenance and upkeep owing to disuse and disrepair have been under-estimated.

UNICEF field surveys in India showed a high breakdown rate in deep-well pumps, 80 per cent of which occurred in pump parts above the ground. This high breakdown rate prompted the development of the INDIA Mark II hand pump. With UNICEF bearing the initial cost of piloting the design, the local manufacture of the Mark II pump (all-steel pumphead and pumpstand) had reached a capacity of 20,000 pumps per year in 1979. In Bangladesh, a shallow-well hand pump of cast iron (New No. 6 Hand Pump)

/had

had been developed and adapted to local manufacturing capacities in order to minimize the amounts of raw materials needed by local foundries. With the provision of small quantities of pig iron (not locally available), local foundries had attained a manufacturing capacity (1979) of 90,000 per year.

WHO has a project in Thailand involving the conversion of open dug wells into covered sanitary wells, and where PVC suction (shallow-well) pumps were introduced. After two years of the project, 90 per cent of the PVC pumps were still in operation. The cost (1980) of the PVC pump (\$US 40) could be lowered if mass-produced. A major initial investment would be the cost of injection molds. In addition, Chulalongkorn University has been executing since 1980 a UNDP/WHO two-year project which aims to develop PVC hand pumps for (a) shallow dug wells, (b) deep dug wells and (c) small diameter tubewells and which should be durable but simple to operate and maintain. Some prototypes have been developed and field-tested.

Hand pumps have been in use and are being made in the Philippines for the past three decades and there are currently over 30,000 pumps installed. Indonesia started producing hand pumps a few years back but a detailed survey is required to ascertain the over-all manufacturing capability of local foundries and workshops. Other countries like Burma and Nepal are planning to develop their own versions of hand pumps which could be manufactured locally.

Hand pumps constitute one of the mainstays in provision of drinking water for rural areas. This is especially so when surface sources (e.g. springs, streams) are intermittent or ephemeral and too remote from users or too expensive to purify. For the target of "water for all by 1990" to be approached, if not achieved, among the pressing needs would be the accelerated manufacture of hand pumps to cope with a progressively increasing demand brought about by expanded activities in rural water supply, programmed to achieve country goals by the end of the Decade.

V. Hand Pump Requirements:

Listed below are the hand pump requirements of some developing countries in the region, based on country replies and Decade programmes.

/s/ Burma

A. Burma

Description	Plan Period 1982-1985	No. of Hand Pumps 1987-1990	Remarks
Shallow tubewell	6,000	20,000	
Deep tubewell	2,400	3,000	Preference is for power-driven pumps
Rehabilitation of old wells	2,000	-	
Sanitary dug wells	12,000	12,000	Two pumps per well
Sanitary extraction of pond water	800	4,800	Two pumps per facility

There are 6,000 tubewells with hand pumps and Government has proposals to produce hand pumps locally on a large scale. The Rural Water Supply Division (RWSD) of the Mechanization Department manufactured (experimental) 300 hand pumps in 1980/1981; and in 1981/1982, 800 will be produced. RWSD has plans to also produce washer cups for the pumps. However, all these activities will be limited in scale as this is not seen as a primary responsibility of RWSD.

The Rangoon Institute of Technology, with UNIDO support, has been involved in testing and improving general metallurgical and foundry techniques which could eventually have an application, inter alia, in hand pump manufacture. Details have not been worked out but UNICEF's inputs will include material support in establishing a foundry and workshop, and provision of raw materials including technical consultancy services if required.

B. Fiji

There is one private contractor operating on a small scale and which forms part of a general engineering/foundry company. In the early 1970s, 30 shallow boreholes were constructed for remote schools. Various types of pumps, including handle operated pumps from India, were used but which broke down in a fairly short time, including copies of pumps made locally by the foundry referred to above. Foot-operated 'Vergnet' pumps are being tried out. Currently, there is little public interest in boreholes and hence, the lack of support facilities such as drilling equipment, pump manufacturers and general expertise in the use of hand pumps.

C. Indonesian

In accordance with the Decade Plan, the hand pump requirements are as follows:

Financial Year	Dug Wells	Facilities Developed with Hand Pumps		
		Shallow Tube Wells	Sub Total	Deep Type Wells
83/84	920	29,110	30,030	8,200
84/85	1,090	26,010	27,100	10,640
85/86	1,250	23,270	24,530	13,320
86/87	1,400	18,030	19,430	15,630
87/88	1,840	14,860	16,700	18,480
88/89	1,530	11,010	12,540	21,390
89/90	1,970	6,900	8,870	28,280
	10,010	129,290	139,300	111,790

In addition to the above, it is estimated that 306,209 shallow and 13,260 deep hand pumps will need to be rehabilitated during the Decade.

The expanded rural water supply programme has provided a strong stimulus to manufacture hand pumps locally, which are copies of imported pumps. While a few maintain reasonable standards, most manufacturers turn out pumps of low quality. WHO and UNICEF have recommended that pumps be confined to a few known and tested makes. Planners have commented that, "to foster local production, when no attempt is made to make a quality product, could be counterproductive to the programme and the national development in the long run".

D. Nepal

The rural population accounts for 93 to 94 per cent of the total population of Nepal, which could be divided into three geographical regions as shown in the following table:

Year	Rural Population (Million)			
	Total	Hills	Midlands	Teral ^o
1980	13.2	1.4	6.8	5.0
1985	16.7	1.5	7.9	5.7
1990	16.4	1.7	8.3	6.4

^o Teral-Plains bordering India in the south.

It is estimated that, at the rate of one tubewell per 200 users, some 32,000 hand pumps will be needed during the Decade. Out of these, some 15 to 20 per cent might be deep tubewells in the foothills of the Terai in the north. In order to improve the level of service, the Government plans to construct an additional 70,000 to 80,000 hand pump tubewells in the Terai, between 1990 and 2000, to bring down the users per well to 75.

It is the clear understanding that pumps and spares needed for this programme will be manufactured locally with external technical assistance. Bangladeshi No. 6 pump has been chosen and would be manufactured locally with minor modifications to suit local conditions. Some foundries have shown interest in pump manufacture, and possibly, modified versions for irrigation purposes could make the enterprise more viable.

A recently launched UNIDO pilot project with respect to foundry work will be providing technical assistance to foundry workers. UNICEF is planning to place trial orders with two foundries for Bangladeshi No. 6 pump, and have UNIDO assist in quality control.

E. Papua New Guinea

The initial hand pump requirements would be on the order of 50-100 per year during the Decade. Suction-type pumps would not normally be used. Hand Pumps need to be of robust construction as well sites are isolated and maintenance visits expensive. Vandalism may occur more frequently if PVC or timber construction is used.

Local manufacture would depend on whether the private sector could establish a factory. However, manufacturing costs would be high in relation to numbers sold and it is extremely doubtful for the venture to be profitable. A Government operation is not feasible at present.

F. Philippines

Based on the Rural Water Supply and Sanitation Master Plan (1982), some 151,600 tubewells would be constructed during the plan period (1982-2000); including the rehabilitation of 17,700 existing point sources (mostly deep tubewells). About 72 per cent of the 151,600 wells, or 108,600, would be shallow (not more than 20 m deep). Implementation will be in three stages, in accordance with the following schedule:

/Construction

Level I Service ^{1/}	Stage I (1982-1985)	Stage II (1986-1990)	Stage III (1991-2000)	Total (1982-2000)
Construction				
Deep wells	14,300	10,700	18,000	43,000
Shallow wells	29,800	34,000	45,100	108,600
Rehabilitation	10,200	4,500	3,000	17,700
Total	54,000	49,200	66,100	169,300

There are at least six factories/foundries engaged in pump manufacture and, with improvements in manufacturing processes, standardization of techniques and quality control, they could match the accelerated requirements for hand pumps programmed for the Decade.

G. Sri Lanka

Type and number of hand pumps required annually during Decade

An estimate of the annual output of deep and shallow wells requiring hand pumps will therefore be as follows:

	<u>Deep wells</u>	<u>Shallow wells</u>
1983	600	600
1984	600	700
1985	800	800
1986	800	900
1987	1000	1000
1988	1000	1100
1989	1200	1200
1990	1200	1300
	7200	7600

Information on local pump manufacture capability

Presently several institutions are involved in the manufacture of hand pumps. Under USAID assistance the Batelle hand pump was manufactured which is fitted where the depth of the well is about 22 ft. The deep well model is also manufactured for wells where the water level is around 60 ft.

/to

^{1/} Level I Service -- A protected well with hand pump, or a protected spring or outlet without a distribution system.

to 70 ft. These pumps are being presently used in community wells deep under government programmes. While this is a cast iron pump, there are other institutions that turn out steel fabricated shallow well pumps. A commencement has also been made to manufacture plastic hand pumps. However, the UNICEF which really pioneered large-scale community wells programmes, has been using the Indian Mark II hand pump so far. This is the hand pump that has been used for all deep wells in the UNICEF programme, and it has so far proved to be a hardy hand pump. With UNICEF assistance therefore the pilot manufacture of the Mark II deep well hand pump has also now been commenced.

As for the local manufacturing capability, there are engineering firms that can conveniently manufacture hand pumps of high quality. Local manufacture however was not undertaken in the absence of a demand in the past. External support is therefore primarily required to launch on community wells programmes so that a suitable level of demand can be maintained for manufacturers. External assistance could also come for testing and monitoring performance of hand pumps locally manufactured, and for making any improvements in them subsequently.

Other associated information, problems and external assistance

A general statement above wells with hand pumps is that in water scarce areas the hand pumps are popular because they bring water. Where the hand pump brings a quality improvement in areas where water is available from other sources, the installation of the hand pump has to be associated with other inputs on health education. Certain teaching problems which have appeared also affect the use of the hand pump particularly in areas where sufficient water is available. One such problem is the deterioration in the quality of water following the covering of the well and the installation of the hand pump. The deterioration is often related to excess iron, its corrosive effects and the problems caused by iron on water filtration. Other mineral and chemical impurities also have come up in certain wells with their use. As the use of the hand pump has to be often promoted with health education inputs, any problems associated with hand pumps, could have severe repercussions on their use.

E. Viet Nam

The Government is interested in local manufacture of hand pumps. The present capacity for production has not been determined, but requirements for a foundry expert is foreseen. Suction-type pumps

would be suitable in most areas and in a country where an average of 1,200 units annually would be needed for the period 1981-1990. If pumps are to be manufactured locally, it will be necessary to design the pump and equipment, such as pipe, for example. The necessary know-how of production would also be needed.

VI. Objectives of the project

A. Immediate objective

To determine measures required to accelerate local manufacture of hand pumps for rural water supply.

B. Long-term objective

To upgrade the manufacturing capabilities of rural water supply to help to achieve country goals for rural water supply in the 1980s Decade (1981-1990).

VII. Work plan

PHASE I

A. Description of activities

A consultant^{2/} would be engaged, for a period of seven months, to visit a number of countries to identify problems and gaps in hand pump manufacture, availability of raw materials and expertise; and determine type of assistance required to stimulate expanded production to meet local demand and, if possible, provisionally supply the needs of other countries. If required, he would also assist in the selection/development of hand pumps which would suit local conditions and technology.

He would review/improve existing pump specifications/drawings, examine/improve the manufacturing process and recommend quality control practices to ensure that the hand pumps are produced in accordance with specifications. Finally he would recommend measures for the proper installation, operation and maintenance of hand pumps.

B. Sequence of activities

1. Recruitment of the consultant, briefing on the project and preparations for country visits.

2. Country visits to consult rural water supply planning/ implementing agencies, survey local boundaries and workshops, assess available materials and expertise, and ascertain the nature and extent of country participation in the proposed project.

3. Preparation and submission of project reports.

PHASE II

A. Further activities.

The report will be studied by members of NAWA, which will decide what further collaborative action should be taken to implement the recommendations of the consultant.

VIII. Cost plan component of phase I

Assuming that 6 countries would be visited for a period of one month in each country and a total stay of approximately 6 months, an amount of \$US 70,200 would be required to implement the project according to the following cost plan:

I. One consultant, \$ 6,000 x 7 months	\$US 42,000
II. Plane fares and DSA	13,500
III. Miscellaneous expenses	
Supplies 3,000	
Contingency 3,000	6,000
IV. Administrative costs	8,700
Total:	<u>\$US 70,200</u>

Post title: Handpump manufacturing

Level and grade: P-5

Duty station: Bangkok

Functions:

1. Examine existing production methods/facilities and problems and report.
2. Verify and test the design of handpumps.
3. Develop and test the design of handpumps.
4. Develop and test the design of handpumps.
5. Develop and test the design of handpumps.
6. Develop and test the design of handpumps.
7. Develop and test the design of handpumps.
8. Develop and test the design of handpumps.
9. Develop and test the design of handpumps.
10. Develop and test the design of handpumps.

Education and qualifications:

1. Advanced diploma in mechanical/industrial engineering.
2. More than 5 years' experience in design development and manufacture of handpumps.