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**FINAL REPORT
ON
THE INTRODUCTION OF PVC
HANDPUMP IN INDONESIA
AND
THE INVOLVEMENT OF WOMEN IN
HANDPUMP TECHNOLOGY**

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INTRODUCTION

Since 1976 The International Development Research Centre (IDRC) has been sponsoring research and development work on a PVC plastic handpump design for use in developing countries. An essential feature of the design is that it must also be capable of local fabrication in developing countries. This is to guarantee that there is technology transfer in terms of technical know how as well as ensuring that spare parts are readily available locally.

In 1983, a project on the "Development of a Small-Scale Handpump Fabrication unit" was started in Malaysia by IDRC to study mass production techniques for the PVC Handpump with the view of substantially reducing its cost and therefore making it more readily available to the rural poor.

In order to ensure that the technology developed is transferred to the villagers in the developing countries IDRC also organized some research projects to field test the PVC handpump in cooperation with local NGOs in the respective countries.

In Indonesia, IDRC cooperates with Yayasan Dian Desa, an appropriate technology group based in Yogyakarta, Indonesia who have had several years of experience with rural water supply projects, to do the research. In Indonesia the Handpump research project was started in January 1986.

The Handpump Research project which was entitled "Introducing PVC Handpump in Indonesia" was divided into several stages namely,

1. Training of Dian Desa staff
2. A preliminary research as preparation to start the project
3. The implementation of the project (installation of handpumps)
4. Adaptation and production of handpump manual
5. Training to handpump recipients
6. Monitoring and Evaluation.

In July 1986, after Yayasan Dian Desa completed the survey to get the handpump recipients to be involved in this projects which supposed to be only 40, the fact showed that there were a lot more villagers who are interested to get the handpump. In order not to discourage them, Yayasan Dian Desa approach CIDA-MAF of Indonesia for additional fund to get 80 more handpumps. Fortunately CIDA-MAF agreed that they could provide with additional fund for 80 more handpumps under the condition that it was a joint project with IDRC where other expenses are covered by IDRC such as the personnel and management cost etc. Upon the agreement of IDRC, CIDA-MAF officially agreed to provide the additional fund for 80 handpumps and the installation of the 80 handpumps was started in December 1986.

Therefore, without any additional cost but for the handpumps units, for this research project instead of 40 handpumps Yayasan Dian Desa are able to install 120 handpumps.

This report is written for IDRC and CIDA-MAF who have jointly funded the program on handpump technology which is also a combination of the introduction of the PVC handpump as well as the involvement of women in the technology. The writer hopes that this report can be of use to IDRC or CIDA-MAF or any other institutions who would like to carry on similar programs as well as for the future of the PVC handpump program itself.

I. Training

In January 1986 two of YDD technical staff, Mr. Verry Renyaan and Mr. Suranto went to the University of Malaya.

Malaysia to undergo training on the construction of handpumps and installation as well as discussion on the various aspects of the handpumps. The training was done in two weeks. The result of the training was successful as back from Malaysia they started to plan the technical things that will be done for the implementation of the handpumps such as the production of the above ground component in adaptation to the local resources.

II. Preliminary Survey

The survey for the preparation of the project was divided into two namely:

A. Survey of Location

The survey was done to determine the appropriate location for the implementation of the handpump project which especially concern with the water level and average water quality which should suit the condition of the handpump.

The survey was conducted by three technicians and one social scientists in 3 villages which consists of 10 hamlets and 5 slum areas.

The choice were made in several places though there were only 40 handpumps because the objective of the research project is to see the impact of the handpump as well as to know the people's acceptability of the handpump. So the handpumps are to be installed scatteredly as they will just be used as a kind of samples to the people in the village.

B. Door to Door Survey

When the locations which fulfill the requirement for handpumps installation were chosen, the survey was continued by door to door survey taking 200 respondents.

The result of the survey was surprising as more than fifty percent (120) were interested to get the handpumps in spite of the fact that many of them do not know anything about handpump and also of some former bad experiences with handpump program.

It is concluded from the result of the survey that in general their reasons for being interested to get the handpumps are :

- need of clean water closer to their house

- subsidy on the concrete ring for the well construction
- It is made of PVC that it won't rust and influence either the color or the taste of the water coming out from the pump.
- the guarantee given by Yayasan Dian Desa
- the training given so that they will be able to maintain and repair their handpump
- reasonable price and uncash payment.

The analysis of the survey is discussed separately and attached in this report (Attachment 1)

III. The Implementation of the Project - Fabrication and Installation of Handpumps

A. The Production of the Handpump Components

1. Below ground components

The below ground components of the PVC handpump were fabricated by the University of Malaya and were sent to Indonesia. Yayasan Dian Desa received the first forty below ground components in March 1986 consisted of 20 suction pumps and 20 of the lift type pumps.

After the agreement of CIDA-MAF to fund for another 80 handpumps, Dian Desa made an order to the University of Malaya. The 80 handpumps were received in February 1987. They consisted of 40 lift pumps and 40 suction pumps.

2. The above ground component

The Yayasan Dian Desa technical staffs adapted the design and the material used to the local resources and economic condition . The main change was the stand pipe which instead of metal concrete pipe was used. The cost of the concrete standpipe is only 1/5 of the metal one. The other parts are similar to those of the design from the Unimark II type. The whole components for the above ground was produced at the Dian Desa workshop for all the 120 handpumps.

The production of the first 40 handpumps was started in February 1986 and was completed in April 1986 while the other 80 was produced in October 1986 up to January 1987.

B. The Handpump Installation

As a result of the survey and a number of meeting done with the handpump recipients prior to the implementation of the handpumps in which the com-

munity was actively involved in the planning stage, it has brought some changes to the original plan such as the change of the construction from drilled to handdug well as most of the people prefer to have handdug well due to traditional belief. Dian Desa agreed to the change of the construction as it had several advantages such as:

- It fulfill the wishes of the recipient so that they will be more at ease and happy in owning and using the handpump
- Most of the community can participate actively and contribute their labour especially in digging the well to the project
- It is practical as the water level is not stable so if the well get dry the villagers can deepen the well and add more pipes themselves.
- Compared to drilled well, handdug well is cheaper

Due to the fact that at first there were only 40 handpump provided by IDRC where as there are 108 respondents who are very eager to get the handpump, so Dian Desa with the agreement of the community involved (the 108 respondents) prioritise to those who live far from water source or of those which may be possible to be used by several families (though it may still be individual ownership).

- a. in may 1986 the first two handpumps were installed supervised by Mr. Rishakaran, a technical expertise from Malaysia, who replaced Prof. Goh Sing Yau who was unable to give the supervision. The first two handpumps installed were consisted of two types , the suction pumps and the lift pumps.
- b. After the first two handpumps have been successfully installed, the Dian Desa's field workers began to make the preparation for the intallation of the other 38 The handpump recipients who come from the villages contributed labour in digging the well as well during the installation of the handpump so that they are actively involved and get the idea of the handpump technical aspect. Those from the slum areas however cannot contribute their labour for the digging of the well because they are mostly side street peddlars and they work from early in the morning till late at night So for the digging of the well Dian Desa hired well digger to do the job but they should spare one day to be involved in the installation of the handpump as it may be part of their training .

The installation of the 40 handpumps funded by IDRC was completed in September 1986. The list of the handpump recipients is given in attachment 2. The installation of the 80 handpumps funded by CIDA-MAF was begun in December 1986 and was completed in April 1987. Actually when the installation was started the below ground component had not been received from the University of Malaya yet. So in the first two and a half month the construction was begun by constructing the well and the stand pipe. When the below ground component arrived in February 1987, then the installation of the pumps can be

done very fast. The list of the 80 handpump recipients funded by CIDA is given in attachment 3.

IV. Adaptation and Production of Handpump Manual

A handpump manual had been developed by Kabalikat Ng Palmyang Filipino. Because of the different system used and the local condition, Dian Desa made some changes and add some drawings as to suit the local situation and condition as well as the construction system used. The production of the handpump manual was done in March and April 1986.

The 120 manuals were ready by May 1986. The handpump manuals is attached in this report as attachment 4

V. Training to Handpump recipients

Training were given to Handpump recipients both men and women owners after all the handpumps had been installed. So, the training was divided into two parts, the IDRC's recipients and the CIDA-MAF's recipients. The training to the IDRC's recipients were conducted From September 10 to September 15, 1986. While the CIDA-MAF's recipients were trained from May 12 to May 20, 1987.

The training was given from hamlet to hamlet so that there were not too many people in one training as to give them more chances to try on what had been explained and demonstrated. So, in one training there were about 6 to 10 persons.

The training given was on maintenance and repair of the handpump. Together with the training package each recipients was given a manual in accordance to the types of their handpump, either lift or suction and a set of basic tool for repair and maintenance.

VI. Monitoring and Evaluation

Monitoring is done once a month together with the collection of repayment. This kind of monitoring in which every handpump is visited is considered as a kind of guarantee by the handpump owners. The visit is meant to monitor the technical performance and the condition of the handpump.

The evaluation was conducted in 14 days by the Dian Desa researchers from the social monitoring section from September 6th to 20th, 1987.

As part of the evaluation and monitoring From 27 July 1987 to 5 August 1987 Prof. Goh Sing Yau, IDRC technical consultant on PVC handpump technology visited Dian Desa and visited every handpump installed., From the visit Prof Goh provided some technical advices and training to the Dian Desa's technicians on what is needed based on his observation in the field. His trip report is also attached in this report as attachment 5.

In general, the result of the monitoring done can be concluded as follows :

- All the handpumps are still in good condition
- The main technical problems is only on the PVC rod for the lift pump which gets broken quite easily. It was identified later on because the quality of the pvc pipe used as the rod is not of good quality. It means that for future program it will be better to make special order from the manufacturer as to prevent similar problem. (see Prof Goh's Trip Report attachment 5)
- There has been problems with the different size of the Indonesian pvc pipe and the malaysian one especially in joining the pipes with the socket due to the different size of the socket too. This problem however have been solved by the advice from prof. Goh Sing Yau , the advisor, who taught the Dian Desa's technician on how to make the socket. (See Prof Goh's Trip Report - Attachment 5)
- Due to the improper timing in starting the implementation of the handpump installation especially in digging the well which is done between May and August in which the water level is still high, while the ones funded by CIDA was done during January to April which is a rainy season therefore the water level too is still high. Apparently when in 1987 in the Yogyakarta area there was a severe long drought, many of the well need to be deepen. In doing this, the handpump recipients were helped by the Dian Desa technicians.
- The charges for the handpump which is Rp. 50.000 and the repayment scheme was considered as relevant to the local condition.
- The training and the manual given have been useful and the skill in repairing the handpump have also been transfered to other people usually other members of the family or the neighbours who take water from the hand-pump.
- In general people like the PVC handpump as there is a strong interest within the community to get the handpumps. Problems however will be on its high cost as it is generally identified that the villagers are willing to pay a certain amount of money but due the devaluation in September 1986 followed by the increase of cost of some materials the cost of the hanpdump becomes too high.
- The system used is an integral part to the success of the program which can also be seen from the fact if a new system in which there will be no subsidy at all given in the program then most of the community who more than 60 % comes from lower middle class community feel than they cannot

afford that much though there will still be a kind of repayment scheme. It should be noted here however that even such the community has shown their active and good participation by showing that they will not only asked the handpump for free though previous handpump project from other institutions or government always gave it for free, but the know their limit of affordability.

- The handpump have brought several positive impact especially in the socio-economic as well as health condition of the handpump owners proves by the increase number of facilities such as toilet, bathroom washing space etc.
- The PVC handpump is better suited the rural areas rather than the urban areas as better acceptability and attitude is developed in the rural areas.

In general the PVC handpump introduced have showed a good technical performance as there have not been any major breakage of the handpump experienced from the 120 installed since April 1986. In other words all the handpumps are still functioning well after 19 months of operation of the first 40 handpumps and 8 months of the 80 handpumps.

The system used is well suited the community in general. The two, the handpump and the sytem, are integral parts towards the success of the program. So, future program should be as closely as possible based on the previous one with improvement and more attention on some of the aspects which in the evaluation is somewhat weak such as the effectiveness of the training, etc.

The detail of the result of the program is presented in the evaluation report in Attachment 6.

The Repayment

The record of the repayment is pretty good. As explained earlier the repayment scheme is made under 20 months repaid basis. It means that the repayment can either be made monthly or every harvest (every four or five months) as long as the total amount is repaid in 20 months. 95% paid it monthly. Up to December 1987 it was recorded that from the 40 handpumps funded by IDRC 86% from the total amount that should have been collected have been collected while from the 80 handpumps funded by CIDA almost the same percentage (86.9%) arecollected. Data on the repayment up January 1988 can be seen in attachment 7.

ATTACHMENT 1

PRELIMINARY SURVEY REPORT



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CHAPTER I

A. Background

Water is still a critical problem in many areas especially in developing countries as Indonesia. The problems include not only on the difficulties of getting water but also on the quality of the water available to be consumed by the community. In many areas people may have to walk several hundred meters or even several kms away from their home to get water from either spring a river or a well or other water sources. In the areas where ground water is not too deep, In Indonesia especially in Java, well becomes the main source for the community's domestic water need. Most of those well however are open well and poorly made which do not fulfill both the health and sanitation standard nor that it is save especially for children.

The Government have done several efforts in trying to overcome the water problems of the community especially in the villages that is by building rainwater catchment in the places where groundwater is not available, putting more piping system especially for small towns, building water supply facilities and installing a lot of handpumps where it is possible. It nevertheless has overcome the problems especially in the rural areas. Not only that because there have not been enough facilities provided but also because many of the facilities such as handpumps have stopped operating after a certain time . Apparently the facilities provided especially handpumps may only answer the problem for a certain time and not for as long a time as possible as it is wished. One of the reasons may be because most of them are public owned that the community is lack of their sense of belongingness to the facility that are provided to them that maintenance and repair is not looked after, or it is difficult to do any repair on the handpump that nobody will do it besides that it of course depends on the quality of the handpump itself.

In 1982 the International Development Research Centre of Canada (IDRC) in cooperation with the university of Malaya in Malaysia developed a Poly Vynnil Chloride (PVC) handpump named the UNIMADE MARK I and UNIMADE MARK II. They made the design as simple as possible as to serve the need of the rural people but at the same time of a durable one. All the parts are made of PVC. Having the UNIMADE MARK I and MARK II, IDRC wanted to test the handpump in several Developing countries to see whether the PVC UNIMADE MARK I or MARK II is acceptable to the people and also whether or not they are really as durable and strong when actually used in the field as well as to test whether its simplicity may have helped the people in the rural areas with limited technical knowledge to understand its technical components and therefore able to do any repair and maintenance themselves as it is an important part contribute to the durability of the handpump. In Indonesia , IDRC appointed Yayasan Dian Desa, a non profit appropriate technology organization based in Yogyakarta, to do the research and testing.

Being responsible to do the research program on the field testing of the PVC handpump, Yayasan Dian Desa conducted this survey to get a base line data for better implementation of the research program.

B.The Problems

Handpump is a technology that many people even in the villages have known. Many of them however do not have a positive impression on handpump technology due to several reasons such as that it did not last long, some said that it is dangerous because of some improper technical aspect, while some others said that the water coming out of the handpump is rusty and some even said that handpump is too expensive that they will never be able to afford it . Based on such condition Yayasan Dian Desa consider that there should be a strategy developed to introduce the new handpump the PVC UNIMADE MARK II to the people as it may not be merely introducing a new kind of handpump vis a vis a technology to them. It should be born in mind that introducing a new technic or a new facility such as the PVC handpump should not only that it may be able to overcome the people's problem of water in a relatively short time but also to be able to improve the knowledge and skill of the community of the technology introduced so that they will be able to realize the value of it for themselves and may come to a realization on the importance and need to do a good maintenance and repair of the facility provided. So, the community involvement in the program from the planning stage through the implementation of the program should be an integral part of the research or development program.

To answer the above problem Yayasan Dian Desa developed a strategy in which the handpump will not be given free to the community. The community will need to repay part of the cost of the handpump in credit (which will be designed from the data taken in the survey) to encourage community's contribution as well as to encourage their sense of belongingness or owning the handpump, while the installation cost will be subsidized by the project in which case the community should contribute labour. This is meant to encourage the community's contribution as well as to encourage their sense of belongingness to the technology in this case the handpump. To ensure better maintenance and repair of the handpump Yayasan Dian Desa will train the community with basic skill for maintenance and repair of the handpump.

However, such strategy may not be suitable for the target community or there might be something within the plan which may not be acceptable to them. It is difficult to decide from one side on which strategy will be most suitable to the community. Therefore other aspect such as the socio-economic condition, the habit and tradition, and other aspect within the community should be understood should also be understood as it may become an integral part to the program development. Therefore this preparation survey is a very important

aspect for better achievement of the 'Introduction of PVC Handpump to Indonesia program'.

C. Goal and Objectives

The goal of the survey is to get as much input as possible from the community which can be used as inputs in the development of the 'Introduction of PVC Handpump Program to Indonesia'

The objectives are:

- To collect data on how and where the community of the target area get their water for their daily need
- To collect data in the socio-economic condition of the people at the target area
- To collect data on the community's knowledge of handpump and their opinion of the PVC handpump explained
- To collect data on the kind of participation and contribution that the community can make to the program
- To collect data on whether or not the community have any objection on the strategy developed and if there is in which aspect.

D. Survey Methodology

Two kinds of methodology will be used, namely by observation to know the ground water condition of the target area and by interview based on questionnaires prepared to get a quantitative analysis.

D. 1. Selection of Target Area

The choice of the target area for the PVC handpump program are based on :

- The condition of the ground water level as to whether or not the area is suitable for the installation of the UNIMADE MARK II handpump either the suction type (up to 8 m) and the lift type (up to 12 m)
- The need of the people in common for clean water
- The community's readiness to participate and contribute actively to the program.
- The target area should be within reached for close monitoring
- The target area consist of villages and slum areas in the city

Based on the above condition the following area are selected for survey target area :

Village

1. Kalurahan Selomartani, Kecamatan Kalasan
2. Kalurahan Sendang Tirto, Kecamatan Berbah
3. Kalurahan Caturharjo, Kecamatan Sleman

The above three areas belong to the Sleman Sub-district (Kabupaten).

Slum Area

1. RK Tukangan dan RK Gemblakan Bawah, kecamatan Danurejan
2. RK Kricak Kidul and RK Sidomulyo, kecamatan tegalrejo
3. RK Serangan, Kecamatan Ngampilan

The above three areas are in the city of Yogyakarta.

D.2. Selection of respondents

In relation to the goal of the program in which the dissemination and introduction of the PVC handpump should be to fulfill the community need for clean water, so respondents are taken of those who do not yet have any water source of their own. 200 respondents, 100 from the village area and 100 from the slum area were chosen for the survey purpose.

D.3. Data collection and analysis

The interview to collect data from selected respondents were done by 4 of the Yayasan Dian Desa staff of the social monitoring section led by a social scientist. The collection of data in the field was done from April - Mei 1986. However, as there was a problem in interviewing the respondents especially those in the slum areas as most of them were not home during the day, so that the interview could only be done at night, so the survey could not be finished in due time as planned (one month). so it needed another two weeks to get all the data from the respondents from the six target area.

The data analysis and report was done by the social scientist of Yayasan Dian Desa, head of the social monitoring section.

CHAPTER II

GENERAL INFORMATION ON SURVEY AREA

a. Kabupaten Sleman

Kabupaten Sleman is one of the regency of the four regencies in the Yogyakarta province. It consists of 17 Kecamatan.

Groundwater is generally available in this area with a range of depth from 3m to 20m. However, in many villages in this area there are still a number of people who do not yet have proper clean water source for their domestic need.

a.1. Kelurahan Selomartani

Administratively Kelurahan Selomartani belongs to Kecamatan Kalasan, Kabupaten Sleman, Yogyakarta Province. It is located about 13 km to the northeast of the city of Yogyakarta.

The main water source of most villagers there is small springs besides the nearby river, the neighbours' well or the public well. Groundwater is available at about 9m to 16 m deep. The soil is sandy and it is the main reason why not many villagers in this area have their own well as it may not be possible to dig a well without putting any rings for the well while the cost of the rings is too expensive if they have to buy at once.

a.2. Sendangtiroto

The village of Sendangtiroto is located to the east at more or less 16 km away of the city of Yogyakarta. Administratively it belongs to Kecamatan Kalasan, Kabupaten Sleman, Yogyakarta Province.

Unlike Selomartani, the soil condition of this area is hard and rocky. The main water source of most villagers at Sendangtiroto is open hand-dug well (it is just a hole they made on the ground). The groundwater level range from 3 m to 8 m. In this area there were already two handpumps installed by the Government but none of it is still functioning.

a.3. Caturharjo

It is administratively belongs to Kecamatan Sleman, Kabupaten Sleman, Yogyakarta Province. The village is located at about 17 kms north west of the city of Yogyakarta. It is within an easy reached by any vehicle.

This area is a fertile area with a river flows through the village. The river water is used for irrigation. Many of the villagers still use the river water for bathing and washing while the water for drinking and cooking is usually taken from the public well or the neighbours' well. The soil condition is a combination of sand and rock layers. The average depth of the ground water is 6 m to 17 m.

b. The slum area of the city of Yogyakarta

As other cities, in Yogyakarta there is also slum area where the poor people live. The ground water level range in these area range from 6m to 15 m.

b.1. RK Ledok Tukangan and RK Gemblakan Bawah

Administratively RK Ledok Tukangan and RK Gemblakan Bawah belongs to Kecamatan Danurejan. It is located along the river bank of Code river, a river that flows through the Yogyakarta city. During the rainy season these area are very often flooded. The Code river however is also the main water source for the community for bathing and washing while they take water from the public well for their drinking and cooking purposes.

This area is very densely populated so that there is only a tiny path left for walking or for motor cycle. The houses are so crowded that there is only very little left to make well or other facilities. Handpump may be appropriate for such area as it does not require a big space.

b.2. RK Kricak Kidul and RK Sidomulyo

This slum area is located along the Winongo River at the west part of Yogyakarta. It administratively belong to Kecamatan Tegalrejo. RK Kricak Kidul is located along the east side of the river bank while RK Sidomulyo is at its west side. The community in those two areas use the river water for bathing and washing while for their drinking and cooking purpose they take the water from the public well of the public handpump which is not yet enough to serve the need for such a densely populated area.

b.3. RK Serangan

Administratively RK serangan belongs to Kecamatan Ngampilan of the city of Yogyakarta. It also located along the Wionongo river but at the south part. unlike the other slum areas where they live along the river bank, Serangan is located along the river but at a higher level, so they do not have flood problem. The people who live around this area also use the river water for their bathing and washing purposes. There have been installed some pbulic hand-pumps, some of them are not functioning anymore while of those that function are not enough to serve the need of all of the community in that area. The ground water level is about 10 m to 17 m deep.

CHAPTER III

A. GENERAL INFORMATION ON RESPONDENTS

A.1. Socio-Economic Condition

The result of the survey shows that the average age of the respondents at Sleman is 44.2 years old with a range of 22 to 80. In the city the average age of the respondents is 46.8 years old with a range from 22 to 66. The biggest percentage of age group at the two regions is the same that is between 41 to 51 years old. Besides, percentage of age group between 51 to 60 is high enough, that is 17% at Sleman and 23% in the slum areas in the city whereas of those whose age is above 61 in the rural area is 10% while in the city 12%. Based on the average age of the respondents in the whole surveyed area which most are of the productive age it is concluded that most respondents are still strong enough to use handpump. This range of respondents age is presented at table 1.

TABLE 1

Average age of respondents	Slum area	Village	Total	%
1. 21 - 30	10	19	29	14.5
2. 31 - 40	22	25	47	23.5
3. 41 - 50	33	29	62	31
4. 51 - 60	23	17	40	20
5. 61 - above	12	10	22	11
Total	100	100	200	100

The educational background of the respondents varies from the uneducated ones to university. The percentage of the uneducated ones at Sleman is 12% while in the slum area is 9%. The biggest percentage at Sleman are of those who have attended primary school either finished or not (35%) which is the same case as in the slum area in which 41% are graduated from the primary school.

The percentage of those who have been to higher education such as academy or university at Sleman is higher (3%) than those from the slum area (1%). All together the difference of percentage of the educational background between the villages at Sleman and the slum area in the city is not big. In the city the average of the education level is 3.8 whereas at Sleman it is 3.4.

The average score of the education level is identified by the following scoring system:

illiterate	1
primary school (unfinished)	2
primary school (finished)	3
junior highschool (unfinished)	4
junior highschool (finished)	5
senior highschool (unfinsihed)	6
senior highschool (finished)	7
academy or university (unfinsihed)	8
academy or university (finished)	9

The average of the education level is drawn from the total of sub-scoring divided by the total respondents.

At Sleman there are 50 families which consist of 1 to 4 members and in the slum area there are 37 families with the same number of family members. There are 46 families with 5 to 8 members at Sleman while in the slum area the total respondents with the same size family is 54. 4 families at Sleman have more than 9 family members whereas in the slum area there are 9 families . The average number of family members at Sleman and in the slum area is almost the same that is 4.8 and 4.9 respectively as presented at table 2.

TABLE 2

Family members	Slum area	Village	Total	%
1. 1 - 4	37	50	87	43.5
2. 5 - 8	54	46	100	50
3. 9 - above	9	4	13	6.5
Total	100	100	200	100

The respondents job varies from farmers, side street peddlars to civil servant. At Sleman the biggest number are of farmers while in the slum areas is as bricklayers (19). The variation of jobs of the respondents in detail are presented at table 3.

TABLE 3

Respondents Job	Slum area	Village	Total	%
1. bricklayer assistants	19	9	28	14
2. farm laborer	-	8	8	4
3. Electronic service	1	-	1	0.5

4. home industry	3	-	3	1.5
5. Small shop	14	-	14	7
6. Farmer	-	44	44	22
7. Chicken breeding	1	-	1	0.5
8. Business/peddlars	7	3	10	5
9. leather craftsmen	10	-	10	5
10. Bamboo crafters	-	5	5	2.5
11.scavandor	1	-	1	0.5
12.Tailor	1	-	1	0.5
13. small industry	5	-	5	2.5
14. Employee	8	8	16	8
15. Govt civil servant	10	12	22	11
16. Retired	4	-	4	2
17. Village heads	-	3	3	1.5
18. Shop guard	3	1	4	2
19. Driver	3	-	3	1.5
20. Becak driver	9	1	10	5
21. Barber	1	1	2	1
22. parkingmen	-	1	1	0.5
23. Gardener	1	-	1	0.5

A.2. Housing Condition

In the survey area most of the respondents live in their own houses. The houses are either inherited from their parents or constructed by themselves. Some of them especially of those in the slum area (16) live in houses with a 'ngindung' system (in Javanese - the house is built over somebody else's land) while at Sleman there is only 1 family . 30.5% respondents live in houses with bamboo walls, 7% have houses with wooden walls, 53.5% have houses made from bricks while the houses of the other 2% respondents is a combination of brick and bamboo wall.

A.3. The Family Income

To get a thorough data on the family income should actually be done separately as it may require a thorough information on every detail concerning their income. In this survey however, it is tried to get the idea of the family monthly income which can be estimated from the several source of income that each of the family have such as being a bricklayer but at the same time they may have some income from their harvest every four or five months It will then be calculated as such to get and idea of the respondents monthly income. The average respondents monthly income is presented at table 4.

TABLE 4

Average monthly income	Slum area	Village	Total	%
0 - 30.000	13	16	29	14.5
30.000 - 60.000	31	46	77	38.5
60.000 - 90.000	30	18	48	24
90.000 - 120.000	11	7	18	9
120.000 - 150.000	7	3	10	5
150.000 - 180.000	4	5	9	4.5
180.000 -	4	5	9	4.5

From the above table it can be seen that 14.5% of the respondents earn less than Rp. 30,000 per month. The biggest number of respondents (38.5%) earn in between Rp.30.000 to Rp. 60.000 while there is very small percentage (4.5%) who earn more than Rp. 180.000. So it means that almost 50% of the respondents belong to the low income family.

A.4. Socio-Economic Condition

In this survey several indicators such as the house condition, ownership of the house, the size of the house and the respondents monthly income are used to determine the respondents socio-economic condition, and each of the indicator will be scored from 1 to 4 *. From the scoring, it was concluded that 29% of the respondents in the villages at Sleman belongs to the poor class, 65% in middle class and only 6% are of the rich families, while in the slum areas is somewhat different as 38% belongs to the poor class , 56% of the middle class and 6% is rich.

*1. a. Housing material used :

bamboo (1) ; Wood (2) ; Half wall (3) ; wall (4)

b. Floor material used :

no floor (1) ; Cemented (2), grey floor (3); teraso floor(4)

Score 1 = (a + b) : 2

2. Housing area + land/garden :

< 100 sq m = (1) ; 100 - 200 sq m = (2) ;

200 - 300 sq m = (3); 300 sq m = (4)

3. Monthly income:

less than Rp. 60.000 = (1)

Rp. 60.000 - Rp. 120.000 = (2)

Rp. 120.000 - Rp. 180.000 = (3)

Rp. 180.000 - above = (4)

The average score is (1 + 2 + 3) : 3

B. WATER, ITS FACILITIES AND ITS USAGE

Water need is divided into two, the need for drinking and cooking and the need for bathing and washing. Whereas the water sources may come from the river, springs and well. The result of the survey shows that there are similarities and differences of water source used.

The total respondents who use river water for bathing and washing is 16% consists of 13% at Sleman and 19% in the slum area. Only respondents from the villages at Sleman (6%) who use spring water which means that only 3% of the total respondents is using spring water. The river water and the spring water is usually only used for bathing and washing purposes while for drinking and cooking the respondents take the water from the public well, their own well, their neighbours or relatives' well etc.

From the total respondents 29.5% used their own well consist of 43% at Sleman and 16% in the slum area. However, they most of them do not have either toilet or bathroom facilities. Some of them however have a very simple facilities such as roofless bamboo bathroom which is usually built next to the well . The bathroom is usually completed with a pail , a drum or an earthen jar. As there is very limited number of toilet facilities, so most people at Sleman use the river as toilet while those in the slum area used public toilet.

Apparently there should be some reasons why many of them do not make their own well. Table 5 shows some of their reasons as follows :

TABLE 5

Reasons for not making a well	Slum area (N = 84)	Village (N = 57)	Average
1. Cannot afford the cost	50%	73.7%	59.6%
2. Not the season yet		10.5%	4.2%
3. No place	31%	-	18.4%
4. Not their own land/house	19%	3.5%	12.8%
5. Soil easily loosen	-	12.3%	5 %
Total	100%	100%	100%

From table 5 it can be seen that the major reasons for not constructing a well of their own is due to its high cost (59.6%), while some other reasons are because it is not yet the season for constructing a well (4,2%), the limited/small space which is the problem of most of those who live in the slum area (31%) or 18.4% of the total respondents, the land is not theirs (12.8%) while 5% said because if they do not use ring the soil will fallen into the well.

B.1. Ways of Fetching Water

As mentioned earlier the main water source for domestic purposes for most of the respondents are their own well, their neighbours' or public well. They are all open well, 80% of which is without concrete rings or just bamboo with some stones on the well's lip. In most cases the women have to get the water from the well but she is helped by every member of the family who is big and strong enough to do the job (the father and grownup son or daughter). The fetching of water is done in accordance to their need, so they just go to the well and get some water whenever they feel need it.

The main equipment used to get the water from the well is pail while to carry the water homes they use either pail or earthen jar or two cans with a bamboo stick to carry which depends on the distance from their houses. If the well is far from the house, usually the women use an earthen jar (klenting) while the father or the son use pail.

B.2. Respondents Knowledge and Experience with Handpump.

Most respondents, 77% at Sleman and 52% at the slum area or 64.5% of the total respondents have never used any handpump. While of those who have ever used or known handpump at Sleman are 23% while those in the slum area are 48% or 45.5% of the total respondents. They are of those who live near or around any handpump provided by the government. Of those who do not make use of the handpump provided was because they live far from it or because the handpumps is broken because of poor maintenance.

Knowledge on handpump are usually got from their experience in using the handpumps whereas those who have never used any handpump know it from others. Information about handpump which they got from different sources have given them different ideas about the handpump as well. The following table presents the different perception of the respondents on handpump :

TABLE 6

Weakness of handpump	Slum area (N = 100)	Village (N = 100)	Total	%
1. Not durable	66	29	95	47.5
2. Difficult maintenance	11	43	27	13.5
3. Small amount of water	6	3	9	4.5
4. No spare parts	-	1	1	0.5
5. Awful taste	8	2	10	5
6. unspecified	9	22	31	15.5
Total	100	100	200	100

47.5% of the total respondents have the opinion that handpump is not durable. According to them of the handpump that they know the valve and the leverage handle is easily worn out that the handpump cannot be used anymore. While 27% of the respondents said that its maintenance is difficult and also that very often the handpump do not function during the dry season due to the dropping of the ground water level and they cannot do anything with it because the installation usually used drilled well construction system.

One of the weaknesses mentioned by the respondents is that the small amount of water coming out from the handpump so that they feel more convenient in using the pail from the well as it is faster. Some others (0.5%) mentioned that the spare parts of the handpump is not available so that they cannot do any repair, 5% said that the water from the handpump does not taste good which is caused by the rust of the iron riser pipe while 15.5% do not give their opinion. However, there are some respondents who have some positive opinion on handpump as presented at table 7.

TABLE 7

Advantages of handpump	Slum area (N = 100)	Village (N = 100)	Total (N = 200)	%
1. Safe for children	3	8	11	5.5
2. Clean water	1	17	18	9
3. Easy to operate	13	17	30	15
4. Small space	29	16	45	22.5
5. Practical	45	24	69	34.5
6. Do not know	9	18	27	13.5
Total	100	100	200	100

From the table it can be seen that actually the respondents have some logical and good opinion on the handpump. Out of 200 respondents 5.5% considered that handpump is safe especially for children, 9% said it is clean as there is not any possibility for animals or dirt falling into it as happened with open well. 15% mentioned that the advantage of handpump is that even children and old people can use the handpump as it does not require too much energy. In spite of the fact that villagers have large area they still have the opinion that handpump may save some space which mean that they know about efficiency.

The above reasons were supported by the opinion of the respondents on the kinds of well that they like most. The survey found out that 66.5% of the total respondents, 62% at Sleman and 51% from the slum area prefer handpump than others where as 38% of the respondents at Sleman and 49% of the slum area or 43.5% of the total respondents prefer well. Almost all of the respondents who prefer well than handpump was because they already have their own well

and it has become part of their habit to take water from the well neither that they feel that it is a hard work to take water from the well.

The above data may be used as a based line data for Yayasan Dian Desa to continue with the introduction of the PVC handpump program in the above area though things may still depend on the further data which concern the kind of system which will be used by Yayasan Dian Desa in the implementation of the handpump.

CHAPTER IV

INTRODUCTION OF PVC HANDPUMP PROGRAM

A. The program plan

Before the implementation of the PVC handpump program, through the survey an explanation was given to the respondents about the PVC handpump as well as the system which will be used in the program.

As mentioned earlier in order to encourage community's participation and contribution to the program as well as their self belongingness, Dian Desa will not give the handpump for free but will bare the installation cost . In the program Dian Desa will also see some different kind of ownership such as individual, group or public. This however will be decided in accordance to the result of the survey which concern the respondents opinion about the ownership pattern. Besides, Dian Desa will also provide services such as :

- Training on repair and maintenance will be given to handpump recipients.
- Guarantee for certain periods will be given on any breakage on the handpump component and services will be provided on paid basis after the guarantee period is ended.
- Cost of the handpump can be paid in credit repayment which will be decided based on the result of the survey.
- Spare parts are provided at Dian Desa headquarter.

A.1. Respondents responds on the PVC handpump program

In general there is a good responds from the respondent on the PVC handpump program as 65% of the respondents at Sleman and 26% of the respondents from the slum areas agreed to participate on the program. There is quite a big different from the two areas which is influenced by some conditions such as that in the slum area many of the respondents do not live on their own house or land (ngindung). Whereas in the village such as Selomartani for example, they found it difficult to construct a well due to the soil condition or if they want to construct one then the cost is too high and it is beyond their affordability (in cash). Besides in the villages at Sleman the distance from one's house to the well is relatively farther than thos in the slum area (2 - 200 m)

The above mentioned reasons might be of those which influenced the decision taken whether they like the PVC handpump or not.

Those who do not want to participate in the PVC handpump program mentioned that the cost charge on the handpump is too high (19%), 25% said that

they already have their own well so they do not need any handpump, 16% mentioned that they only rented the place so they cannot add anything (only in the slum area) while there are 6% of the total respondents who said that they prefer well than handpump and they even propose a kind of credit repayment scheme for well construction (without handpump).

A.2. Respondents opinion on individual, group or public owned handpump.

In this program Dian Desa try to get an idea which kind of ownership prefer by the respondents as it will have a big influence on its future in relation to repair and maintenance which may have a strong influence on the handpump technical performance. Therefore it is offered to the respondents in which kind of ownership they prefer together with an explanation of the advantages on group ownership such as the cheaper repayment as it will be shared among them.

The result of the survey however shows that in general most respondents do not agree on group or public ownership. This is quite a surprising result due to the fact that there have been a kind of tradition exist in all parts of Indonesia especially in the villages in Java of "Gotong Royong" (working together for something). So why not practise the 'gotong royong by buying the handpump in groups. Apparently they give some logical reasons as follows: 55.5% of the total respondents , consist of 37 respondents from Sleman and 74 from the slum areas said that they want to maintain the good relationship with the neighbours. Owning something together may cause some distraction on the already settled peace in the neighbourhood suppose there are some conflict which may happend if something happen to the handpump or in the use of the handpump. They (19.5%) also mention that the need of one family may not be the same from the other so that the frequency of usage of the handpump might also vary from one to another,. If they bought in group though they use it differently then one may not feel comfortable to share the same amount to repay the handpump. 8% of the respondents said that it is complicated to deal with money in group in other words money is a sensitive aspect which they do not like to touch too much in group. 24% which consist of 17 respondents from Sleman and 31 from the slum areas even have the opinion that they do not like group or public ownership because the handpump will break faster if it is used by many people. Besides the above mentioned reasons, most of the respondents also stated that it is better to have it individually as it may give them a certain right over the handpump. So it can be concluded that in general the respondents prefer individual ownership rather than group or public ones

A.3. Respondents affordability for the repayment and the time frame proposed

From the respondents who have agreed to participate in the PVC handpump program further questions were asked regarding their affordability for the

repayment and the time frame. From the data there two versions of repayment proposed by the respondents, monthly and every harvest (every four months). The amount of affordability proposed by the respondents range from Rp. 2000 to Rp. 10,000 monthly and Rp. 5000 to Rp. 50,000 for every harvest time. From 108 respondents, 82 prefer monthly repayment while 26 prefer every harvest because their main income come from their field. It should be noted here that only those from the villages who prefer every harvest and none from the slum areas. From the 82 respondents who prefer monthly repayment, 86.6% can only afford between Rp. 2,000 to Rp. 3,000 per month, 9.7% said they can afford between Rp. 3000 to Rp 5000 per month and there are also 9.7% who can afford in between Rp. 5000 to Rp. 10,000 (only of those from the slum area). From the 26 respondents (all from the villages) 53.8% (14 respondents) mentioned that they may afford in between Rp 5,000 to Rp. 10,000 for every harvest (or Rp. 1,250 to Rp. 2,500 monthly), 19.2% (5 respondents) mentioned Rp. 10,000 to Rp. 15.000 (or Rp. 2,500 to Rp. 3,750 monthly) and 26.9% (7 respondents) proposed that the repayment for every harvest is Rp. 15,000 (or Rp. 3,750 per month).

The average repayment proposed by the respondents from the villages at Sleman is Rp. 2,513 while from those who live in the slum area the average repayment proposed is Rp. 2,588. Whereas of the average amount proposed by those who prefer every harvest repayment is Rp. 14.888,-. Table 8 present the repayment proposed by the respondents.

TABLE 8

Average repayment	Slum. area		Village	
	monthly	per harvest	monthly	per harvest
1. - 3.000	35	-	34	
2. 3.000 - 5.000	3		5	
3. 5 000 - 10.000	3			14
4. 10.000 - 15.000				5
5. 15.000 -				7
Total	41		39	26

CHAPTER V

CONCLUSION

From the data of the survey it may be concluded that in general (70.5%) of the respondents do not have their own source of clean water so that they may have to go to a distance that range from 2m to 200m and carry heavy pail of water homes besides that some still use river water for their bathing and washing purposes which from health point of view is very unhealthy. Based on the above data, it is concluded that the survey area may need assistance to provide clean water sources for the community.

The community efforts in fulfilling their own need of clean water source either by constructing well or installing a handpump is considered very low due to several reasons. But the main reason is because of the cost which is usually beyond their affordability as to make a well will cost approximately Rp. 150.000 to Rp. 200.000 . Looking at the average monthly income which is only Rp. 66.759 per month and Rp. 81.174 per month in the slum area, it cannot be expected that they may be able to construct a well or even a handpump on their own (because it should be in cash).

The introduction of the PVC handpump program in general have got a positive respond from the respondents because 108 out of the 200 respondents agreed to participate to the program in accordance to the system that have been set up by Yayasan Dian Desa in which the respondents may have to repay the handpump. This is a very good result because it was only expected that there will only 40 to 50 respondents who would be willing to be involved in such program due to the fact that usually handpump were given for free by the government or other institutions and also that many respondents (64.5%) do not know about handpump yet.

Therefore The surveyors proposed that it is necessary to introduce the PVC handpump program into the survey area due to the need of clean water sources for many families in the survey area and also based on eagerness of the respondents to try to install the PVC handpump by risking their money for it. It is a good environment to start with the Introduction of the PVC handpump program.

Most of the community especially of those from the villages at Sleman prefer to have hand dug well rather than drilled well and they have agreed to actively participate in the installation especially in the digging of the well. The situation is different with the slum area as in the slum area most of the prefer drilled well due to the limited space available and they have mentioned that they may not be able to actively participate in the installation (they may only spare one day) as they have to do their business which need the whole day of their time from morning till night. From such data and after calculating the installation cost with

the two different system, the surveyors proposed that handdug well construction will be most suitable and acceptable.

The economic condition of the community in the survey area is low as 50% of the total respondents have less than Rp.60.000 per month. It was also reflected on the monthly affordability if they have to repay the handpump which 86.6% can only afford Rp. 2000 to Rp. 3000. So, the best monthly repayment will Be Rp. 2.500 monthly and Rp. 10.000 for every harvest.

Being so,. the PVC handpump program will help the community to have clean and healthy water source and hopefully it will attract the attention of others which would be a good sign for the future of the PVC handpump development program.

ATTACHMENT 2

LIST OF IDRC ASSISTED HANDPUMP RECIPIENTS

ATTACHMENT 2

List of the recipients and areas where the 40 handpumps funded by IDRC are installed:

No	Name	Pedukuhan	Kelurahan
Village			
1.	Public	Mangunan	Caturharjo
2.	Arjosihono	Mangunan	Caturharjo
3.	Mohdiharjo	Mangunan	Caturharjo
4.	Ahmadirejo	Mangunan	Caturharjo
5.	Sarjo	Gatak II	Selomartani
6.	Suhardi	Gatak II	Selomartani
7.	Ratno Sudiro	Gatak II	Selomartani
8.	Amat Sukamin	Demangan	Selomartani
9.	Public	Demangan	Selomartani
10.	Palil Praptohardjono	Demangan	Selomartani
11.	Hadi Mulyono	Pondok	Selomartani
12.	Siswo Wardoyo	Pondok	Selomartani
13.	Warsito	Pondok	Selomartani
14.	Darmo P	Kringinan	Selomartani
15.	Mardirejo	Kaliwaru	Selomartani
16.	Adijono	Kaliwaru	Selomartani
17.	Asmokaryo	Kaliwaru	Selomartani
18.	Rejo Utomo	Maredan	Sendang Tirto
19.	Martowiyono	Maredan	Sendang Tirto
20.	Rantiwiyono	Jetak	Sendang Tirto
21.	Prawiro Sentono	Jetak	Sendang Tirto
22.	Kartono	Sendang	Sendang Tirto
23.	Harjowikarto	Sendang	Sendang Tirto
24.	Bariyanto	Kemasan	Sendang Tirto
25.	Darmo	Kemasan	Sendang Tirto
Slum Area			
26.	Rahmat Hadisunyoto	Sidomulyo	RT6 Bener
27.	Parimin	Sidomulyo RT7	Bener
28.	Kisworo Pramuji	Sidomulyo RT6	Bener
29.	Tugiyono	Sidomulyo RT4	Bener
30.	Ngatijan	Kricak Kidul	Bener

31. Saiman Mulyodiharjo	Kricak Kidul	Bener
32. Sukiman	Kricak Kidul	Bener
33. Karto Atmojo	Ledok Tukangan	Suryatmajan
34. Purwohudoyo	Ledok Tukangan	Suryatmajan
35. Sasro Utomo	Ledok Tukangan	Suryatmajan
36. Mulyo Sriyono	Serangan	Notoprajan
37. Suwardi	Serangan	Notoprajan
38. Prawirodiprojo	Serangan	Notoprajan
39. Supardal	Serangan	Notoprajan
40. Widi Eddy	Serangan	Notoprajan

ATTACHMENT 3

LIST OF CIDA-MAF ASSISTED HANDPUMP RECIPIENTS

ATTACHMENT 3.

List of the recipients and area of the 80 handpumps funded by CIDA:

No.	Name	Pedukuhan	Kelurahan
1.	Mulyo Sukarto	Mangunan	Caturharjo
2.	Abdulrachman	Mangunan	Caturharjo
3.	Sugimo	Mangunan	Caturharjo
4.	Dwihandoyo	Mangunan	Caturharjo
5.	Jemu	Mangunan	Caturharjo
6.	Jumakir	Mangunan	Caturharjo
7.	Sumpono	Mangunan	Caturharjo
8.	Sugimo	Mangunan	Caturharjo
9.	Pardi	Mangunan	Caturharjo
10.	Public	Kaliwaru	Selomartani
11.	Pawiro Sentono	Kaliwaru	Selomartani
12.	Adi Kisno	Kaliwaru	Selomartani
13.	Mujiono	Kaliwaru	Selomartani
14.	Darmaji	Kaliwaru	Selomartani
15.	Marto Sentono	Kaliwaru	Selomartani
16.	Cipto Harjono	Pondok	Selomartani
17.	Boiman	Pondok	Selomartani
18.	Suratmi	Pondok	Selomartani
19.	Teguh Suparno	Pondok	Selomartani
20.	Somorejo	Pondok	Selomartani
21.	Rejo Sumarno	Pondok	Selomartani
22.	Suratimin	Pondok	Selomartani
23.	Pujo Suwarno	Pondok	Selomartani
24.	Budiono	Pondok	Selomartani
25.	Darmo Utomo	Pondok	Selomartani
26.	Pak Dukuh	Pondok	Selomartani
27.	Sunardi	Kringinan	Selomartani
28.	Darmo Pratoyo	Kringinan	Selomartani
29.	Sutrisno	Gatak	Selomartani
30.	Sugiyanto	Gatak	Selomartani
31.	Karyono	Gatak	Selomartani
32.	Tejo Atmojo	Gatak	Selomartani
33.	Muhrozi	Gatak	Selomartani
34.	Sobhi Harjono	Demangan	Selomartani
35.	Ngadiran	Demangan	Selomartani
36.	Tugiyo	Demangan	Selomartani

37. Ibu Rejo Prawiro	Demangan	Selomartani
38. Paldi	Demangan	Selomartani
39. Tukiman	Maredan	Sendang Tirto
40. Sukardi	Maredan	Sendang Tirto
41. Mardi Susanto	Sembung	Sendang Tirto
42. Tumiran	Kemasan	Sendang Tirto
43. Wagiman	Kemasan	Sendang Tirto
44. Wongso Karno	Jetak	Sendang Tirto
45. K. Sentono	Jetak	Sendang Tirto
46. Public	Sendang	Sendang Tirto
47. Warsito	Klodangan	Sendang Tirto

Slum Area

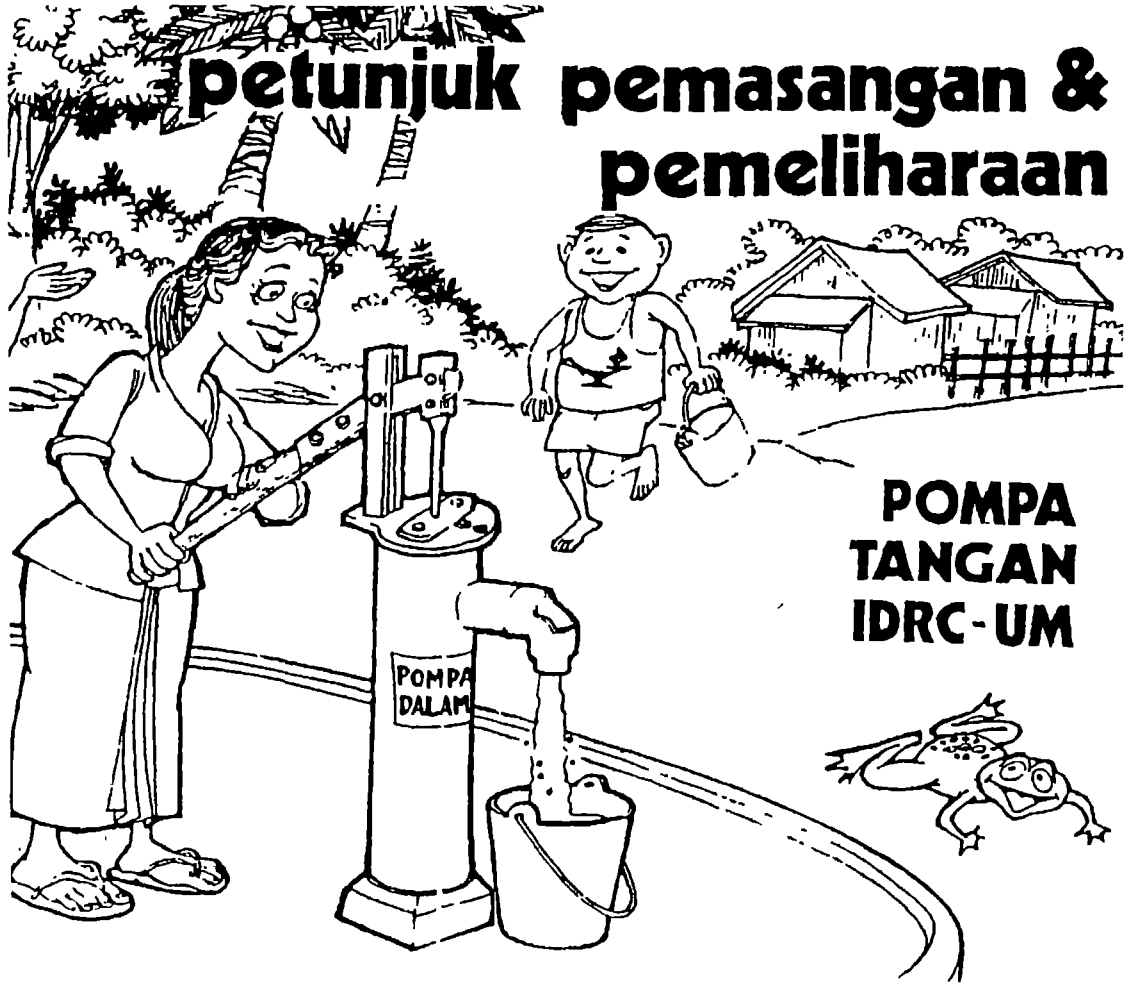
48. Harto Rahrdjo	Ledok Tukangan	Suryatmajan
49. Kris Susetyo	Ledok Tukangan	Suryatmajan
50. Mardiyah	Ledok Tukangan	Suryatmajan
51. HB Sagiran	Ledok Tukangan	Suryatmajan
52. Marsup	Ledok Tukangan	Suryatmajan
53. Nitiharjo	Ledok Tukangan	Suryatmajan
54. Darmo Prayitno	Kricak Kidul	Bener
55. Slamet	Kricak Kidul	Bener
56. Karnadi	Kricak Kidul	Bener
57. Darmo Prawiro	Kricak Kidul	Bener
58. Sugito	Sidomulyo RT7	Bener
59. Sutopo	Sidomulyo RT7	Bener
60. Sastro Suwarno	Sidomulyo RT7	Bener
61. Sutrisno	Sidomulyo RT7	Bener
62. Joko Rahayu	Sidomulyo RT7	Bener
63. Wahadi	Sidomulyo RT7	Bener
64. AC Mulyono	Sidomulyo RT7	Bener
65. Jumadiyono	Sidomulyo RT4	Bener
66. Mohadi	Sidomulyo RT4	Bener
67. Sutopo	Sidomulyo RT4	Bener
68. Ibu Satirah	Serangan	Notoprajan
69. Atmo Suryono	Serangan	Notoprajan
70. Mursihono	Serangan	Notoprajan
71. Surono	Serangan	Notoprajan
72. Yoto Utomo	Serangan	Notoprajan
73. Mulyodiharjo	Serangan	Notoprajan
74. Hadi Sumarto	Serangan	Notoprajan
75. Yordan Saidan	Serangan	Notoprajan

76. Notodiharjo	Gemblakan	Notoprajan
77. Parto Wiyono	Sengkan	Condongcatur
78. Mulyono	Sedogan	Condongcatur
79. Sukardi	Minomartani	Condongcatur
80. Suwardjono	Minomartani	Condongcatur

ATTACHMENT 4

ADAPTED HANDPUMP MANUAL

petunjuk pemasangan & pemeliharaan



**POMPA
TANGAN
IDRC-UM**

Program pengenalan dan pengembangan pompa tangan IDRC-UM ini dimungkinkan atas kerjasama antara :

- International Development Research Centre (IDRC), Canada**
- Program for Appropriate Technology in Health (PATH) Philipina**
- Kabalikat ng Pamilyang Pilipino, Philipina**
- Universiti Malaya, Malaysia**
- Yayasan Dian Desa, Indonesia**

CIRI-CIRI POMPA TANGAN IDRC-UM :

- 1. Bagian-bagian pompa yang dipasang di bawah permukaan tanah terbuat dari Polivinil Chloride (PVC) atau Acetal Plastik.**
- 2. Bagian-bagian pompa di atas permukaan tanah bisa dibuat dari bahan lokal yang ada. Untuk tuas pengangkat sebaiknya terbuat dari kayu yang keras dan ulet, sedangkan beton dudukan pompa terbuat dari cor beton. Walaupun demikian bisa diganti dengan bahan lain yang tersedia di lokasi.**
- 3. Pompa angkat dengan silinder ukuran 76 mm diameternya dapat digunakan untuk menyedot air sampai sedalam 12 meter.**
- 4. Ada dua buah katup, yaitu klep dasar (foot valve), dan torak (piston)**
- 5. Bagian-bagian pompa tidak perlu diganti untuk sekurang-kurangnya 8 tahun asalkan pompa dirawat dengan baik.**
- 6. Klep dasar bisa dikeluarkan dan dibersihkan sewaktu-waktu.**

DAFTAR ISI

I. Bagian-bagian Pompa

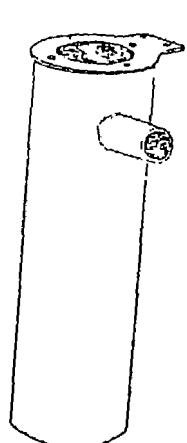
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III. Pemasangan

IV. Masalah dan Cara Mengatasinya

V. Pemeliharaan

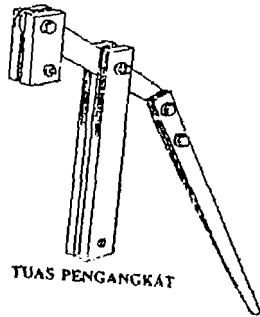
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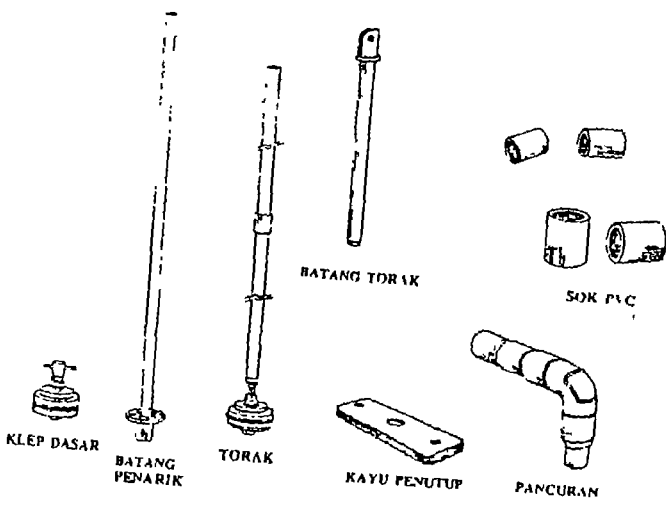
BEFON DUDUKAN POMPA



SILINDER POMPA



TUAS PENGANGKAT



KLEP DASAR

BATANG PENARIK

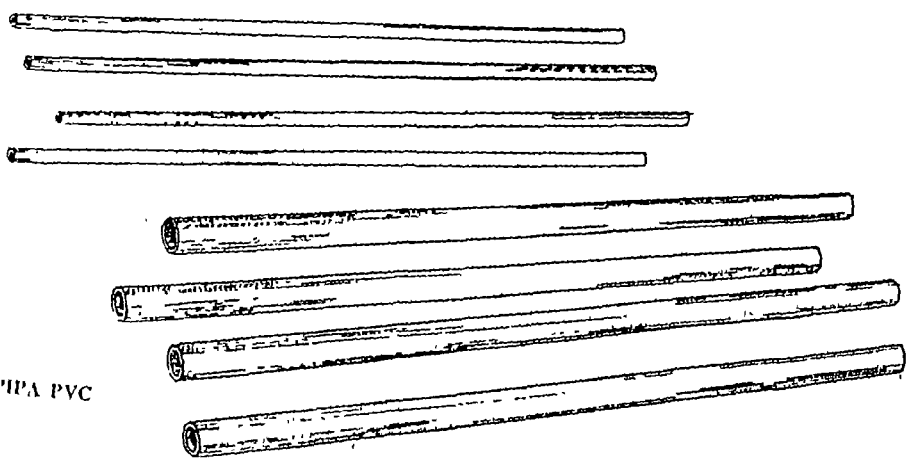
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BATANG TORAK

KAYU PENUTUP

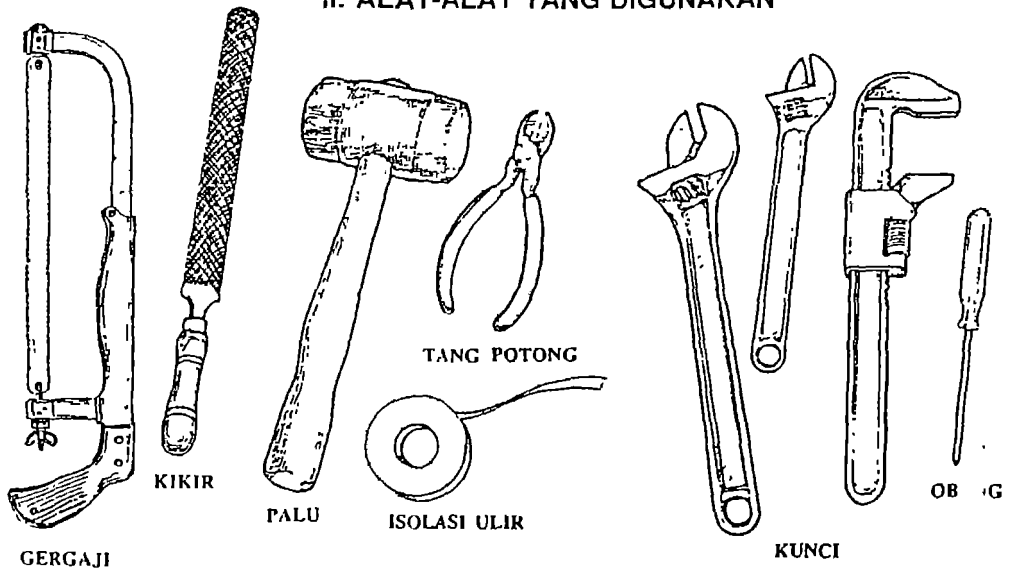
SOK PVC

PANCURAN

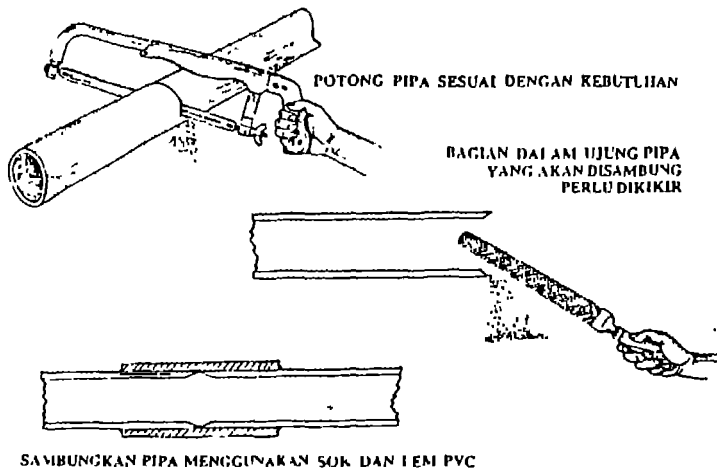
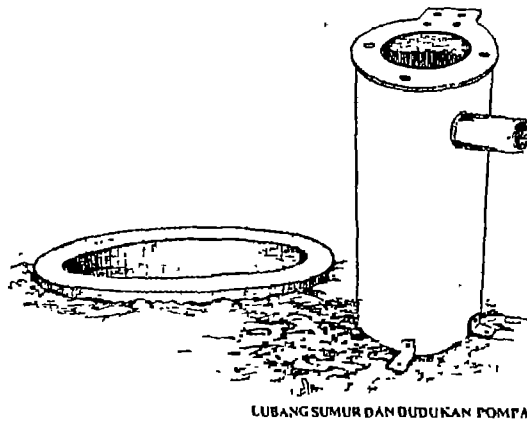


PIPA PVC

II. ALAT-ALAT YANG DIGUNAKAN



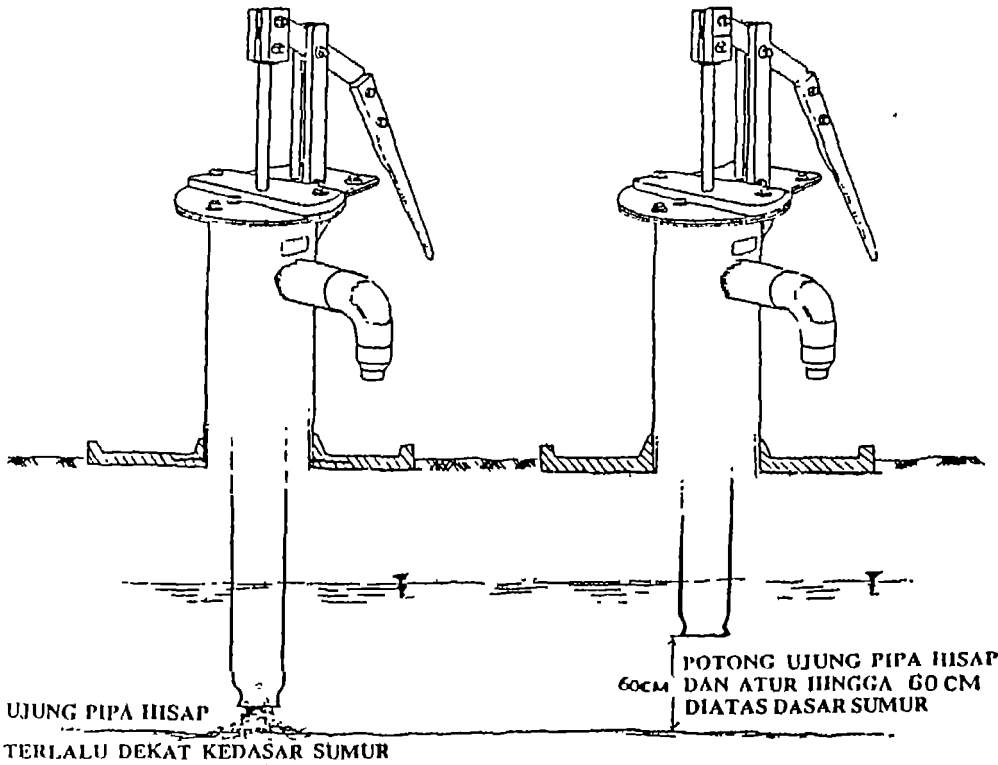
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IV. MASALAH DAN CARA MENGATASINYA

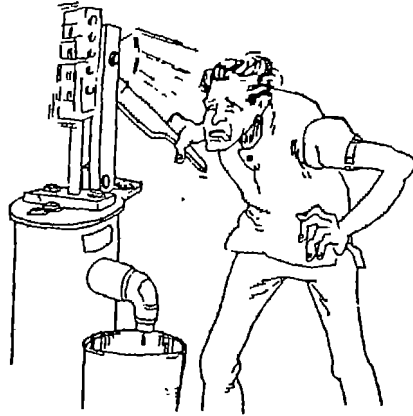


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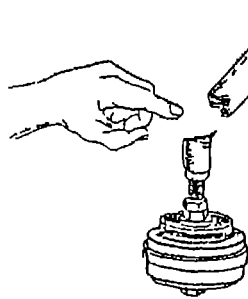


UJUNG PIPA HISAP
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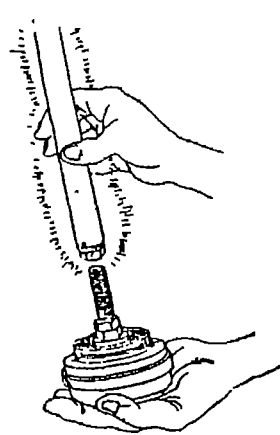
POTONG UJUNG PIPA HISAP
DAN ATUR HINGGA 60 CM
DIATAS DASAR SUMUR



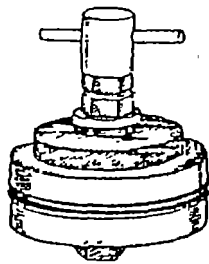
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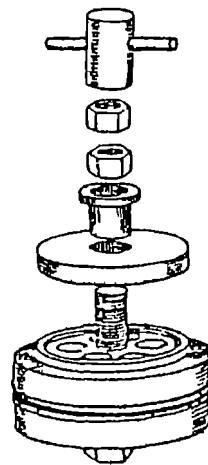
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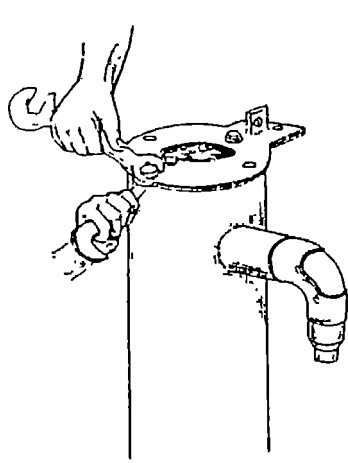
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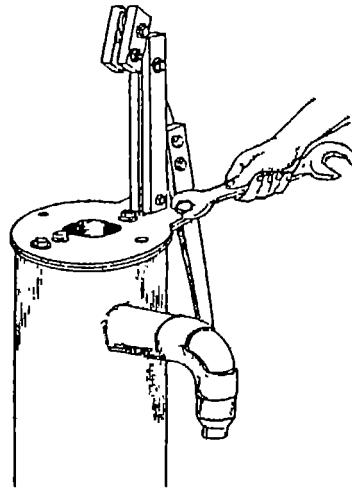
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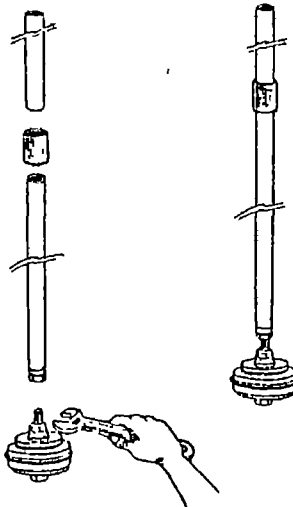
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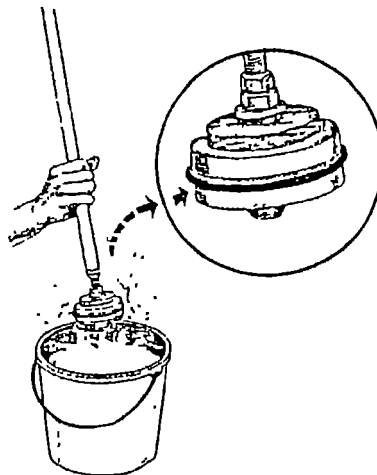
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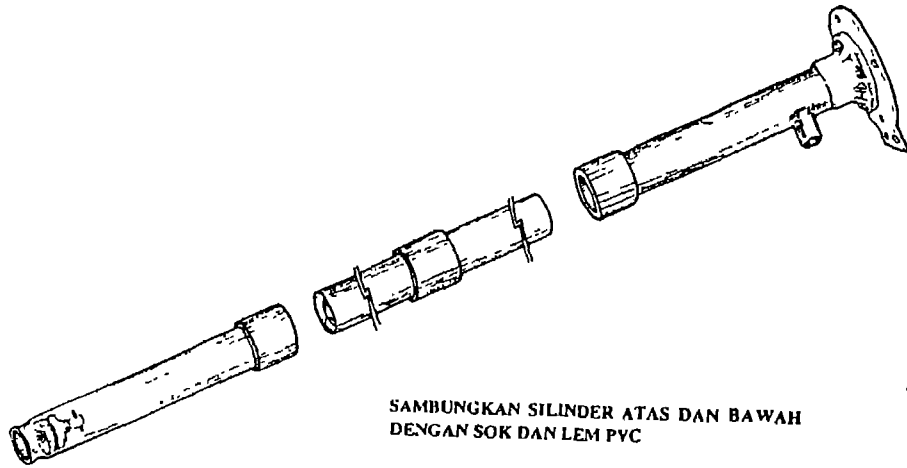
PASANG TUAS PENGANGKAT



PASANG TORAK PADA TANGKAINYA

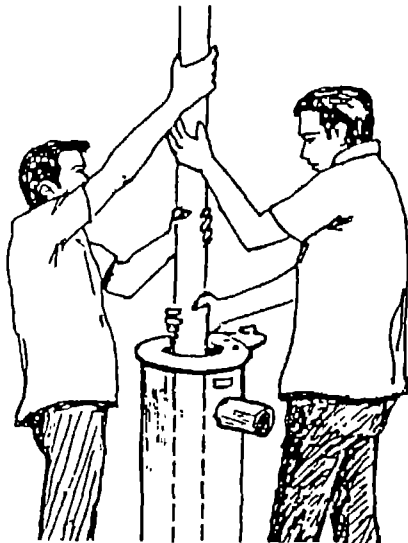


BASAHI TORAK DENGAN AIR

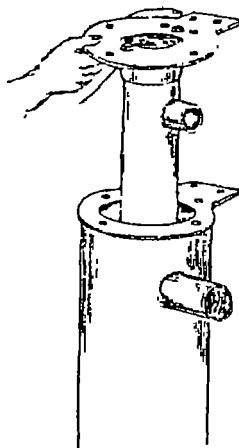


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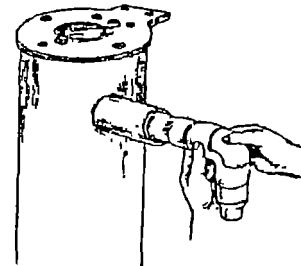
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DENGAN SOK DAN LEM PVC



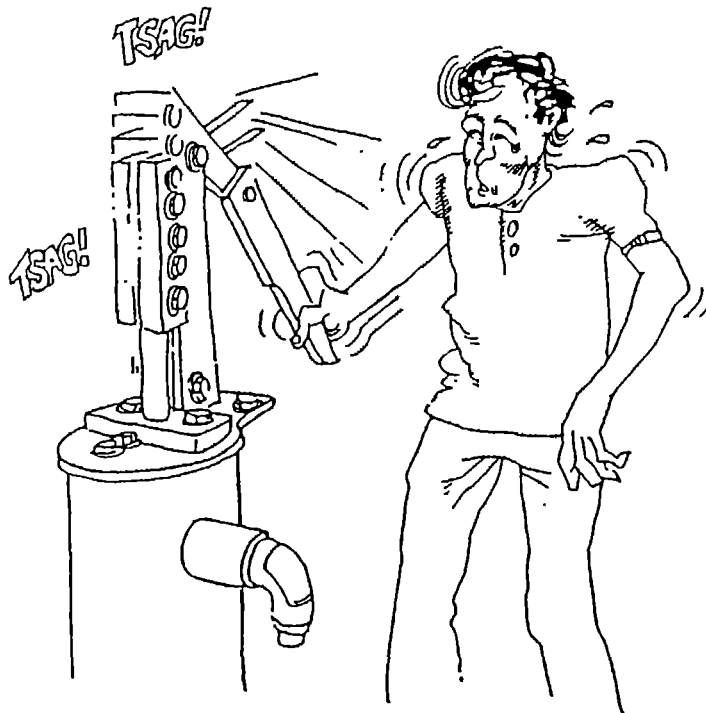
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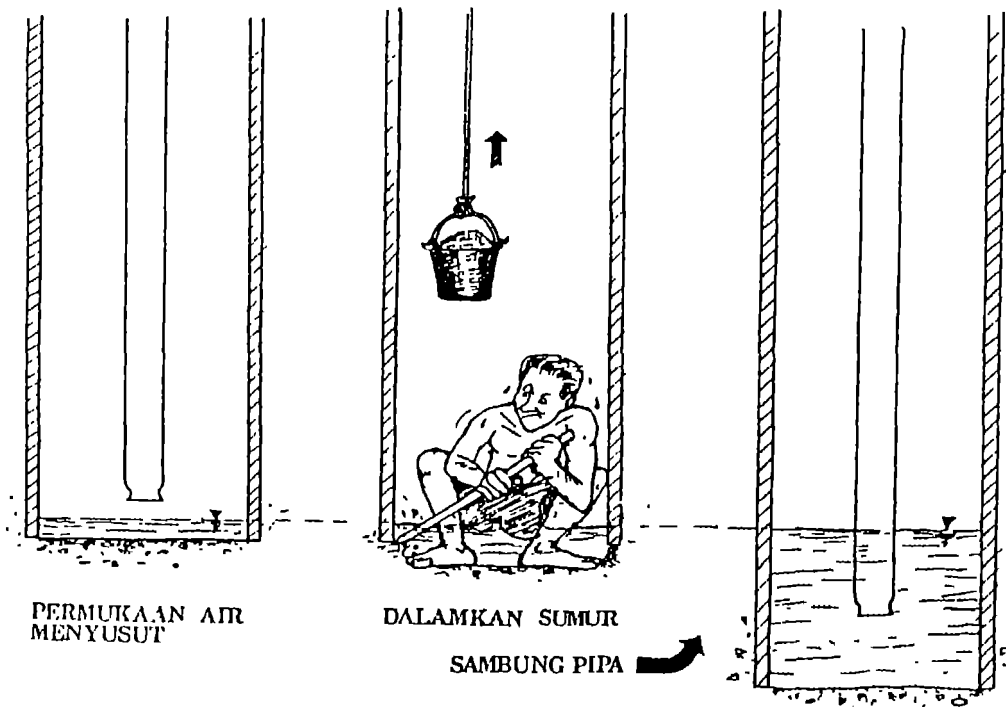
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PASANG PANCURAN PVC

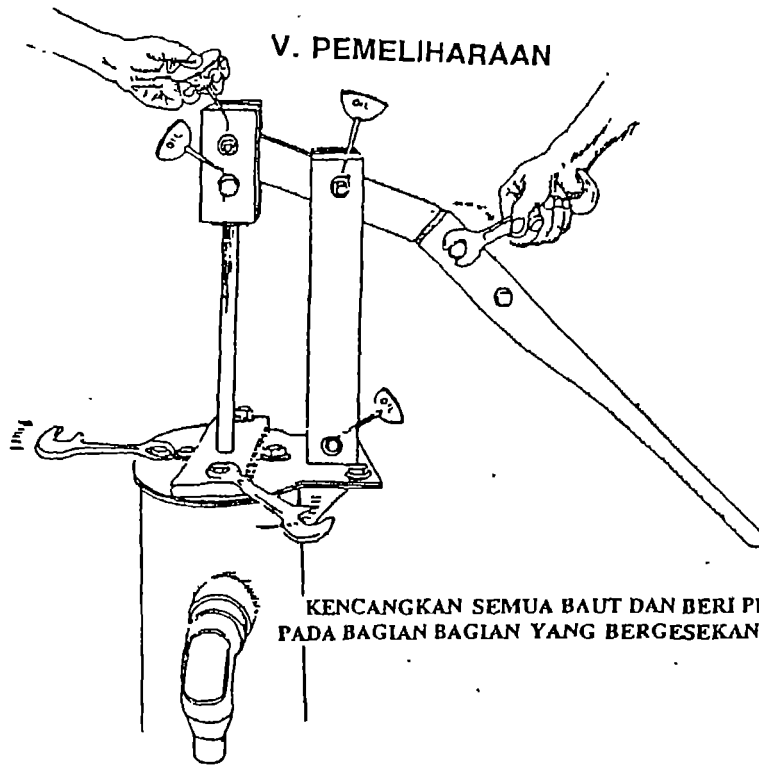


AIR MASIH JUGA TIDAK KELUAR



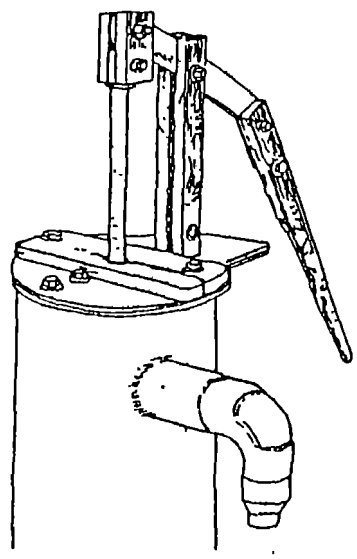
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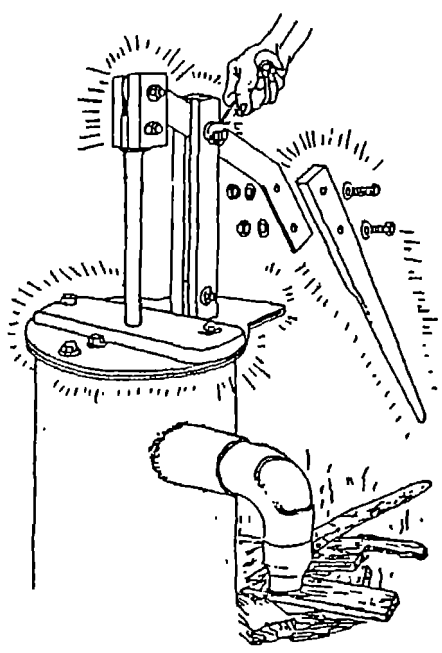


V. PEMELIHARAAN

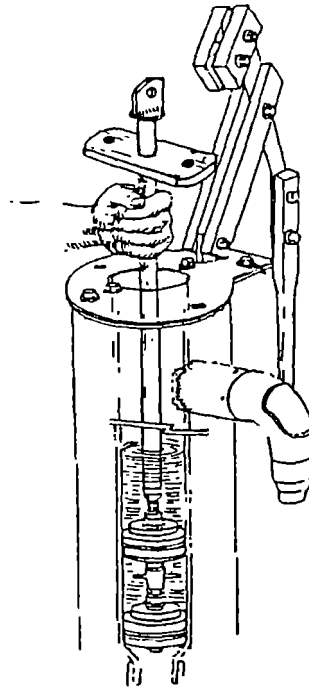
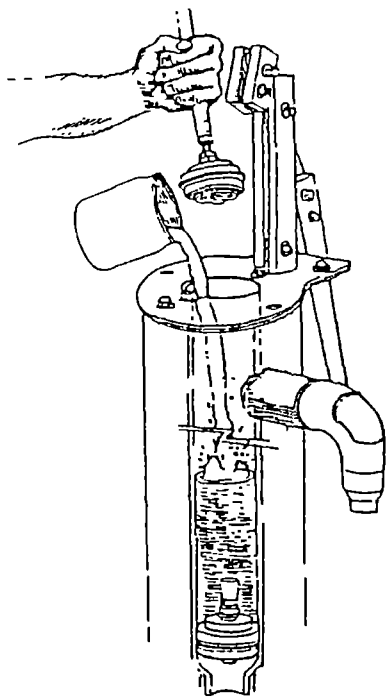
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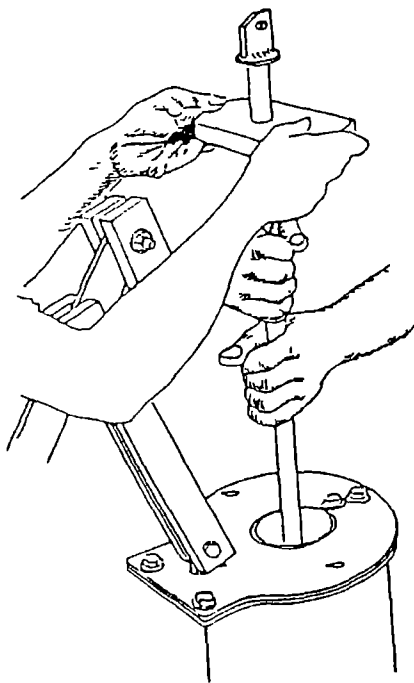
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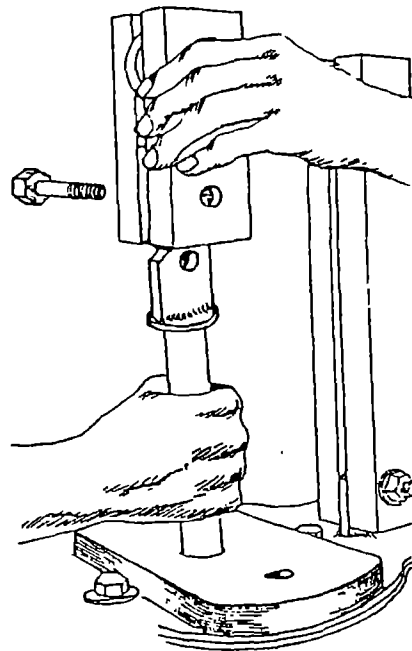
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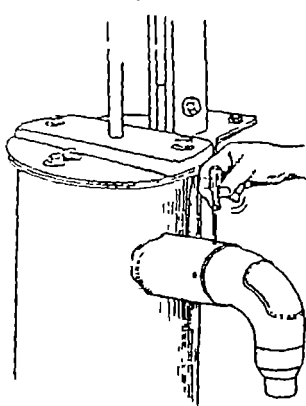
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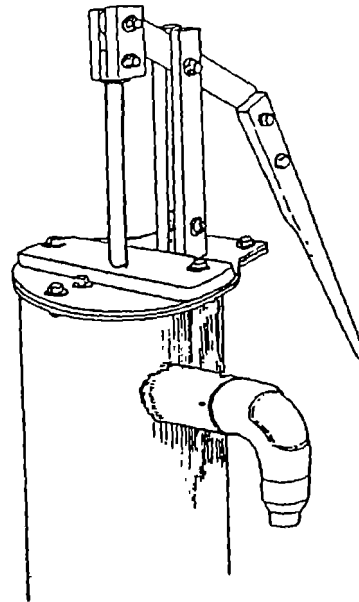
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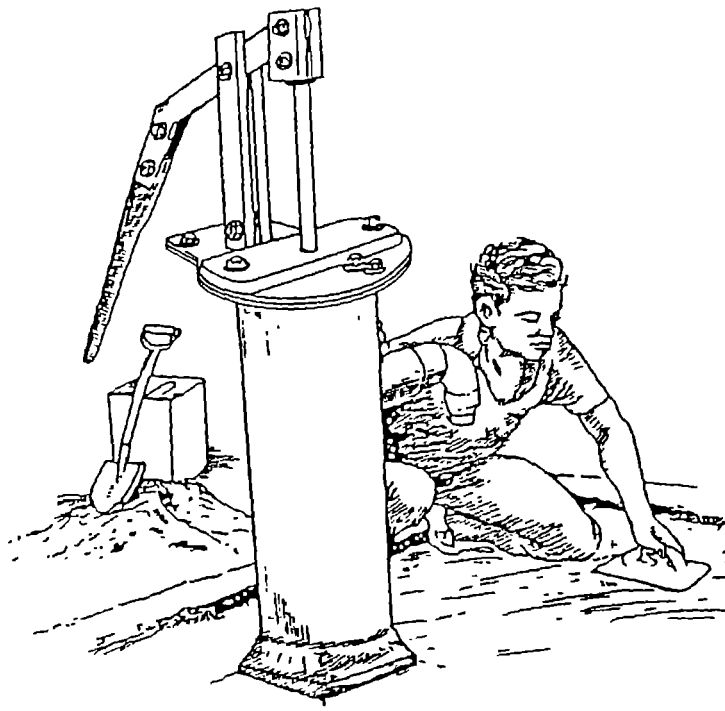
PASANG BATANG TORAK PADA TUAS PENGANGKAT



PASANG PANCURAN PVC
DAN KENCANGKAN BAUTNYA



POMPA TELAH SELESAI TERPASANG



LANTAI SEKITAR POMPA SEBAIKNYA DISEMEN

ATTACHMENT 5

TRIP REPORT OF PROF. GOH TO HANDPUMP PROJECT IN INDONESIA

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1. Background

The handpump project in Indonesia was carried out by Yayasan Dian Desa in the Yogyakarta area. As part of the project program, one complete Mark II suction handpump was sent by air-freight to Dian Desa in December 1985. Two technical officers, Mr Verry Renyaan and Mr Suranto visited Malaysia from 27 January to 7 February 1986 to undergo training in Fabrication, installation and maintenance of the IDRC-UM handpump. As imported steel pipes are expensive in Indonesia, it was decided to replace the steel pipe stand by a concrete stand. This modification was adopted for all handpumps installed by Dian Desa.

In April 1986, 40 sets of Mark II below-ground components were sent by air-freight to Dian Desa. During May 1986, Mr K. Rishyakaran from the Ministry of Health, Malaysia visited the Dian Desa handpump project to provide technical advice on the selection of well sites and installation of the handpumps. With CIDA funding, Dian Desa later ordered an additional 85 Mark II below-ground components and 2 complete Mark III handpumps for a complementary project. These were sent to Dian Desa in January 1987.

2. Purpose of the Present Visit

The purpose of the present visit is to provide overall technical consultation to the Dian Desa handpump project.

3. Persons Met

NAME	POSITION HELD
1. Ms Christina Aristanti (CA)	Principal Investigator Dian Desa
2. Mr Verry Renyaan (VR)	Technician Dian Desa
3. Mr Suranto (SU)	Field Manager Dian Desa
4. Mr Anton Soedjarwo (AS)	Director Dian Desa
5. Mr Eldi Iswadi (EI)	Technician Dian Desa

6. Ms Elly Wisanti (EW)	Researcher Dian Desa
7. Mr Aryo Salugu (AS)	Researcher Dian Desa
8. Mr Wahyudi (WA)	Field Assistant Dian Desa
9. Mr Herman Soedjarwo (HS)	Workshop Project Manager Dian Desa
10. Gov. Cornelio Villareal Jr (CV)	Governor Province of Capiz, Philippines
11. Ms Constancia Fagtanan (CF)	Project Analyst Provincial Planning & Development Office, Roxas City, Philippines
12. Mr Cakra (CK)	Manager "Super Star" Plastic Factory Jalan Mayor Suryotomo 26 A , Yogyakarta
13. Dr Jingjai (JH)	Director IDRC Regional Centre, Singapore
14. Mr Marc Ameringen (MA)	Liason Officer IDRC-CIDA, Ottawa

4. Itinerary and Activities

DATE	PERSONS MET / ACCOMPANYING	ACTIVITY
28.7.87 (Tuesday) <i>Afternoon</i> Dian Desa Office	CA,VR,SU	Discussed progress of project.
29.7.87 (Wednesday) <i>Morning</i> Demangan & Mangunan	(CA,SU & WA)	Visited handpump sites in 2 villages.

Afternoon Dian Desa workshop	(SU & HS)	Demonstrated the fabrication of PVC sockets for PVC piston rod pipes.
30.7.87 (Thursday) <i>Whole day</i> Magelang	(CV,CF,CH,	Visited hydram project site.
31.7.87 (Friday) <i>Morning</i> - Dian Desa office	(CV,CF,SU, EW, WA)	Witness demonstration on water purification using bean seeds.
- Villages near Yogya	(-do-)	Visited handpump sites.
<i>Afternoon</i> - Village near Yogya	(CV,CF & CA)	Visited clay oven making factory.
1.8.87 (Saturday) <i>Morning</i> Villages near Yogya	(SU)	Visited handpump sites.
<i>Afternoon</i> Slum areas of Yogya	(SU)	Visited handpump sites.
3.8.87 (Monday) <i>Morning</i> Yogyakarta	(CA)	Visited plastic injection moulding factory.
<i>Afternoon</i> Yogyakarta	(SU)	Visited handpump sites in 2 slum areas.
4.8.87 (Tuesday) <i>Morning</i> Dian Desa	(AS & assistant)	Discussed sociological survey
<i>Afternoon</i> 1. Yogyakarta 2. Dian Desa Workshop	(JH,MA,CA,SU) (SU & assistant)	Visited handpump sites in village Demonstrated making of PVC sockets for 3" riser pipes.



Proud Owners ?



The "CIDA" Handpump

5. Activities

During the visit I was able to provide the following technical assistance :

1. Trained Dian Desa technicians to make PVC sockets for the 3/4" piston rods and 3" riser pipes.
2. Discussed how to improve quality control on the timber levers and pivot bushes.
3. Discussed ways on how to prevent breaking of the piston rod in the lift pump.

When I visited the project, the Dian Desa project team had installed 40 Mark II handpumps in the IDRC project (IDRC handpumps) and another 82 Mark II handpumps with CIDA funding (CIDA handpumps). The IDRC handpumps have been in the field for 12 - 14 months while the CIDA ones were in operation for about 3 months. The PVC cylinder, pistons and footvalves for all the handpumps were supplied by the Malaysian handpump project. Dian Desa fabricated the concrete stand as well as the leverage assembly.

5.1. Fabrication of PVC sockets

Commercially available socket joints are not suitable for joining piston rods and riser pipes because the wall thickness is too small or the fit too loose, and as a result the joints fail after some use. Special sockets have to be made from thick-walled pipes to ensure that they are not only sufficiently strong to withstand the impact forces experienced in a handpump but also of a good fit with the PVC pipes. It is therefore important for the project staff to be able to fabricate locally the PVC socket joints for of the piston rod and riser pipes. Moulds for expanding PVC pipes to form straight-through sockets were machined by Dian Desa technicians. The moulds were tested and both 3/4" and 3" diameter socket joints were successfully fabricated.

5.2. Leverage Assembly

During the field visits I noticed that the timber leverage assembly of the later CIDA handpumps were not as good as those of the earlier IDRC handpumps although they were both fabricated by Dian Desa staff. In many instances the leverage assembly of the CIDA handpumps were worn more than the IDRC handpumps although the later were installed about a year earlier. SU explained that as they had to hire a planing machine for a few days to make the timber parts, they had to rush to complete the CIDA leverage assembly. The purchase of a Hitachi Universal Planer/Saw (estimated cost US\$2160) will enable the Dian Desa team to produce the timber leverage parts without having to rush to complete the job. This machine can also be used to produce the timber spare parts as and when these parts need replacement. I also pointed out to SU to



"I prefer it this way"



"Don't worry I can do it myself"

ensure that the brass bushes in the timber bearings are at least 2 mm longer than the timber members so that after the locking nut is completely tightened on to the bolt at the pivot joints, the timber members are free to rotate round the brass bushes.

5.3. Piston Rod Breakages

The suction handpumps have no problems although they have been in continuous use for up to 14 months in the Dian Desa project. However, in some of the lift handpumps, the piston rod broke quite often at or near the socket joints where the stress is concentrated. While training Dian Desa staff to fabricate socket joints in the workshop it was discovered that some of the PVC pipe sections, when expanded to form sockets, cracked. On closer examination the PVC pipes showed signs of discolorisation which is a symptom of over exposure to the sun. It is interesting to note that piston rods broke only in some pumps while other handpumps in the same area of equivalent depth and usage have no problems. It may be safely deduced that some of the PVC piston rods were of poor quality due to inappropriate storage. The solution is to inspect the PVC pipes for deterioration of quality when ordering from the retailer. A better solution is to order the PVC pipes and take direct delivery from the factory. For large quantities a PVC pipe factory would also accept a special order to meet the customer's specifications. For a project to install 300 handpumps (requiring about 900 - 1000 lengths of piston rod) it would be possible to place a special order for thick-walled class '7' (OD 26.8mm, ID 18.4mm) 3/4" diameter PVC pipes for use as piston rods. The Malaysian project has not experienced any piston rod problems in handpumps installed down to 30 metres using such thick-walled PVC pipes as piston rods. There is an instance of a 10 metre piston rod installed in a prototype handpump in 1979 (Phase I) still in good working condition.

5.4. Local Manufacturing Capability

(a) Above-ground Components

Dian Desa has successfully shown that they can produce the metal and concrete above-ground components in their existing workshop. They will need to buy a wood planer/saw to make the timber parts for the leverage assembly. I think their present facilities can produce up to 3000 sets of above-ground components per year.

(b) Below-ground Components

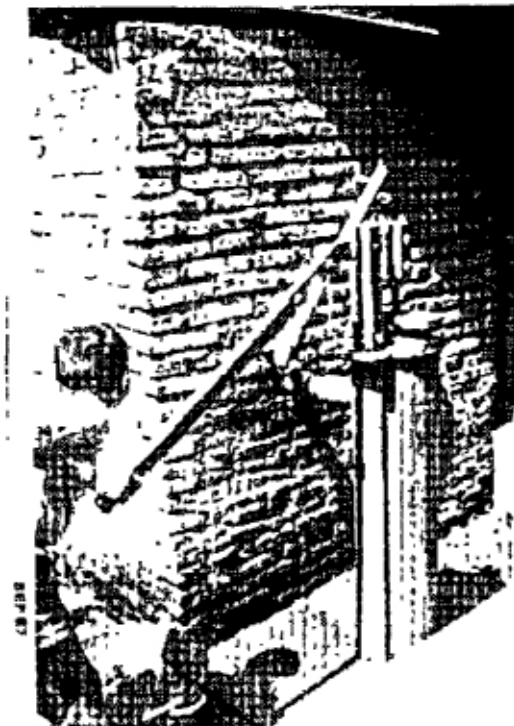
The below-ground components consists essentially of (1) an upper cylinder, (2) a piston and a footvalve and (3) a lower cylinder (for the lift pump only). Indonesia does not presently make the 3" Class 'E' PVC pipes which are used for making the pump cylinders. CA and I also visited a plastic injection moulding



VILLAGE LEVEL INNOVATION

- a 2-WAY SPOUT

1. water into pail



OR

2. water into bathroom

factory. The factory has the capability to produce most of the parts such as the piston and rings. However, the minimum order per mould is much more than Dian Desa will require. For example, the factory will accept an order of 10,000 piston rings. This can be reduced to a minimum of 6000 piston rings per order but he will charge more for each ring.

Until such time as there is a demand of several thousand handpumps per year, it is unlikely to be economical to produce the below-ground components in Indonesia.

6. Concluding Remarks

My general impression of the Dian Desa project was very good. There were some minor technical problems and I have suggested steps to overcome these in section 5 above. The major contribution of the Dian Desa project is a demonstration of a successful introduction strategy of an appropriate hand-pump technology to the rural poor as well as to dwellers in slum areas.

What is plainly obvious to me is that the villagers have accepted the technology. The men and women demonstrated confidence in taking apart and putting back together the various parts of the handpump. Some can do major repairs including bringing up the submerged pump cylinder of the lift handpump for inspection and repair. In one instance, I witnessed villagers raising the complete lift handpump assembly to repair a leak in the riser pipe.

In almost every village that we visited, we were approached by villagers who enquired when they will be the next proud owner of the Dian Desa handpump. The sociological unit in Dian Desa will be conducting a survey within the next 3 months to assess in a more formal manner the results of the project.

I understand that Dian Desa plans to replicate the handpump project in other areas. I fully support this initiative.

ATTACHMENT 6

EVALUATION REPORT

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INTRODUCTION

The evaluation survey was carried out to evaluate the implementation of the IDRC's funded project on 'the Introduction of PVC Handpump in Indonesia'. Besides, this evaluation survey may also be used as base line data for the future programs.

The survey was carried out from September 6 - 20, 1987 by the Yayasan Dian Desa Social Monitoring Section assisted by some students from the Gajah Mada University.

The respondents of the survey was taken from two different target groups, the handpump owners and non handpump owners. The interview to the handpump owners is meant to see their opinion on the technical performance of the handpump and how they perceive as well as their opinion and suggestion towards the handpump and the system of the program as a whole (the subsidy, the repayment, its cost etc). The impact of the availability of the handpump on the owners socio-economic condition was also tried to be looked into.

The respondents taken as the non-handpump owners were from villages and slum areas where some handpumps have been installed as well as from the neighbouring area, so as to see the impact of the handpump to the surrounding area and how the people in general like the PVC Handpump.

The survey to the handpump owners in general was divided into seven category namely,

1. The respondents' identity
2. Respondents' socio-economic condition
3. Condition before existence of handpump
4. Reason for getting/buying the handpumps
5. The Handpump performance
6. The Repayment
7. Impact of the Handpumps

While some of the aspects covered on the survey to the non- handpump owners are

1. The respondents identity
2. The respondents socio-economic condition
3. Community water source
4. Respondents source of water and level of interest on the PVC hand-pump program

The total respondents taken on this survey were 375 , 120 of which were handpump owners and the rest 255 were non-handpump owners. In the analysis however it was found that 16 questionnaires all from the handpump

owners were not valid as the respondents did not give most of the answers. So there will only be 104 respondents of the handpump owners which will be analyzed.

This evaluation survey is part of the report submitted to the International Development Research Centre (IDRC) and the Canadian International Development Agency - Mission Administered Fund (CIDA-MAF) of the Canadian Embassy of Indonesia who have jointly funded the research on **'The Introduction of the PVC Handpump in Indonesia'** and **'The Women Involvement on Handpump Technology'**

As the PVC Handpump is the first of its kind being introduced here in Indonesia, Yayasan Dian Desa hopes that this report may be useful for other organizations or institutions who would like to implement similar program.

THE HANDPUMP RECIPIENTS

Based on the questionnaires collected, from 120 handpump owners respondents, 16 of the questionnaires were not taken into consideration because the respondents hardly give any answer. So only 104 were analyzed.

Table 1 and table 2 present the number of handpumps assisted by either IDRC or CIDA and the type of handpump installed.

Table 1

Assisted by	Slum area	Village	Total	%
1. IDRC	14	26	40	38.5
2. CIDA	27	37	64	61.5
Total	41	63	104	100

Table 2

Type of handpumps	Slum area	Village	Total	%
1. Suction.	23	40	63	60.6
2. Lift	18	23	41	39.4
Total	41	63	104	100

1. The Respondent Identity

The respondents' identity was taken to give an idea who the respondents are, their job and the family size as well as their education level which are presented at table 3,4,5,6,and 7.

Table 3

Status of respondents	slum area	village	Total	%
1. Husband	26	47	73	70.2
2. Wife	14	14	28	26.9
3. Son/daughters	1	2	3	2.9

Table 4

Age of respondent	slum area	village	Total	%
1. 20 - 29	3	12	15	14.5
2. 30 - 39	10	13	23	22.1
3. 40 - 49	10	14	24	23.0
4. 50 - 59	12	9	21	20.2
5. 60 - above	6	15	21	20.2

Table 5

Level of education	slum area	village	Total	%
1. illiterate	7	10	17	16.3
2. elementary school	21	29	50	48
3. Junior high school	8	11	19	18.2
4. Senior high school	5	10 15	14.4	
5. University/academy	-	3	3	2.9

Table 6

Family members	Slum area	Village	Total	%
1. 1 - 4 members	16	32	48	46.2
2. 5 - 8 members	19	30	49	47.1
3. more than 9	6	1	7	6.7

Table 7

Respondents Jobs	Slum area	Village	Total	%
1. Gov civil servant	9	6	15	14.4
2. Employee	3 9	12	11.6	
3. Army	5	3	8	7.7
4. Business/peddler	6	4	10	9.6
5. Farmer		27	27	26
6. Bricklayers	5	10	15	14.4
7. Labour	13	4	17	16.3

2. Respondents socio-economic condition

The respondents socio economic condition is also once again discussed in this report though it has been discussed in the pre survey report as to give an idea to the readers on the general condition of the respondents. Table 8 presents data on the average monthly income of the respondents and table 9

classify the respondents into five groups regarding their economic condition. There are 4 indicators used to determine the economic condition of the respondents such as the education, house condition, income, other properties which is presented in detail on the scoring conversion at attachment 1.

Table 8

Average monthly income	Slum area	Village	Total	%
1. 0 - 59.900	24	34	58	55.8
2. 60.000 - 119.900	12	21	33	31.7
3. 120.000 - 179.900	3	6	9	8.7
4. 180.000 - 239.900	2	2	4	3.8
5. 240.000 - above	-	-	-	

Table 9

Soc.-economic status	Slum area	Village	Total	%
1. Very poor	12	15	27	26
2. Poor	23	27	50	48
3. Middle Class	5	16	21	20
4. Rich	-	4	4	3.8
5. Very rich	1	1	2	1.9

3. Condition before existence of Handpump

Data on the respondents condition in relation to water availability before the PVC handpumps were installed were already presented on the report of the preparatory survey. Some of the important point however are presented again in this report so as to give a comparison on the change and impact of the existence of the PVC handpump.

In general, the respondents source of water before they have handpumps were either from the neighbours' or public open well which condition are poor from sanitation point of view as dirt, leaves or even cats, chicken or dogs may fall into the well. Women who were responsible to provide domestic water for drinking and cooking had to carry the water to their homes which distance range from 15 m to 500 m. It was quite a hard job for the women to do so as in one day, they may have to take more or less 20 pails of water.

The following table 10 and 11 show the water source used before the existence of the PVC handpump, while the average distance to get the water and the kind of use of the water are presented at tables 12 and 13.

Table 10

Water source	Slum area	Village	Total	%
River/spring besides it	12	14	26	4.8
Well	37	60	97	93.3
Pump (handpump/electric)	2	-	2	1.9

Of the 97 repondents who take the water from the well are divided into three different sources namely :

Table 11

Ownership of Well	Slum Area	village	Total	%
Respondents'ownwell	6	30	36	37.1
Neighbour's well	22	26	48	49.5
Public well	9	4	13	13.4

Table 12

Distance of water source	Slum area	Avg	Village	Avg
1. own well	1 - 12m	5.6m	0 - 10m	5m
2. neighbour's well	5 - 25m	13 m	5 - 100m	32m
3. Public well	4 - 20m	11 m	15 - 40m	30m

Table 13

Water taken is used for	Slum area	Village	Total	%
1. Cooking	41	63	104	100
2. Drinking	41	63	104	100
3. Washing up dishes	40	53	93	89.4
4. Bathing	39	43	82	78.8
5. Washing clothes	33	40	73	70.2
6. Toilet	8	8	16	15.4
7. Watering plants	8	11	19	18.2
8. Cleaning the house	1	7	8	7.7
9. Washing vehicle	7	-	7	6.7
10. Bathing the catles	1	-	1	1

4. Respondents' reasons for getting the PVC handpump

As discussed in the previous survey report in general the respondents did not have a good impression on handpump. 47,5% of the respondents had the opinion that handpumps were not durable and difficult to repair and to maintain (see report of pre- survey). In this evaluation therefore it is important to know the reasons why they like to take the PVC handpumps as well as their opinion and impression after they used the PVC handpump and the approach and system presented by Yayasan Dian Desa.

The three most common interest expressed by the handpump recipients are the relatively affordable price accompanied by reasonable credit repayment system and the subsidy given for the well concrete rings. However there are other reasons as well which are expressed such as the need of clean water, time and energy saving, etc. which can be seen at table 14

TABLE 14

Repondents interest on participating on the PVC handpump Program	Slum area	Village	Total	%
1. Subsidy on well const	20	26	46	44.2
2. Relatively affordable price	8	33	41	39.4
3. Credit repayment scheme	23	33	56	53.8
4. energy save	9	18	27	26
5. Need of clean water	19	7	26	25
6. Time save	11	13	24	23.1
7. Like the PVC handpump	4	13	17	16.3
8. Healthy	4	6	10	9.6
9. Save esp for children	1	9	10	9.6
10. Just following neighbours	2	4	6	5.8
11. the two years guarantee	1	5	6	5.8
12. Interesting explanation	3	-	3	2.9
13. The training given	1	-	1	1

5. Technical Performance of PVC Handpump

One of the objective of this research program is to see the technical performance of the PVC handpump. This of course is very much influenced by the maintenance done by the owner of the handpumps.

In general after 18 months of operation of the first 40 handpumps and 8 months of the 80 handpumps there have not been any major problems encountered. All the 120 handpumps are still in operation up to the present time. Considering the data that shows that most of the handpumps are used daily as presented at table 15, it shows a promising future for the handpump due to its simplicity, easy maintenance and a good technical performance.

TABLE 15

Frequency of use	Slum area	Village	Total	%
1. Every day	40	49	89	85.6
2. Not every day	1	13	14	14.4

It is mentioned at table 15 that there were 14 handpumps which are not used everyday. The data is considered bias except one, as looking at table 16, their reasons for not using it everyday was because the handpumps were in problems. So it is concluded here that if the handpumps are in good condition then they are likely to use them everyday as well.

TABLE 16

using everyday	Total	%
1. water level gets down	16	15.4
2. The pump is broken	2	1.9
3. Have an electric pump	1	1

Besides, Table 17 shows that 59,6% (62 respondents) of the total handpumps are used by more than one family; 21.1% are used by two families, 18.3% are used by three families, 11.5% are used by four families , 6.7% are used by five families, and 2% are used by six or more families.

TABLE 17

Number of family using the PVC handpump	Slum area	Village	Total	%
1. one family	22	20	42	40.4
2. two families	8	14	22	21.1
3. Three families	5	14	19	18.3
4. Four families	4	8	12	11.5
5. Five families	2	5	7	6.7
6. Six families	1	-	1	1
7. 20 families	1	-	1	1

The water quality of the water from the PVC handpump in general is good as presented at table 18.

TABLE 18

Water quality	Slum area	Village	Total	%
1. Clean and clear	38	61	99	95.2
2. Dirty	-	-	-	
3. Smelly	-	-	-	
4. Unstable	3	1	4	3.8

The durability of the handpumps depends on the maintenance done by the owners. Table 19 give the idea on what kind of maintenance done by the owners while table 20 presents who among the owners do the maintenance. It is a positive attitude shows here because 76.9% of the handpumps owners regularly oiling the handpumps while 24% do a simple repair to their handpumps. There are also 26.9% of the handpump owners who do prevention for their handpumps that is by putting a roof or a fence to protect the handpump from the heat or from the children in order not to play with it. From the total handpumps only 10.6% are lazy as they do nothing to their handpumps. Surprisingly the handpumps too are still operate well and it is their reasons why they do not have to do anything to their handpumps . Dian Desa technicians however feel the need to further motivate them to take care of the handpumps if they want it to be durable.

TABLE 19

Kinds of maintenance	Slum area	Village	Total	%
1. Oiling	31	49	80	76.9
2. Service/cleaning	10	15	25	24
3. Put roofing over it	6	17	23	22.1
4. Keepout of children	-	5	5	4.8
5. do nothing	1	10	11	10.6

Note: some respondents do more than one kind of maintenance

However, in general it has shown a very good habit developed by the handpump owners in doing regular oiling and cleaning.

From table 20 it is proved that the involvement of women into the program has also brought a meaning to it as 53.8% of the regular oiling is done by the women, while repair usually done by the men or any other member of the family who already have the skill.

TABLE 20

Who is doing the maintenance	Slum area	Village	Total	%
1. Mother	17	39	56	53.8
2. Father	11	20	31	29.8
3. Any one in the family	6	11	17	16.4

Training on handpumps maintenance and repair were given to handpump owners with the hopes that they will be able to do any repairs when they have problems with the handpumps. Table 21 and 22 shows data on how useful the training given by Dian Desa as well as the manual provided and whether or not the training was passed on to other people and who they are

TABLE 21

Is the training useful	Slum area	Village	Total	%
1. Useful	26	45	71	68.3
2. Not useful	2	-	2	1.9
3. Not attend the training	12	14	26	25
4. Not specified			5	4.8

TABLE 22

Is the manual useful	Slum area	Village	Total	%
1. Useful	14	41	55	52.9
2. Not useful	-	-	-	
3. Do not have	25	24	49	47.1

The Dian Desa field workers have made mistake as to forget to distribute the manuals to some of the handpump recipients. So right after the interviewers reported it, the field workers distributed the manuals to every body who have not got one .

However, The data shows that 98% of the respondents find that the training given is useful as well as the manual which is useful as their reference when they have to do the repair. Some of the handpump owners have even passed on their skill to others as presented at Table 23 which shows that 52.88% (55 respondents) of the handpumps owners have passed on their skill to others, while table 24 shows to whom are the skill is passed to.

TABLE 23

Is the skill passed on to others	Slum area	Village	Total	%
1. Yes	14	41	55	52.9
2. No	25	24	49	47.1

TABLE 24

To whom is the skilled passed to	Slum area	Village	Total	%
1. Other pump owners	4	15	19	18.3
2. Neighbours	10	8	18	17.3
3. Other family members	9	20	29	27.9
4. to all three above	1	6	7	6.7

The skill is passed mostly to the other members of the family (27.9%) or 29 respondents, to their neighbours who take water from their handpumps (17.3% = 18 respondents) or they also taught other handpump owners who were still having problems in repairing their handpumps (18.3% = 19 respondents, probably of those who did not attend the training). Therefore, very often in one family there are more than one person who can do the repair and maintenance which are shown in table 25.

TABLE 25

Number of family members who can repair the handpump	Slum area	Village	Total	%
1. one person	9	17	26	25
2. Two persons	6	13	19	18.3
3. Three persons	2	5	7	6.7
4. More than three	3	2	5	4.8
Total	20	37	57	54.8

From the above table it can be seen that not all handpump owners admitted that they can repair their handpump themselves. This of course need more attention.

It was mentioned earlier that in general the handpumps have showed a very good technical performance after 18 months of daily use. Table 26 however shows that almost 50% of the total 120 handpumps have undergone some problems.

TABLE 26

Do respondents face any difficulties with PVC HP	Slum area	Village	Total	%
1. Never have any difficulties	40	53	93	89.4
2. Have some difficulties	1	10	11	10.6

It should be explained here that the problems encountered by most of the handpumps were not because of the bad quality of the handpumps but because of several other reasons. It is recorded that 90% of those which have had problems with the handpumps are those of the lift pump and the three most common problems encountered are :

- The poor quality of the PVC rod used in the lift pump that it breaks easily.
- The loosening of joint of the riser pipes due to the fact that the Indonesian PVC pipe are of different size with the Malaysian one.

The two above problems have been identified by both the Dian Desa technicians and the advisor from the University of Malaya, Prof. Goh Sing Yau that better performance of the handpumps can be maintained in the future. The problems with the poor quality of the PVC rod used will only be able to be overcome by making a special order so that the thickness and better quality 3/4" pvc rod can be guaranteed and this will eliminate the problems with the

rod. The problems with the different size of PVC pipes has also been able to be overcome when the advisor taught the Dian Desa's technicians on how to make the joint ourselves instead of buying it from the shops.

- The third problem is the water level gets down during the dry season especially that in 1987 the Yogyakarta area had a long severe draught so that many of the wells get dry. The problems however have been anticipated by both Dian Desa technicians and the handpump recipients due to improper timing of the implementation. It is not a big problem as they only have to dig the well to deepen it and to joint another piece of pipe.

There are also other problems besides of the three common ones such as the piston rings are worn out. From the monitoring record those piston rings which need replacement were at least after 12 months used.

All of the problems stated by the respondents are presented at table 27 and 28.

TABLE 27

Have the PVC handpump undergone problems	Slum area	Village	Total	%
1. Never	16	37	53	51
2. Yes	25	26	51	49

TABLE 28

Kinds of problems	Slum area	Village	Total	%
1. breaking of PVC rod	14	6	20	19.2
2. Worn out of ring	5	12	17	16.3
3. Loosen of riser pipe joint	7	7	14	13.5
4. Breaking of leverage handle	1	-	1	1
5. Others			7	6.7

At table 28 the common problems are breaking of PVC rod and the second is the loosen in the joint as discussed earlier. Other problems mentioned is the worn out of the ring and the breaking of the leverage handle.

Table 29 present data on the frequency of problems encountered by the PVC handpump.

TABLE 29

Frequency of problems	Slum area	Village	Total	%
1. Once	12	17	29	27.9
2. Twice	3	6	9	8.6
3. Three times	4	2	6	5.8
4. Four times	4	-	4	3.8
5. Seven times	1	-	1	1
6. ten times	1	-	1	1

While table 30 present data on how long have the handpumps been installed when it first undergone the problems.

TABLE 30

Duration before having problems with the handpumps	Slum area	Village	Total	%
1. 1 - 3 months	15	6	21	20.2
2. 4 - 6 months	6	12	18	17.3
3. 7 - 9 months	3	2	5	4.8
4. 10 -12 months	4	-	4	3.8

Questions were also asked regarding who did the repair when the handpumps had problems. It shows that 30% of the respondents did the repair themselves and paid the cost for the repair themselves too. But, as promised by Dian Desa that Dian Desa give two years guarantee and especially to lengthen the riser pipe due to the fact that problems of well getting dry had been predicted, so the rest of it were done by Dian Desa technicians assisted by the owners. They have made understood that after two years they will have to do the repair and burden the cost themselves . It is presented at table 31 and 32.

TABLE 31

Who did the repair	Slum area	Village	Total	%
1. Handpump owners	4	2	6	5.8
2. Handpump users	5	4	9	8.6
3. YDD technicians	15	16	31	29.8

TABLE 32

Whether or not respondents faced problems in doing the repair	Slum area	Village	Total	%
1. technical problems	1	-	1	1
2. lack of spare parts	-	2	2	1.9

At table 32 it was mentioned that 2 of the respondents have had problems with the availability of spareparts. This problems was overcome by the visit of the Dian Desa technicians who noticed that they had running out of the spare parts provided and had given some more. (in every pedukuhan one person is appointed and given the responsibility to take care of the main tool such as the piston puller and the spare parts such as piston rings). The average cost spent by the villagers in doing the repair are at table 33.

TABLE 33

Cost spent to do repair on handpump	Total
1. up to Rp. 500	4
2. Rp. 501 - Rp. 1000	3
3. Rp. 1001 - Rp. 2000	2
4. Rp. 10.000	1

To see how far the pvc handpump have attracted others, questioned were also asked to handpump owners whether or not there are other people who are interested to get the pvc handpumps and the most common information asked by them. From table 34, 99 respondents or 95.2% of the respondents informed that there are people interested to get the handpumps which shows that the pvc handpumps are quite favourable to the people in common. Moreover, those who are interested do not only come from the same village (66 = 63.5%) but also from other villages (33 = 31.7%) which shows that the pvc handpump is pretty well accepted.

TABLE 34

Who are interested on the PVC handpump	Slum area	Village	Total	%
1. People from the same village/area	27	39	66	63.5
2. From outside the area	7	26	33	31.7

At table 35 it can be seen on the kind of interest or questions asked by those who are interested on the PVC handpump

TABLE 35

Kinds of questions asked	Slum area	Village	Total	%
1. Price of the PVC handpump	6	21	27	26
2. How to get the handpump	26	39	65	62.5
3. Technical inquiries	3	11	14	13.5

6. Repayment

Respondents respond on the credit repayment scheme is positive as it has become one of their reason to become interested to get the handpumps while at table 36 it was shown that 95 or 91.3% of the respondents said that they have no problems with the repayment and only 8.7% said that they some difficulties with the repayment . The difficulties mentioned are because they do not have a permanent income or because the untiming collection of the monthly repaymentas presented at table 37.

TABLE 36

Is there problem with repayment	Slum area	Village	Total	%
1. No problems	34	61	95	91.3
2. Yes	7	2	9	8.7

TABLE 37

Kinds of difficulties	Slum area	Village	Total
Have no permanent job/income			2
Untiming repayment collection			1

During the evaluation survey, most of the respondents are quite satisfied with either the design or the technical performance of the pvc handpump. Some of them give their ideas.

7. Impact of the handpumps

In general there are three advantages stated by the handpump owners namely, saving time, saving energy and availability of clean water. These three advantages have brought some impacts on some other aspects namely :

- Improvement of economic condition/income. Some respondents especially the women have started other activities such as open a small shop or restaurant while others can help their husband in the field more effectively that their field is maintained better than before after they have the PVC handpump.
- Improvement of family welfare.
Many of the women have more time for the family especially for the children.
- Better relationship with the neighbours.
The relationship of most respondents with their neighbours increased especially with those who do not yet have pumps and get the water from their handpumps. Besides they also have better relationship with other handpump owners as they will assist and discuss with each other whenever they have problems with their handpumps. Handpump owners also feel that having the handpump is a kind of prestige too.
- Environment and health improvement.
Many handpump owners improved their facilities such as adding toilet, washing facilities and improve the waste water canal. Such things of course improve the family health condition.

The supporting data on the impact of the PVC handpumps are presented at table 38, 39, 40 and 41.

TABLE 38

Time saved is used for	Total	%
1. Income activities	50	48
2. Increase family inter relation	38	36.5
3. Community/neighbourhood relation	28	26.9
4. Improve surrounding condition	17	16.3
5. Improve family health condition	18	17.3
6. Others	7	6.7

TABLE 39

Saved energy is used for	Total	%
1. Income activities	38	36.5
2. Increase family inter relation	24	23
3. Community/neighbourhood relation	12	11.5
4. Improve surrounding condition	13	12.5
5. Improvement of family health	35	33.6
6. Others	2	1.9

TABLE 40

Availability of clean water has impact on	Total	%
1. Family income	22	21.1
2. Family inter relation	19	18.3
3. Community/neighbourhood relation	26	25
4. Improvement of surrounding condition	17	16.3
5. Improvement of family health condition 41	39.4	
6. Others	3	2.9

The summation of the three above tables is presented at table 41, that is the general impact of the time saving, energy saving and the availability of clean water by the existence of the PVC handpump.

TABLE 41

Impact of PVC handpump on respondents	Total	%
1. Income	65	62.5
2. Improvement of family inter relation	56	53.8
3. Improvement of community relation	45	43.3
4. Improvement of surrounding area	35	33.6
5. Improvement of family health	53	51
6. Others	9	8.6

The impact of the handpumps is also seen on the additional facilities made after the installation of the PVC handpumps such as toilet facilities, bathroom, washing space, water canal, etc as presented at table 42

TABLE 42

Additional facilities built after the existence of the handpump	Before Prg	After Prg
1. Well	39	104
2. Toilet	17	26
3. Washing space	37	86
4. bathroom	39	64

CONCLUSION

Based on the result of the survey it can be concluded here that the PVC handpump program both the 'Introduction of the PVC handpump' and 'the Women involvement on Handpump Technology' have achieved its objectives. It can be considered as a successful one as considering the economic condition of the recipients who 94.2% comes from lower middle class family.

In term of technical performance the PVC handpump is good as after 18 months of operation there have only been some minor problems and all 120 handpump are still in operation. So in general the PVC handpump specifically the UNIMADE MARK II has shown a good promising future to be developed for rural and urban areas.

The system/mechanism offered by Yayasan Dian Desa in the PVC handpump program that is by subsidizing part of the well construction cost ,the repayment scheme , the training , the manual, the guarantee and the involvement of women into the program can also be considered as a good package program as it played quite an important role on the whole achievement of the program.

In general the PVC handpump has been well accepted socially and technically within both the community in the rural areas and in the slum area in an urban area. However, from the data it can be seen that the acceptability as well as maintenance and care for the handpump is better perform in the rural areas.

Based on the result of the evaluation, the researchers would like to propose that before the guarantee (the 20 months) is over it would be wise for the Yayasan Dian Desa technicians to give one more time training to the hand-pump owners because:

- Some of the handpump owners admitted that they did not get any training yet
- During the guarantee period the Dian Desa technician is still helping the handpump owners in doing some repair.
- For those who have regularly maintain and repair their handpump themselves it may be a kind of refreshment on what they have known
- With the training it may be possible that Dian Desa technician will get inputs from the owners especially of those who have done the repair themselves which will be valuable for the design of the future program.

The other important aspect which should be taken into consideration by Yayasan Dian Desa especially if in the future the program is to be implemented in wider range of area is the distribution of spare parts so that there will not be any difficulties faced by the handpump owners because of lack of spare parts.

NON-HANDPUMP RECIPIENTS

The evaluation survey included 255 respondents of the non- handpump owners in order to see whether the PVC handpump introduced is acceptable to the people or not, as well as to see some other aspects which may affect the acceptability of the PVC handpump such as the people's socio-economic condition, the design, their water source, the cost etc.

From the total 255 repondents, 150 were taken from areas or villages where some handpumps have been installed and 105 were from the surrounding areas outside the village where there has never been any handpump installed yet (see table 1). From table 1 it can also be seen that the respondents were also taken both from the village area, 150 respondents, and from the slum areas in the city of Yogyakarta, 105 respondents.

TABLE 1

Origin of respondents	Slum area	Village	Total	%
1. From places where handpumps have been installed	85	131	216	84.7
2. From area where there is no handpump	20	19	39	15.3

1. Respondents Identity

Table 2, 3 and 4 present data on the respondents identity, their status, age and education.

TABLE 2

Respondents status	Slum area	Village	Total	%
1. Husband	70	128	198	77.6
2. Wife	25	15	40	15.7
3. Others	10	7	17	6.7

The age of the respondents range between 19 years to 80 years old as presented at table 3.

TABLE 3

Average age	Slum area	Village	Total	%
1. 20 - 29	27	16	43	16.9
2. 30 - 39	35	50	85	33.3
3. 40 - 49	28	34	62	24.3
4. 50 - 59	17	28	45	17.7
5. 60 - above	8	22	30	11.8

In the villages there are more of the old people who are still actively function as the head of the family.

The educational level of the respondents are pretty good as there are only 10.6% are uneducated and they are usually of the old ones, while 47.4% have ever been in the elementary school, 22% in junior highschool, 12.5% attended senior highschool, and there are 7.5% who have been in universities or colleges.

The data is presented at table 4.

TABLE 4

Education level	Slum area	Village	Total	%
1. uneducated	7	20	27	10.6
2. Elementary	48	73	121	47.4
3. Junior highschool	29	27	56	22
4. Senior highschool	10	22	32	12.5
5. University/academy	11	8	19	7.5

2. The Respondents economic condition

The economic condition is classified into five(5) categories, from the very poor to the very rich ones. The scoring conversion based on the four indicators used as mentioned before is presented at attachment 2.

From table 5 it can be seen that 22.3% belongs to the very poor families, 47.5% are poor, 24.3% can be considered as middle class, 5.1% are rich and 0.8% can be considered as very rich.

TABLE 5

Socio-economic condition	Slum area	Village	Total	%
1. Very poor	32	25	57	22.3
2. Poor	44	77	121	47.5
3. Middle class	22	40	62	24.3
4. Rich	6	7	13	5.1
5. Very rich	1	1	2	0.8

3. Community water source

In terms of ground water level, in general all the respondents live in the areas possible for handpump installation. Table 6 shows that (62.7%) respondents live in the areas where the ground water level range from 3m to 8 m which is suitable for the suction type handpump and 37.3% live in the areas with ground water level range from 8m to 14 m which can be reached by the installation of the lift type handpump.

TABLE 6

Ground water level	Slum area	Village	Total	%
1. 3 m - 8m (suction)	60	100	160	62.7
2. 9 m - 14 m (lift)	45	50	95	37.3

The main water source of most of the respondents is from a well either of their own or of their neighbour's or public well. Table 7 presented the different water source of the respondents. 11.4% respondents take their water from the nearby river, 79.2% take their water from well, 13.3% from handpumps which mostly are from the PVC handpumps of their neighbours', 2.7% already have electric pumps, while 2.4% buy their water. Some of them however, use more than one water sources such as one may take water either from the river or the public well.

TABLE 7

Community water source	Slum area	Village	Total	%
1. River	13	16	29	11.4
2. Well	71	133	204	80
3. Handpump	24	10	34	13.3
4. Electric pump	6	1	7	2.7
5. Buying water	6	-	6	2.4

Note : Some respondents use more than one water source

Of those 204 respondents whose water source is from a well, 31% have their own well, 36% take it from their neighbours' well and 13% from the public well (see table 8).

TABLE 8

Status of well	Slum area	Village	Total	%
1. own well	17	62	79	31
2. neighbour's well	27	65	92	36
3. public well	27	6	33	13

In relation to table 7 and 8, table 9 present the average distance that they have to cover to get water.

TABLE 9

Distance	Slum area	Avg	Village	Avg
1. own well	0 - 25m	4.6 m	3 - 30m	5.6 m
2. neighbour's	5 - 25m	8.7 m	3 -300m	40 m
3. public	5 - 50m	13.1 m	10 -300m	88.3 m

In general distance from water source in the city is shorter than in the rural areas as it is usually more crowded. As a comparison, the average distance in the city is 9.4 m whereas in the village is 26.1 m. From table 10 we can see that the main use of the water taken is for domestic purposes such as drinking, cooking, bathing and washing as 100% of the respondents use it for drinking and cooking, 99.2% use it for washing the dishes, 88.2% for bathing and 73.7% for washing the dishes. Some others use the water for other purpose as well such as, 23.9% use it for sanitation purpose, 16.4% for cleaning the house, 13.3% for watering the plant, 5.5% for washing their vehicle while 2% for bathing their cattles.

TABLE 10

Water purposes	Slum area	Village	Total	%
1. Cooking and drinking	105	150	255	100
2. Washing up dishes	105	148	253	99.2
3. Bathing	105	120	225	88.2
4. Washing clothes	91	97	188	73.7
5. Toilet	50	11	61	23.9
6. Cleaning the house	25	17	42	16.8
7. Watering plants	14	35	82	2.7
8. Washing vehicle	7	7	14	5.5
9. Bathing cattle	-	5	5	2

According to the respondents and based on interviewers observation, 93.3% of the water quality is good as it is lean and clear, 4.3% is dirty (mostly of those from the river) and 2.4% is not stable (See table 11).

TABLE 11

Water quality	Slum area	Village	Total	%
1. clean and clear	90	148	238	93.3
2. dirty	11	-	11	4.3
3. unstable	4	2	6	2.4

4. Respondents' opinion and level of interest on the PVC hand pump program

Table 12 to 14 present data on the respondents opinion on the PVC handpump and some of the aspects which may affect the opinion. Table 12 presents data on whether or not the respondents know about the PVC handpump.

TABLE 12

Respondents knowledge on handpump	Slum area	Village	Total	%
1. Not knowing	26	3	29	11.4
2. Have only heard	20	12	32	12.5
3. Have seen	14	44	58	22.7
4. Have tried	16	50	66	25.9
5. Have regularly used	29	41	70	27.5

From the above table it can be seen that the information about the PVC handpump is more effectively spread out and shared in the villages rather than the slum area in the city.

In most cases the information on the PVC handpump was given by the owners (79.2%) which proves that the handpump owners are quite satisfied with what they have and they are a promoters for the handpump, 5.5% from other people and 3.9% from YDD field workers (see table 13).

TABLE 13

Source of information	Slum area	Village	Total	%
1. handpump owners	71	131	202	79.2
2. non handpump owners	5	9	14	5.5
3. YDD field worker	-	10	10	3.9

Note : data is somewhat bias as two of YDD field workers are also handpump owners live in the villages

In general the respondents have a good opinion on the PVC handpumps. From table 14 it can be seen that 62.3% said that the PVC handpump is good, 23.5% said that the cost charged is relatively cheap and affordable, 9.8% said that it is healthy to use handpump while 9.% said that the handpump is good but the well should be made deeper (this was due to the fact that may of the well get dry during the dry season so that most of the owners have to deepen it as explained in the previous chapter), 5.5% said that the handpumps is not good as it has several problems which have also been discussed in the previous chapter.

TABLE 14

Respondent's opinion on PVC handpump	Slum area	Village	Total	%
1. good	55	104	159	62.3
2. Cheap	2	58	60	23.5
3. Healthy	-	25	25	9.8
4. Well is not deep enough	2	21	23	9
5. often have problems	-	14	14	5.5

At table 15 however, the respondents also give their opinion on why they are interested on the PVC handpump. Most of them (55.3%) are interested because subsidy was given on the construction of the well (the concrete ring), 28.2% because the cost is relatively affordable (based on the cost charge in the former program - Rp. 50,000) due to the credit repayment scheme, 27% said they are interested because they need clean water, 11% said because the handpump may save energy, while 7.4% said because using handpump may save time. 12.6% merely said that they like the handpump, and 1.6% only follow their friends.

TABLE 15

Respondents reasons for being interested on the PVC handpump	Slum area	Village	Total	%
1. Subsidy on well const	16	74	90	55.3
2. Affordable price	11	61	72	28.2
3. Need of clean water	4	65	69	27
4. Save energy	7	21	28	11
5. Save time	3	16	19	7.4
6. Because they like it	1	31	32	12.6
7. Follow the others	-	4	4	1.6

Looking at the above data it can be concluded that the PVC handpump is quite acceptable and favourable to the people in common but of course it cannot be separated from the fact that there are other factors which influenced it such as the cost, the repayment scheme, and the subsidy provided as they seem to have a very strong influence on the acceptability of the PVC handpump itself.

The acceptability was also seen from the fact that at the first instance when it was explained that there was a possibility for expansion of the handpump program, 67.% of the respondents expressed their eagerness of getting the handpump and 33% said 'no' (see table 16). The handpump seems to be more acceptable and appropriate for rural areas rather than the urban areas. One of the reasons may be because the urban area may have got several other alternatives (piping, more public well, more handpumps, electricity)

TABLE 16

Respondents interest to get handpumps before explanation	Slum area	Village	Total	%
1. interested	32	139	171	67
2. Not interested	73	11	84	33

However, in its future program Dian Desa intend to maximize the community's contribution to the project. The following data will be a very important data on designing the future handpump project regarding the strategy.

In its data collection, before continuing to get further data, the interviewer explained on the possible future system for the next handpump program in which it was explained about the total cost of the installation of a handpump either the suction of the lift type depending on the ground water level as follows:

The following calculation example takes an average depth of 8 mPVC handpump cost per unit.

	Suction (Rp)	Lift (Rp)
A. 1. Underground component	65.000	80.000
2. Pipes and sockets		
Suction		
2 of 1.5" PVC pipes @ Rp. 8.000	16.000	
1 of 1.5" PVC socket @ Rp. 2.500	2.500	
Lift		
2 of 3" PVC pipes @ Rp. 15.000		30.000
2 of 0.75" PVC pipes @ Rp. 3.000		6.000
1 of 3" PVC socket @ Rp. 4.500		4.500
3. Above Ground component	36.290	36.290
B. 1. Well construction		
Labour(digging and const)@Rp.5.000/m	40.000	40.000
Material @ Rp. 10.000/m	80.000	80.000
2. Installation		
Portland cement : 2 bags @ 4.000	8.000	8.000
Sand and coral	2.500	2.500
Concrete iron bars	2.500	2.500
Labour	5.000	5.000
T O T A L SUCTION	257.790	
LIFT	290.290	

Note: each respondent is helped in calculating the estimated cost depending on the ground water level of the well.

Strategy to try to get to know the reaction of the respondents was developed by explaining to them that from the above cost there may not be any further subsidy for the handpump nor the well construction but there will still be a credit repayment scheme so that they may still be able to afford it.

After the explanation the respondents was asked again on whether or not they wanted to get the handpump. From table 17 it can be seen that the number of those who would like to get the handpump (171 respondents) dropped to only 33 respondents (19%) , 30% or 51 respondents withdraw and said that they are not interested anymore if the cost is as it is proposed, while 51% (87 respondents) prefer to wait for the last decision of the system that will be used in the next handpump development program as they would like to see about the cost of the handpump as well as whether or not there will be any subsidy given especially for the concrete ring.

TABLE 17

Respondents interested after explanation	Slum area	Village	Total	%
1. Still interested	9	24	33	19
2. Interested but depends on the system developed	-	87	87	51
3. Not interested anymore	23	28	51	30

Note: From the 30% of those who are not interested anymore, 8% even suggested that they are willing to buy in credit just the concrete ring not the handpump so that the cost may not be too high but they will be able to get clean water nearby their house proposed.

Such a fact shows that well as a traditional water sources especially in the villages has been part of their life. They all realize the need for having clean water nearby their house but due to its economical condition they cannot afford to make a well moreover to think of providing other facilities such as handpump. From health point of view as well as from other aspects such as the energy and time spent etc of course handpump is a better facility. Apparently in a handpump development program, the best way is to combine it with the well.

In that regard, some data on the average affordability for monthly repayment was also taken as presented at table 18. From the total respondents who are interested to get the handpump (33) 33.3% can afford up to Rp. 10,000 per month, 6.6% can pay Rp. 8,000 per month, 60% agree for Rp. 5,000.

TABLE 18

Amount to afford monthly	Slum area	Village	Total	%
1. Rp. 10.000	1	10	11	33.3
2. Rp. 9.000	-	-	-	-
3. Rp. 8.000	1	1	2	6.6
4. Rp. 7.000	-	-	-	-
5. Rp. 6.000	-	-	-	-
6. Rp. 5.000	7	13	20	60

Out of the 87 respondents (all from the rural area) who would like to wait for further development of the future program however, 50 of them (57,5%) stated that they may be able to afford for Rp. 5.000/month, while the rest 37 (42.5%) can only afford Rp. 2.500 / month.

This shows that if a credit repayment scheme is to be developed, the best monthly payment should be in between Rp. 2,500 to Rp. 5,000

CONCLUSION

Majority of respondents and the people live in the area of the survey are from the poor family so that they may have a very limited level of affordability to provide themselves with even basic facility such as a well or a handpump.

After the introduction of the PVC handpump by Yayasan Dian Desa which strategy is a combination of subsidy, local contribution and credit repayment scheme, in which make them possible to have facility to fulfill their basic need of clean water, they are very much interested to get the handpump.

In general the handpump design and technical performance is acceptable to the people, but the acceptability cannot be separated from the atrategy used in the handpump development program.

From the data collected as discussed in the report, it can be seen that if in its future program there will not be any subsidy provided though repayment scheme will still be used, there will only be 13% of the community who can afford and they are of course from the richer families who can afford approximately Rp. 5.000 a month.

On the other hand if the same system will be used in which subsidy was given on the well construction (the concrete ring) while the cost of the handpump is adapted to the new cost (due to the devaluation and increase of some of the material cost), there will be more who will be interested to joint and get the handpump.

The design of the monthly repayment should also be in between Rp. 2.500 - Rp. 5.000 and should not over the maount. Moreover, 50% of the respondents can only afford Rp. 2.500.

Based on the respond and attitude of the respondents towards the PVC handpump, it is concluded here that the PVC handpump is better suited the rural area especially where there is no electricity. From the survey it can also be seen that acceptability in the rural area is better than the urban area which was also showed by the greater interest of the people in the rural area. So it is sugessted that for its future program attention should be given more to the rural area.

So, if future handpump program is to be carried out in the future, funding may still needed to subsidize part of the total cost of the PVC handpump installation.

ATTACHMENT 7

DATA ON REPAYMENT

