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COUNTRY AND INTERCOUNTRY PROGRAMMES AND PROJECTS

PROJECT RECOMMENDATIONS OF THE ADMINISTRATOR

Assistance for a global project

Testing and Selection of Rural Water-Supply Hand-Pumps
(GLO/79/010)

Estimated UNDP contribution:	$ 215 000
Duration:	Two years
Executing Agency:	International Bank for Reconstruction and Development (World Bank)

I. Background

1. The goals that are being established by Governments for the International Drinking Water Supply and Sanitation Decade will require massive expansion of rural water-supply programmes during the Decade. The last comprehensive review of water-supply conditions undertaken by the World Health Organization (WHO) in 1976 indicated that 78 per cent of the world's rural population were without an adequate drinking water supply. Protected wells or bore-holes equipped with hand-pumps are often the most suitable means of providng safe drinking water to dispersed rural and village populations, and generally the most economical. As a consequence, it can be safely predicted that many hundreds of millions of dollars will be invested by Governments in hand-pumps over the course of the Decade.

2. There is growing concern among national Governments, international organizations and bilateral development agencies, however, whether present hand-pump technology will meet requirements. While the technical and economic feasibility of hand-pump water supplies is not in doubt, experience has shown that the communal use of hand-pumps presents serious problems with regard to engineering design, quality of

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manufacture, and installation. Hand-pump technology has, until recently, remained almost unchanged over the past one hundred years. Most models have been designed for use by individual households and therefore tend to break down under intensive community use. Failure rates ranging from 30 to 70 per cent in less than five years are commonly reported.

3. There are at present approximately 100 manufacturers of hand-pumps throughout the world, including a growing number in developing countries. Many of these pumps perform well under certain geographical, social and cultural conditions but are completely unsatisfactory in other situations. A major problem facing Governments in their selection of pumps for particular programmes is a lack of readily available and objective information on the relative merits of different pumps available, and their comparative performance under different conditions. The problem is compounded by lack of adequate testing facilities in developing countries for carrying out the necessary tests before large sums are invested in hand-pump procurement. As a consequence, many decisions regarding types and models of hand-pumps to be used in national rural water supply programmes are at present being made on the basis of inadequate information. To correct this situation, there is an urgent need for the development of pump selection guidelines based on thorough standardized laboratory and field testing of representative types of hand-pumps currently available. This programme must be linked with an organized effort to begin strengthening developing countries' own hand-pump testing capacity.

4. A complete hand-pump testing programme should include both laboratory and field testing. Laboratory testing of pumps under simulated field conditions is the most economical way of obtaining the necessary basic information on pump performance, handling characteristics, component wear and breakdown frequency, convenience of use and durability. Such testing is necessary in order to identify and eliminate models which have serious design faults and are not worth field trials. Laboratory testing can also be extremely useful in identifying weaknesses in design or materials that can be corrected by slight modifications leading to substantially improved performance and cost savings. While an essential first step, laboratory testing is no substitute for field testing and evaluation, and the latter constitutes a necessary follow-up to laboratory testing.

5. Several projects for field evaluation of hand-pumps, field trials and laboratory testing are currently under way in various parts of the world, and are yielding valuable results. To date, however, there has not been a wide-scale international testing programme carried out according to a standardized methodology comprising common criteria, definitions, testing methods, and reporting format. Such a standard methodology is necessary so that results may be fully comparable and capable of being pooled internationally.

6. Significant progress towards the required standardization has been made under a programme assisted by the Ministry of Overseas Development of the United Kingdom during the past few years. Under the programme, approximately 12 widely used hand-pumps manufactured in developed and developing countries have been laboratory tested, and a standard testing protocol developed. The results of this programme were reviewed in May-June 1979 by an International Working Meeting on Hand-pump

esting, Selection and Development organized in May-June 1979 by the WHO International Reference Centre for Community Water Supply (The Hague) and attended y 33 delegates from Government departments responsible for water supply and ublic health. The Meeting concluded that the work carried out thus far provides he basis for the preparation of a guidance manual on the subject of hand-pump esting, evaluation and selection that would be extremely useful to developing ountries. To broaden the data base, the Meeting recommended that additional and-pumps be laboratory tested, with primary concentration on models now being anufactured by developing countries. The laboratory testing phase should be ollowed by field tests of promising types of pumps in selected developing ountries, in collaboration with national testing laboratories or other appropriate acilities.

. The present project is designed to meet these objectives up to, but not ncluding, the actual implementation of a field-testing programme which it is proposed hould be organized as a separate follow-up project at the appropriate time.

II. The project

3. The ultimate objective of the project is to improve the dependability and reduce the cost of drinking water-supply programmes that use hand-pumps for the delivery of water from various types of wells. Towards this objective, the project aims at establishing a standard methodology for hand-pump testing and evaluation that will permit meaningful comparison of results obtained in different tests and areas; developing a guide for the selection of hand-pumps best suited to particular installations, geographic conditions, cultures and applications; and promoting the development of hand-pump testing facilities in developing countries.

9. The immediate objectives of the project are to:

(a) Test an additional 10-15 hand-pumps of representative types under prescribed laboratory conditions to determine performance, durability, component wear and breakdown frequency, ease and convenience of operation, ease of parts replacement, maintenance and repair characteristics, and water-safety qualities. Predominant emphasis will be placed on models manufactured by developing countries;

(b) Collate these test results with the findings of other tests already carried out and develop recommendations regarding the selection of models for follow-up field testing;

(c) Advise on ways of preventing or correcting pump defects which are detected during testing with a view to improving performance;

(d) Identify laboratories in selected developing countries suitable for collaboration in a follow-up field-testing programme, and prepare, in collaboration with national Governments and interested national agencies, detailed plans for wide-scale field testing within the context of on-going rural water supply programmes; and

(e) Transfer to selected institutions in developing countries the laboratory testing methodology that will be developed under the project so that locally manufactured hand-pumps can be tested in the country of origin in the future.

10. Project activities will include a comprehensive review of the literature covering previous and current studies, and evaluation of hand-pumps and of available data on field projects in which relevant experience has been accumulated on hand-pump performance and maintenance.

11. The principal outputs expected from the project are:

(a) A document which presents laboratory findings on a selected group of hand-pumps (10 to 15 in number) and which presents recommendations on the choice of units to be subjected to further tests in the field under a separate project;

(b) A companion document to the one mentioned above presenting a proposal for a standard procedure and methodology for testing hand-pumps under laboratory conditions capable of replication in other laboratories and permitting comparison of results between laboratories;

(c) A document which identifies critical parts subject to early failure in any of the pumps tested and recommends changes in design, materials, or method of fabrication which could overcome problems uncovered during the tests;

(d) A preliminary set of specifications to be used for reference by Government authorities responsible for hand-pump procurement for rural and fringe-area water projects. These specifications would be of a preliminary nature to be further tested through application in a Phase II field project; and

(e) Recommendations for the elements to be included in the field testing of hand-pumps and detailed proposals for a follow-up field-test programme for the consideration of national Governments and development assistance organizations.

12. The Executing Agency for the project will be the World Bank, which will subcontract the laboratory testing and preparation of technical reports and other documentation to a laboratory experienced in hand-pump testing. Planning of the proposed field-testing programme will be carried out in close consultation with WHO, the United Nations Children's Fund (UNICEF) and other organizations supporting rural water-supply programmes. In the implementation of the project, close contact will be maintained with the Technical Advisory Group that is being assisted under the Global Project Low-Cost Water and Sanitation Techniques - Development of Demonstration Projects (GLO/78/006).[1/] whose expertise will be drawn upon.

13. To enable detailed planning of the project to be initiated, preparatory assistance in the amount of $75,000 was approved in February 1979, in accordance with the authorization granted to the Administrator by the Governing Council at its twenty-fifth session (E/1978/53/Rev.1, decision 25/3).

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1/ DP/PROJECTS/R.12/Add. 5.

14. The expenditure components of the proposed UNDP contribution are as follows:

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Project personnel	40 000
Subcontract	165 000
Miscellaneous	10 000
	215 000

The proposed UNDP contribution will be contained within the Global IPF established by the Governing Council for the current cycle.

III. Recommendation

15. The Administrator recommends that the Governing Council:

(a) Approve the project; and

(b) Authorize the Administrator to make the appropriate arrangements with the World Bank for the execution of the project.

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