COMMERCIALIZATION OF THE UNIMADE HANDPUMP: AN EVALUATION

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Abstract

The Unimade handpump is undoubtedly a technological achievement that has received widespread socio-economic and cultural understanding and acceptance. But despite interest to assemble or manufacture the pumps locally, actual commercialization of the technology remains a partially realized objective. Active steps toward large scale production, marketing and use of the pumps will need to be intensified considerably under entirely different sets of assumptions and motivations. Entrepreneurial and managerial orientation and know how are necessary to "own" the task of commercialization in order to overcome the multifarious difficulties. Evidently, sound socio-economically feasible technology is insufficient to make inroads into a market where competition and real world relations, entwined with finance and politics both nationally and internationally, must be reckoned with. Even the successful completion of four legal agreements would not be meaningful, unless real benefits of the technology can touch and water the lives of the poor and needy.

Introduction

For many years the provision of safe drinking water and adequate sanitation have been considered necessary for protecting public health. However, due to rapidly expanding populations and limited resources, most developing countries have not been able to provide these basic services. Unfortunately, those most seriously affected are the rural poor and peri-urban population. In view of this, several aid agencies, development organizations and private industries had taken the initiative to design and develop a reliable, low-cost handpump for the rural area of the developing world. The Water Pumping Technology, a joint research project between the University of Malaya, the Ministry of Health (Malaysia) and the International Development Research Centre (IDRC) was initiated in 1979 with the objectives of developing a handpump which could be produced using locally available materials and which could be easily operated and maintained at the village level.

The First Phase of this project, which involved both laboratory investigation and field testing to determine the technical viability of a unique handpump design incorporating plastic (PVC) below ground components, was completed in 1981. The primary objectives were to test this basic design concept under varying social, economic and environmental conditions. However, it was discovered that technical aspects alone are not enough to ensure the acceptance, adoption and sustained utilization of a technology in the Third World. Social, economic and managerial issues related to acceptance, use and maintenance, as well as the active participation of communities in choosing and planning the intervention are important aspects that can determine the success or failure of the introduction of new technologies in traditional societies.

The result of the series of projects described above was the establishment of a Phase II network of projects in 1983 to test the technology in various social, economic and environmental settings. The primary aims were to acquire empirical experience in the manufacture and assembly of handpumps and to assess the technical and economic viability of duplicating the experience of the pilot plant on a commercial production scale. The Malaysian project became the focal point of a Phase II research network which incorporated projects in Malaysia, Philippines, Thailand, Indonesia, India, Sri Lanka, Mali, Kenya and China. The majority of these Phase II projects were carried out by action-oriented, non-governmental organization (NGO's). As implementors and disseminators of the technology, the primary role of the network was to research into important "software" issues such as social acceptance, economic viability, technical efficiency and maintenance.

With the successful completion of Phase II on 30 April 1988, Phase III formally commenced on 1 May 1988. The primary objectives of this third and final phase were to disseminate the knowledge, experiences and skills gained in the two previous phases and to promote mass production and utilization of the technology among those who need it most, the rural poor. The three major areas that had been identified for implementation were :-

i) The planning and implementation of a commercialization strategy, including a manufacturing program. The main emphasis was to focus on the promotion of a widespread acceptance of locally-developed handpumps through the establishment of licensed manufacturers in neighbouring countries.

ii) The setting up of a Regional Handpump Technology Centre at the University of Malaya. This Research and Training or R & T Centre would act as the focal point for transferring the technology (that is, handpump design, installation and maintenance procedures, mass production techniques, and marketing and implementation strategies) to other developing countries.

iii) The establishment of a Telematics Network to facilitate communication between participants of the third phase of the project. The proposed telematics system would enable participating organizations to continuously share knowledge gained in incremental improvements of the design, in the testing and manufacture of the handpump in individual country projects. It would also facilitate the sharing of problems encountered in designing, modifying, manufacturing, installing and using the handpump, so that solutions might be collectively addressed.

OBJECTIVES OF EVALUATION

The main objectives of this evaluation at the final stage of the project are to document the performance and accomplishments of Phase III. Effectiveness in attaining the goals, efficiency of the methods and strategies employed, the extent of success achieved and the difficulties encountered in the project are assessed. Lessons that can be learnt from this phase are also analyzed. Suggestions for future commercialization of technology for socio-economic products and services are contained in this report.

METHODOLOGY EMPLOYED

A few approaches were adopted to acquire information for this evaluation.

First, existing reports and project documents provided an important backdrop on the early objectives, activities and accomplishments of Phases I and II of the overall project. All relevant papers were examined thoroughly.

Secondly, deliberate effort has been made by the Senior Evaluation Consultant to attend the monthly meetings of the project team in Malaysia, to learn about the *progress, new developments* and problems at various stages of Phase III. Close contacts with consultants were maintained through the meetings. Apart from observations, views and suggestions - particularly on aspects of the commercialization process - were given from time to time. The observatory-participative approach proved satisfactory as rapport and mutual understanding gradually evolved.

Thirdly, informal discussions regarding the objectives of Phase III, operationalization of those objectives, marketing plan and evaluation of the project, were held with the Principal Investigator and Project Network Coordinator in Kuala Lumpur, and with the Regional Director and Senior Program Officer of IDRC in Singapore.

Fourthly, to obtain feedback from different project teams in various participating countries, a mail survey was carried out to generate primary data on Phase III. Based on the review of existing reports and project documents, observations and clarifications with consultants at monthly meetings, and informal discussions with the main project leaders, a concept paper on evaluation was developed. Subsequently, upon general acceptance of the concept paper, a survey instrument comprising questions contained in a Feedback Form was designed. It was sent to twenty five key project persons in nine countries who participated in or were associated with the Phase III network of projects. Their views on effectiveness, efficiency, success and obstacles were sought and aggregated for analysis on Phase III performance.

CONCEPTS USED

Effectiveness was defined as the degree to which the goals of Phase III have been attained. Three aspects of this were considered:

i) **Formal objectives** as listed in the original project document (3-P-87-0084 Background page 9).

ii) **Informal objectives** which were not written nor officially stated. This might include personal aspirations of the project team in specific areas of research, training that could be obtained, experiences that might be acquired, organizational interests such as participation of students, keeping ahead of competitive technology or other reasons.

iii) **Operational goals** referred to those targets of divisions (such as R & T Centre, telematics, legal work, negotiating and control) or of subprojects (such as in different countries) that guided day to day decision making for specific activities or programmes in implementing the project.

Efficiency generally referred to the degree to which output was attained in relation to resource inputs, that is productivity. At least four aspects were considered:

i) **Technical conversion process or system** that combined inputs for outputs (both tangible and intangible).

ii) **Maintenance subsystem** that included activities necessary for the smooth functioning of the technical conversion process or system (including external resources supply and disposal of output to the external environment, internal allocation of resources).

iii) **Adaptation subsystem** to ensure survival of system in the environment (R & D, planning, appraisal, PR, adjustments to changing environment).

iv) **Guidance or Managerial Process** for direction and coordination of activities (to guide, make decisions, communicate and control, including ensuring consistency within project for achievement of purpose).

Overall success of Phase III of the project were gauged in terms of linkages and relationships between the project and the wider environment in which it operated. The following aspects were evaluated:

i) **Awareness** of the project and its benefits to the socio-economic environment (that is heard of).

ii) **Understanding** of the purposes and aims of the project by the socio-economic environment (that is know of).

iii) **Acceptance** of the new technology in terms of socio-economic-political environment (that is recognize usefulness).

iv) **Steps taken to adopt** on a wide scale (action taken regionally or nationally).

v) **Interest and desirability** to produce pumps in own region or country (that is plans to assemble or manufacture pumps).

Resistance / Obstacles already encountered or would likely be met in adopting the technology on a large scale were also analyzed along several dimensions.

FINDINGS

1.0 The Survey Respondents

Of the twenty five questionnaires, fifteen were returned from nine countries. They included China, Indonesia, Kenya, India, Singapore, Philippines, Egypt, Costa Rica and Malaysia. However, the actual number of respondents were seventeen persons because the reply from the Philippines incorporated the views of three project members in one feedback form. Eight of the fifteen responses came from Principal Investigators who were the key persons responsible for leading and coordinating the project in their respective countries. Other respondents included the Network Coordinator, the Technical Project Coordinator, the Telematics Coordinator, the Plastic Consultant, Project Officers and the former Senior Evaluation Consultant.

2.0 Effectiveness of Phase III

Effectiveness defined as the degree to which the goals of Phase III were attained, was evaluated in terms of the formal objectives, the informal and personal objectives, and the various operational goals.

2.1 *Formal Objectives*

At the outset of the survey, an attempt was made to assess understanding of the formal goals of Phase III among project members in participating countries. It was believed that the extent Phase III objectives were understood would have affected the role played by the Principal Investigators and the tasks that have to be carried out by team members. This in turn would determine the effectiveness of the project. The survey showed that eleven of the fifteen responses were able to state the three main objectives of Phase III very clearly:

1. Commercialization of the handpump.
2. Setting up a training centre at the University of Malaya.
3. Setting up a telematics network to support Phase III activities.

It was observed that five of the eleven were Principal Investigators and six described themselves as Project Coordinators or Officers. But the finding that four persons actually confused the objectives of Phase III with those of Phases I and II was unexpected in view of the continuous communication that took place between the R & T Centre and the country teams. Despite personal visits, letters, faxes and the monthly newsletter, Waternet, designed to keep the network informed, the misunderstanding or mixing up of objectives was difficult to explain. One would expect more than 73% of the responses and over 55% of the Principal Investigators to have correctly stated formal objectives that were contained in the original Phase III documents.

2.2 *Informal and Personal Objectives*

Effort to study the informal, personal goals or aspirations of project participants was important because unwritten and unofficial objectives could either obstruct the attainment of formal goals or contribute toward their achievement. The former would occur if the formal and informal were in conflict. On the other hand, informal goals could assist the meeting of formal objectives if they were consistent with each other.

Respondents were requested to state three of their informal or personal goals for being in the project. Their answers showed that 20 of the 38, that is 53% of all the informal or personal goal statements were derived directly from the formal project objectives themselves. Examples included development of a quality, rust free and durable pump to provide water to the poor at a very low cost; development of indigenous methods for installing and maintaining pumps at the village level; to popularize the handpump in the country; to encourage awareness and wide scale adoption by developing communities; to be able to commercialize the technology locally; to complete the tasks stipulated in the official agreement; etc. Generally, such informal goals could be categorized into those that centered on development of the handpump; secondly, those that focussed on commercialization of the handpump; and thirdly, those that concerned popularization of the handpump.

The observation that 53% of the stated informal goals were very closely matched with the official objectives of the overall project, was indeed encouraging. Moreover, the finding that 7 of the 8 questionnaires of those providing such answers were from Principal Investigators, testified to the commitment of the project leaders. They regarded objectives of the project as their own informal goals. However, a closer examination revealed that 35% of such near-formal goal statements concerned development of the handpump as compared to 20% for commercialization, and another 20% for popularization of the pump. This implied that informal goals, though positively in line with the formal objectives, were biased toward technical improvement considerations rather than business transaction or social adoption aspects. This could be explained partly by the professional backgrounds, training and interests of majority of the respondents, who were very much engineering and technical oriented. They appeared better suited for the first phase of the project rather than Phase III. (See Table 1).

It was also found that 18 of the 38, that is 47% of the informal or personal goals, did not derive directly from the formal Phase III objectives. However, they were found to be related to the mission of the project. Specifically, four categories of such personal goals were reported. First, exactly half of such responses came from those who stated that the project provided them an opportunity to be involved in a research project that would improve their knowledge and technical skills. Secondly, 28% of the responses believed that the social contributions of the project in improving the water and sanitary system of their country had motivated their participation. Thirdly, 17% was attracted by the international and social exposure aspects of the project; while fourthly, 5% were motivated by possibility of personal development. (Table 1).

Table 1 : Summary of Informal or Personal Goals

	Goals derived from formal Phase III objectives	Goals related to formal Phase III objectives	Total
No. of statements:	20	18	38
Per cent:	53%	47%	100%

Types of statements

Derived from Phase III formal objectives	Linked to Phase III formal objectives
Development of the handpump 35%	Opportunity for research 50%
Popularization of the pump 20%	Social contribution of project 28%
Commercialization of the pump 20%	International/social exposure 17%
Others e.g. contract condition 25%	Personal development 5%
100%	100%

2.3 *Operational Goals*

In response to open ended questions on operational goals, a variety of action oriented statements described targets for which each respondent was aiming at. They could be regarded as more detail subgoals of the formal objectives of the project. They included number of pumps or parts to install, to test, to produce; the number of trainees or persons to train as caretakers or for other work; the number of parties to contact for disseminating information on the new technology, to adopt and utilize the pump, to enter into serious negotiation; the number of villages, settlements, provinces or areas to visit; the number of official trips to make for various purposes; the number telematics linkups to establish, and so on. The extent those operational targets had been achieved was reported, along with problems faced and lessons learnt for specific goals attempted.

The wealth of detail information collected was very useful in providing insights on the project situation in each country, which should be taken into account for future activities. Detail findings would be incorporated into other relevant sections of this report.

2.4 *Achievement of Objectives and Goals*

When asked to indicate the extent objectives of the project have been attained with respect to the formal goals, informal and personal goals, and the operational targets, respondents as a whole provided an extremely interesting picture with their answers expressed on four-point scales. Evidently, commercialization of the pump was regarded as least achieved, with a mean score of only 1.5. On the other hand, development of the pump was most highly attained. The score of 3.33 indicated that the project was almost fully meeting its goal in technical development. Even popularizing the pump in several countries with a rating of 3.25 was more than somewhat achieved. (Table 2). Without the benefit of personal interviews, the reasons for the weak assessment of attainment of the prime objective of Phase III, that is commercialization of the handpump technology, could partly be explained by self assessment statements of project members when considering operational goals, as well as from other findings of the survey, as discussed below.

Table 2 : Attainment of Goals Derived from Formal Objectives

Goal statement	Rank	Mean score	(n)
Development of the handpump	1	3.33	(n=5)
Popularization of the pump	2	3.25	(n=3)
Others	3	2.67	(n=3)
Commercialization of the pump	4	1.50	(n=4)

It was gratifying that the overall achievement of the personal goals of project team members was high. The only respondent who desired some kind of personal development through his participation in the project reported a perfect score of 4. The level of social contribution attained - at 3.60 - was high. The team members also benefited from the international and social exposure, as well as the opportunity to be involved in a research project of this nature. The ratings were 3.53 and 3.33 respectively (Table 3). Despite the inability to meet

the commercialization objective fully, it was important that project members did not feel despondent. In fact, the high level of achievement of personal goals, testified to the importance of the project. The relevance of its objectives persisted even at the end of Phase III. Belief in the cause of the project was confirmed by the concurrence of the formal and informal goals of respondents.

Table 3 : Attainment of Personal Goals

Goal statement	Rank	Mean score	(n)
Personal development	1	4.00	(n=1)
Social contribution	2	3.60	(n=4)
International & social exposure	3	3.53	(n=2)
Opportunity for research	4	3.33	(n=5)

It was not surprising that operational goals, as in the case of the formal objectives, were not fully attained. Reasons given included problems with customs clearance for parts imported (for example India, the Philippines, Indonesia); inadequate promotion and marketing (the Philippines, Indonesia); competition from other pumps such as the World Bank and the UNICEF pumps (expressed by a few countries); political obstacles due partly to administrative structure and organization, and partly to the obligation to those who provided financial assistance to purchase pumps for the area; lack of funds and credit facilities especially among the rural poor (China, Kenya, Philippines); probably families rather than communities be targeted as pump owners for reasons of better sense of ownership and maintenance; and insufficient communication between the main R & T Centre at the University of Malaya and the country projects as well as within the network. An analysis of such difficulties would be provided later in the report.

3.0 Efficiency of Phase III

Efficiency referred to the rate at which output was obtained in relation to resource inputs, that is, the productivity of the processes employed for implementing Phase III. To determine the efficiency of the processes that were activated in Phase III, various subsystems that were necessary for the desired output were examined. They included :

- the technical conversion process
- the maintenance subsystem
- the adaptation subsystem
- the guidance or managerial process

Survey respondents were asked two questions for the purpose of evaluating efficiency of the subsystems - first an indirect question, followed by a direct question.

3.1 *Direct Response on Efficiency*

Answers to the direct question that required team members to describe the efficiency of the process of the project they were familiar with in terms of each of the subsystems, showed that Phase III were considered to be fairly efficient generally. However, the technical conversion subsystems were regarded as most efficient, with a fairly high mean score of 2.9. Since technical conversion concerned the close relation between input and output, one could conclude that resources were well utilized in the project, at least to carry out tasks that were under the responsibility of respondents. The managerial subprocesses were ranked second for efficiency, with a score of nearly 2.8. But the adaptation and maintenance subsystems which required references to the environment to assist or ensure that the objectives of the project could be met, were rated relatively less efficient with scores of 2.7 each. This signified difficulties that had to be overcome by the various country projects when dealing with others in the environment, including within their own country and with those outside. (Table 4)

3.2 *Indirect Response on Efficiency*

When asked to indicate the extent the various subsystems could be changed from what actually took place in Phase III, that is to assess efficiency indirectly, respondents gave different results. A high degree of possible changes would imply that methods used for implementing Phase III tasks were far from efficient and more could have been done. Conversely, a low degree of possible changes would suggest that little room for improvement existed; and possibly the best alternative was already taken, which was as efficient as technically possible.

It was found that the adaptation subsystem had the least possibility for improvement in productivity (score 2.2) and probably whatever that could be done had been attempted when ensuring continuation and survival of the project within the environment. In other words, despite the relatively poor result obtained for the adaptation subsystem in the environment, possibly the best had already been attempted. The technical conversion subsystem (with a score of 2.3), was also relatively efficient in the sense that only slight changes could have taken place to improve the input-output ratios. Similarly, productivity might not be significantly elevated with changes to the maintenance subsystem, hence the mean score of 2.3, which indicated that only moderate changes could have been tried. But the finding that changes in the guidance and managerial process for direction, coordination, communication, decision making and control would bring the most significant improvement in productivity (score 2.4), such as in sharing of experience and expertise, signified inadequacies that might have been avoided if alternative courses of action were taken. (Table 4).

Specifically, communication problems with the project R&T centre had been highlighted. Undoubtedly, the R&T centre proved very useful in training and coordinating the network. But the telematics component of Phase III were not really helpful for both the countries where linkups were established (despite delays of customs clearance for equipment import and in getting their packet switching lines from their respective authorities). The Philippines had little meaningful

communication due to software problems and lack of full time skilled staff to carry out the relevant tasks regularly; while Indonesia had to abandon the trial due to high costs and the low priority given to setting up the telematics link. In the case of China and India, the absence of packet switching networks in their respective countries meant that international direct dial-up was the only alternative for the telematics link, which was not economically feasible in either case. Clearly, alternative methods for guiding, directing, coordinating and controlling the project network would be necessary for efficiency of Phase III. Mean scores on efficiency measures are summarized in Table 4.

Table 4 : Efficiency of Subsystems of Phase III

Direct Efficiency Measure	Rank	Mean Scores	(n)
Technical conversion system	1	2.90	(n=10)
Guidance or managerial process	2	2.78	(n=9)
Maintenance activities	3	2.70	(n=10)
Adaptation subsystem	4	2.70	(n=10)
Indirect Efficiency Measure	**Rank**	**Mean Scores**	**(n)**
Adaptation subsystem	1	2.22	(n=9)
Technical conversion system	2	2.33	(n=9)
Maintenance activities	3	2.33	(n=9)
Guidance or managerial process	4	2.44	(n=9)

4.0 Success of Phase III

In relation to the wider socio-politico-economic-cultural environment, commercialization of the water pumping technology project has to be examined carefully in terms of linkages and relationship between the project and the wider environment in which it operated. Overall success of the project could be evaluated according to awareness of the project, understanding of the project, acceptance of the technology, steps taken for large scale adoption, and interest and desire to produce locally. Respondents were asked to indicate degree of success for each of the aspects, on four point scales ranging from very low to very high.

The survey showed that the water pumping technology has been most successful with respect to acceptance by the environment. The mean score of 3.0 testified to the fairly high degree of success the pump received in terms of its social, political and economic impact on the communities targeted at. Awareness and understanding of the aims and processes of the project, especially its ensuing benefits, were also rated fairly successful. Mean scores of close to 2.8 were returned.

However, the same could not be said of interest and desire to produce the pump, either to assemble or to manufacture the handpump in their respective regions or countries. The score of 2.5 indicated that respondents had difficulty in getting interested parties to engage in its production. Business enterprises were not attracted to the handpump market because of low potential returns. Undoubtedly, the need for the pumps by the rural poor was immense. But effective demand was fraught with uncertainty because villagers could not afford to own pumps. Aid agencies, charitable organizations had to be relied upon for funding besides government. Perhaps the lack of promoters to financially support the use of the pump on a large scale, casted doubts among potential producers at the local level. The feedback showed that the project was least successful in getting steps taken to adopt the pump on a wide scale, as evidenced by the moderately low score of only 2.0. (Table 5)

Table 5 : Overall Success of Phase III

	Rank	Mean score	(n)
Acceptance of technology	1	3.00	(n=13)
Awareness of project benefits	2	2.77	(n=13)
Understanding of project aims	3	2.75	(n=12)
Interest and desire to produce	4	2.46	(n=13)
Steps taken to adopt widely	5	2.00	(n=13)

Clearly, the pumping technology was well known, well understood and well accepted. But real success in getting interested parties to produce and to market the pump, so that the product obtains extensive distribution and utilization by the intended beneficiaries of the project, was extremely limited. To date, agreement to produce pumps incorporating the Unimade technology is confined to the contracts with the Philippines (March 1990), and very recently with Kenya (July 1992), Costa Rica (September 1992) and China (September 1992). What could have been the reasons for the weak support and interest, despite acknowledgment of technological superiority of the pump and positive effects in targeted communities? How successful would be the implementation of the manufacturing processes in these four countries? What were the major obstacles encountered by Phase III?

5.0 Difficulties of Phase III

In assessing the obstacles or resistance that were faced in adopting and commercializing the technology, the single most important problem was to get sales in the face of competition from other pumps. This was followed by difficulties in obtaining relevant market information and contacts, and thirdly, in getting adequate finance for the project. Clearly, market transactional issues were most formidable. However, all obstacles encountered could be grouped into 5 main areas.

First, the most problematic area centered on marketing the pumps, with scores ranging from 2.25 to 2.62 - which are by no means low. Apart from the top three problems mentioned, physical distribution and the economics of commercialization were expressed as marketing related. The second area of difficulty were associated with after sale fears, including servicing and maintenance problems; supply of replacement parts, resources or materials; and continuity of future supply and improvement of the pumps. Scores of 2.0 to 2.08 were reported. Thirdly, socio-economic-political factors hindered the commercialization process. To succeed, it was necessary to overcome certain practical politico-legal problems, changes to values and life-styles, organization and management within the communities. (Scores of 1.67 to 2.0). Least problems of commercialization were in the technological aspects themselves, including availability of skillful manpower for implementation (with scores of only 1.5). It was felt that technology and skill issues had already been well addressed before attempts of commercialization began. (Table 6).

Table 6 : Obstacles Encountered in Commercialization

Difficulties	Type	Rank	Mean Score	(n)
Sales and competition	1st	1	2.62	(n=13)
Market information and contact		2	2.54	(n=13)
Finance		3	2.50	(n=12)
Physical market distribution		4	2.39	(n=13)
Economics		5	2.25	(n=12)
Resource and materials	2nd	6	2.08	(n=12)
Marketing strategy		7	2.07	(n=13)
Servicing and maintenance		8	2.00	(n=12)
Continuity of future supply		9	2.00	(n=12)
Value and life-style	3rd	10	2.00	(n=12)
Management and organization		11	1.92	(n=12)
Political		12	1.92	(n=12)
After sales training		13	1.83	(n=12)
Legal		14	1.69	(n=13)
Social-cultural		15	1.67	(n=12)
Technological	4th	16	1.50	(n=12)
Manpower and skill		17	1.50	(n=12)

EVALUATOR'S COMMENTS AND CONCLUSIONS

For the future utilization of the water handpumping technology and the benefit of other similar projects involving technology transfer of a socio-economic product, several comments can be made. Approximately a year into the Phase III project, the following observations were made :

1. There was virtually few or **no major technical problems;** and building on the results of the first two phases, Phase III would see a technologically superior, problem free handpump.

2. There was a need to **distinguish** between "need or want" and "effective demand" backed by purchasing power and willingness to buy in the prospective markets.

3. There was a need for **more** in depth market knowledge for each local situation specific relevant contacts in each country project visibility and known channels of communication with country projects or information centre that was accessible for interested parties to raise their interest with.

4. There was a need to employ **different marketing strategies** in different countries, depending on the socio-political and economic system and structure that prevailed. The "top down" or "bottom up" approaches suggested in the initial project document would probably be set aside.

5. There was a need to find or create **linkages** between the **potential market** for the pump, secondly, **finance** to support large scale adoption of the pump and thirdly, production facilities with manpower capable of absorbing and using the technology.

6. There was a critical urgency to instill **entrepreneurship** into the Phase III project wherever practicable.

Clearly, the results of the feedback confirmed these observations in that least difficulties were associated with technology (that is point 1), while the most serious problems were marketing related (points 2, 3 and 4). Further, when asked to suggest the type of organization that was best suited for disseminating and commercializing the water pumping technology, 6 out of 11 replies thought that government organizations or agencies such as the Ministry of Health (Malaysia), the Ministry of Public Works (Indonesia), FELDA (Malaysia) and similar bodies were most appropriate for dissemination. Five felt that research centres and institutes of higher learning such as universities could play the role of disseminating, training or transferring the technology, as well exemplified by the University of Malaya.

For commercialization however, all except one respondent rejected the idea that a Non Government Organization (NGO) was best for the task. Although NGOs were thought to be suitable for commercialization of the socio-economic product - as indicated in the Phase III

document - evidently, experience in the last few years showed the contrary. Lessons can be drawn from the Philippines.

5 out of 11 suggested that government bodies or agencies that have a wide range of industrial interactional activities or infrastructural support could carry out the task. A respondent from China for instance, proposed a Sino-foreign joint venture or some form of cooperation between an international funding agency and the state. Such an approach may continue to be relevant and workable in circumstances where control is centralized and remains very much in the hands of the government or the public sector. The contract agreement with China is in fact with a provincial government.

However, it was extremely interesting to find that 5 out of 11 responses stated that business organizations or private companies would be best for commercializing the handpump. The reasons given were because companies are profit oriented establishments that are geared towards efficiency and profitability. They can operate more freely without government bureaucracy and are able to compete on a commercial basis as proven necessary by the experiences of the project. Some proceeded to further suggest that companies that can maintain a balance between profits and social objectives be selected, because of the view that only companies with a strong social conscience would be able to commercialize the technology successfully.

It must be accepted that points 5 and 6 stated above on business linkages and entrepreneurship remain unexploited to drive the commercialization process of the water handpumping technology. The problem of commercialization must be "owned". In view of business risks involving market acceptance, financing costs both for investment and continued operation, production and manpower efficiency, and most of all managerial decision making and problem solving capabilities, entrepreneurship and the corporate form, if skillfully applied to the process, will bring fresh hope and life into the well developed water pump. But more importantly, commercial success of such a socio-economic product should ensure that the rural poor would become the ultimate beneficiaries of the new technology.

87-0084

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To document the performance and accomplishments of Phase III

- Effectiveness in attaining goals
- Efficiency of strategies and methods used
- Success achieved
- Difficulties encountered
- Lessons learnt
- Suggestions for commercialization

Methodology for Evaluation

- Reports and documents of project
- Observation and participation
- Informal discussions (Research & Training(R&T) Centre and IDRC)
- Feedback from participating countries through mail survey

FINDINGS BASED ON :

Survey

- 15 of 25 feedback forms returned

Countries (9)

- China
- Indonesia
- Kenya
- India
- Singapore
- Philippines
- Egypt
- Costa Rica
- Malaysia

EFFECTIVENESS OF PHASE III

- Clear understanding of Phase III objectives by :

  - 73% of the responses (11 of 15)
  - 55% of the Principal Investigators (5 of 8)

- 53% of informal or personal goals DERIVED from formal Phase III objectives while 47% were RELATED to formal objectives

(See Tables 1, 2 and 3)

EFFICIENCY OF PHASE III

- Direct measure
  - fairly efficient
  - technical conversion subsystems most efficient
  - adaptation and maintenance subsystems less efficient

- Indirect measure
  - adaptation subsystem had least possibility of improvement although probably the best already attempted
  - guidance and managerial process could be improved
  - telematics component was inefficient and not useful

(See Table 4)

SUCCESS OF PHASE III

- The pumping technology was :

  - well known
  - well understood
  - well accepted

- But extremely limited success in :

  - getting pumps produced
  - marketing and selling
  - obtaining extensive distribution among and utilization by intended beneficiaries

- Legal agreements to produce pumps completed with :

  - Philippines (March 1990)
  - Kenya (July 1992)
  - Costa Rica (Sept 1992)
  - P. R. China (Sept 1992)

DIFFICULTIES OF PHASE III

RANK

1 To achieve sales amidst strong competition

2 To service, maintain, supply replacements parts/materials

3 Socio-economic-political factors including changes to :

- values and lifestyles
- organization and management within communities

4 Technological aspects including skillful manpower for implementation

COMMENT 1

There was virtually few or **no major technical problems**; and building on the results of the first two phases, Phase III would see a technologically superior, problem free handpump.

COMMENT 2

There was a need to **distinguish** between "need or want" and "effective demand" backed by purchasing power and willingness to buy in the prospective markets.

COMMENT 3

There was a need for **more**

- in depth **market knowledge** for each **local** situation
- specific **relevant contacts** in each country
- project **visibility**
- known **channels of communication** with country projects or information centre that was accessible for interested parties to raise their interest with

COMMENT 4

There was a need to employ **different marketing strategies** in different countries, depending on the socio-political and economic system and structure that prevailed. The "top down" or "bottom up" approaches suggested in the initial project document would probably be set aside.

COMMENT 5

There was a need to **find** or **create linkages** between 3 major elements :

- the **potential market** for the pump
- **finance** to support large scale adoption of the pump
- **production** facilities with **manpower** capable of absorbing and using the technology

COMMENT 6

There was a critical urgency to instill **entrepreneurship** into the Phase III project wherever practicable.

CONCLUSIONS

- Actual commercialization of the new water pumping technology is only partially realized

- Who are the **proven** real beneficiaries of the new technology?

- To ensure that the benefits reach targeted groups, several modalities must be used according to the needs and constraints of each particular situation

- Entrepreneurship is necessary but may not be sufficient for inroads into a competitive market complicated by the realities of political and business relationships both within countries and internationally

REPORT OF WORKSHOP DISCUSSIONS

87-0084

SUMMARY

Based on the reports of the workshop discussions, (attached herewith), the following conclusions were made :-

I) Production/Technical

1. There is a need for standard specifications for purpose of quality control/performance acceptance/evaluation. These should be prepared by Independent Testers that could be accepted as 'International Standards' and not based on the lab or field tests done by University of Malaya.

2. It was suggested that CAAMS was the most qualified as it had the necessary experience being the recognized national standard setting body of China for certain products and also on the basis of China's market potentiality.

II) Market - related

1. There is a need to involve professional people in promotional activities.

2. There is a need for tie-up with local programmes.

3. There is a need for support and accompanying technology (eg. well construction/sanitation) which are just as important as the pump technology.

4. There are problems of spare-parts, repairs and maintenance.

III) Main Funding

There are problems in getting adequate financing for :

i. Manufacturing
ii. Marketing/distribution

IV) General

1. There is a need to develop relationships with health authorities, community programs and other internal organizations.

2. It was agreed that a time-table (future) on commercialization (on country basis) be prepared by participants.

REPORTS OF THE 4 WORKSHOPS

Participants were grouped into 4 workshops to discuss :-

1. Problems in commercialization (marketing, distribution and financial).

2. Steps in commercialization (action plus implementing body or agency).

GROUP 1

The following are the findings of the workshop groups :-

1. Quality Control (production)

Problem : to ensure quality control for any marketing strategy.

Solution : University Malaya must therefore develop procedures/standards/tests to ensure the quality control. In China CAAMS has been identified as the suitable institution to be the Independent Tester. Others can refer to CAAMS standards as they have been testing the pumps for several years.

2. Promotion - 2 ways

i) Informal - on visits outside and to visitors to projects.
ii) Formal - Attached to the cost of the pumps. (Direct costs)

3. Funding Agencies

Problem : that Funding Agencies will always suggest their own pumps

Solution : The reports from other users. (Eg. CAAMS) could be used to support the promotion of the pumps.

GROUP 2

1. Discussion

i. Defined objective of program.

ii. Defined commercialization as self-sustaining manufacturing, marketing and servicing of the pump in a free-market environments.

iii. Discussed social aspects of commercialization-to enable people to buy or obtain the pump (accessibility).

iv. Technical innovations in different countries.

2. Findings

i. Commercialization stages of participating countries :

a) Philippines and Malaysia - already commercialized.
b) China and Mali - if there are funds.
c) Egypt - too small a market.

ii. Different approach

a) China - co-operate with Internal Agencies (4 levels of Authorities to deal with)

b) Philippines and Malaysia - self-financed

c) Mali - IDRC funding required

Commercialization would require :

Support and accompanying technology (making wells and sanitation) just as important as the pumps technology itself.

iii. Technology/Marketing

a) Don't need a new factory to manufacture - sub-contract or use existing factories.

b) Promotional activities - tie up with local programs for health.

c) Should involve professional people in the promotional work.

GROUP 3

1. Discussion

i. Agree that the handpump is appropriate, therefore the need is identified.

ii. Production Problems

a) China - No big problems because of support from the government.

b) Indonesia - different problems because there is no support from the government have to seek funding.

iii. Agree that quality control is important if production is to be started. Refer back to Group 1 and CAAMS desire to be the controlling party.

iv. Manufacturing by existing manufacturers and not new manufacturers.

2. Commercialization Plans

i. Need identified - but demand questionable.
'Demand" - users who can't afford to buy. Handpumps include other technology which are more costly than the handpumps itself.

ii. Financial support still required.

GROUP 4

1. Problems

i. Standards - different requirements in different member countries. Eg. 10% sampling before you can achieve requirement of pump performance acceptability.

ii. Main market is the central government through the funding agency. This requires high level lobbying - 'Need' identified.

iii. Performance data of one user country inadequate.

iv. Finances.

2. Recommendations

i. Share the data and influence the acceptability of the pumps in other difficult countries where the data is relevant.

ii. Joint promotional approach so that we can use the same materials and share the marketing strategies used in different countries.

iii. For more impact, organizational approach rather than leaving individual manufacturers to approach their own governments eg. IDRC/Network Group or other International organizations who have the capability to undertake the assignment.

iv. Need for high level approach for funding of large scale production.