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EVALUATION MISSION ON OMT PROGRAMMES
IN THE URBAN AND SEMI-URBAN WATER SUPPLY SECTOR
SUPPORTED BY THE NETHERLANDS GOVERNMENT

March - April 1986

Final report

The Hague, May 1986

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Tel. (070) 814911 ext. 141/142
ISBN: ISN 2981
LO: R 822 ID 86

PREFACE

These pages contain the final report of the team assigned to an evaluation of the OMT programme in the urban and semi-urban Water Sector supported by the Netherlands Government. The team, composed of a director of a Water Company in the Netherlands, a specialist in training and a specialist in community work based in Indonesia, and a representative of Cipta Karya, spent three weeks in the field (March-April 1986) and visited West Java, North Sumatra and Aceh. An executive report was submitted and discussed in April 1986 in Jakarta (Dep. Pekerjaan Umum) immediately after completing the fieldwork. The final report was completed after return to the Netherlands by three of the four members. At such a distance in space and time, an evaluation tends to assume more critical overtones, however, the team did not feel the necessity to change the substance of the executive report.

The team wants to underline again the reservations expressed in the executive report on the shortcomings of the observations.

The team feels the need to express as a general covering note, that the work done both on the Indonesian side and by the expatriate Consultants, is really impressive and that the critical remarks made are meant to improve operations and to warn against specific constraints and some questionable assumptions.

It goes without saying, that people with such varying professional background and work experience do have different styles of writing and reporting. They are also aware of the fact that the different categories of readers have their own interests, points of reference and knowledge.

The team hopes that, despite the lack of weeks of extensive editing work, it has produced a report with relevant information, both to the decision makers and the implementators.

The team would like to repeat its grateful feelings to all those who have extended friendly helping hands, both in the intellectual field and in logistic affairs and wishes that they will be successful in their future endeavours.

EVALUATION MISSION ON THE OMT PROGRAMMES
IN THE URBAN AND SEMI URBAN WATER SUPPLY SECTOR
SUPPORTED BY THE NETHERLANDS GOVERNMENT

March - April 1986

Executive Report;
Summary of Observations and Conclusion

Jakarta, April 5th 1986

The Mission submits herewith a first summarizing version of its main conclusions formulated after the evaluation mission March 17 - April 5, 1986.

This summary report is produced to be discussed in the debriefing meeting on April 5, 1986.

First of all, the mission wishes to acknowledge its gratitude towards all persons and agencies, who have facilitated the work to be done both in the field as well as in the central offices. The encounter with the various actors, contributed considerably to the understanding and assessment of the actual status of the various OMT projects. The mission was impressed, if not overwhelmed by the number of reports and documents produced by the Indonesian agencies and the consultants.

Looking back upon the experiences in the various towns of Indonesia, the mission has to express its admiration for the work accomplished by Indonesian authorities on all levels, as well as by the consultants, to provide drinking water to the population.

The mission likes to state a number of conditions and events that may have reduced the scope and the depth of the observations made.

- no actual training session could be observed;
- no comparison with the situation outside the areas covered by Dutch Development assistance could be made;
- the selection of sites visited was influenced by consideration of convenience; therefore the sample cannot be considered as quite representative;
- it appears to be impossible to separate systematically the contributions of the Indonesian agencies and the Indonesian and expatriate consultants.

The mission offers its apologies for these shortcomings.

As a general impression the mission likes to state that a considerable amount of efforts have been made in the implementation of the water supply program.

At the same time the mission has a slightly uneasy feeling that the (quantitative) targets set in the national plan exert heavy pressure on the projects; and that goal achievement on a macro level has become rather dominant, reducing the efforts to build sound, viable and lasting water systems. There are still many things to do a.o. to train thousands of staff, to set up new water systems, to integrate the new systems into the existing administrative structures.

Considering the volume of the assistance provided by the Netherlands Government in the past years, some (additional) efforts to consolidate the investment already made seem not to be inappropriate.

1. The mission has the impression that all water enterprises visited - PDAM as well as BPAM experience, due to their small size, severe constraints as independent water enterprises.

Support and assistance should be given to those enterprises by higher level institutions - preferably on provincial level - on vital functions as:

- training personnel;
- laboratory facilities;
- technical planning & design;
- financial planning;
- water meter maintenance and repairs;
- support of the IKK system;
- procurement capital for investment;
- purchase;
- stock of high cost equipment
- also crosssubsidies in favour of high-cost water enterprises could be considered.

2. Big differences occur in the performance of the water enterprises visited by the mission in practically all fields of operation of the water enterprises. The dominant factor for the differences seem to be the management qualities of the managing director and his/her staff. The mission has not found relevant differences in the performance of the enterprises due to the training methods of Netherlands consultants DHV or IWACO.

Much attention should be given to selecting capable managers and staff for water enterprises and to training of them.

3. All water enterprises visited by the mission, set up with aid of the Netherlands Government would benefit considerably from further support in many fields of operation. The mission suggests that the Netherlands Government supports water enterprises set-up with Netherlands government aid through longer periods after completion of the technical works. In order to channel this aid provincial institutions might be used.

4. Most water enterprises that were visited by the mission are incapable of maintaining sufficient water pressure in the distribution system for 24 hours/day.

Though customers do not ask for a 24 hrs/day supply, maintaining pressure in the distribution system is essential for a good water supply system.

5. The mission acknowledges the importance of a sound management information system as a base for management decisions in the water enterprises.
6. In all but one water enterprise, visited by the mission, waterbills for customers with house connections are hand-made. Since differences in the billing system seem relatively small the mission advises to develop a simple computerised billing system that can be used in all water enterprises.
7. The mission has found that in many water enterprises the system of maintenance and repairs of the distribution network is underdeveloped. This will eventually lead to a high amount of leakages, low pressure in the pipe system and illegal connections, as well as poor waterquality resulting in insufficient service to the public and many complaints. The missions suggests that more attention should be given to maintenance and repairs of the distribution network in water enterprises.
8. The water supply in IKK, planned and built under the present conditions is still very vulnerable.

The mission is of the opinion that in general IKK systems will not operate succesfully unless a certain number of conditions are fulfilled:

- there is a basic need of water for the people in the IKK;
- a flexible technical design, as simple as possible and fitting into the local situation;
- a financially and technically capable support system;
- adequate community involvement.

The mission has experienced that in many cases these conditions are not fulfilled and therefore IKK systems do not function properly.

9. The OMT projects are all aiming at 'institution building'. The training activities in the proper sense as part of this 'institution building' approach appear to have been at the same time overestimated as a means to achieve the set targets and somewhat under exploited receiving low priority in practice.

10. The training approach has been divided into two main strategies:
(a) the so-called class room approach (eventually an off-the-job training) and (b) an in-service on-the-job/desk to desk training. Both strategies require different training methods. The on-the-job training has been subdivided into/supplemented with trouble shooting monitoring, action and review activities.
This has resulted in the view of the mission, in a complexity of objectives and of actions, too much linked to improvisation, and to the personal style of individual consultants.
11. The off-the-job training has produced among other things an impressive set of training modules, planned to be enlarged in the future.
The training module strategy ensures that nationwide an uniform competence in instrumental skills (both technical and administrative) can be pursued. At the same time the foundations are built for the provision to every jobholder of a work manual for his personal daily use.
The mission recommends thorough field testing of these materials and regular review/improvement of the modules and other training materials.
12. Until now only the higher echelons have experienced the off-the-job training programs, the reactions of the former participants are, in general, positive. Though most of them considered the training received not enough. Especially in the field of management trainees leaned heavily on their earlier management experiences.
13. There was an unanimous preference for in-service training as being more directly effective and relevant to the actual work situation. The degree of satisfaction appears to be closely related to the variations in intensity/-frequency of the on-the-job training as implemented to how.

There are very few clear indications that on-the-job training used as the dominant approach, would produce better results under all circumstances. A balance between off-the-job training and on-the-job training has still to be established experimentally, taking into account costs, level of the jobs of the trainees, availability of trainers and the required speed of dissemination of knowledge and skills.

14. The immediate benefits of both the off-the-job as well as the on-the-job training interventions are, in the opinion of the mission, difficult to assess as there are apparently many other variables that have an influence on the quality of the job performance.

However, the mission wishes to suggest that the training activities should be intensified, quantitatively and qualitatively in order to achieve the goals set in the overall plan.

15. The effectiveness of the training efforts can be increased when the regional support system between the central (national) level and the Waterenterprise (W.E.) would be strengthened, offering:

- training facilities;
- Competent trainees/resource persons;
- regular and easy contacts.

Proposals to this effect have already been made, and, in addition, to have regional monitoring and assistance units. The mission backs up these proposals.

In the opinion of the mission the development of a qualified staff of W.E. is greatly dependent of the availability of enough competent trainers and experts in monitoring. The present ad hoc programs of training of trainers and the training function throughout the system should be reviewed.

16. The overall performance of the W.E. appears to be closely related to the personal qualities of the directors and the senior staff.

Therefore the mission stresses the importance of a careful selection of the key job holders (director, divisional heads) and offering to them recurrent training.

17. A diversification of the training-learning methodology is recommended especially in the training of those job holders who have heavy external relation components (community relation and relations with the administration) in their tasks. Narrow instrumental skill teaching will not be sufficient in those cases, more attention should be given to these aspects.

18. The promotion of a practice of in company training of subordinates by their superiors is recommended, as well as the inter-company sharing of experiences.

19. The effectiveness as well as the efficiency of the training efforts can be increased when sound and clear internal and external organisational structures are promoted. Uncertainty and unclarity in those respects greatly neutralize/diminish the results of training activities.

COMMUNITY INVOLVEMENT

MISSION FINDINGS

1. The consumers in the IKK water supply systems observed, both with house connections (HC) and public tap (PT) users, have a very limited sense of their share in the responsibility for the effective functioning of the service. The same applies for the users of public taps in BNA systems. One direct result is that 60-90% of public taps were not functioning and of the remainder the consumers were often not paying for the water.
2. In the IKK systems observed there is a strong correlation between successful functioning and use of HC's and public taps and thorough community preparation, providing that there is a regular supply of water of acceptable quality.
3. In the past there has been little or no recognition of the importance of community involvement.
This situation is changing, however the providers of the water supply for both BNA and IKK systems still tend to limit the concept of community involvement to the community obeying the rules made by the providers.
4. Reliance on targets, standardised approaches and limiting the dissemination of information to formal channels only, in many observed cases has resulted in incorrectly or partly informed consumers, and lack of time for preparation, including consultation on issues such as choice of type of service and location.
5. No TPM, or community workers, were found in any of the projects visited. These people could be a key link in the community component of IKK water supply systems.

Taking into consideration the above problems, the mission considers it is crucial to increase both the quantity and quality of the endeavours to promote and sustain maximum community involvement.

The following measures are therefore recommended:

- I. A sense of shared responsibility and ownership by potential consumers of IKK services will be maximum if the community is involved in all stages of development of the water supply scheme, including:
 - a. socio-economic survey, including inventory of community resources;
 - b. decision on water source, type of service, locations, discussion on tariff (amount, billing), community contribution;
 - c. implementation;
 - d. continual functioning of the system;
 - e. effective use of facilities to achieve healthier lives.
- II. Where IKK systems are already established, or are in the process of construction, efforts should be made to involve the community in as many of these stages as is possible.
- III. In order to develop effective models for mobilising community resources and maximising community participation it is advised to try out various approaches in pilot IKK's.
- IV. The selection of location for installment of an IKK water supply system should be based on data collected through an exploratory survey. The data could include a.o.:
 - degree of need for water
 - extent of community desire for IKK service and willingness to pay
 - cost benefit analysis.
- V. The location of public taps should be determined by the local community in cooperation with the water enterprise. Conditions could include:
 - the community needs and wants and a public tap
 - community willingness to pay
 - proximity to consumers homes
 - proximity to responsible caretakers home.
- VI. The implementation of the water supply system should include education of the consumers in the use of water for promoting healthier lives by water supply providers in cooperation with appropriate staff from Dept. of Health. If possible at the same time the sanitation system should be improved to create a healthier environment.

VII. Selected staff at all levels should be trained in the techniques of promoting and organizing community involvement.

It is recommended that this include: PPSAB staff from the development assistant (asisten pengaturan), PDAM staff from consumer relations (hubungan Langganan), IKK unit heads (kepala unit IKK) and also community volunteers (tenaga penggerak masyarakat).

The Consumer/Community Relation Section of PDAM/BPAM should be strengthened, with major functions including community relations and promotion.

(This recommendation was delivered orally at the muting 8 April).

VIII. The services of organisations with extensive direct experience in community development (particularly NGO's) should be utilised to assist in planning strategies, training and implementation of models, in order to strengthen the community involvement component in water supply systems.

IX. Consultants involved in Netherlands aid programmes should use the services of experts, particularly local experts, with proven skills in community organisation.

X. A communication strategy should be developed at provincial level to provide back up support for educational and promotional activities for both BNA and IKK systems.

Communication materials should then be designed and produced for this purpose.

Field staff should be trained in the techniques of effectively using such materials.

The evaluation mission:

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FINAL REPORT

FUNCTIONING OF WATER ENTERPRISES

1. THE SIZE OF WATER ENTERPRISES IN WEST JAVA, NORTH SUMATRA AND ACEH

1.1 MISSION FINDINGS

Most of the water enterprises the mission has visited have serious problems in different areas. The question arises whether this has anything to do with their size.

1.2 QUALITIES OF AN INDEPENDENT WATER ENTERPRISE

If BPAM and PDAM have to be selfsupporting and independant water enterprises, that are able to cope with the problem of growth of water supply, certain conditions have to be met:

- a. The water enterprise must be able to service its water production plant(s) and to maintain its distribution network. In many cases the mission has found the production plant is serviced fairly well, but the distribution network needs more attention (this shall be discussed later).
- b. The administrative and bookkeeping system must be correctly executed. The mission did not study this aspect thoroughly, but has no reason for serious doubts.
- c. The enterprise must be able to plan and to control its future financial situation in connection with the desired growth of the enterprise. This growth often makes high investments necessary, that demands procurement of investment capital with consequences for income and expenses of the water enterprise as well as for future tariffs. For this job skilled staff is necessary, however this is rarely found in the enterprises the mission has visited.
- d. The enterprise must be able to plan, develop and control the design of future extensions of the production and distribution systems of the water enterprise. This means that the water enterprise - in case of independence - needs a skilled staff of engineers and technicians that are able to do research and development as well as technical design and are able to formulate and control the work of technical consultants and contractors.

In fact hardly any water enterprise the mission has visited has sufficient technical staff with the capabilities mentioned above. Only in the PPSAB (provincial level) and the Cipta Karya national offices these capabilities are available (apart from the larger water enterprises in Indonesia).

- e. In water enterprises in general - but especially in rapidly growing enterprises - there should be an internal training system for new staff. This means that staff (or part of the staff) of the enterprise should have the capability, the facilities and sufficient time to train incoming staff for their new jobs. Of course external training in training centres is desired, but complementary to that, or instead of it, internal training is necessary. After the starting-up phase of the enterprises many new staff members in the enterprises visited, appear to take up their new jobs without external training in the water enterprises, while internal training is minimal, or may be non-existent.

Changes in personnel and frequent mutations leave the enterprise after some time with insufficiently trained staff and, consequently, with insufficiently capable staff.

In larger enterprises where most jobs have more jobholders and staff are more specialised, internal training is executed with less difficulty.

- f. A water enterprise should have its own sufficiently equipped and staffed laboratory. This laboratory should be able to control water quality in the production plant as well as in the distribution network. If possible the laboratory should be able to do some research on water quality of future water intakes and on future treatment processes.

The mission has found that in all the water enterprises visited only some routine checks (if any) on water quality are done (pH, water temperature, jar test, chlorine content). No laboratory did sufficient control of the water production process or check on E-coli. This contributes to the fact that in many cases production processes, involving chlorine dosing, flocculation and filtration do not run properly.

- g. Since water supply in small towns (IKK) become the responsibility of the water enterprise after establishment by PPSAB, the water enterprise should have enough capabilities to control water supply in the IKK, involving:
1. financial capabilities to cope with (temporary) income shortages of the IKK water supply;
 2. management capabilities to support the staff of the IKK water supply;
 3. technical and logistical capabilities to carry out maintenance and repairs of the IKK water supply system in minimal time;

4. staff that is able to handle the community aspects of the IKK and BNA public taps.

The mission has found that in every PDAM and BPAM visited, the management and staff are highly reluctant to take over responsibility for the IKK water supply because these enterprises do not regard themselves fit to fulfill all of these requirements.

It seems that the qualities that are mentioned above can only be obtained in larger water enterprises than the mission has visited in Indonesia.

1.3 MORE ADVANTAGES OF LARGE WATER ENTERPRISES

If the water enterprises in Indonesia were larger than the present BPAM and PDAM organized on the Kabupaten level more large scale advantages would be felt.

- a. A workshop for cleaning, repairing, painting, calibrating and gauging water meters could be established.

In all but one water enterprise visited, water meters that needed repairs were kept in stock, and only new water meters were installed. The price of a new watermeter (\$ 20 - \$ 30, depending on the make) is usually about four or five times as expensive as repair of a used one.

For the establishment of a workshop trained technical staff and special equipment is required. It is only worth-while to establish such a workshop when sufficient water meters are available for handling.

A water enterprise with, for example, 6,000 house connections that changes its water meters on every house connection, according to the regulations, once per three years (which is presently done at none of the water enterprises) would have to handle 2,000 water meters per year, so about 10 per working day. It goes without saying that such a small quantity is not enough to establish a water meter workshop. It would be better to have one or two workshops per province to repair all the water meters for water enterprises in the province.

Water meters could be sent to these workshops in packages of some hundreds at a time and handled at a fixed price per water meter. The workshop should be part of a larger water enterprise or a provincial institution. It seems better not to have water meters handled by private industry.

Water meter workshops should do:

water meter dismounting, washing and drying, repairment or replacement of meter and clockwork, blasting and painting the brasswork, assembling, calibrating, gauging and sealing the water meter.

Also the meter, taken out of a house, should be read again in the workshop. Together with the special number that is printed in every water meter this would make it possible to have an effective control of the meterreading in the past years of installment.

- b. Big investments in treatment plants or distribution networks are both in Indonesia as elsewhere done for a city as a whole or part of a big city. The larger the water enterprise and the more cities in the supply area of a water enterprise, the less the relative influence a single capital investment has on the financial balance of the enterprise. In fact if a province had only one water enterprise all the yearly investments together would be a continuous investment capital-flow that would be easier to handle for the enterprise.

Also if investment capital is in constant flow in the water enterprise abrupt tariff changes for customers due to capital investment will not occur. If in a province the water tariff were the same for every customer a smooth system of cross subsidising from one city to another would automatically be created. It is practically impossible to realise such a system on the long run outside the framework of a single water enterprise.

The mission has observed that in most water enterprises attraction and handling investment capital is of grave concern for the management. Loans from private banks are hard to get, since banks want realistic balance-sheets that are not available in some enterprises. Moreover loans from banks have high rent-tariffs.

It appears that in many enterprises the management is not familiar with procurement of low-rent government loans provided by Cipta Karya or hesitates to procure such loans because of future repayment obligations.

- c. Purchases and stock of high-cost equipment is cheaper and easier to handle for a large water enterprise than for a smaller one. The mission has observed that in most water enterprises that were visited stock of low-cost materials and equipment for day to day use is available (pipes with small diameters, small valves, chlorine and aluminium for dosing), but that in all enterprises visited no high cost materials and equipment is in stock (large diameter pipes and valves for extensions and repairs, complete diesel engines for IKK).

1.4 INTERNATIONAL SITUATION

In many parts of the world very small water enterprises exist. Many of them supply just a small group of houses or small villages. Still their performance can be very good, in spite of their small size (USA, West Germany).

On the other hand in many parts of the world large water enterprises exist, that supply millions of house connections, without having problems due to their size. (Great Britain, France, USA).

What influence does the size of a water enterprise have on its performance?

It seems that this depends largely on the tasks of the water enterprise.

Small enterprises often have in common:

- a. simple water production, for example ground water or spring captation.
- b. simple water distribution: small distribution networks in towns or villages, that are geographical and/or administrative entities.
- c. little change in water production and water distribution.
- d. unchanging and safe intake water quality.
- e. easy tariff structure, often in combination with other public utilities, administered by local authorities.
- f. little or no growth of water demand or number of house connections.

Large water enterprises often have in common:

- a. a more sophisticated water production process: water intake from surface water that may be polluted or ground water that needs intensive control.
- b. distribution of water in large cities or vast areas that are often administrative and/or geographical entities.
- c. ability to adapt to alternative water sources due to, for example, pollution of existing water intakes.
- d. ability to make rapid changes in and extensions of the distribution network made necessary, for example, by expanding and reconstruction of cities.
- e. changes in intake water quality make intensive control of water production and laboratory activities necessary.
- f. more complicated tariff structure, caused by various categories of customers (industry, trade, house-connections).
- g. ability to cope with the rapid growth of water demand or distribution-area.

In Indonesia the second administrative level - the Kabupaten and Kota Madya level - is chosen for handling the water supply both technically and administratively.

The new water enterprises are at first founded by provincial PPSAB offices, that create BPAM water enterprises in the Kabupaten. The BPAM are predecessors of the PDAM (in North Sumatra and Aceh the BPAM phase has been skipped and PDAM are created with many starting up problems as a consequence). These BPAM, as well as the PDAM, are in the first years of their existence water enterprises that supply one or two cities in the Kabupaten. The production plant as well as the distribution network is constructed under responsibility of the provincial PPSAB office.

When the Kabupaten takes over responsibility for the enterprise and the PDAM is founded, the water enterprises have generally:

- a. financial income equal to, or a little more than, expenses (without taking in consideration depreciation of investments).
- b. the number of house connections and public taps still has to be increased; the city is only partly supplied; the rural area is mostly not or only partly supplied.
- c. the senior staff of the water enterprises have had initial training, consultants left the water enterprise after the technical works are completed.
- d. The distribution network is often not in good shape; high figures for "unaccounted for water" occur frequently.

This situation creates serious problems for the new PDAM which, as the mission experienced, they have great difficulties in overcoming. In fact the BPAM often have the same problems but they can appeal to the provincial PPSAB offices for support and assistance.

1.5 COMPARISON WITH NETHERLANDS SITUATION

The following will compare the size of Indonesian water enterprises, in this case the city of Tebing Tinggi, with the Netherlands situation.

Tebing Tinggi is a city in North Sumatra that has presently 45,484 inhabitants.

According to BNA design 60% of the inhabitants should be provided with a water supply, the supply should be 90 lpcpd for a house-connection and 30 lpcpd for a public tap, 40% extra use for industrial purposes, 15% extra for peak factors and 15% for "unaccounted for water".

BNA approach: 60% of 45.484 inhabitants served: 27,290 inhabitants served.

50% of them by house-connections

with 10 person/h.c. : 1,365 house-connections.

50% of them by public tap with

200 persons/p.t.: 68 public taps.

The design supply would be:

$$\frac{27,290 \times 60 \times 1.40 \times 1.15 \times 1.15}{1,000} = 3,031 \text{ m}^3/\text{day}$$

So a waterproduction system of 40 l/sec would have to be built.

If we compare this to the Netherlands situation three different aspects can be recognised: water production, water distribution and administration/billing.

The Netherlands

In the Netherlands the overall-average water use of one person is about 210 lpcpd (incl. leakage, industry etc.).

So a production of 3,031 m³/day as designed for Tebing Tinggi is in the Netherlands on average sufficient to supply a city of:

$$\frac{3,031 \times 1,000}{210} = 14,433 \text{ inhabitants,}$$

with 2.7 persons per house this means $\frac{14,433}{2.7} = 5,346$ house connections.

From a distribution point of view the number of connections is a clear indication of the size of a water enterprise. In the Netherlands there are about 2.7 persons per house, so the 1,433 connections (house connections and public taps) designed for Tebing Tinggi would cover a city of $1,443 \times 2.7 = 3,869$ persons in the Netherlands.

From the administrative point of view the number of bills is a clear indication of the size of the enterprise. For the city of Tebing Tinggi

$\frac{27,290}{10} = 2,729$ connections, or $2,729 \times 2.7 = 7,368$ persons in the Netherlands.

Even when eventually the city of Tebing Tinggi has a 100% supply through house connections and with a more realistic figure of seven persons/h.c. this will lead to $\frac{45,484}{7} = 6,489$ house connections in Tebing Tinggi.

This will lead to the following comparison in case of supply to all the inhabitants of the city of Tiding Tinggi through house connections.

	<u>Tiding Tinggi</u>	<u>Comparison with Neth. city</u>
inhabitants	45,484 inhabitants	--
production	7,579 m ³ /day	13,367 h.c./36,091 inhabitants
distribution		
(house connections)	6,498 h.c.	6,498 h.c./17,545 inhabitants
billing	6,498 bills	6,498 h.c./17,545 inhabitants

In the Netherlands a number of 50,000 - 100,000 house connections is considered minimum to carry all the responsibilities of a modern water enterprise. The Netherlands water sector is presently being reorganized to obtain this goal for water enterprises. The Indonesian standards (for most PDAM and BPAM these calculations can be made) are far below that level.

The following conclusions can be drawn from this comparison:

- a. Indonesian water enterprises that are established are very small in comparison with Netherlands water enterprises and generally excepted standards in the Netherlands.
- b. In comparison with the Netherlands Indonesian enterprise water production sections are relatively bigger than distribution and administrative/billing sections. This is mainly caused by two factors: the higher number of people per household (h.c.) and the water supply from public taps which reach relatively many people.

1.6 RECOMMENDATION

The mission considers that the water enterprises which are established at Kabupaten level are, in many cases, too small to carry the responsibility of an independent and selfsupporting water enterprise. The foundation of larger enterprises is recommended, preferably at the provincial level.

As long as legislation prevents foundation of these larger enterprises the establishment of a support and monitoring-system is supported. This system could assist the presently existing enterprises in the following important ways:

- training personnel;
- enabling career development;
- laboratory facilities;
- technical planning and design;
- financial planning;
- water meter maintenance and repairs;
- support of the IKK system;
- procurement of capital for investment;
- purchase;
- stock of high cost equipment.

Also cross-subsidies in favour of high-cost water enterprises could be considered.

2. ABOUT THE DISTRIBUTION OF WATER

2.1 TASK OF THE DISTRIBUTION DEPARTMENT

In the distribution department of a water enterprise a number of tasks should be accomplished:

- A. inside the office:
- technical planning and design of the distribution network
 - administration
 - stockkeeping of materials and equipment
 - water meter repairs (if done by the enterprise)
- B. outside the office:
- construction of new house connections and public taps
 - construction of new pipelines (as far as this is done by the enterprise itself)
 - operation of valves
 - detection of leakages and illegal connections
 - repairment of leakages
 - disconnection of non-paying customers
 - replacement of water meters
 - maintenance of valves, fire hydrants, air outlets and public taps

The mission found that in most water enterprises many tasks mentioned under B are hardly or never carried out. If the distribution network is not properly looked after this will eventually lead to many leakages and badly functioning valves, fire hydrants, air outlets and public taps. Obviously the water pressure in the distribution system will thus become lower, customers will complain and tend to draw more water from the network by connecting pumps. Moreover illegal connections will be made by non-experts as only experts can make connections on a distribution system with sufficient water pressure.

This is one of the major causes of the high amount of "non accounted for water", that plagues most of the enterprises that were visited by the mission.

Most water enterprises that were visited by the mission are incapable of maintaining sufficient water pressure in the distribution system during 24 hours/day, which is highly necessary to keep the system functioning in a proper way.

Leakage repairs is one of the most important tasks, that has to be carried out by the distribution department in a water enterprise in order to keep the distribution system functioning properly.

2.2 NUMBER OF LEAKAGES IN INDONESIA AND THE NETHERLANDS

In every distribution network in the world leakages occur.

The number of leakages depends largely on:

- a. the quality of the pipelaying (contractors)
- b. the type of pipe material used (PVC, HPE, galvanised iron)
- c. the quality of the pipe materials
- d. the type of soil (clay, sand)
- e. the movement of the soil (by traffic, earthquakes).

The number of leakages differ from enterprise to enterprise, but some statistic figures can be given.

In the Netherlands the number of leakages in a distribution network (excl. house connections) is on average about one on seven kilometers of pipeline per year.

It may be expected that the number of leakages is higher in Indonesian waterenterprises.

The number of leakages in house connections per year is generally much higher than in the pipe system. In the Netherlands figures of two pipebursts per 100 house-connections per year are quite common. In Indonesia this figure will be higher too. From one large enterprise in Indonesia a figure of 1 leak on 15 house connections was given.

In Banjar the mission learned that the total real number of leakages is about 10 per month, so about 120 per year, which is still low in comparison with the number of one leak on 15 house connections per year (that would lead to 160 leaks in house connections only in Banjar).

When we apply the Netherlands figures to the water supply in Banjar for example we may expect:

pipesystem: 26.4 km of pipeline \geq 50 mm	\times 0.14	=	4 leaks per year
house-connections: 2,083 house-connections	\times 0.02	=	<u>42</u> leaks per year
total:			46 leaks per year

When we apply the figure of one leak on 15 house connections per year on a large water enterprise with for example 50,000 house connections, this means that about 3,300 leaks can be expected. Proper repairment of these leakages in a distribution network takes a considerable number of well-trained staff of pipe fitters, which will lead to higher numbers of staff-members than stated in the Buku Pedoman.

Apart from leakage repairs all the other duties of the distribution department have to be carried out too.

2.3 NUMBER OF PERSONNEL IN THE DISTRIBUTION DEPARTMENT

In general leakages become visible when the water pressure in the pipe system is high enough (wet spots). In distribution systems with continuously low pressure leakages will not become visible. Moreover in distribution systems with low pressure it is easy to make an illegal connection, while in systems with continuously high pressure this is practically not possible for non-experts without special equipment.

So in every water enterprise with low pressure and with a high "unaccounted for water" figure a considerable effort has to be made by the employees of the distribution department to get the number of illegal connections down, to trace and repair leakages and to replace non-functioning watermeters. To do so will be the only way to lower the "unaccounted for water" figure, raise the income and bring pressure on the water in the pipe system, and in this way improve the service to the public.

When the distribution system is under sufficient pressure (min. 15 - 20 mwc, preferably 20 - 30 mwc) on 24 hours/day and the water leaves the production plant sufficiently chlorinated, some free chlorine is in the water at the taps in the houses and the water can be used by the consumers without boiling. Only in the city of Banjar the mission has observed such a situation.

It appears that in most enterprises not enough personel are available to fulfill the task of maintaining the network properly. The task of bringing the "unaccounted for water" figure down to about 15 - 20% will involve many more employees than the standard given in the Buku Pedoman. Moreover the employees have to be trained for this task much better than they are now.

To carry out the immense task of repairing the distribution system of a water enterprise in order to diminish the leakages it is advised to work district by district and to start close to the production plant. In every district the network should be improved: leakage detection, leakage repairs, disconnection or legalisation of illegal connections, check and, if necessary, replacement of watermeters. After improving the network in such a district it is necessary to keep enough water pressure in the system.

It can be expected, that after improving the network in a district and bringing the pressure at a sufficient level, the (legal as well as total) waterconsumption will go up sharply. After some months - after one or two monthly bills are collected - consumption will go down again, but the water consumption will remain higher than before. On the basis of only one experience 10 - 20% could be guessed.

It is clear that when the system is improved in such a way more water has to be produced and distributed.

2.4 RECOMMENDATIONS

The mission recommends that high priority should be given to maintenance and repairs of the distribution network in order to get and keep the "unaccounted for water" figure at an acceptable level. This will in many enterprises lead to a higher number of staff in the distribution department of the water enterprises, even higher than the Buku Pedoman states. It is highly recommended to keep sufficient pressure in the distribution system at 24 hours/day, though consumers do not really ask for it.

3. ON THE WATER SUPPLY IN IKK

3.1 VULNERABILITY OF THE IKK WATER SUPPLY SYSTEM

The mission has visited six IKK systems, and has studied the reports on the water supply in IKK, including the action and review reports.

The mission has observed the tremendous effort of consultants, PDAM, BDAM and PPSAB to establish and improve the water supply in IKK and was impressed with the ongoing action and review program.

Nevertheless the mission feels the water supply in IKK is very vulnerable and in the future breakdowns of water supplies in IKK are predicted.

Some points illustrating the vulnerability:

The technical design used to be completely standard in the past. After the action and review program deviations of the standard were allowed.

The standard design has disadvantages: for example diesel engines are vulnerable machines and need intensive maintenance. Some day the diesel engine breaks down and needs intensive repair or sometimes replacement. It is advised to have a PLN connection for the IKK water supply. If diesel engines are used it is necessary to have a back-up system for maintenance and repairs, so breakdowns from (one of the two) diesels will not be noticed in the IKK supply more than one of two days. On those days the other diesel may take over the running time of the broken-down one. Moreover it would be possible for a diesel engine for replacement to be made available within a few days. It appears many BPAM and PDAM can hardly give any support on this point, especially if the PDAM is reluctant to do so for financial reasons.

The water treatment system is sometimes - in relation to the size of the treatment plant - complicated. A water treatment plant for surface water with chemical water treatment is really a small size copy of water treatment plants for large cities (water intake - chemical dosing - flocculation - sedimentation - filtration - clean water pumps). Since even in large water enterprises with trained staff many problems occur with this type of water treatment it can be expected that in the IKK with only a few staff many problems occur.

Again the back-up system has to guarantee the continuing functioning of the water supply, but unfortunately in many cases a good back-up system - especially in PDAM - is not available.

The result is that in many cases the water treatment plant does not run according to design, and water with high turbidity is distributed. To add to this in most IKK the chlorination did not work at all.

The distribution system is very vulnerable too. The water supply to house connections and public taps is continue during supply hours, so no peaks in water supply are expected. The peak supply used for designing the distribution network is only 10% higher than the average supply (in BNA systems 100% higher). The consequence of this design is that pipes in IKK have only small diameters and supply to the house connections will immediately diminish considerably through leakages, illegal taps and broken seals.

Taking IKK Pantai Cermin as an example:

The total length of the distribution network is 6.1 km, and the number of house-connections will eventually be 180.

So with one leak on 15 h.c./year and one leak per 7 km pipe per year, about 13 leaks per year may be expected. The total production is 9,000 l/hour. If one leak causes a loss of 300 l/hour, only 3 or 4 unrepaired leaks will cause serious trouble to the system. This problem will be aggravated by the fact that small leaks can hardly be detected. Leaks of 50 l/hour and less will often stay invisible even in clay soil for a long time while in course sands leaks of 200 - 300 l/hour can stay completely invisible. Leaks where the water goes into ditches and drainages can be hard to find too (if at all).

Only well trained and well motivated staff with good equipment can handle the leakage problem in the IKK.

If this is not the case, with the consequence that leakage results in water supply per house connection to be below design, it may be expected that seals will be broken, illegal connections made and the figure for "unaccounted-for-water" rise. Since the production system has no reserves with all house connections supplied and small pipe diameters in the distribution system this will cause severe problems for customers and consequently create bill collection difficulties.

From the financial point of view water supply in IKK is vulnerable. Especially in high-cost-systems (surface water treatment with pumped supply and small quantities: 2,5 l/sec.) the tariff level has to be high in order to cover all expenses even without depreciation being taken into account. This means that PDAM and BPAM have to cross-subsidise the IKK-system. This, in view of the difficult financial situation of these enterprises, is hardly possible and the management of PDAM and BDAM is reluctant to do so.

3.2 SIZE OF THE IKK WATER SUPPLY SYSTEM

In some cases the mission has observed that families used well water as well as the piped supply. The wells appeared to be in good order all year round questioning the need for a reticulated IKK water supply. In other cases, however, a piped supply appeared to be very necessary at times even outside the town area.

Some of the problems that occur in water supply for IKK would be easier to handle if the production capacity as well as the supply area were larger. It might be considered to build larger systems.

Since IKK water supplies should be built in areas where piped supply is highly necessary, enlarging there would be a good thing (for example the coastal area in North Java).

Moreover it would be preferable to build the distribution system not as marginal as now. The production system can be enlarged later, but the present distribution system can never be enlarged without laying new pipes with bigger diameters.

3.3 RECOMMENDATIONS

The mission is of the opinion that in general IKK systems will not operate successfully unless a number of conditions are fulfilled:

- a. Adequate community involvement: this is discussed separately in the mission report.

- b. A flexible technical design: the design has to be as simple as possible in order to prevent break-downs and to lower costs. So, if possible have gravity systems; if not spring captation prior to groundwater, groundwater prior to surface water and if possible have PLN-connections. Moreover it would be better if the supply system would be built in such a way that it could be enlarged in the future.
- c. A financially and technically capable support system;
- d. A basic felt need for water from the people.

Completed but not functioning IKK, fulfilling these conditions should be considered for the "action and review program".

4. ON FINANCES AND ADMINISTRATION

4.1 GENERAL

In the water enterprises that the mission visited monthly reports were available about the financial situation of the enterprise. In most enterprises balance sheets were available too. The mission did not study the financial and administration department and their performance in detail, since most enterprises seemed not to have serious problems in this field and staff in general seemed to be sufficiently capable.

Still some remarks can be made.

4.2 TARIFF STRUCTURE

The tariff structure is applied in all enterprises according to national regulations, although minor deviations occur. In most enterprises - according to national regulations - the tariff for the first 15 m³ of water is fixed and has to be paid for, even if a customer does not use this amount of water. So there is a tendency for customers to use 15 m³/month anyway. It seems more fair towards the customer and more in line with saving water, to bill only for the cubic meters that are really used. In order to make up for financial losses a fixed price for having a house-connection could be applied (or enlarged, when this system is already in use) additional to the price per m³.

4.3 MANAGEMENT INFORMATION

The book keeping system seems to be rather complicated for small water enterprises. Many directors and staff members have complained to the mission about the complexity of the system ("70 forms").

The system is considered to be more like a registration system than an information system for the management of a water enterprise and gives the management insufficient information to base management decisions on. Therefore the mission acknowledges the importance of a sound management information system as a base for management decisions in the water enterprises.

4.4 AUTOMATION OF BILL PRODUCTION

In all but one water enterprises, that the mission visited, water bills for customers are handmade. This takes much time from the enterprise staff and consequently is rather costly. Since in all Indonesian water enterprises the tariff system is practically identical and is rather simple corresponding to the national designed system, it could be considered to develop a simple computer system. The mission feels that the software could be developed by the national Cipta Karya office and made available against cost-price to the water enterprises to be used with a small compatible office computer.

4.5 DEPRECIATION

In most water enterprises depreciation of investments is not applied. If an enterprise does not apply depreciation, no reservations for future investments and replacement of present investments can be made. This seems rather risky from the financial point of view, though the mission acknowledges the problem of raising the tariffs which is the consequence of applying depreciation. In the status report of both consultants DHV and IWACO depreciation is calculated as a fixed yearly amount. It seems better and easier to use a different method of calculating depreciation. With the suggested method depreciation is not a fixed amount of money per year, but a fixed amount of money per m3 supplied.

If we take the Banjar supply as an example, the figures are as follows:

investments: 600 million Rps - depreciation time approx. 25 years
electromech. equipment: 200 million Rps - depreciation time 7.5 years
production capacity 40 l/sec. = 1,261440 m3/year.

depreciation per m3 investments are $\frac{600 \text{ million}}{1,261440 \times 25} = 19 \text{ Rps}$

depreciation per m3 electromech. equipment is $\frac{200 \text{ million}}{1,266140 \times 7.5} = 21 \text{ Rps}$

Total depreciation per m3 produces 40 Rps

Per m3 water sold the depreciation is then:

$\frac{\text{m3 water produced}}{\text{m3 water sold}} \times 40 = 1.30 \times 40 = 52 \text{ Rps}$

So the depreciation is a constant figure per m³ water sold of 52 Rps
The advantage of this way of calculating depreciation is that no water price shocks occur for customers.

This way of calculating depreciation can only be done when it is certain that the investment will be fully used and the water enterprise has no financial risk. This risk is not present, since investment is - for the larger part - paid for by the central government. Depreciation is not used for paying back investment loans but is meant for reservations for future investment.

4.6 INDEPENDANCE OF KABUPATEN

In Indonesia the regency government responsible for a water enterprise is permitted to collect 55% of the net-profit of the water enterprise. Since most water enterprises do not apply depreciation this means that 55% of the cash flow may leave the enterprise. The Minister of Home Affairs has urged local kabupaten authorities not to take profits out of the water enterprise. On the other hand many kabupaten authorities support their local water enterprises by lending them personnel. These staff are not always well trained and can be withdrawn at any time. The mission feels that both types of involvement of the kabupaten with the enterprise in the end are not in favour of an independent water enterprise. The enterprise should eventually be able to run its own business.

5. ON WATER QUALITY AND PIPE MATERIALS

5.1 WATER QUALITY AND PIPE MATERIALS

The quality of the intake water in all water enterprises visited is, in comparison with water quality in industrialised nations, very good.

The treatment can for that reason be fairly simple. In case of surface water in Indonesia the treatment is usually:

water intake - chemicals dosing - flocculation - sedimentation - rapid sand filtration - pH correction - chlorination - storage.

Generally the pH of the intake water is low. In most cases the pH is below 7 and in some cases even below 5. The treatment process as described above lowers the pH so in many enterprises lime or soda ash is used for dosing as part of the treatment process to bring the pH up. The process of dosing requires some expertise from the employees that are handling and maintaining the equipment. In many enterprises the dosing of chemicals has stopped with the consequence that the pH is below design. As a consequence the enterprise has lower costs.

The mission has observed that enterprise staff tends to think that there is no problem as long as the pH is over 6.5, the minimum level according to WHO standards. This, in fact, is not true. The pH level from the WHO standards is only a health standard. A pH higher than 6.5 means that there is no health risk. Still this pH is too low as the water is too acid, especially when materials that may corrode are part of the distribution network (iron, galvanised iron, cast iron, copper, lead). In many cases galvanised iron is used to construct house connections. This is done because galvanised iron is strong enough to make drainage crossings, is easy to handle, fairly cheap and easy to get.

The lower the pH the more leakages in house connections that will occur in the future. Of course, other chemical components in water determine the corrosivity too (CO₂ content, conductivity). The pH, however, is a very important factor which can be influenced easily. Therefore it is necessary to bring the pH on the level prescribed in the consultants design of the water treatment plant and to keep it at that level. The design levels are in most cases somewhere between pH = 7 and pH = 7.5.

This will not be high enough to prevent pipe corrosion. The higher the pH the less pipe corrosion will occur. From publications it is known that pH has to be at least 7.5 though there are indications that even pH = 9 is necessary.

In the Netherlands the nationally agreed VEWIN recommendations range from pH = 8 to pH = 8.3.

Galvanised iron pipes may corrode on the outside of the pipe too.

The fact that these pipes are galvanised will slow down corrosion but certainly will not prevent it. Since PVC pipes are available it is recommended to use PVC pipes with, if necessary, iron pipes as protection pipes for drainage crossings. Even better still are HPE pipes which may be more expensive than PVC and G.A. On the other hand HPE pipes (which are hoses really) are much easier to handle, have no connections, so less chance of leakages, bends can be made easily and the connection to the main pipe in the street is very simple.

Therefore it is highly recommended to use HPE for house-connections.

It would be attractive if HPE pipes could be produced in Indonesia at fair prices.

5.2 RECOMMENDATION

In most water enterprises galvanised iron is used as material to construct house connections. In the future this material will be subject to corrosion. Therefore HPE or PVC is recommended as material for construction of house-connections.

Also, in order to prevent corrosion, it is recommended that the pH in distributed water is brought up to the design figure.

6. ABOUT THE PERFORMANCE OF THE WATER ENTERPRISES

6.1 FINDINGS OF THE MISSION

Most enterprises that the mission visited, as may be concluded from the mission findings and the consultants status reports, have serious constraints in their performance as independant water enterprises.

In fact only one enterprise visited by the mission, the city of Banjar, really meets the standards that the mission would like to set for the performance of a water enterprise: proper water production, continuous pressure on the distribution system, acceptable "unaccounted for water", healthy water quality up to the consumers taps, acceptable billing efficiency, good relation with customers.

Two matters may at this place in the report be put forward in relation to the performance of the waterenterprises:

- a. The impact of the OMT programs executed by Netherlands consultants and Indonesian counter parts on the water enterprises.
- b. Should support be given to waterenterprises after the starting up phase and should the Netherlands government contribute by giving supplementary aid.

6.2 ON THE IMPACT OF OMT PROGRAMS

ad a. The mission has found that in all the enterprises that were visited big differences occur in the performance of the enterprises in the various fields the enterprises cover.

In general it can be stated, that in the enterprises performance of bookkeeping and administration is better than the technical performance and the performance of water production is better than that of distribution. Consumer relations gets minimal attention. The mission found that the predominant factor for the performance of the water enterprises visited is the quality of the management. The mission did not find relevant differences due to training methods of different consultants. The management quality of the managing director and his/her senior staff in particular are of extreme importance for the water enterprise.

Since internal relations between employees and management in Indonesian enterprises are more heavily based on hierarchy than in the Netherlands the management quality is of more importance too. Moreover many water enterprises in Indonesia are in the pioneer phase of their existence, a phase with stronger hierarchical relations than later in the consolidation phase of the enterprise's existence.

Therefore the mission suggests that much attention should be given to the selection of capable managers and senior staff for the water enterprises and these managers and staff should be trained well for the task they have in the enterprises.

It is important to note that when managers and senior staff are selected for new jobs, those applicants who have experience in water enterprises should be favoured. The mission has found that many managers and staff members were selected who had no experience at all in water enterprises, thus making their new job extremely difficult for them to carry out.

6.3 RECOMMENDATIONS

Since the predominant factor for the performance of water enterprises appears to be the quality of the managing director and his/her senior staff, special attention should be given to selecting and to training of them.

6.4 FURTHER SUPPORT BY NETHERLANDS GOVERNMENT

ad b. In practically all the enterprises that the mission has visited the job of the consultants was completed and the enterprises - as far as they were PDAM - were practically left on their own. In many cases these enterprises could be helped considerably with further assistance and support. Since Indonesian law does not permit the establishment of provincial enterprises a monitoring and support system as is planned may take up this task. The tasks that could be done on the provincial level through this system could be similar to those described in chapter I on the size of water enterprises.

It is important that support from provincial level should not only go to BPAM but to PDAM as well, though the mission is aware that their independent status might hinder this process.

Since the Government of the Netherlands has invested a considerable amount of capital in the water enterprises that the mission has visited, the mission recommends the Netherlands government continue financial aid and OMT support through longer periods than at present. As stated above practically all the enterprises that the mission visited are in some kind of trouble and would benefit considerably from longer term support. Since the Netherlands government has taken up responsibilities to establish these enterprises in the first place it seems logical to the mission support should come from the Netherlands government after the starting-up phase. It seems more acceptable to the mission in the long run to establish one or two waterenterprises less and to support the established waterenterprises through longer periods.

This applies even more strongly for the establishment of IKK-water supplies, that practically all run into serious trouble when they are handed over to PDAM and BPAM after the starting-up phase. These IKK could benefit considerably from longer (and in their case probably continuous) support.

The support financed by Netherlands Government aid could involve:

- a. support by consultants
- b. support by experienced persons, for example from overseas water enterprises.
- c. provision of funds for incidental contributions to overcome serious constraints of the enterprise.

It seems to the mission that the financial consequences of this aid will be a low percentage of the total aid given for establishing the water enterprise (OMT and technical support). In line with the ideas of the mission the aid should not be given directly to the enterprises itself but should be given through the provincially based monitory and assistance units that will be founded.

6.5 RECOMMENDATIONS

All water enterprises visited by the mission, set up with aid of the Netherlands government would benefit considerably from further support in many fields of operation. The mission suggests that the Netherlands government supports water enterprises set-up with Netherlands government-aid through longer periods after completion of the technical works. In order to channel this aid provincial institutions might be used.

7. ON COSTS OF OMT

The consultants IWACO and DHV who, together with Indonesian counterparts, have provided for OMT-programs, partly financed by Netherlands aid, provided information on the costs of OMT.

DHV - 11 cities project

construction costs: Rps 11,231.5 million
engineering costs: Rps 2,808.0 million
total costs: Rps 14,038.5 million (excl. OMT)

(According to the status report Augustus/September 1985, 1\$ = Rps 1,150 and f 1,-- = 325 Rps)

OMT costs: f 1,94 million, and Rps 170 million, 5.6% of total capital costs (DHV, 4th April 1986).

Engineering costs of 11 cities project were about 25% of construction costs. OMT cost of IKK water supply projects were 4.1% of total capital investment.

IWACO - 15 cities project:

construction costs: f 24.4 million and Rps 15,850 million
engineering costs: " 7.4 million and Rps 425 million
total costs: f 31.8 million and Rps 16,275 million excl. OMT

OMT costs: f 3.25 million and Rps 95 million, about 4,5% of total costs.

Engineering costs of the 15 cities project are about 12% of construction costs. OMT costs on IKK water supply projects and Cirebon small communities were 9.6% of total capital investment.

On IKK projects only, no figures of costs on OMT are available.

Some remarks, however, can be made on the costs of OMT of these projects:

- a. The investment costs per city of the 15 cities project were considerably higher than of the 11 cities project, so it may be expected that the OMT percentual costs per city are lower. As is stated in the training part of this report the training investment in man months is higher for the 15 cities project than for the 11 cities project.
- b. The time lag between establishment of the 15 cities project was larger than between the 11 cities project, so there was little chance of combination of training in this project in classroomtraining.
- c. No information is available on the training costs per person trained, so no sound comparison between DHV and Iwaco training programs can be made.

8. ON WATER SUPPLY AND SANITATION

When consumers are supplied with water through a piped water system, the average use of water per household will go up sharply.

Consumers without piped supply that do their bathing and washing at a river or spring may have a water use per head for drinking and cooking of 3 - 10 lpcpd. With 7 persons per house this will lead to a consumption of 20 - 70 l per house per day. In houses with well-water supply, where bathing and washing is done in or nearby the house, the water use is higher. In houses with piped water supply the water use per household with a house connection on average is mostly 15 - 20 m³/month, or 500 - 700 l/day. This figure is in accordance with the calibrated supply of 600 l/day for a house connection in IKK.

The consequence of piped water supply in houses - especially to those where no water used to be available for washing - is that the amount of used water per house will go up by approximately 500 - 600 l/day.

The mission has observed that in many cases this used water creates problems, that may have consequences on the health of the consumers.

At the sites of public taps too, much wasted and used water may flow freely, causing drainage problems in the surroundings.

When no piped water supply is available the used water in many cases is drained into a pit, where the water infiltrates into the ground. In these cases piped water supply causes pits to overflow, mixing may occur with sewage water, and the water pollutes the surroundings of the house if no proper drainage system is available.

Recommendation

The mission recommends that, when a new water supply system is to be built, the used water situation should be taken into account too and - if necessary - a proper wastewater system should be constructed at the same time as the water supply system.

TRAINING EFFORTS

1. TRAINING AND INSTITUTION BUILDING

The OMT programs are, in essence, meant to be "institution building" (1) exercises, aiming at the development of viable, running water enterprises, that can both reach the national planning objectives, as well as can satisfy manifest basic needs of the urban and semi-urban population, all projected into a longer time perspective.

"Building" an institution implies more than the provision of adequate funds, than constructing technical/administrative systems, than recruiting a competent labour force, and eventually issuing some regulations. As currently, practised by most Water Enterprises.

The policy decisions, underlying the present OMT activities, give the impression to acknowledge the importance of the non-technical factors, and seek to identify and to operationalise the necessary instruments to achieve proper management and organisation, and to supply relevant training to key job holders and other staff.

The number of training manuals, instruction sheets, training workshops, as well as the volume of the "desk-to-desk" provision of training and instruction, is quite impressive, as well as the records of training meetings both off-the-job and on-the-job.

However, the mission, after having made its observations both at the suppliers and the consumers side of the ongoing training activities, feels the need to raise a general note of warning here. We could not fail to notice two interrelated factors, that are well known and regularly occur in development projects, especially in human resources projects of some scale.

We have the feeling that, also in the present case, training has been overestimated as an instrument to achieve project goals and, at the same time, underexploited in practice of implementation of plans. There is, in general, a tendency to attribute too much, and in a too simple manner, to training, in order to achieve the desired stage of development, while insufficient awareness is present what this all would mean, in terms of time and programming, of trainers and training facilities available, of learning psychology, didactics and learning motivation. Even in this area of water supply, with its relatively simple technology and administrative procedures, training is in reality less easy and requiring more specific efforts, than it looks from the national planningroom.

On the other hand, despite the high hopes and the good intentions, it is universally true that whenever difficulties (time pressure, financial constraints, logistic and administrative problems, etc.) arise, training is among the first items which are vulnerable to a decrease in priority or can even be sacrificed. Then, there is always an excuse to postpone or to cancel training. Furthermore the pursued effects of training tend not always to be immediately apparent, which may demotivate trainers and planners. And, occasionally, training appears to be less effective as a first approach to change someone's skills and attitudes, than was envisaged, mainly because the counterforces, inducing the trainee not to learn, remain unknown or unmanageable.

The mission observed several factors and conditions (reported in other paragraphs of this report), - also forming part of the institution building strategy -, that tend to neutralize the impact of training or provide excuses to give less attention to training. Training, we should say, is not optimally integrated into the package of instruments and approaches, required for a full and effective building of a water sector institution.

Recommendation

An ongoing review whether the intentions of training are realistically operationalized, and whether the pursued targets primarily based on training provided, are (or still are) feasible, is recommended. Such a review should be made by professional educationalists, with ample experience in functional adult education.

The mission considers it appropriate to make this general remark, although it appreciates the considerable and intensive efforts that are put into the training part of the projects. It means more to shift emphases and to adjust operations, than to change the overall approach or to provide additional resources.

2. TRAINING STRATEGIES

The training strategy has been divided into two main approaches:

- A. the so-called classroom approach (eventually an off-the-job training);
- B. an in-service on-the-job training, frequently called desk-to-desk training.

The two approaches are based on different teaching-learning processes, requiring their own training methods, and they fit in general to different training targets. In fact they are to be regarded as supplementary.

It seems, however, that:

- 1) there have been imperfect synchronizations between classroom training and the construction of the physical water systems, so that immediate follow-up with on-the-job training was not always possible. In a later stage of the projects the emphasis was shifted towards on-the-job training;
- 2) at the same time troubleshooting, monitoring, action and review activities started, introducing into the on-the-job training a complexity of actions and objectives, resulting in a situation that seems too much linked to improvisation, to the personal style of individual consultants, and too much dependent on the availability of the (visiting) consultants.

Recommendation

The mission is of the opinion that the training strategy could be supplemented with a third approach, i.e. in-company training of subordinates by their superiors. There are still thousands of people in the lower ranks both in the technical and the administrative sector who need to be trained mainly in routine tasks.

It is not realistic to send them to some far-away centre. There will always be new employees who need some specific training and introduction to the work in Water Enterprises. Also the IKK heads would benefit from being trained in a Water Enterprise and to witness all operations first hand. That implies that the future training programs of key job holders should contain one or more sessions on the basic principles of training their own people and how to recruit competent trainers, part of whom can be found among their own staff. These additional training efforts can be implemented within the present budgets or with very small extra funds.

3. CLASS-ROOM TRAINING

The off-the-job training has produced among other things an impressive set of 400 training modules, planned to be enlarged in the future.

The training module strategy, centrally developed, ensures that nationwide a uniform competence in instrumental skills (both technical and administrative) can be pursued. If well conceived and properly administered, it can form the backbone of a uniform system of technical and administrative procedures that contributes to keeping the running- and maintenance costs of the whole system low.

At the same time the foundations are laid for the provision of work manuals (buku pienter) to each job holder for his personal daily use. There are a few comments to be made in this context.

- a. Not all skills and competences can easily be learned on the basis of uniform training modules. The more complex tasks, specifically the managerial function of the higher echelons can not be adequately learned by the prescriptive approach that forms the strong side of training modules. Competent trainers have to step in here, and the learning method should be more of a discovery and problem-solving nature.

The world over, handbooks of management, general as well as specific, have an abstract, theoretical flavour to the taste of practising managers. They contain too few relevant core items, wrapped in too many general observations. Only in the case that a machine-bureaucracy style of management (the scientific management of former days) is advocated, then prescriptive management training modules can do the work.

Some of the reports contain lists of problems and constraints that were summed up in meetings of managers and they give a good impression of what sorts of problems the key staff of water enterprises are facing. The same type of problems to overcome were frequently mentioned in interviews with directors by the mission.

It requires, however, a good professional competence in learning psychology and didactics, to 'translate' such remarks into teaching objectives and methods.

The observation was made that the W.E. would benefit by the development of a proper informationsystem for management.

This subject should receive proper attention in the management training programs.

Recommendation

- b. The mission recommends thorough field testing of the training modules, and regular review, improvement and updating of all the training materials. The considerable investment in professional competence, time and money made in the training modules, should be well cared for.

Recommendation

- c. Since they have originally been designed and composed by several individual writers the total set of training modules should be checked on the points of uniformity of style and of omissions of crucial details.

Recommendation

- d. Apart from that, a diversification of training methodology, both in the off-the-job and on-the-job training situations, is recommended. This suggestion refers specifically to the training of those job holders who have heavy external relations components in their tasks. Narrow, instrumental skill training, based on prescriptive and instructive methods will not be sufficient in those cases.
4. Until so far in general, only the higher echelons have experienced the off-the-job training programs, in some cases already several years back. Since some of the directors and department heads have been newly appointed because their predecessors had left, the mission found that it is no exception when Water Enterprises are run by people who have had no training at all. The reactions of former participants are, in general, positive, though many of them considered the training received not enough to perform their tasks. New situations do occur and new regulations are introduced, and in this respect the need for additional and follow-up training was expressed. Especially in the field of management the trained staff leaned heavily on their earlier management experiences.

5. ON THE JOB TRAINING

There exists an unanimous preference for on-the-job training as being more directly effective and relevant to the actual work situation.

The degree of satisfaction expressed appears to be closely related to the variations in the intensity/frequency of the on-the-job training implemented so far. In some cases distances to be covered by the visiting consultants are so great that actually only a few hours are available and the training deteriorates into a collective affair from one desk to many desks simultaneously. Of course, the effectiveness of on-the-job training is, as evaluated by the trainees, also dependent on the rapport between trainer and trainee. There are very few clear indications that on-the-job training used as the dominant approach, would produce better results under all circumstances. Costs, availability of trainers, the level of the jobs of the trainees, and the required speed of dissemination of skills and knowledge, are relevant factors in this respect. A balance between off-the-job and on-the-job training has still to be established experimentally.

6. PROVINCIAL TRAINING CENTRE

Apart from the production at the national Centre of training materials, the efforts to create a self-contained training system have not reached concrete, definite forms.

Indeed, off-the-job training courses have been organised; the planning for 1985-86 provides for 17 courses, most of 2 weeks duration, at 8 different provincial towns, reaching nearly 900 persons. In 1984-85 1250 people went to such courses. One cannot escape the impression that given the targets of REPELITA V the number of courses has to be increased considerably during the coming years.

The development of a corps of competent trainers is still in a first phase. Consultants, both Indonesian and expatriate, are still the key personnel, expected to do the job.

The training-of-trainers program is unfortunately still weakly and meagerly implemented, while it should receive high priority, given the tasks to be done in the coming years.

The observation made by the mission that the Water Enterprises, both PDAM and BPAM, are too small in size to become self-reliant in various aspects, is crucially relevant in the field of training.

The effectiveness of the training efforts would be considerable strengthened when a regional (provincial) support system would be promoted. Such a provincial centre at relatively short distance and building up an image of being "close" and specifically interested in the performance of their "own" W.E. at the kabupaten level, could facilitate the training efforts concretely.

At this provincial level trainers and experts in monitoring should be appointed and supplied with enough means to be mobile within their region. Also, a training centre should be installed and be kept operational. The W.E. should find easy access there when training needs may arise unexpectedly. Proposals to this effect have already been made and, in addition plans, to have regional monitoring-and-assistance units.

The mission gives its full support to these intentions.

7. MANAGEMENT SKILLS

The overall performance of the Water Enterprises appears to be closely related to the managerial abilities and personal qualities of the director and the senior staff. Water Enterprises are - at least at present - run not as self-propelling systems, but as instruments in the hands of a very small number of people.

Some of the Water Enterprises visited appeared to have had several, successive directors in a few years time. Others had directors who spent part of their time on other functions. The negative consequences of such a situation were clearly visible.

The mission stresses the importance of careful selection of the key job holders (director, divisional heads), to offer them recurrent training, and to promote a practice of sharing experiences between Water Enterprises. Training alone, according to worldwide experience, is not sufficiently effective to raise managers. Too many personality factors are involved to become a competent manager. In this respect the provincial support systems can, again, play an important role.

8. ORGANIZATIONAL STRUCTURE

The effectiveness as well as the efficiency of the training efforts can be increased when sound and clear internal and external organisational structures are promoted.

The formal status of the staff varies greatly, even within a single Water Enterprise. Some are 'pegawai negeri', others are employed by the Local Authority, while still others have contracts as 'pegawai harian'.

Lack of clarity and certainty about their formal status provided heavy preoccupation in the minds of the people concerned, and seem to influence the effects of training considerably.

Uncertainty and unclarity also prevailed in the concepts of the structural identity of the W.E. In the daily practical operations the concept of the 'dinas' casts heavy shadows, while on the other hand notions about the concept of 'enterprise' are rather vague. Discussion on the options of creating 'private' enterprises or one single state enterprise could be heard with some frequency.

It should also be noted that careers in W.E. are not considered as extremely attractive while the salary level is experienced as rather low and functions in the W.E. administrations can easily be regarded by the Kabupaten authorities as back trails where they can 'dump' staff that is not quite up to standard in other jobs.

9. DIFFERENCES IN PERFORMANCE

As has been observed before, the differences in the performances of the Water Enterprises visited can not be attributed to eventual differences in the training approach of either DHV or IWACO.

Other factors, quality of the management, circumstantial conditions, may be the prime cause for the varying performances observed.

There are, however, differences in the actions in West Java (IWACO) and in North Sumatra/Aceh (DHV).

In West Java greater emphasis was put on several forms of on-the-job training than in North Sumatra/Aceh.

Time spent on OMT activities

	I W A C O			D H V		
	Indo.	m.m. expat.	%	Indo	m.m. expat.	%
Classroom training	25	9	7	13	6	15
In-service training	250	28	54	27	7	27
System development, development of training infrastructure	79	35	22	21	20	33
Organization development	24	12	7	6	5	9
Project management, support PPSAB	16	34	10	-	20	16
	394	118		67	58	100
	512			125		

These proportional differences in time spent on on-the-job training between the IWACO and DHV operations are, according to the mission, not in the first place a matter of deliberate preference(although some personality factors may have their influence) but the outcome of the interplay of circumstances.

Indonesian consultants seem to be based mainly on Java, so that they have to be literally "flown in" to other places.

Unfortunately the mission had only very occasional contacts with the Indonesian consultants. So much more with the expatriate consultants who did not fail to impress the mission as dedicated, hardworking people with an open eye for the local conditions and practices.

The training materials developed by them, though not inspected in detail by the mission, appears to be sound and clear in the sector of straight instrumental skills (technical and administrative), but contain some weaknesses in respect to other, more complex learning processes (insight, comprehension, motivation, complex analysis or human behaviour).

So it seems that among the expatriate (and also Indonesian?) there is some weakness in the technicalities of the competence in the educational sciences. An engineer's perspective, so much appropriate in setting up the technical system, is at times too dominating in the field of training.

Summary of training aspects

When closely scrutinized, there still are many weaknesses in the building-up of water supply systems in the provinces visited, which will probably not be fully recovered by the current OMT Programs.

Seen from the perspective of training (one out of three interventions, the others being Management and Organization), despite all the work already done in both off-the-job and on-the-job training, improvements can/should be made on the following points:

- a. the management factor being crucial, the training of the director and the kepala's bagian, should have the highest priority. The selection process should be very strict, they should not assume office before they have attended at least a 2 week off-off-job training course. In such a course great attention should be given to (a) use and eventually to (help to) introduce an appropriate management information system; to methods to organise in-company training for all ranks.
The management should be supported during the first year after appointment by regular on-the-job training and assistance. Later they should participate in a recurrent training scheme including experience sharing.
- b. Referring to the mission's views on the size of the W.E., a training centre, as part of a wider support centre, should be soon established in every province (perhaps two centres in large provinces), well equipped not only with materials and classrooms, but with full time, professional and mobile trainers.
- c. A practice of in-company training should be promoted.
- d. Training should also be oriented to the "linkages": in the first place to the relations with the consumers and the community. How to involve the community whenever appropriate; how to develop a good market approach as suppliers of a commodity, that eventually has to become a most obvious certainty in the consumer's perspective.
- e. A program of training-the-trainers (of various types) should be pursued with energy.
- f. Monitoring approaches and procedures should be carefully developed. It is a general experience that monitoring systems when not explicitly conceived as becoming permanent, have unspecified detailed objectives, have a "craft" nature recycling on personal relations, and usually do not promote complete self-reliance, and have short term perspectives.
- g. Assistance and support in training activities, beyond the duration of the present projects, should be offered by the Netherlands government.

Note (1)

The term 'institution building' is used here in the technical sense as elaborated in the Public Administration theory of that name.

An institution is to be built by developing and properly arranging several institutional elements and to develop various types of linkages with the environment.

Important elements are:

- a. leadership (both quantitatively and qualitatively): all the capabilities vested in persons to perform and be responsible for all the roles necessary to let the institution function;
- b. Doctrines: all explicit and implicit normative complexes (from policies, to formal regulations, to informal usages), 'styles' of management;
- c. programs: the activities the institution is supposed to do and what it really does.

Among the linkages are important functional linkages along which the institution can deliver the goods, relations with the consumers; enabling linkages: relations with those institutions that can help the institution to perform its tasks;

normative linkages are those channels through which other institutions of the environment impose their norms on the institution and vice versa.

Normative linkages are involved when consumers demonstrate 'deviant' behaviour (not paying bills, tampering pipes and connections, refusal to use public taps, etc.).

In the OMT conception, Organisation, Management and Training each have a double aspect:

1. as an objective: sound organization, proper management and setting up a training system;
2. as a means or instrument: to make organisational interventions to introduce particular procedures of management, to provide training.

In the numerous reports and also in practice those two meanings are somewhat diffused and unintegrated. This is also the case with O. and M. and T. in relation to each other.

Organisational interventions have had more lasting and identifiable results than training interventions.

Management styles came into existence on the basis of uncontrolled factors, and circumstances, and management training had to be adjusted to that reality in order to be experienced as realistic.

COMMUNITY: USE, BENEFITS AND INVOLVEMENT

USAGE OF THE WATER SUPPLY SERVICE BY THE COMMUNITY

The justification for the existence of a service is its effective use; the service provided by the Water Sector is no exception. Water, the product supplied by Water Enterprises - PDAM and BPAM - is provided to meet a basic need of both urban and semi-rural communities. Unless these communities use this product there is no argument to justify investment in the technical and managerial development of these enterprises.

In setting goals for the Water Decade and the attainment of Health For All by the Year 200 the Indonesian government has stipulated that 75% of both urban and rural populations should be using clean water by 1990.

To achieve this goal Water Enterprises are supplying two types of services in both the Basic Needs Approach (B.N.A.) and Ibu Kota Kecamatan (IKK) systems, ie. house connections and public taps. The extent to which the community will utilise the water provided through these services will depend on three major factors:

- . community perception of the water supply
- . community attitude to prices for water
- . organisation of the community to use these services.

Each of these factors will be examined in relation to the two types of services in urban BNA and in semi-rural IKK systems.

BASIC NEEDS APPROACH SERVICES

A. HOUSE CONNECTIONS

1. Community Perception of the Water Supply

a. **Water quality**

Consumers expected clean water from the reticulated system, however their tolerance of water quality largely depended on comparison of the reticulated water with their alternative supply. Those with no other choice complained little about minor discolouration of water or, after a period of adjustment, to chlorine in the water. But those with good well water tended to prefer it for drinking and cooking rather than discoloured or chlorinated tap water which they often used for washing and bathing purposes only.

b. **Quantity and Reliability**

A strong sense of the need to save tap water was evident, usually based on economic considerations. Therefore a majority of families interviewed were using less than the daily quantity stipulated for the BNA system. However many were also using supplementary water sources. In towns with distribution problems many complaints were frequently heard of unreliability of the supply often resulting in insufficient water for a household. As a result, while some families have increased storage facilities to build up a reserve supply, others have resorted to detrimental actions such as damaging meters and pipes, stealing water and leaving taps open permanently, in their effort to obtain enough water to meet minimal needs.

c. **Accessibility**

Major distribution pipes tend to serve main roads and other areas with a high predominance of families with adequate economies. In most BNA cities visited a high percentage of poorer families are denied access to piped water due to location and or prohibitive connection fees.

d. **After Sales Service/Care and Maintenance**

There was little evidence of a community sense of responsibility for reporting leaks and other technical problems. This was seen as the task of PDAM field staff. In extreme cases when water is cut off as a result of non-payment, delegations may present their case at PDAM and negotiations take place. However in towns with poor distribution systems the community had assumed an apathetic attitude towards PDAM and often resorted to their own solutions. Some PDAM staff have felt bound to defend their credibility by misrepresenting the situation.

2. Community Attitude to Prices for Water

a. **Connection Fee**

The size of the connection fee is determined by the stance of the PDAM/BPAM. BPAM Banjar, for example, has a strong orientation to the widest possible sale of water. Hence the connection fee is minimal with easy credit terms. In this way expansion is promoted by eliminating a major factor preventing poorer families from obtaining house connections. Other water enterprises however emphasise the income potential of the connection fee and may charge as much as Rp.100,000 to Rp.200,000 (depending on length of tertiary piping) with no (or minimal) credit terms, thus denying a house connection to poorer families. Many Water Enterprises considered credit arrangements unwieldy. Some Water Enterprises with limited water resources pursue the high connection fee policy purposely to limit development. Others regret the high price, such as Sidikalang PDAM, which is negotiating credit through a local bank.

b. **Monthly Tarif**

The only complaints recorded about monthly tariffs were in areas with a minimal charge of 15 m³ per month. Large numbers of families use less than this amount. Some commented on this measure as a disincentive to economise on the use of water.

Families who previously bought water from vendors, at up to 10 times the cost of their current bill, commented on the cheapness of the tariffs in comparison.

c. **Arrears**

The problem of loss of income from arrears takes on greater proportions in those PDAM/BPAM with management and technical problems. Many consumers refuse to pay for irregular supplies and PDAM staff hesitate to take a firm stand, being aware of the unreliability of the water.

3. Organisation of the Community

This aspect is of minimal importance for consumers on house connections in the BNA systems.

B. PUBLIC TAPS

This is a special service of Water Enterprises, with the following aims:

"- to provide a basic need of people;

- to provide equity and ease in meeting the need for drinking water.....

A basic function is to serve people in densely populated areas with limited resources."

Quoted from Appendix VIII of SKB Men Dagri and Men PU, No. 5/1984 - 28/KPTS/84 (A Joint Resolution by the Minister of Internal Affairs and the Minister of Public Works).

It is important that this statement is kept in mind when reading the following section.

1. Community Perception of the Water Supply

a. Water Quality

The situation was similar to that for house connections.

b. Quantity

Two aspects of quantity are important: the quantity of water used and the number of functioning public tap facilities.

In areas where families have an accessible, but not so clean, alternative water source the quantity of tap water collected is restricted to drinking and cooking needs. Where tap water is used for all needs it proved impossible to estimate whether the quantity used approximates the BNA regulation of 30 lcd. Significant seasonal variations in quantity used occur due to limited alternative sources during the dry season.

In an effort to increase coverage, especially of poorer sections of the community, PDAM/BPAM have constructed public tap facilities -from 20 to over 100 in the cities observed. This measure has a potential for significantly increasing coverage to more closely approximate the desired 75% of the population. Originally Cipta Karya stated the house connection/public tap ratio as 50 : 50. This ratio has become more flexible recently. However, with the exception of Banjar, 80% to 98% of public taps were not functioning, producing a very low public tap ratio. The small number of functioning public taps meant that large numbers of families who could not afford house connections had to resort to alternative sources. In several cities visited, such as Sidikalang and Jatibarang, these sources were not clean. It is highly probable that this situation would become much worse in the dry season.

c. Reliability

The situation was similar to that for house connections.

d. Accessibility

In a few cases the location of a public tap has been decided in consultation with potential consumers, however most decisions on location have been top down and often influenced by project targets, the desire to cut down costs, and the convenience of contractors. As a result large numbers of public taps observed were in disadvantageous positions - near a main road, close together, amongst economically secure families, etc. -and subsequently not used. On the other hand a public tap in Tebing Tinggi set in a crowded kampong of labourer families was used constantly by more than 30 families. Likewise in a dry area amongst factory workers in Cimahi, and in mosque grounds, markets and schools in several cities. In a few cases the water was brought even closer to the house by attaching a plastic hose to one of the taps and running water straight to a bathroom.

One problem faced in determining location is land to place the tap. Experience has shown that this can be best solved through discussion with the community.

Another aspect of accessibility which was raised several times is the community understanding of a public tap as providing a free, public service open to everyone. The suggestion arose that taps be called "neighbourhood taps" (Kran Warga) to facilitate limiting accessibility and thus increasing accountability.

e. After Sales Service/Care and Maintenance

A few examples were observed in which agreement had been reached on PDAM and consumer responsibilities for care and maintenance and in these cases taps had been replaced and cleanliness observed. However in most cases the consumers had no feeling of responsibility resulting in leaking and damaged taps, littered and broken aprons and unrepaired pipe leakages.

2. Community Attitude to Prices for Water

a. Connection Fee

Public tap facilities are provided free of charge.

b. Monthly tarif

A major reason for non-functioning public taps was that the Water Enterprises considered them difficult to organise and the cause of a significant financial loss, leading to eventual disconnection.

Even amongst the functioning public taps visited a majority of consumers were not paying monthly bills. Reasons given were numerous: several were not being billed, others claimed they had been informed that water was free, and in a few cases collection of consumers monthly contribution had not been organised. Most consumers admitted that the tariff was not high and some expressed a willingness to pay if they were organised and billed.

c. **Arrears**

For the reasons given above arrears and non-payments are rife. The current situation highlights the importance of a Water Enterprise discussing the billing system and methods of payment in initial discussions with potential consumers, to avoid false promises and misconceptions and promote better organisation.

After discussions on proposed billing a group of families in Banjar constructed small open storage tanks near the tap, each holding 2 m³ of water. This enabled the amount of water taken to be estimated and the consumer billed accordingly by the caretaker.

3. Organisation of the Community

Despite clear guidelines set out by Cipta Karya for organising public taps, most taps visited were not organised as recommended. In some cases information was disseminated through bureaucratic channels only, in others even this was neglected. With very few exceptions potential consumers were only informed of regulations and responsibilities after the tap had been constructed.

Successfully functioning taps had several features in common:

- appropriate location
- definite group of consumers (usually less than 10 families)
- a recognised caretaker
- clearly understood and well-organised methods of payment
- clear understanding of consumer responsibilities for care and maintenance.

Observations highlighted the crucial role of adequate preparation and organization by PDAM/BPAM to ensure the successful functioning of a public tap.

It is interesting to note that in Banjar the effective organisation of public tap services has encouraged many consumers to eventually subscribe to a house connection (See Banjar Case Study, page).

I.K.K. SERVICES

A. HOUSE CONNECTIONS

1. Community Perception of the Water Supply

a. **Water Quality**

The IKK situation was similar to that of BNA. The longer a consumer had used piped water and the more urgent her need for water the greater the willingness to adapt to impurities in the water. Whereas potential consumers facing the same water tended to postpone making a connection if they had an alternative supply.

Chlorine also has been a handicap and most IKK staff have reduced quantities or ceased the supply completely for technical reasons and the fear of losing customers.

b. **Quantity and Pressure**

A unique feature of the IKK is the use of flow restrictors which enable the daily quota of water per household to be reached if one tap is kept running for the designed number of hours. Initially in most areas the supply of water was unreliable. This, combined with the small flow of water, described by one consumer as a "rat's tail", led to widespread tampering with the restrictors. As well many consumers had inadequate storage tanks which meant that they could not receive their full daily quota. However in all IKK visited, which have been functioning for more than six months, these problems have been largely overcome and consumers are stressing storage capacity rather than pressure. Nevertheless many consumers turn the water off to prevent overflow and therefore do not obtain their fully daily quota. Despite this no complaints of inadequate quantity of water were recorded.

c. **Reliability**

Most IKK have a poor record for reliability of supply. Shoddy construction, technical problems and empty promises of contractors have compounded this problem. However major repairs conducted through Action and Review programmes had righted this situation in all IKK visited. For four or more months supply has been reliable resulting in regular monthly payments from consumers and a growing number of requests for new connections. However customers with no alternative supply expressed fears about the vulnerability of the IKK system. Without doubt the successful development of IKK is directly related to its ability to continue to provide a reliable service.

d. Accessibility

With IKK, accessibility covers two aspects: what households are reached by the system, and the convenience of access to the household tap. The main reasons for not requesting a house connection, in their order of importance, include: inability to pay, an alternative water supply, location (not reached by the distribution system), hesitancy about reliability, and insufficient water supply.'

Initially contractors had to supply only six meters pipe from the distribution pipe to each household. As a result the water outlet for most households was in their yard. Under the West Java Action and Review programme connections were extended into people's homes. In North Sumatra and Aceh however the householder must pay Rp. 2,500 per meter for the piping to be extended to the home. Many householders have failed to make this move for reasons of lack of money, or hesitancy to invest further in a system which has not yet proved its permanency. Many examples of temporary, open and unhygienic storage arrangements were observed, particularly where connections did not reach houses.

e. After Sales Service/Care and Maintenance

Most IKK staff stressed the importance of this aspect, however they saw it was a reactive rather than preventive measure. Consumers considered leaks, faulty taps, etc to be the responsibility of IKK staff, however, due to the limited size of the system and the proximity of the staff to the community, reports of problems and complaints were usually heard within a short time.

Larger maintenance problems were reported to PDAM/BPAM. The promptness of response varied from the next day to more than a week. In West Java IKK heads have recently begun to report specific problems related to consumer relations for discussion in monthly PDAM meetings. To date no cases had been reported which were beyond the competency of IKK staff to solve.

2. Community Attitudes to Prices for Water

a. Connection Fee

Although IKK is permitted to waive the connection fee Lima Puluh IKK was the only one amongst those visited which had not imposed a definite fee. These range from Rp.19,000 to Rp,50,000, and all could be paid on easy credit terms. Nevertheless many families claimed that the connection fee was too high for them, particularly when they also had the expense of constructing extra storage facilities.

b. Monthly Tarif

Initially many IKK staff had problems collecting monthly tariffs for a variety of reasons, including: reluctance of PDAM staff to provide definite information on tariffs because of the unreliability of the supply, misunderstandings about water being free because of misinformation and the failure to impose tariffs at the beginning, and the community's perception of a free government service.

After there was tangible proof of a more reliable water supply, and discussions had been held with consumers, billing efficiency increased markedly. Monthly tariffs varied between Rp.1450 to Rp.3000 (25 lh) to Rp. 6000 (75 lh), and consumers now have the choice of one of three tariffs according to the size of the flow restrictor. In some IKK, such as Karangnunggal, many consumers have chosen 50 lh restrictors despite the higher tariff of Rp.5000 per month. No complaints were heard from consumers about tariffs. Increases in tariffs, providing they were gradual, had not resulted in consumers cutting off connections as feared by IKK staff. Nevertheless some farmers and labourers with an irregular income rejected a house connection because of their reluctance to take on a constant monthly monetary commitment. Two interesting cases related to tariffs.

In Matang Kuli (Aceh) tariffs have caused no problems.

In fact each consumer has agreed to pay an extra Rp.250 per month to cover the cost of the public tap in the mosque.

During preparatory discussions potential consumers were given a detailed description of the breakdown of operational costs. They understand they were paying for the service, not the water.

In pantai Cermin IKK (North Sumatra) a few poorer families were sharing a house connection. A tap was situated between the neighbours homes and a hose provided each house with a 12 hour supply of water. Both connection fee and monthly tariff were just 50% for each family, and therefore not a burden.

c. **Arrears**

Once water was running constantly arrears became a minor problem. Cut-off was threatened after three months of non-payment, and many consumers have kept just two months behind in payment.

Very few cut-offs were recorded. IKK staff were afraid to lose customers, particularly if they were local officials.

3. Organisation of the Community

In the first two batches of IKK construction preparation and other aspects of organisation of the community were very weak. Even in the latest batch this aspect has been neglected during the construction stage. Targets and the package nature of the programme have emphasised technical aspects and finishing dates. The community and village and district officials have usually been contacted when installations were complete. This meant that contacts of the community and the officials were with local contractors only. The contractors vested interests, including meeting the target of 180 house connections, have resulted often in the dissemination of misinformation and false promises, causing serious problems for IKK staff in later stages.

Efforts to ameliorate this situation were made during Action and Review activities. PPSAB teams (West Java) and individual staff (North Sumatra and Aceh) and consultant staff - together with government staff or independently - spent periods of three days to three weeks with the local people. They held formal discussions and meetings with officials and potential consumers, and in some areas had informal discussions at home, in the mosque, etc. PDAM staff and IKK heads have been included in this process. These activities have had a very positive influence on the officials and peoples perception of the water supply.

B. PUBLIC TAPS

1. Community Perception of the Water Supply

a. **Water quality**

The situation is similar to that for IKK house connections

b. **Quantity**

Despite the apparent need for public tap facilities only an average of 25 % of the 9 or 18 taps constructed in each IKK were functioning in the IKK visited. The supply had been cut off because of non-use and non-payment. It was estimated in a consultants progress report that the resulting change in the house connection/tap ratio meant a 33 % increase in house connections and a 17 % decrease in coverage and subsequently a 17 % increase per capita in investment costs.

c. **Reliability**

The situation was similar to that for IKK house connections.

d. **Accessibility**

At first it was stipulated that each public tap should serve 20 families. Subsequently the number was reduced to 10. In reality the facilities were being used by at most 8 families. The few functioning taps were in close proximity (less than 100 meters) to consumers homes. Other locations, usually determined by contractors without any consultation with potential consumers, were in such unlikely places as an open field, a cemetery and near a traditional water source.

c. **After Sales Service/Care and Maintenance**

There was very little evidence of the community feeling responsible for reporting problems or implementing minor repairs.

2. Community Attitude to Prices for Water

a. **Monthly tariffs**

The flat rate for IKK public taps was Rp. 10,000 on the assumption that each family (20) would pay Rp. 500 per month; a very reasonable amount. However with only 8 consumers, for example, the amount becomes Rp. 1,250 - approximately the tariff for a house connection which was considered too high by public tap consumers.

In Karangnunggal IKK the location of one public tap was most appropriate, being set in amongst a group of poor farmer families. The shallow wells in the vicinity dried up in the dry season and water from deeper wells was salty.

The other water source was a dirty river $\frac{1}{2}$ kilometre away.

After construction of the public tap the families closeby were told to organize themselves - 20 families at Rp. 500. It was the rainy season and the few wells were full. Therefore only 10 families were interested in using the public tap. These families felt deceived when informed the tarif would be Rp. 1000 per month. They refused to pay and the water was cut off. They acknowledged the convenience of the public tap and would agree to reconnection - at Rp. 500 per month.

Some IKK heads were reluctant to collect payments, questioning the fairness of the same tarif for all consumers.

b. Arrears

This could be a problem, however IKK staff considered public taps difficult to organize and therefore were less reluctant to cut off a public tap compared to cutting off a house connection.

In areas with a limited water supply it was considered advantageous to cut off public tap water to enable more house connections.

3. Organization of the Community

The situation was similar to that for IKK house connections, although it appeared that preparations and other aspects of organization were even less intensive for public taps.

Recently PDAM staff and IKK heads in West Java were trained in techniques for organizing public taps (BNA and IKK). Commenting on this training several staff claimed that it was too theoretical and failed to equip them with the skills required to overcome specific problems.

COMMUNITY INVOLVEMENT

A. WHY COMMUNITY INVOLVEMENT?

Past experience has confirmed the importance of consumer communities being involved in BNA and IKK water supply systems to "instill a sense of belonging" expressed in the effective use and care of the water supply. In recognition of its importance Cipta Karya has responded, for example, by producing manuals, brochures and other literature on community responsibilities and techniques for promoting community involvement. Considering the ambitious targets of the water sector which are set for 1990, the final year of the Water Decade, demanding on average a 200 % increase in the present number of house connections and completion of 2200 IKK systems, it is imperative that all resources, including those of the community, be mobilised to facilitate this process.

Three important factors currently handicapping the achievement of 75 % coverage include: the limitation of funds and of manpower and the problems in maintaining the effective functioning and use of present services.

Development programmes in many sectors have proved that active involvement of recipient communities can play a significant part in alleviating these problems, providing:

- the community is given the opportunity to participate
- the community is convinced that the programme is for their benefit
- the community is involved in planning the activity
- the community trusts the intentions of the providers.

It is therefore highly appropriate that the water sector has not only recognised the importance of community involvement, but has also taken steps to make this a reality.

B. CURRENT APPROACHES AND ATTEMPTS TO INVOLVE THE COMMUNITY

1. Perception of community involvement

From observation of water supply programmes and the study of reports and manuals the conclusion has been reached that water sector providers interpret community involvement as:

- consumers paying for water
- consumers making proper use of the water
- consumers reporting leaks
- consumers accepting the flow restrictor system (IKK)
- potential consumers providing storage tanks (IKK)

In other words, community involvement is interpreted as the community using the provided water supply effectively.

2. Attempts to promote involvement

As described in an earlier section of this report, during the first two batches of IKK and for the public tap service of BNA, the common approach of the water sector was to inform the community, as the recipient of the water supply, of their duties and responsibilities through bureaucratic channels after completion of the facilities. In the past this approach had produced satisfactory results with consumers of BNA house connections. However, numerous cases of non-use, mis-use and non-payment for services prompted the providers to question this approach to the community, particularly for consumers of public taps and IKK-services. Complaints had also been received that PDAM/BPAM and local government officials had been bypassed which was causing frictions in handing over IKK systems to the local authorities.

As a result in the current third batch of IKK installations revisions to the approach have been made. For example, in West Java an Extension Team (Tim Penyuluhan) was formed by PPSAB (from Assistant for Development). This five member team, including an anthropologist, sends 2 to 3 members for approximately three days to assist with community information activities on completion of IKK installations. Discussions with government officials and PDAM/BPAM staff, aimed at gaining their cooperation, are followed by formal meetings with community leaders and potential consumers to provide information, explain consumer rights and responsibilities and answer queries. If time permits informal meetings are also conducted.

Under the Action and Review programme for selected IKK systems efforts have been made to intensify the approach to the community. The community relations worker has spent at least 15 days in the area, usually in two stages.

- I. During the field assessment he is responsible for discussing consumers problems related to the water supply with village officials and the people while the technicians assess the technical situation (3 days).
- II. During the tryout of the system after the technical problems have been righted, the community relations worker approaches community leaders and potential consumers through meetings and home visits to explain the system and their responsibilities and discuss problems and queries (approximately 3 days).

This is followed up with extension activities on an informal basis - at the mosque, market and in homes etc. - to obtain feedback on problems, to prevent problems worsening and attracting new consumers (approximately 9 days).

The Action and Review experience convinced those involved that the problem solving, informal approach was very effective to gain an accurate picture of the community's perception of the water supply, their hopes and potential problems. They were also convinced that approaches to the community, government officials and PDAM should commence at the initial planning stage of a new IKK programme (presurvey, detailed survey and starting up period).

Verbal reports have provided other interesting examples of community involvement approaches.

Case 1

In Sidikalang, North Sumatra, the PDAM succeeded in developing water supplies in seven kecamatans (districts) and in twelve villages. Funds were from CK/PU - for 2 district IKK projects and the remainder from the community and PDAM.

It was reported that the approach was as follows. If a community was interested in improving their water supply the district or village head had to plan with potential consumers their role and contribution in developing the resources. A request was then submitted to PDAM enumerating the community's contribution to the construction, in money, materials and labour. On completion each consumer paid a monthly tariff of Rp. 750. It should be added that this PDAM has kept costs down by exploiting gravitational water sources.

Case 2

In Kuta Ampel, West Java, plans for developing a local water supply were discussed with the community. It was agreed that the project would build the installations and the people lay the pipes with funds from PDAM. Pipe layers were given brief training and implementation was closely supervised by PDAM. There was a strict system of responsibility for use of funds.

Case 3

In a CK project in Cirebon, West Java, the community, after in-depth consultation, planned and constructed public taps with hygienic drainage arrangements. Supervision and limited funds were provided by the project.

C. ALTERNATIVE APPROACHES TO COMMUNITY INVOLVEMENT

Three scenarios or Proposed Strategies for Increasing Community Involvement

A study of the cases given above indicates that community participation can extend beyond just using the water supply service and reporting problems to the water enterprise. In development-programmes in many fields community participation has involved the community taking part in the implementation, maintenance, planning and the expansion of the programme too.

Historically the basic service of the water sector has been the provision of house connections in which it is appropriate for community involvement to be limited to the effective use of the services. However, the diversification of services to include public taps and IKK water supplies has challenged the water sector to expand its concept of community participation. As an illustration of the possibilities of community involvement on a broader scale, three scenarios or proposed strategies are presented below.

These scenarios are based on the assumption that the programme - both in the installation and maintenance of public taps and of IKK water supplies - are basically the responsibility of the local community and community leaders, with PDAM and other sectors of the water enterprise functioning as technical advisors and supervisors. This implies that in all stages the water enterprise staff give as many opportunities as possible for district officials and community representatives to take the initiative in organizing meetings and other activities and acting as the organizing committee.

It is recommended that the approaches outlined for both public taps and the IKK system (scenario 1, 2 and 3) be developed into an operational manual after field testing in one or two IKK areas. Non-government organizations with experience in community development work could assist with the implementation of the field testing of these approaches.

More intensive involvement of the community in the planning and construction of public taps and IKK systems, may take time in the initial stage due to lack of experience of water enterprise staff. However, with increased experience it will be possible for policy makers to make realistic estimations of approximate time required and incorporate this into the DUP, to avoid subsequent problems in budgetting and implementation of the DIP.

Three scenarios or proposed strategies for increasing community involvement

Scenario I - Public Taps

PDAM informs the kampong heads throughout the town of the availability of public taps services, and the head of crowded Kampong B responds with a request for three public taps.

PDAM visits Kampong B officials for discussion on the steps to be taken:

- selection of possible locations
- selection of one caretaker for each tap
- discussion with the potential consumers on payment and care and maintenance.

After reaching decisions on the above in consultation with potential consumers, Kampong B invites PDAM to inspect the proposed locations and hear the plans for effective operation of the taps.

When confident that the plans are sound, PDAM then installs the taps. One month later PDAM visits the caretaker of each tap to investigate if any problems have arisen.

Scenario 2 - Public Taps

Kampong D responds with a request for two public taps. PDAM follows up with a visit to kampong officials and a group of potential consumers.

Through discussions the following decisions are reached on the involvement of the community and PDAM in providing public taps services. The plans are subsequently implemented according to this division of responsibilities.

Community	PDAM
<p>Planning:</p> <ul style="list-style-type: none"> - Selection of possible locations - Selection of caretakers - Decision on organisation of payment through a caretaker and care and maintenance - Decision on contribution of labour and materials for construction 	<ul style="list-style-type: none"> - Inspection of sites and joint decisions on most appropriate sites - Provision of information on alternative organisation of payments - Provision of standpipes - Training community labour for construction work (if necessary)
<p>Implementation</p> <ul style="list-style-type: none"> - Materials and labour provided to build apron and drainage, digging trenches and other groundwork - Pay monthly bills regularly 	<ul style="list-style-type: none"> - Construction of standpipes - Supervision of construction of apron, drainage and groundwork - Submit bills on time
<p>Care and Maintenance</p> <ul style="list-style-type: none"> - Division of tasks for cleaning surroundings daily - Repair and/or replacement of leaking taps - Reporting leaking pipes - Repairs of apron and drains (if needed) 	<ul style="list-style-type: none"> - Major repairs (if needed) - Repair of pipe leakages - Routine discussions with caretakers

Scenario 3 - IKK System

Action	Those involved	Expected results
<p>1. Feasibility study</p> <p>a. Data collection on:</p> <ul style="list-style-type: none"> - need for water - economic feasibility - water resources - community resources <p>b. Selection of locations for IKK</p> <p>c. Selection of IKK head</p>	<p>Regency authorities (PEMDA)</p> <p>PDAM - Community relations team</p> <p>Prospective IKK heads</p> <p>District officials</p> <p>Local formal/informal leaders</p>	<ul style="list-style-type: none"> - Appropriate location selected - Common understanding that this is programme of mutual cooperation between PDAM and the community
<p>2. Meeting with community representatives and interested members</p>	<p>PDAM - Community relations team</p> <p>District officials (O.C.)</p> <p>IKK head</p>	<ul style="list-style-type: none"> - Community understand IKK system - Decisions on: location of installation, public taps, etc.; type of community contribution (labour and materials) - Implementing committee set up from district official and community representatives
<p>3. Meeting</p>	<p>Implementing committee</p> <p>PDAM - community relations team</p> <p>IKK head</p> <p>contractor</p>	<ul style="list-style-type: none"> - Plans for implementation - Plan for community campaign

Action	Those involved	Expected results
4. Community campaign/approach to potential consumers	District Official IKK head Implementing committee	<ul style="list-style-type: none"> - List of potential consumers (HC) - Decision on locations of public taps - Selection of TPM and form of rewards for TPM
5. Training of Community members to be involved in construction work (if necessary)	PDAM	<ul style="list-style-type: none"> - Skilled labourers ready to participate in construction work
6. a. Construction of installation b. Construction of distribution system	Contractor supervised by PDAM and IKK head Contractor and/or community supervised by PDAM, IKK head and implementing committee	<ul style="list-style-type: none"> - Installation completed - Distribution pipes laid accurately - House connections and public taps of good quality and relevantly placed
7. Follow up	IKK head TPM PDAM - Community relations head	<ul style="list-style-type: none"> - Problem solved - Detection of potential problems - Changes in health practices related to water

Recommendations

That the community be involved in all stages of the planning, construction and maintenance of public/neighbourhood taps.

That the proposed strategy in promoting community involvement in public/-neighbourhood tap programmes be implemented with adjustments to local conditions.

That the location of public/neighbourhood taps in both BNA and IKK systems be determined by the local community in cooperation with the water enterprise.

That IKK public/neighbourhood tap reservoirs be constructed in 2 sizes to meet the needs of smaller community groups as well as public places.

That the tarif structure for public/neighbourhood taps be based on a reasonable set tarif per family.

Recommendations

That the community be involved in all stages of the development of an IKK water supply to maximize the contribution of local resources and attain a sense of shared responsibility and ownership by the potential consumers of IKK services. Particular attention should be given to involving the community in preconstruction activities.

That maximum efforts be made, in cases where IKK systems are already established, or in the process of construction, to involve the community in as many managerial aspects as possible and in expansion of the scheme.

That the given proposed strategies be tried out in pilot IKK systems in order to develop effective models for mobilizing community resources and maximizing community participation.

That consideration be given to the use of the services of organizations with extensive, direct experience in community development, particularly non-government organizations (NGO's) to assist in planning strategies, training and implementation of models for strengthening the community involvement component.

(Possible NGO's: Yayasan Indonesia Sejahtera, Bina Swadaya and LP3ES).

D. OTHER TECHNIQUES FOR PROMOTING COMMUNITY INVOLVEMENT

1. Staff Development

To effectively motivate communities to participate in the planning, implementation and maintenance of activities community facilitators with particular skills and attitudes are required. If PDAM/BPAM are committed to increasing the level of involvement of consumers of BNA and IKK water services, it is crucial that at least two staff are selected in each PDAM/BPAM and trained to carry out the specific functions of preparing potential consumers of BNA public tap services and IKK services and subsequently supervise the effective use and maintenance of these services. These PDAM/BPAM staff will be able to function most effectively if backup support is provided from national and provincial level staff. To achieve this a proposed strategy is presented for consideration.

Recommendation

That selected staff at all levels of the water sector be trained in the techniques of promoting and organizing community involvement.

It is recommended that this include PPSAB staff from the Development Assistant section (Asisten Pengaturan), PDAM/BPAM staff, IKK unit heads.

That the Consumer Relations Section of PDAM/BPAM be strengthened, with major functions including community relations and promotion.

That a Community Relations team be founded in this section, in cooperation with the Planning Section. This team should be relieved of billing duties.

That the Proposed Strategy for Development of a Community Relations Team in PDAM/BPAM be considered for implementation.

PROPOSED STRATEGY FOR DEVELOPMENT OF A COMMUNITY RELATIONS TEAM IN PDAM/BPAM

Background

Considering:

- a. the importance of public taps to achieve coverage and equitable distribution of water in both BNA and IKK systems;
- b. the problems currently confronted with non-functioning taps and tarif arrears for public taps;
- c. the problems and potential problems faced by the IKK water supply system, greater attention needs to be given to the preparation and organization of public taps and IKK watersupply systems.

Aim

To strengthen the promotional, marketing and community relations functions of PDAM/BPAM.

Suggested Strategy

1. Appoint a staff person responsible for community relations, or preferably, a team from the consumer relations and planning sections. This team would be relieved of all billing functions.
2. Provide training to equip the official team to implement promotional and community relation functions.
3. Delegate the team to approach and prepare potential consumers of public tap and IKK services (together with IKK-head).
4. Delegate the team to follow up public tap and IKK activities on a regular basis.
5. Provide support services at provincial PPSAB level through a community relations team from the Assistant for Development section and at national level through the appropriate section in Directorate of Clean Water (DAB)

Administrative level	Team
National	DAB (appropriate section)
Provincial	PPSAB (community relations team)
Kabupaten	PDAM/BPAM (community relations team)
Kecamatan	IKK (IKK-head)

6. Cooperate with other government departments, eg. Community Health Centre Staff, Family Planning field worker etc. after a short orientation on the water supply system.

Implementation

1. **Appointment of a community relations team at national level -**
CK, DAB with responsibility for providing support and backup for PPSAB community relations teams.
2. **Formation of a community relations team at provincial level -**
PPSAB, Assistant for Development section.
3. **Training of PPSAB community relations team to perform the following functions:**
 - training of PDAM/BPAM consumer relations teams
 - guidance and support of PDAM/BPAM consumer relations teams.
4. **Selection of appropriate staff (PDAM/BPAM)**
Suggested criteria:
 - minimal educational qualification - completed secondary school
 - mature
 - able to communicate effectively
 - considered capable of carrying out the following functions.Functions:
 - a. Approach prospective consumers
 - b. Motivate the community to participate actively in planning, organizing and maintaining services
 - c. Participate in the team supervising local contractors
 - d. Provide appropriate information from consumers to other sections of PDAM/BPAM
 - e. Assist with training and guidance of TPM
 - f. Provide follow up, particularly for public taps and IKK services
 - g. Assist with the promotion of clean water.

5. Training of selected staff, including IKK-head

Aim:

To equip PDAM/BPAM community relations team and IKK-head to implement the above mentioned functions.

Trainers:

PPSAB community relations team

Senior PDAM/BPAM staff

Content could include:

- Background and functions of PDAM/BPAM community relations team
- Promotional activities
- Motivation techniques
- Planning, organizing and maintaining of water supply services
- Community involvement in planning, organization and maintenance of water supply service
- Supervision of contractors
- Cooperation with other sections of PDAM/BPAM
- TPM - their training and guidance
- Potential problems of public tap and IKK systems
- Follow up techniques.

6. Implementation of Field Activities

For public tap and IKK services in the planning stage the Community Relations team works closely with the community in planning the type of service, locations, division of responsibilities, organization of tariffs etc.

For established public taps and IKK services the Community Relations team maintains regular contact:

- for BNA - direct
- for IKK - through IKK-head

To discuss problems, complaints and suggestions from consumers.

7. Conduct an orientation for staff from the Department of Health, Family Planning Body and other related government departments.

Aim:

- To explain the water supply system scheme to staff from related government services
- To determine a clear division of tasks and responsibilities in promoting the water supply service and its effective use.

2. Community Volunteers (TPM)

One of the techniques used by Cipta Karya to increase community involvement has been the training of potential community organizers from the community. This has included:

- a. Cooperation with the Scout Movement
- b. Formation of Tenaga Penggerak Masyarakat (TPM)
 - a. In cooperation with the Scout Movement Cipta Karya has trained scout leaders on technical, health and social aspects of the water service. These leaders then trained scouts who would implement their skills and knowledge in the community. Reports were received during the field visits indicating that these goals had not been attained and the multiplying effect did not occur as planned. Causes mentioned included the 'temporary' nature of the target group (secondary students approaching graduation), the absence of a clear strategy for follow up and the lack of funds. Another possible reason was that the scouts failed to implement the acquired knowledge and skills in their own communities.
 - b. The evaluation team heard of T.P.M. in West Java only. It appears this approach has not yet been applied in North Sumatra or Aceh. The explanations from water enterprise staff in these two provinces suggest that the concept and strategy of T.P.M. have not been fully grasped and funds are not readily available.

In West Java however, PPSAB, through the Extension Team, have trained members of the PKK (womens movement) as TPM in three districts. Their functions included providing information on IKK, reporting problems and promoting healthy practices. They were expected to complete a lengthy report for IKK to be forwarded to PPSAB. The complicated form however, caused problems and PPSAB planned to simplify it.

The mission team considers the formation of TPM a relevant strategy to promote greater community involvement in the IKK system, particularly if the TPM function as 'servants' of the people, rather than as an extension agent of the water enterprise.

It is therefore proposed that the TPM programme be strengthened and expanded to cover communities in all IKK projects, along the lines of the following Proposed Strategy for the Formation of Community Volunteers (TPM).

Recommendation

That the community volunteers (Tenaga Penggerak Masyarakat) programme be extended to cover all IKK watersupply units.

That the Proposed Strategy for Formation of Community Volunteers (T.P.M.) be considered for Implementation

PROPOSED STRATEGY FOR FORMATION OF COMMUNITY VOLUNTEERS
(TENAGA PENGGERAK MASYARAKAT (TPM))

TPM are volunteers, preferably women, who are representing their community and have been trained to perform specific functions aimed at enabling the community to use the local water supply as efficiently and effectively as possible to promote greater welfare.

Criteria

TPM should meet the following criteria:

- member of the local community
- prepared to represent consumers in her/his neighbourhood
- capable of communication and of influencing others.

Suggested Functions

1. Approach potential consumers.
2. Give information on:
 - the water supply system
 - aspects of the care and maintenance of the water supply
 - water and its relationship to healthy living.
3. Communicate consumer requests, problems and complaints to IKK head and village head.
4. Assist in planning the community's role in developing the water supply system.
5. Assist in implementation, eg. construction of public taps, drainage and sanitation.

Training

Aims:

To equip TPM to perform the stated functions.

Trainers:

PDAM staff

IKK head

Community Health Centre Staff

Content

Organisational Aspects:

- The IKK water system
- Role and functions of TPM
- Community role in care and maintenance of the system
- Potential problems of the water system and how to handle them
- Water and healthy living.

Technical Aspects:

- House connections and public taps
 - .. form
 - .. location
 - .. tariffs
 - .. constraints
- Drainage and sanitation

Preferably this training could be divided into two sections and given in two stages.

Operational Aspects

1. TPM are representatives of the community and primarily responsible to the community.
2. TPM represent a neighbourhood and are responsible to consumers in that area.
3. TPM are volunteers.
4. Rewards or recognition of services given can be provided in many forms, such as:
 - plaque to be attached to outside wall of TPM's house
 - opportunity to visit other IKK
 - opportunity to meet with other IKK
 - subsidised tarif
 - larger flow restrictor
 - uniform
5. TPM are invited to periodical meetings with IKK head for discussion.
6. TPM are not expected to produce written reports for PDAM/BPAM

3. Communication Support Programme/Information Strategy

One prerequisite for community involvement in a programme is that the community is aware of the need for their involvement. In other words they are aware of a problem of need which should be tackled. In the water sector it cannot be assumed that the community is automatically aware of problems, particularly these related to cleanliness and other aspects of health. Therefore it is important to include techniques to increase community awareness in the strategy to promote community involvement.

A key technique is effective communication - oral, visual and experiential. For the water sector relevant messages include those aimed at promoting behavioural changes which enable the community to obtain health benefits from the improved water supply and behavioural changes which will promote effective and efficient use of the water supply. As the Manual for Management of IKK Water Supplies claims 'Community participation in the functioning of the IKK water supply can be achieved through community education' *. Effective communication and community education include a wide range of activities - conversations, workshops, training, articles, radio programmes and posters, amongst others. To date the water enterprises have utilised some of these means to gain more consumer involvement.

Current Communication Activities

At the national level Cipta Karya has developed a number of attractive booklets and posters for limited distribution. Target groups include consumers, potential consumers and community leaders. The latest project is the development of materials for preconstruction information campaigns. As well as this HRDP, in cooperation with Cipta Karya, has developed five video programmes, including three on IKK consumer relations, as an effort to strengthen the communication support materials.

At the provincial level some PPSAB have been active in the development of communication support materials. For example, in West Java (Assistant for Development) has developed leaflets, posters, banners, slides, T-shirts, a demonstration flow restrictor and other materials, covering messages emphasising the need for discipline in paying and taking care of the water supply.

* Pedoman/Petunjuk Pengelolaan Air Bersih IKK, Dep. P.U. 1984

In cooperation with interested PDAM/BPAM, the PPSAB reproduced these materials and distributed them for use at the annual exhibition held in each regency. Pamphlets have also been distributed to IKK offices. Another innovative method of communication mentioned was organizing school children to visit IKK installations.

In North Sumatra the door-to-door distribution of brochures to potential IKK consumers proved effective as a motivational tool, eg. in the construction of storage tanks. Apart from this, brochures, posters and stickers were distributed at IKK promotional meetings. Sidikalang PDAM also mentioned the use of slides at the local theatre.

Despite this variety of materials the mission gained the impression that PDAM/BPAM have limited or no access to them. With a budget of Rp. 750,000 per year for communication materials they tend to restrict promotional and educational activities to a demonstration in the annual regency exhibition. On the whole community educational activities were not considered a priority activity for PDAM.

In view of the importance of such activities the Proposed Information Strategy for strengthening the Communications Support Programme is given for consideration.

To increase the channels through which messages relating to water are disseminated the water sector could fruitfully cooperate with allied government departments, such as the Department of Health and Education. This cooperation could be extended beyond sharing educational activities to such activities as drainage and sanitation as in the Integrated Urban Development Programme (P3KT) and the KFW 11 Cities Programme in West Sumatra in which PU cooperated with the Department of Health.

Recommendations

That educational activities be expanded to promote the effective use of the water supply by consumers to attain healthier lives. These activities could be developed by the water sector in cooperation with appropriate staff from the Department of Health and other related government agencies.

That a communication strategy, including communication materials, be developed at provincial level to provide materials and backup support for educational and promotional activities for both BNA and IKK systems.

That field staff be trained in techniques of using such materials effectively.

That the Proposed Information Strategy for Strengthening the Communications Support Programme be considered for implementation.

Proposal for Strengthening the Communications Support Programme/Information Strategy

Aims:

1. To develop local communication materials to support the educational and information aspects of the water programme.
2. To disseminate the materials to ensure their effective use.

Implementing Agencies:

Cipta Karya/P.U.

PPSAB

Developing Materials

Development of communication materials covers five stages:

1. Selection and formulation of the most relevant messages.
2. Reaching a decision on the most appropriate media, and channels through which to disseminate the messages.
3. Designing the materials.
4. Conducting field tests of the drafted materials.
5. Revision and final preparation of the materials.

As socio-cultural conditions vary from one area to another and each area faces some specific problems, it is important to have local input during the first three steps. This could be achieved through a workshop with water providers and key members of the community. Through guided discussions a sound decision can be reached on appropriate messages, media and channels. Based on this information competent technicians can then produce the first draft of the proposed materials.

To avoid production of inappropriate or incomprehensible materials it is invaluable to obtain feedback on the draft materials. Water providers can assist here. However the most revealing feedback can be obtained from the proposed target group. Do they understand the messages as intended? Do they stir their hearts? If not, why not? This feedback provides the guidelines for revision of the materials which are then finalised for production.

A non-government agency with experience in conducting workshops for the development of a communication strategy and materials and field testing of materials could be invited to assist PPSAB to implement such a workshop.

Examples of Materials

Target Group	Materials
House connection consumers	- posters - flyers (for inclusion with bill) - brochures - radio messages - billboards
Public tap consumers	- handouts - tin plates for taps - T-shirts - radio messages - billboards

Dissemination

This is the crucial link in a community support programme. It involves:

- distribution of materials, or examples of materials, and funds for producing them in greater quantities, to appropriate sections of the water enterprise
- distribution by the water enterprise to target groups.

To facilitate this process it is essential that the water enterprise grasp the importance and need for educational and communication support activities beyond the annual regency exhibition. It is also essential that the staff know how and when to use the materials so that they can have greatest impact. It would be appropriate if these two aspects of dissemination were covered in training programmes.

PROPOSED CONTRIBUTION OF DUTCH CONSULTANTS IN COMMUNITY ASPECTS

Dutch consultants could participate in the strengthening of this process of involving the community in a number of ways, including the following:

1. Participate as a member of the team responsible for the feasibility study for IKK water supply programs in Dutch aided projects.
2. Assist in training activities
 - design
 - implementation
 - publishing training materials
3. Monitor the implementation of activities 1 - 7 (see Proposed Strategy on IKK) and provide feedback for PPSAB.
4. Cooperate with the PPSAB team to develop an operational manual on community involvement for IKK water systems.

The consultants could also be actively involved, in close cooperation with PPSAB and PDAM, in one or two pilot projects aimed at searching for the most effective community involvement approaches for IKK projects.

To assist in this task and also in development of training activities (no. 2) the services of non-government organizations with experience in community development activities and training community workers would be highly recommendable.

Recommendations

- That Dutch consultants assist in strengthening the community involvement components of IKK systems.
- That consultants involved in Netherland aid programmes use the services of experts, particularly local experts from non-government organizations, with proven skills in community organization.

METHODOLOGY USE BY COMMUNITY EXPERT

A tight schedule confined field visits to a maximum of half a day per enterprise. This caused constraints for the team member collecting information on the community's perception and use of the water supply. In order to obtain as representative picture as possible within the limited time the community expert and co-worker selected sample populations in the BNA cities based on:

- location
- quality of the water supply
- special problems.

For each city a minimum of 30 consumers and non-consumers of house connection and public taps services were interviewed, plus interested bystanders. In each city the community expert was accompanied by two staff from PDAM/BPAM, the consumer relations official and a meter reader, both having extensive knowledge of consumers and their problems.

All interviews were of an informal nature and were conducted in the Indonesian language.

The IKK systems covered a much smaller population in a limited and easily accessible area. In these cases the sample covered:

- the district head (if available)
- the IKK head and staff
- house connection consumers who were differentiated according to:
 - . length of time of connection
 - . degree of satisfaction
 - . size of flow restrictor
- public tap consumers and ex-consumers.

Respondents were interviewed at home, however in these semi-rural populations groups of people often gathered spontaneously enabling lively discussions about the water supply. Interviews and discussions were not recorded on tape-recorders, however notes were made as soon as possible after conclusion of the interviews.

All visits were preceded by a study of relevant progress and other reports.

APPENDIX 1

Evaluation of Netherlands supported water supply organization,
management and training programmes in West Java
and North-Sumatra/Aceh, Indonesia

Terms of Reference

March 1986

Prepared by
Ir A.G.N. Jansen

1. General

Physical growth

Institutional development of the Indonesian urban water supply sector is a great challenge for all parties concerned. The rapid growth of the installed water supply capacity and the specific geographic/demographic features of the country call for human resources strategies with special attention for co-ordination, decentralization and practical/cost-effective solutions.

There has been a remarkable breakthrough in production capacity from 9.000 l/sec in 1969 up to 35.000 l/sec at present; although this is sufficient to supply 60% of the urban population according to the Basic Need Approach (60 l/c.day, ratio house connections/public taps 50%, communities more than 20.000 population), the actual coverage is 40% due to the backlog in the construction of distribution systems. The present fourth Five Years Development Plan (Repelita IV: 1984-1989) aims to further increase the urban water supply coverage till 75%; besides extension of distribution networks this implies an increase of the water production to 68,000 l/sec. In the framework of Repelita IV it is furthermore envisaged to supply 1,800 semi-urban capitals of sub-districts (Ibu Kota Kecamatan or IKK, 3-20,000 population) with on average 45 l/c.day through restricted flow systems; this will require an additional 10,000 l/sec. The total investments required to achieve the Repelita IV targets equal US \$1200 million, including an estimated foreign exchange component of US \$200 million. This is a four-fold increase of the Repelita III (1979-1984) allocation for the urban water supply sector.

Human resources implications

The consequences of these targets in terms of water supply personnel are not less impressive! At present there are about 200 water enterprises in Indonesia, employing 17,000 people (1969: 450 people!). Based on a prospected size distribution of water enterprises (0-2000, 2000-7500, 7500-20,000, more than 20,000 connections) and taking into account the official blue prints for enterprise staffing/ structure depending on the size of the enterprise (Buku Pedoman Organisasi), it is estimated that the present number of water enterprises during Repelita IV will increase to 336 and staffing requirements will grow to 38,000 people. The number of employees per 1,000 connections will vary per system, i.e. 3.5 for IKK systems, 15 for systems with less than 2,000 connections, 12 for systems between 2000-7500 connections and 10 for systems with more than 7500 connections.

At present 25% of the personnel is employed by so called BPAM's (Badan Pengelolaan Air Minum), or regional water enterprises with a temporary management status. These BPAM's, relatively young enterprises, are during their initial period of operation (2-5 years) under the jurisdiction of the Ministry of Public Works/Directorate General Human Settlements (Cipta Karya), the responsible agency for the construction of piped water supply systems in Indonesia. Once a BPAM has reached the financial break even point, its status is transferred into a PDAM (Perusahaan Daerah Air Minum) or semi autonomous regional water enterprise under the local government; PDAM's now employ 75% of all water enterprise personnel.

Manpower development activities

Starting from 1974 there has been an ever increasing awareness on the side of the Indonesian government that institutional development efforts parallel to the construction of water supply schemes are a prerequisite for safeguarding capital investments on the long run. The aim was not only to carry out randomized regional training programmes for water enterprise personnel, but to define a comprehensive strategy for the sector development as a whole. When making up the balance 10 years later, it may be concluded that the foundations for an institutional sector development programme have been laid, but sustained efforts are required in the future.

The government agency at national level responsible for all matters related to management, operation and maintenance of newly established water enterprises (BPAM's) is the Sub Directorate of Technical Development (STD), which is part of the Directorate of Water Supply/Directorate General Cipta Karya of the Ministry of Public Works. The fact that STD forms part of the Directorate which is responsible for the construction of piped water supply systems must be considered positive, since it enables an efficient dialogue/feedback and integration between hard- and software specialists. Tasks of STD include a.o. manpower forecasting, the development of model job-descriptions, planning-preparation (course design and training material production) - implementation of training courses and monitoring of BPAM enterprise performance; the sub-directorate is assisted by Provincial Project Offices for Water Supply (PAB's) and national/expatriate consultants to carry out these activities.

From a recent note* issued by STD it follows that the available number of formal training courses for key job holders (e.g. director, deputy director, head of department/section, bookkeeper, water treatment operator, leakage inspector) have increased from 5 in 1980 to 20 in 1985; the trained staff per annum increased in this period from 160 to 1300 (2 weeks training/trainee). The number of enterprises receiving in-service training grew from 4 in 1980 to 23 in 1985. Despite the encouraging growth in training activities it can be concluded from the STD note that the current budget allocation for the 1985/1986 programme (Rp 675 million) constitutes roughly only 50% of the amount required (Rp 1478 million) to carry out all planned activities (formal training for new recruits and backlog of existing staff, in service training in 8 provinces and operating cost of a provincial training centre in Medan). The budget requirements will increase in future considering the fact that the incorporation of PDAM personnel in the training courses is deemed necessary; at present training is only provided for BPAM enterprises (25% of urban water supply personnel, see above). Furthermore it is envisioned to decentralize training activities and therefore establish 6 provincial training units, (construction cost: external finance, operating cost: local budget). Considering the geography of the country and socio-cultural differences this seems a most appropriate solution. The training units will liaise with STD at Jakarta and organize formal- and in-service training on a provincial basis; furthermore these centres will facilitate workshop training for e.g. pipe layers, meter repairers and plant attendants.

The Manpower Development Overall Plan

Institutional development of the urban water supply sector however means more than "only" training of staff. Like in other developing countries Indonesian water enterprises face difficulties with the coverage of recurrent cost; besides low level of management-operation and maintenance capabilities, this may be due to insufficient number of house connections, ratio house connections/public taps, high percentage unaccounted for water and acceptance/use of the provided services by the communities. Financial deficits of the water enterprise will be reflected in delayed maintenance and result in an intermittent or broken down supply; this will in turn demotivate water enterprise staff to perform in a satisfactory manner.

* Human Resources Development, a note on strategy and programmes for water supply, financial requirements for 1985-1990; STD/Cipta Karya, January 1985

Increased awareness for the extension of distribution networks, leakage detection schemes and proper consumer relation programmes (development of entrepreneurship) are therefore vital elements for water enterprises to become financially viable. This calls for upgrading the capabilities of e.g. local contractors and consultants to carry out these activities in a proper way. Furthermore sustained efforts are required to improve employment conditions, salary structure and career perspectives for Indonesian water enterprise personnel to allow for a motivated workforce which is acceptable in terms of quality and quantity.

Against this background STD has in 1983 adopted a strategy** for a manpower development overall programme (MDOP) in which 6 important target groups are identified for upgrading, i.e. Indonesian executive agencies, water enterprises, consultants and contractors, suppliers and manufacturers, education and the profession and finally society and community. It has been calculated that the cost to carry out the MDOP programme equal US \$25 million and constitute only 2.5% of the selling value of drinking water in the period 1983-1990; in the meantime initials steps have been made but increased efforts are required!

Finally, from many points of view, urban water supply has strong relations with the rural water supply- and sanitation subsectors (human waste, solid waste and drainage), which also receive considerable attention in Repelita IV. The development of organization, management and manpower of these relatively young subsectors at national and local level is a key point and programmes in this field should at least be attuned to, or preferably be integrated with human resources development efforts in the urban water supply sector.

In conclusion there is a great need for further institutional development of the urban water supply- and related sub-sectors; on the side of the Indonesian Government there is increasing awareness and determination to expand appropriate software programmes. The continued assistance of bi- and multilateral donor agencies with technical and financial aid remains indispensable in this respect.

** Final report of the working group for manpower development overall programme for urban water supply in Indonesia; CK/STD, February 1983

Netherlands support

Since 1974 the Netherlands have assisted Indonesia with the implementation of water supply and sanitation programmes in North Sumatra/Aceh and West Java (concentration regions). Urban water supply programmes have been or are being carried out in a few large cities (Palembang, Balikpapan, East-Medan, Sukabumi, Bandung/co-finance with Asian Development Bank), 49 small cities - mostly district capitals - and 102 capitals of subdistricts or IKK; besides since 1976 assistance is being rendered towards a rural water supply programme in West Java. From the start of the bilateral co-operation the importance has been recognized to carry out organization, management and training programmes, complementary to the construction of water supply schemes. Ongoing regional institutional development programmes (6-11-15 cities, IKK) therefore aim at the establishment of water enterprises, capable to manage, operate and maintain the installed facilities. Upon completion of the expatriate and local consultancy services there is often a need on the side of the young water enterprises for continued assistance. The establishment of long lasting (5-10 years) twinning relations between Indonesian and Netherland's water enterprises may serve this purpose; a twinning between the water enterprises of Bandung and Rotterdam has recently started while other proposals for twinning are under consideration. In 1979 Netherland's assistance was provided to carry out the so-called Manpower Development programme for Community Water Supply (MDP); this programme aimed at supporting STD activities at central level in a.o. manpower forecasting/classification, analysis of training needs, provision of guidelines for recruitment, preparation of training planning and the production of training materials. In 1983 MDP was transferred into the Human Resources Development Programme (IBRD co-financing). Since its inception till February 1985 HRDP phase I has a.o. produced approximately 400 task oriented training modules which can effectively be combined to provide formal training for key job holders in small, medium and large water enterprises. In the ongoing HRDP phase II much emphasis is being put on the development of in-service training programmes for water enterprise staff and skill development of operational personnel; another important item is concerned with the design and material production for community related programmes. Quite another contribution to institutional development concerns the Netherland's supported project for testing and certification of water supply materials.

This project aims at the establishment of a laboratory under the Ministry of Public works for the quality testing of e.g. pvc pipes, water meters and appendages which will be used in the large scale construction programmes; in the longer run it is envisioned to establish a certification system in co-operation with the Indonesian Standards Institute.

2. Scope of services

The evaluation team will focus its activities on the following Netherlands supported organization, management and training (OMT) programmes:

- * OMT 6 cities programme (West Sumatra, South Sumatra, West Java, Bengkulu, Ternate)
- * OMT 11 cities (North Sumatra-Aceh)
- * OMT 15 cities (West Java)
- * OMT 60 IKK's (North Sumatra-Aceh and West Java)

Considering available time for the evaluation (3 weeks, see para 4), the team will make a representative selection of water enterprises to be studied in depth out of each above mentioned OMT programme.

Training interventions are directed towards development of knowledge, attitude and practices of water enterprise staff, resulting in a sound enterprise performance and a subsequent adequate water supply service; acceptance, use and ability to pay on the side of the community are reflective for sufficient tariff revenues to cover recurrent cost expenditures and therefore safeguard continuation of the service against this background the evaluation team will assess and make recommendations with regard to:

- * Scope and efficiency of the OMT interventions, taking into account new developments in the field of human resources development (e.g. decentralization of activities, monitoring/HRDP I/II).
 - * Functioning of water enterprises.
 - * Usage of the water supply service by the community, consumer relations.
- These items are detailed in the following paragraphs.

2.1 Scope and efficiency of the OMT interventions

Source:

proposals, progress reports and final reports submitted by the expatriate consultants DHV and IWACO to the Governments of The Netherlands and Indonesia (GON-GOI).

Key points for assessment:

-
- general methodology, approach and specifically developed training practices (formal classroom/in-service training, technical/financial-administrative versus trouble shooting/Enterprise Performance Development (EDP), management/operational staff training, community information programmes);
 - expatriate/local consultancy input (m months) for preparation, design and implementation of training courses; efficiency and added value of expatriate input;
 - interrelation between Netherland's supported OMT programmes, a.o. use of training materials developed in the framework of the national Human Resources Development Programme (HRDP);
 - appropriateness of the OMT programmes considering local conditions;
 - observation of training sessions and other opportunities to evaluate methodologies (current and newly developed within the HRDP).

2.2 Functioning of water enterprises

Source:

-
- Interviews with staff of a number of water enterprises covered by the 6-11-15 cities Palembang and IKK OMT programmes.
 - Interviews with local, regional and national GOI administration representatives (a.o. Bupati, Provincial Project Offices for Water Supply - PAB, Ministry of Public Works/Dir.Gen.Cipta Karya).
 - Observations of water enterprise organizations and technical facilities.
 - Materials produced as a result of the projects (e.g. training modules) and other relevant information produced in the scope of the OMT activities.

Key points for assessment:

-
- staffing level of the water enterprise; knowledge, attitude and practice of management and operational personnel;
 - recurrent cost coverage (personnel, chemicals energy, short life time assets) in relation to tariff level, ratio house connections/public taps, ability of the community to pay;
 - reasons for discrepancies between intended functioning and actual performance of technical facilities with respect to
 - * water quality (source, treatment plant, main/distribution storage, water points, leakage, etc.);
 - * water quantity (water source/transmission/distribution) supply quantity to HC, PH consumers.
 - * reliability (design/construction, operation/maintenance, capabilities).

2.3 Usage of the water supply service by the community

Source:

Interviews with the community, observations at taps and in the households. It is proposed that a representative of YIS (Yayasan Indonesia Sejahtera) or similar NGO will assist the community information specialist in the administration of the interviews.

Key points for assessment:

-
- reasons for discrepancies between intended and actual usage with respect to:
 - * proportion of households using the facilities (reasons) for non-usage e.g.: location, cost, taste, reliability, etc);
 - * volume of water used and for what purposes (per capita consumption depending on service level-houseconnections/public taps; catering for domestic needs such as drinking, cooking, washing of food and utensils, personal washing and washing of clothes).

3. Composition of the evaluation team

Considering the items mentioned under chapter 2 the evaluation team will be composed of:

- * a training specialist: to cover items 2.1 and partly 2.2;
- * a water supply engineer: to cover item 2.2;
- * a community information specialist: to cover item 2.3;

Team members should preferably be familiar with institutional development aspects of the Indonesian water supply sector.

- * a representative of the Sub-Directorate of Technical Development (STD)/Cipta Karya/Ministry of Public Works;
- * resource person/RIVM: makes all necessary arrangements for preparation of the mission (i.e. time planning, budget preparation, selection of team members); liason between evaluation team and relevant Indonesian and Netherlands authorities, expatriate and local consultants, water enterprise staff etc.; provides oral or written information concerning the OMT projects at request of the mission; coordinates final reporting of the evaluation team to GON and GOI.

4. Time planning

The stay of the evaluation team in Indonesia is scheduled to cover a period of 3 weeks starting from next January 20.

5. Reporting

The evaluation team will, upon completion of the mission, discuss an executive summary of preliminary conclusions and recommendations with Cipta Karya and the Netherlands Embassy at Jakarta.

The full evaluation report will be submitted to GON and GOI ultimo within 6 weeks upon completion of the mission.

6. Budget

For the expatriate team members GON will cover all cost related to:

- * salary and social tax (maximum 1.5 m month/teammember for preparation, stay in Indonesia, reporting);
- * international/local air travel (economy class) and other travel expenses;
- * daily subsistence allowance (DSA) according to DGIS regulations;
- * vaccination, insurances etc.

For the Indonesian team member GON will cover the cost of local air travel and other travel expenses, as well as board and lodging.

Leidschendam, 4th March 1986

APPENDIX 2

COMPOSITION OF TEAM

- Alizar Anwar, Cipta Karya
- Mary P. Johnston, BA, Dipl.Soc.Stud.
Staff of Yayasan Indonesia Sejahtera
assisted by: Abdul Chamid, Yayasan Indonesia Sejahtera
Meth. Kusumohadi, Bina Swadaya
- Prof. drs. J.H. Kraak, Director CESO
- Ir. J.C. van Winkelen, Director nv Waterleiding Friesland

Resource person: ir. A.G.N. Jansen

The team was accompanied to some areas by ir. Darmawan Saleh (P.V.) and J. Blom (DGIS)

APPENDIX 3
SCHEDULE OF VISITS

Jakarta

- 17-3-1986: - Meeting with Dutch Embassy staff.
- Meeting with HRDP staff.
- Meeting between mission members.
- 18-3-1986: - Meeting with ir. Darmawan Saleh CK/PU.

West Java

- 19-3-1986: - Briefing with IWACO (15 cities project).
- 20-3-1986: - Briefing with PPSAB Jabar.
- Visit to Soreang installations.
- 21-3-1986: - Meeting with PDAM Bandung.
- Interviews with consumers around city.
- Visit to Cemahi installations.
- 22-3-1986: - Meeting with Assistant Sekwilda Tk II Tasikmalaya, and members of Regency Water Board.
- Meeting with PDAM Tasikmalaya.
- Interviews with consumers and non-consumers around city (house connections and public taps).
- Visit to Karangnunggal IKK. Interviews with Camat, staff IKK and community.
- Visit to Tasikmalaya installations.
- 24-3-1986: - Meeting with BPAM Ciamis-city of Banjar.
- Interviews with consumers and non-consumers of house connections and public taps.
- Visit to Banjar installations.
- Visit to IKK Banjarsari. Interviews with Camat, staff IKK and community.
- 25-3-1986: - Meeting with BPAM Indramayu.
- Interviews with community in Jatibarang.
- Visit to Jatibarang installations.
- Visit to IKK Bangodua. Interviews with staff and community.

North Sumatra

- 26-3-1986: - Meeting with PPSAB Sumatra Utara in Medan.
- 27-3-1986: - Meeting with PDAM Sidikalang and members of Regency Water Board.
- Visit to Sidikalang installations.
- Interviews with consumers of house connections and public taps.
- 29-3-1986: - Meeting with PPSAB Aceh in Medan.
- Visit to IKK Pantai Cermin. Interviews with IKK staff and community.

Aceh

- 30-3-1986: - Visit to IKK Matang Kuli.
- Interview with Camat, staff IKK, Community leaders and community.
- 31-3-1986: - Meeting with Bupati of Kabupaten Langsa.
- Meeting with PDAM Langsa.
- Interview with consumers and non-consumers.
- Visit to Langsa installations.

North Sumatra

- 1-4-1986: - Meeting with PDAM Tebing Tinggi.
- Visit to Tebing Tinggi installations.
- Interviews with consumers.
- Visit to IKK Lima Puluh.
- Interviews with IKK staff, consumers and non-consumers, village officials.

Jakarta

- 2&3-4-1986: - Report writing: preparation of Executive Report.
- 4-3-1986: - Meeting with IWACO and DHV consultants.
- 5-4-1986: - Final meeting with Cipta Karya; presentation and discussion of provisional findings and recommendations.

APPENDIX 4
BRIEF DESCRIPTION OF WATER ENTERPRISES VISITED

Mission findings

In the following section a description is given of mission findings from the water enterprises that were visited. This description is not complete, because the facts and figures that are noted in the numerous reports of consultants are not mentioned.

Especially the reports that are mentioned underneath each description should be considered complementary to the description.

Moreover it has to be noted that some facts that were experienced in general or in most or many enterprises are not mentioned but dealt with separately in the mission report.

Calculation of percentage of population served is done on the assumption of 7 persons per house connection and 50 persons per public tap.

PDAM BANDUNG, CITY OF CIMAHI - 21st March 1986

Population : 237,000. Urban/semi urban. Factory labourers, small-medium traders, armed forces located on edge of Bandung

No. house connections : 4,696

No. of public taps functioning: + 10

% population served : 14%

Community aspects

	House connections	Public taps
Those not reached by supply:	backlog of 500 families registered for connection. Victims of low pressure, etc. (800 families)	far from pipes, far from location of taps. Those doubting regularity of supply.
Use of water:	some families washing only, others for all needs	. washing only . incidental in rainy season; well used in dry season.
Alternative supply:	wells, but deep ground-water decreasing	wells (drinking and cooking).
Community preparation:	not properly - top down	. no apparent organization . community requests through official channels . payment not coördinated.
Ability to pay		
. Connection fee:	currently ~ Rp 100,000 + cost of tertiary piping: one payment. Installments possible (under project). In some areas manipulation of fee.	none
. Monthly tarif:	complaints about minimal tarif of 15 m ³ .	not billed

	House connections	Public taps
Willingness to pay:	mixed reactions: if poor supply reluctant	not paying, not billed but claim willing to pay.
Quality of service:	<ul style="list-style-type: none">. irregular. yellow water, filtered by many consumers. no chlorine. many faulty and non functioning meters	<ul style="list-style-type: none">. irregular supply especially in dry season. dirty water at times
Educational activities:	annual exhibition only.	
Community attitudes:	<ul style="list-style-type: none">. conscious of saving water. willing to share tap water with neighbours. many filter water	<ul style="list-style-type: none">. request for more PTs but no response from PDAM. location at times inappropriate

Technical and managerial aspects

- a. The water production works are still under construction and personnel is only partly trained by IWACO yet.
- b. The water enterprise in Cimahi is, as in Soreang a branch (cabang) of the PDAM Bandung. The Cimahi branch has a staff of 26 persons.
- c. Only 5 out of 10 deepwells are in operation yet; air vessels are not in operation. This may cause damage due to waterhammer.
- d. Chlorination of water from well-captation as well as from deepwells is not in operation; chlorine supply appears to be irregular. Apparently there is no chlorine in stock. IWACO concludes in the 1985 status report on Cimahi, that hardly any expenses are done on purchases of chemicals.
- e. The stock of pipe-material is untidy. Many pipes appear to be broken and dirty.
- f. In the city of Cimahi the water pressure in the pipe system is continuously low; parts of the city have irregular water supply.
- g. Leakages occur in the well-captation that supplies part of Cimahi.
- h. Used water meters are not repaired; faulty meters replace by new ones.
- i. The pH of the distributed water is pH 6.9.
- j. The bookkeeping system is done according to the manual (Buku Pedomen). The PDAM Bandung is financially not selfsupporting and is subsidized.
- k. According to the information no systematic maintenance of distribution network is done.

- l. Lower-level staff training is only done incompany.
- m. A computerised billing system has been developed in the PDAM Bandung, and appears to be ready for operation. Only one person is capable of handling the system.
- n. Unaccounted for water in Cimahi is 35 - 62% (IWACO status report).

For further information see report: "Preliminary status report Cimahi" (IWACO september 1985).

REMARKS The PDAM Bandung needs further support and assistance in all fields of operation.

TASIKMALAYA . BNA - 22nd March 1986

Population : 155,923. Total population of which 99,900 live
in areas where distribution pipes are laid.

No. house connections : 5,205

No. functioning : 15% leakage

No. of public taps : 60 (1-6%)

No. functioning : 1 at bus terminal (according to respondents)

% population served : 36%

Community aspects

	House connections	Public taps
Those not reached by supply:	backlog of \pm 1,300 families registered for connection \pm 60% of poorer population and those on outskirts and new areas. Poor families	
Use of water:	washing and bathing well water preferred for drinking if available	drinking, washing for shops at terminal and public toilet.
Alternative supply:	wells	
Community preparation:	publicised over local radio	told to organise after built. The one functioning tap organised by tradesmen at terminal.
Ability to pay		
. Connection fee:	\pm Rp 160,000 (30 meter) very high	
. Monthly tarif:	Rp 2,750 minimum. Some complaints re 15 m ³ minimum	1 functioning tap no problem. Others dis-organised and not paying.

	House connections	Public taps
Willingness to pay:	high, providing service is good.	
Quality of service:	On whole regular, with occasional cut offs. Complaints about Chlorine. Operation 7 hours in morning off 4 hours early afternoon. At times water dirty.	
Educational activities:	none apparent except for annual exhibition.	
Community attitudes:	big desires hampered by expensive connection fee and inability of PDAM to service requests. Complaining of failure of PDAM to announce water cut-offs	all except one public tap cut off. Some consumers have changed to house connections.

Technical and managerial aspects

- a. This water enterprise is still influenced by the Galunggung vulcano-eruption in 1982. At that time part of the 27 km long water-supply pipe line was distorted. Due to this failure the water supply under gravity had to be taken over by a pumped system. At the time of the visit from the mission, the pipe-system was repaired, the pumps had stopped and the gravity-system was in operation again.
Still according to information from the technical staff the water supply by the pipe-system was not according to design criteria and not sufficient. The cause of this trouble could not be found yet.
- b. The waterpressure is low.
- c. Unaccounted for water is 48%.
- d. Direktor and staff are trained by DHV and have attended refreshing courses at PPSAB Jawa Barat, according to information received. The head of the technical department is only a short time in office.
- e. The water enterprise has no stock of materials for maintenance or repairs of the distribution system.
- f. The bookkeeping and administrative sections appear to be in good order.

Further see recommendations Status Report Tasikmalaya 1986 - DHV (pages 42,43).

REMARKS Especially on the technical field this water enterprise needs extensive support.

IKK - KARANGNUNGGAL - 22nd March 1986

No. house connections : 160 fams of \pm 700 in town area
No. of public taps : 2, non functioning
% population served : 15%

Community aspects

	House connections	Public taps
Those not reached by supply:	poorer families more than \pm 10 m from pipe. Families on opposite side of road from distribution pipe.	those far from location of taps.
Use of water:	drinking, cooking, bathing. If available well water used for washing and bathing	drinking, cooking, bathing, some washing
Alternative supply:	minimal. river: dirty water irrigation channels: dried out in dry season wells: some families	same, plus neighbours with house connections
Community preparation:	contractors-many empty promises and mis-information. Action Review team: formal contracts, formal meeting, informal-at home, mosque, etc. 6 weeks process	inadequate
Ability to pay		
. Connection fee:	Rp 50,000,-- too much if not in installments	no fee.
. Monthly tarif:	Rp 3,000,- (25 fr.) Rp 5,000,- (50 fr.) - no problem for traders Rp 8,000,- (75 fr.)	Rp 10,000,-- a month a tap

	House connections	Public taps
Willingness to pay:	good service-very willing poor service-not paying	unwilling due to mis- information repayment (prepared to pay Rp 500 a month).
Quality of service:	Before Action Review poor. New - regular 9 hours. Chlorine - minimal because of consumer complaints.	
Educational activities:	non existant, no materials.	
Problems:	Expensive if providing storage tanks. Tanks often too small. Some families want meters. Regret wasting excess water. Less water for consumers far from installation	

Technical and managerial aspects

Not visited by mission member in these fields.

IKK - BANJARSARI (BPAM CIAMIS) - 24th March 1986

Very short visit, minimal information collected.

No. house connections : figures not obtained
No. of public taps : " " "

Community aspects

	House connections	Public taps
Those not reached by supply:	those difficult to reach with distribution pipe	
Use of water:	washing, some for drinking	
Alternative supply:	wells, although many wells dry up in dry season	
Community preparation:	minimal, told to fill out application form	community told to organise payment after PT built responsibility for collection of fees and repairs unclear.
Ability to pay		
. Connection fee:	Rp 19,000,- paid in 19 installments	no fee.
. Monthly tarif:	Rp 1,450,- (300 l/d) very low	Rp 10,000 a month a tap
Willingness to pay:	good service - no problem no service - most refuse	most unwilling to pay because not organised
Quality of service:	1984 - Feb. 1986 poor. Last two months since Action Review regular. Water at times dirty	consumers consider flow far too small.
Educational activities:	none.	

Problems: People want meters (they compare with nearby town). Rubber calibration removed to increase pressure.

Technical and managerial aspects

- a. This IKK water is not yet in full operation. The records show that long intervals of non operation occur. Construction is nearly completed.
- b. Problems occur in the filter unit. The filter sand is washed away, so sand has to be refilled.
- c. Direktor of BPAM Ciamis (responsible for this IKK Water Supply) and operators dislike diesel engines, due to intensive maintenance and repairs. Connection to PLN-network planned in near future.
- d. Problems in the distribution network occur; apparently not all the existing leaks can be found.
- e. Five people operate the IKK-system. The head of operations (kepala-unit) was from outside the district, the four stafmembers were local inhabitants. All of them were trained on the job in the IKK.
- f. At many places in the IKK proper groundwater wells were observed that are still used by the people. Question arises whether this district towns needs a water supply urgently.

JATIBARANG CITY BPAM INDRAMAYU - 25th March 1986

Population	: 39,520
No. house connections	: 1,735
No. functioning	: 1,638
No. of public taps	: 24
No. functioning	: unknown
% population served	: <u>+</u> 34% (assuming all PT's are working)

Community aspects

	House connections	Public taps
Use of water:	drinking, washing, cooking	same
Alternative supply:	wells - deep, many dry up river - dirty	same same
Community preparation:	top - down	people told to organise after public taps built. Remain unorganised.
Ability to pay		
. Connection fee:	Rp. 86,000,- - 50% cash, remainder installments	no fee.
. Monthly tarif:		Rp 10,000 a month a tap.
Willingness to pay:	no problem if good service provided	unorganised
Quality of service:	complaints about chlorine. Irregular supply in rainy season and water often dirty.	
Educational activities:	none.	
Comments:		Many ex-consumers now have house connections PT used mainly in dry season.

Technical and managerial aspects

- a. Water pressure in the distribution network of Jatibarang appears to be low during daytime (only 2-3 mwk). At night the pressure was said to be higher.
- b. Water mixing in the flocculation reservoir was not correct. The same problem with mixers as in Soreang appeared to exist. No rotators appeared to be in operation causing insufficient coagulation.
- c. The pump system was not running properly. Valves were partly closed in order to keep the pressure high in the pump, but in the distribution network the pressure was low. The airvessel installation was not in operation.
- d. Still the production plant works more or less as designed.
- e. Management was convinced that production of water should be increased in Jatibarang.
- f. Unaccounted for water is 15% according to information received.
- g. Water production is running 24 hours/day during the last month. Before that the production was running 20 hours/day.

REMARKS It appears that in this water enterprise it is insufficiently recognised that there is a close relation between: sufficient pressure during 24 hours/day in the pipe-system and unaccounted for water. It is necessary to try to keep sufficient pressure in the system in order to prevent illegal connections and to be able to detect leakages. It is essential only to enlarge the number of house connections if the pipe-system remains pressurised: if this goal is not achieved the figure for "unaccounted for water" will probably go up from 15% to the figure of about 40 - 50% as in many other water enterprises.

The staff of the PDAM seems well trained and instructed, but could use further assistance to run their enterprise.

BANGODUA IKK (PPAM INDRAMAYU) - 25th March 1986

Location : just 18 kms from large town of Jatibarang
No. house connections : 175
No. functioning : unknown
No. of public taps : 18
No. functioning : 11

Community aspects

	House connections	Public taps
Those not reached by supply:	Those far from distribution pipes	
Use of water:	drinking, cooking, bathing	
Alternative supply:	wells, but many salty and some dry up. Neighbours with HC. River - dirty and distant	
Community preparation:	initially contractors sought out potential consumers, put in connections. Under Action Review thorough preparation.	misinformation. At first water free. PT constructed, then people told to organise themselves. 20 families á Rp 500.
Ability to pay		
. Connection fee:	Rp 65,000,-	
. Monthly tarif:	Rp 1,500,- easier to collect from posier people	Rp 10,000,- a month flat rate.
Willingness to pay:	no problem providing water runs. 75% billing efficiency	consider amount too much. Some able to pay but not willing because not organised
Quality of service:	First 6 months intermit- tent, no flow restrictor, water free, then ceased. Action and review. Last 4 months running well	flows too slowly.

Education activities: had some pamphlets but not used. PT: no materials.

	house connection	public tap
Problems:	Still in process of selling the system. Meddling with flow restrictors common.	

Technical and managerial aspects

- a. The water is taken in from an irrigation channel, that according to information was dry for six weeks to two months per year in the dry season, in order to clean the channel: so during 6 weeks a year no water is distributed in this IKK.
- b. This IKK has diesel engines to produce the electrical energy. The supply is 12 hours a day.
- c. The financial income in the IKK is insufficient to pay for running costs (chemicals, energy and wages).
- d. The people without a piped water supply or without use of a public tap in Bangodua have to use the water of the irrigation canal. In the dry season they have to use the water from a river at a distance of some kilometers, since the canal is dry. Groundwater is salty or brackish. These water sources are used as public toilets as well, so the situation is unhygienic. People in this IKK need the water supply badly. This counts for the surrounding villages as well, that have no water supply yet. Especially at these places it is advisable to construct larger water production plants in order to enlarge the distribution of water. Moreover it is necessary to supply water in the dry season too, so a water intake at a different point is necessary.

PDAM SIDIKALANG - BNA - 27th March 1986

Population : Total of 15,824. Heterogenous, small traders, skilled and unskilled labourers.

No. house connections : 1,475

No. functioning : 1,175

No. of public taps : 34

No. functioning : 2 (5,8% -(in army and Public Works complex)

% population served : 53%

Community aspects

	House connections	Public taps
Those not reached by supply:	240 families on waiting list. Those in higher areas, poor pressure. Poor families.	
Use of water:	all purposes. Some families prefer river water for drinking.	
Alternative supply:	river - distant and dirty. Springs on edge of town. No wells. Collect rain water	same.
Community preparation:	nothing done	through official channels. Location not discussed with potential consumers.
Ability to pay:	good for consumers	
. Connection fee:	Approx. Rp 120,000 (50% and installments)	
. Monthly tarif:	no problem	flat rate-considerere a burden if less than 20 KK.
Willingness to pay:	good	unwilling

	House connections	Public taps
Quality of service:	Pre '83 - irregular water discoloured. Now - regular, clean. Chlorine commented on but not a problem.	
Educational activities:	slides shown at local theatre. No other specific efforts except annual exhibition.	
Attitudes:	Emphasis on saving water	difficulty in organisation of groups. Tended to promote HC.

Technical and managerial aspects

- a. The PDAM - organization was established three years ago.
- b. 180 house connections have no watermeters yet.
- c. The unaccounted for water is 31% according to the director, the DHV report shows a figure of 47%.
- d. Water use in army barracks is very high: approximately 4 l/sec. (20% of total production!)
- e. The PDAM has 52 staff-members, 34 paid for by the PDAM, 18 by the kabupaten.
- f. The net-income is 70 million Rps a year, the net-expenses are 60 million Rps excluding tax and depreciation. The kabupaten gets 5 million Rps a year.
- g. The director is aware of low pressure in the distribution system and therefore wants to expand the water production. Some parts of Sidikalang receive water for only part of the day. Water pressure in the distribution network is low.
- h. The water intake with pumps, pipes, diesel engines, buildings are in good order.
- i. The water filtration with a (double) slow sand filter does not operate as it should. The slow sand filters have no roofs to prevent the sun's rays. Due to sunshine algae grow in the slow sand filters, that clog the filterbeds. According to the records running time of a filter before cleaning is four weeks. So every 14 days one filterbed is taken out of the production process to be cleaned during 3 days. Moreover due to clogging the water production per filter is too low. The result is that during daytime filters are bypassed, so non-filtered (and non-chlorinated) water enters the distribution network.

Roofs over the slow sand filters are highly necessary (cost \$ 20,000,-). The cleaning (washing) of the sand of the slow sand filter takes 17% (!) of the waterproduction.

- j. The water that had passed the slow sand filter was being chlorinated at the time of the visit (the DHV report states in December 1985 that is not done yet).
- k. The stock as well as the production plant at the head office is in good order, though part of the stock seems unnecessary.
- l. Director and staff say, that they are properly trained. They have contact with DHV office every month for further management support.

REMARKS This water enterprise has still starting up problems as a new water-enterprise. The water enterprise needs investment capital and support for expanding (roof over slow sand filters, water production as well as number of house connections), continued training and management support for director and staff.

MATANG KULI IKK (PDAM LHOKSEUMAWE) 30th March 1986

Population : 3050 people, 10 km. from sea and 28 km from town
farmers and labourers of Mobil Oil

No. house connections : 180 (cap. 500)

No. functioning : 147

No. of public taps : 9

No. functioning : 2 (22,2%)

% population served : 37%

Community aspects

	house connection	Public taps
Those not reached by supply:	many families take attitude of "wait and see". Those with reasonable wells who complain of iron content in IKK water.	
Use of water:	all purposes. Those with wells prefer well water for drinking.	
Alternative supply:	Wells, river (Rp 1,5/litre) In dry season many wells dry up.	misinformation from contractors
Community preparation:	In '83-through contractors '85 Action Review with approach to formal leaders and community meeting.	
Ability to pay:	payments are good even though higher than normal price.	
. Connection fee:	Rp 20,000. Pay 5,000 cash + installments. Rp 37,500 from contractors.	
. Monthly tarif:	25 fr. - Rp 2,250 50 fr. - Rp 4,250 75 fr. - Rp 6,000	

	House connections	Public taps
Willingness to pay:	tarif includes extra Rp 250 to cover cost of PT in mosque and Islamic School	
Quality of service:	Began in '83 - intermittent Last 4 months - good supply Some complaints re iron content of water	
Communication/information activities:	letter distributed to all consumers on regulations and results of meeting	
Problems:	Cost of installing storage tanks. PPSAB contributed - open in yards. Uncertain back up from BPAM to cover operational costs. Iron content of water.	

Technical and managerial aspects

- a. Water supply in IKK had run for six months continuously until three days ago when a diesel engine broke down. Since then the supply is 12 hours/day. It is not clear if or when the diesel engine will be repaired.
- b. Groundwater from a deep well is used for water supply.
- c. The water contains some iron (3,5 mg/l) that colours the water brown/yellow in the water reservoirs of the consumers. The water probably contains no oxygen. This causes no health risks. Iron removal equipment has been promised to consumers, the question rises whether such an installation should be built since it will be expensive to operate and involve much maintenance.
- d. House connections are made of galvanised steel (as in most places).
- e. Recently a road was reconstructed with an asphalt top layer, covering the main transport pipeline. Future leaks in this pipe will be practically impossible to trace.
- f. No stock of pipe-materials was available for maintenance and repairs.
- g. The staff seemed well trained and operated the production plant well.

PDAM LANGSA (ACEH) - 31st March 1986

Population	: 37,700
No. house connections	: 3,500
No. functioning	: unknown
No. of public taps	: 24
No. functioning	: 4 = 16,6% (in mosques)
% population served	: 66% (assuming all connections are functioning)

Community aspects

	House connections	Public taps
Those not reached by supply:	beyond distribution system (50 applied). Higher areas due to low pressure.	
Use of water:	all purposes if no well water.	
Alternative supply:	river, wells.	
Community preparation:	nothing done except instructions through formal channels/leaders	told to organise payment after construction. Many families promised free water.
Ability to pay:		
. Connection fee:	Rp 100.000,- Rp 200.000,-	
. Monthly tarif:	no problem	none paying.
Willingness to pay:	many not paying due to irregular service. Stealing common	none paying.
Quality of service:	in many areas irregular	at times irregular
Communication/information activities:	none. Plans to participate in annual exhibition.	

	House connections	Public taps
Problems:	many meters unreadable, others tampered with	PDAM lost interest in cut-off taps.

Technical and managerial aspects

- a. The management complains about the quality of the watermeters; the meters do not run properly, especially at low debit.
- b. The PDAM has 56 staff members; 16 of them are from the Kabupaten.
- c. The PDAM staff complains about lack of laboratory equipment, complexity of bookkeeping system and performance of production plant.
- d. The water inlet functions well. Chlorine dosing and chalk dosing are in operation, though records show that operation stops from time to time for some days due to lack of chemicals in stock.
- e. Though the treatment process is running irregularly (flocculation breakthrough, no proper filter backwashing), the water produced is clear.
- f. The ball-bearings of the distribution pump that was functioning at the time of visit produces too much noise and should be replaced immediately.
- g. Water pressure in the city is continuously low. Parts of the city will not have supply during part of the day.
- h. Though stock of materials for maintenance and repairs of the distribution network are available, the network appears to be in bad shape (many leaks, many illegal connections).
- i. Unaccounted for water is over 50%.
- j. Changes in staff occur very often.
- k. Managing director has only been functioning for one month.

REMARKS This water enterprise needs support in all fields of operation. One of the most important reasons of ill-functioning appears to be bad management in the past.

PDAM TEBING TINGGI - 1st April 1986

Population : approx. 45,484
No. house connections : 2,200
No. functioning : 1,692
No. of public taps : 74
No. functioning : + 40 = 12,2% (including 9 mosques, 12 schools)
% population served : 30%

Community aspects

	House connections	Public taps
Those not reached by supply:	higher locations, poorer families, those beyond distribution system	
Use of water:	for all purposes if no well water	for all purposes if no well and far from river
Alternative supply:	good wells 6 artesian wells	good wells 6 artesian wells river
Community preparation:	top down contact with formal leaders only	top down contact with formal leaders only.
Ability to pay: . Connection fee:	comparatively good Rp 50,000. Recent decision - raises to Rp 150,000. PDAM arranging credit facilities through bank.	
. Monthly tarif:	not expensive, according to consumers	not expensive, according to consumers with correct information.

	House connections	Public taps
Willingness to pay:	New connection fee too high. PDAM is organising credit through bank. 70-80% billing efficiency.	40% paying. PDAM now approaching consumers to pay.
Quality of service:	At times intermittent. Pressure varies. Water at times not clean.	
Communication/information activities:	Limited to annual exhibition only.	
Problems:		surrounds often dirty and unhygienic

Technical and managerial aspects

- a. The number of staff is 38; 15 are not on PDAM-payroll.
- b. The managing director is 10 months in office, his last job was head of a technical department in the Medan water enterprise.
- c. The city has 24 hours/day water supply, though the pressure in the distribution network is continuously low; water supply in the higher parts of the city is not continuous.
- d. The energy supply will be changed from diesel engine to PLN connection (costs: 15 million Rps, for installment, energy costs will decrease from 5 million Rps/month to 2.5 million Rps/month).
- e. The city has a (beautiful) water tower, that is not in operation, because the water pressure in the city is too low to fill the reservoir. Even if the pressure were high enough to fill the reservoir, this tower seems superfluous according to modern water enterprise design.
- f. Key job holders have been trained by DHV, except for the managing director.
- g. The enterprise had problems with implementation of the manual (Buku Pedoman) for bookkeeping since the provincial government has different bookkeeping regulations. A balance sheet is not available.
- h. Plates from tilted plate-separators are not functioning well, due to the fact that they are not properly placed in the framework. High waterlosses by open valves in spillways occur.
- i. The rapid sand filtration is not working properly. The anthracite top layers have completely disappeared. Backwashing of the filters is not done properly, with breakthrough of the filterbed. The filtered water probably has a high turbidity causing dirty water-problems in the city.

j. All waterbills were handwritten.

k. All house-connections are made of galvanised steel.

l. The site of the production plan is polluted by oil from the diesel engines.

REMARKS This water enterprise needs support in many fields of operation.

LIMA PULUH IKK (PDAM KASIRAN) - 1st April 1986

Population	: 582 households. Rural, strung along main road, extending back on to rubber plantations. Minor civil servants and plantation workers
No. house connections	: 240
No. functioning	: unknown
No. of public taps	: 9
No. functioning	: 1 = 11.1% (on land IKK staff)
% population served	: 42%

Community aspects

	House connections	Public taps
Those not reached by supply:	poorer section. System can no longer support new connections.	
Use of water:	for all purposes except houses with good, clean well.	
Alternative supply:	wells, but dry up. Wells (400 m distance).	
Community preparation:	three meetings during construction, continuous contact with community by IKK	top down instruction from formal leader. Installation linked with political purposes.
Ability to pay		
. Connection fee:	Just for labour dan pipes (Rp 2,000 - Rp 5,000).	
. Monthly tarif:	Rp 2,000 (25 fr.)	flat rate Rp 10,000 per 10 families.
Willingness to pay:	85% billing efficiency.	
Quality of service:	no complaints. Previously chlorine content not liked.	

	House connections	Public taps
Communication/information activities:	no contact with Health or school. Good informal community relations.	
Problems:	construction of storage tanks. Before IKK: 19, after: 51. Much tampering with flow restricters at beginning (30%).	

Technical and managerial aspects

- a. The total income is Rp 450,000 a month, the expenses are Rp 325,000 a month excluding salaries
- b. Salary-costs has been paid for by the provincial PPSAB office up to April 1st, after that the BPAM has had to pay the salaries.
- c. The head of the water supply in the IKK (Kepala-unit) and staff have been trained by PPSAB and DHV (in service training).
- d. The water supply in the IKK has generator-sets for energy supply, the operation time is 24 hours/day.
- e. Chlorine dosing is not in operation and according to information has not been in operation the last couple of months.
- f. The water source is deep well. Water from the deep well is so abundantly available, that a spillway had to be installed.

APPENDIX 5
CASE STUDIES ON BANJAR, BRANCH OF
BPAM CIAMIS, WEST JAVA
AND
IKK PANTAI CERMIN, NORTH SUMATRA

Mission findings

In the following section a description is given of mission findings from the water enterprises that were visited. This description is not complete, because the facts and figures that are noted in the numerous reports of consultants are not mentioned.

Especially the reports that are mentioned underneath each description should be considered complementary to the description.

Moreover it has to be noted that some facts that were experienced in general or in most or many enterprises are not mentioned but dealt with separately in the mission report.

Calculation of percentage of population served is done on the assumption of 7 persons per houseconnection and 50 persons per public tap.

Banjar, branch BPAM SIAMIS of (BNA system)

Banjar, a town of 46,000 population, spreads across a rice growing plain bordered on the south by Citanduy River. The town is a market place and a large part of the population earn a living through service industries.

Until 1979 the community's water sources were shallow wells, rivers and springs. With assistance from IWACO the resources of the Citanduy River were harnessed with a production capacity of 40 l/sec. = 3,456 m³ day and a real daily production of 1,509 - 2,106 me/day (IWACO figures) and in 1982 323 house connections were installed. Since then the number has reached 2400 house connections (2187 running) and 43 public taps (41 runnings). In all serving 60% of the population.

This is the only BNA-city visited by the Mission where the water enterprise appears to be operating according to design. It was a pleasant surprise to the mission.

Under the capable directorship of Mrs. Nastiti from PPSAB Bandung, Banjar was pursuing an active sales policy. Groundwater was decreasing and the demand for reticulated water subsequently increasing. Therefore the water enterprise has been actively promoting a policy of providing clean water for all. The minimum bill for house connections was 10 m³ (as against 15 m³ in many other PDAM/BPAM) at a cost of Rp 2,750 and the connection fee was only Rp 65,000 which could be paid in 10 or more installments. These are attractive terms, even for poorer families. Field staff were young and appeared to have good consumer relations. Incidental promotion was through the annual regency development exhibition at which posters are exhibited brochures distributed.

Consumers with house connections expressed their satisfaction with the regularity of the service and the water pressure. In the city water is supplied 24 hours/day under sufficient pressure, more than 30 mwk (3 bar). No one in the city complained about expense. However a few families with good wells admitted that they use tap water for washing and bathing, preferring chlorine free well water for drinking and cooking. In distributed water chlorine-residuals are present up to 0,1 - 0,5 mg/l, so the distributed water at the taps is safe for drinking without cooking.

Interviews in the city

families in the shopping centre and market

One family, newly connected, was delighted with the tap supply. They commented "It is so clean, runs continually and is cheap at just Rp 3,000 a month. Previously this family bought 5 - 6 cans (20 l) of water worth Rp 1,000 a day just for drinking. The tap supply was being used for all purposes.

Two other traders had not connected. They did not live in their shops and use neighbours tap water to meet their minimal needs during the day.

One trader had attempted to get a house connection in an area beyond the distribution system. He had not yet succeeded in gathering sufficient potential consumers in the neighbourhood to justify a BPAM survey.

Other non-connected families

Mr. P. had not connected because he lived in a contracted house.

Mrs. T. fortunately had a well. She would have liked to connect, especially for a dry season water supply, but her home was over 20 meters from the distribution pipe. She could not afford the cost of the extra piping, at Rp 2,500 per meter, beyond the six meters provided by BPAM,

Public taps

Compared with other BNA systems visited, Banjar has the amazing record of 41 out of 44 of its public taps being in use. Public taps were spread throughout the town - in mosques, schools, markets, public washrooms and in poorer areas. The latter were placed in close vicinity to users homes. In most cases the number of consumers had dwindled to one to five families, many previous consumers having been attracted by the convenience of a house connection with its easy terms.

Several examples of public taps

One public tap in mosque grounds was used regularly by worshippers and a few neighbours when their wells dried up in the dry season.

Another public tap meets the constant need for water of a group of fish traders. At their request the taps were constructed to flow into troughs in the market. One of the eight traders collects the monthly subscriptions. Minor repairs are organised by the group.

Twenty poor families used another public tap under the coordination of the unit head. The tap was easily accessible in the crowded kampong and is in constant use. Monthly payments were regular and care of the surroundings was organised by the group.

One tap was in the grounds of a private businesswoman and used by her twenty labourers for drinking and washing after work.

BPAM views public taps as one way to achieve equity of distribution of water. However they also considered their function as the first step to a house connection as valid. In fact many times consumers supplied by public taps asked for house connections after having used the water from the public tap for some time, a relevant way of using public taps as a sort of inbetween stage before house connections are asked for.

bpam and its ikk responsibilities

Apart from serving the BNA population of Banjar the enterprise also had the responsibility of supervising 19 IKK systems of which only four were functioning at the time of the visit.

The enterprise tended to consider IKK systems as a "social welfare activity", which at best, can only break even financially.

Recent improvements in the system were applauded, such as the increase in the size of IKK town to be served, access to cheaper water sources, better contractors and growing opportunities to change from genset to electric power.

VISIT TO BANJAR INSTALLATIONS AND OFFICE

BNA calculated demand is 3,066 m³/day = 35 l/sec.

$$\text{ic. } 46,000 \text{ inhabitants} \times 0,6 \times 60 \text{ lpepd} \times \frac{1.4 \times 1.15 \times 1.15}{1000}$$

$$= 3,066 \text{ m}^3/\text{day}.$$

The water production plant appears to be in good order: all equipment looks well-maintained and is running or ready to run. Chlorine-dosing and lime-dosing are in operation.

Laboratory facilities are available and well used. Routine checks on water quality are done on a day to day basis (pH, chlorine, lime, temperature, aluminium, jan tests).

Waterleakage in the city of Banjar is well under control. The amount of water lost in the distribution network is checked by measuring the water flow during the night. Leaks are looked for and immediately repaired. If necessary sound-equipment is used in order to find leaks. There is a good administrative system of maintenance and repairs of the distribution system. About 10 leaks a month are recorded.

The stock of materials for maintenance, repairs and for construction of new house connections appear to be in good order (materials for new house connections are available).

The unaccounted for water is supplied 24 hours/day under sufficient pressure, more than 30 mwk (3 bar).

In 1984 the financial break-even point was reached. The enterprise makes a profit at present.

The bookkeeping and administrative system appears to be in good order. Bills are hand-made every month.

In Banjar the number of staff is 33 persons, trained by IWACO according to the Enterprise Performance Development (EPD). In 1982 two months desk to desk in service training was given. Three employees were in the distribution system. Pipe-laying is carried out by private contractors.

The managing director of the BPAM Ciamis, from which Banjar is a branch, Mrs Nastiti, is only working parttime for the BPAM Ciamis.

The staff of the water enterprise in Banjar appears to be well trained, interested in their jobs, loyal and able.

Some remarks on enterprise performance

Some remarks can be made about Banjar that do not really influence the positive impression that the mission has about the water enterprise.

All water bills are typed out by hand on a typewriter. Producing approx. 2,200 water bills every month for house connections only takes much time and is an expensive procedure.

Water meters that are used, are not cleaned or repaired, but kept in stock.

As in practically every water enterprise house connections are made of galvanised steel-pipe. These pipes will be subject to corrosion in the future (depending on the soil this may be as soon as 5 - 10 years). It would be better to use HPE for house connections or - if this material is not available - PVC pipes to prevent numerous leakages in the future.

The pH of distributed water is 7. The pH of the river water varies, but is rather low (sample pH = 6.7) and tends to decrease in the treatment proces. The pH is corrected up to 7 by lime-dosing. This pH is high enough not to create any health risks and is within the accepted pH range according to Indonesian and WHO standards.

Still the water is aggressive towards steel; so apart from corrosion from the outside, house connections pipes will corrode on the inside too. This could be improved by a higher lime-dosage, so the pH could become pH = 8 (VEWIN recomandetions: pH 8.0 - 8.3), but it is better too to use HPE or PVC house connections.

Maps and designs of the pipe-system in the distribution network are available. Measurements of points of the distribution network (valves, connections, crossings) were not recorded on maps, though initial measurements were recorded by IWACO.

Electrical wiring should be taken care of in a better way. On some places uncovered wires were observed, that could cause danger to personnel and may cause failure of equipment.

In the official BNA calculation the peak- and leakage factors are multiplied to the average daily demand ($1,15 \times 1,15 = 1,325$). It seems more logical to multiply the sum of the two factors tot the average daily demand ($1,15 + 1,15 = 1,30$).

FACTS AND FIGURES

estimated population 1985	: 46.000 inhabitants
actual population 1985	: 44.000 inhabitants
production capacity as build	: 40 l/sec = 3.456 m ³ /day
BNA calculated daily demand (*)	: 3.066 m ³ /day = 35 l/sec
real average daily production (IWACO figures)	: 1.509 - 2.106 m ³ /day
BNA calculated number of house connections	: 1.380
BNA calculated number of public taps	: 69
actual number of house connections	: 2187 running out of approx. 2400
actual number of public taps (in operation)	: 41 running out of 44
BNA calculated number of people served	: 27.600 (= 60%)
actual number of people served with official figures 10 persons/hc, 200 persons/pt:	30.070 (= 68%)
actual number served with estimated 7 persons/hc and 50 persons/pt	: 17.359 (= 39%)
ratio people served by house connections and public taps (7 persons/hc, 50 persons/pt)	: 88/12

For further actual and design information see: "Preliminary status report"
(IWACO - September 1985).

* Calculation according to BNA approach:

$$\frac{46.000 \text{ inhabitants} \times 0,6 \times 60 \text{ lpcpd} \times 1,4 \times 1,15 \times 1,15}{1000} = 3.066 \text{ m}^3/\text{day}$$

In the official BNA calculation the peak- and leakage factors are multiplied to the average daily demand (1,15 x 1,15 = 1,325). It seems more logical to multiply the sum of the two factors tot the average daily demand (1,15 + 1,15 = 1,30).

PANTAI CERMIN IKK SYSTEM

The 386 houses in the Pantai Cermin District town of 3,500 people are strung along a secondary road on the North Sumatran coast. The piped IKK water supply with a distribution network of 601 km, serves the small traders and agriculturalists inland as well as the fisher settlement along the beach. The IKK system was completed in 1982 and provided a tenuous supply for several months only. Recently the system underwent an Action and Review programme and for the past few months the supply has been regular. Currently 184 families have house connections and one out of nine public taps are functioning. In all approximately 35 % of the local community obtain piped water.

When originally installed the contractor forced families to put on house connections and on occasions, false promises were made of free water and other misinformation was given. This made initial marketing of the water supply extra difficult. However, during the Action and Review programme efforts were made to restore the community's confidence in the system by disseminating correct information through meetings with villagers and informal contacts during the planning stage and a formal meeting when the system was ready to put into operation again.

The energy supply to pump the groundwater into the system is provided by two diesel engines (2 x 5 kW), which are currently functioning for 24 hours. Chlorine dosing is not in operation. The dosing method is apparently difficult to operate and is not regarded as necessary. It was observed that the airvessel contained hardly any or no air, probably due to the continuous operation of the pumps. Usually the airvessel is supplied automatically with some air each time the pump is switched off when the pressure in the distribution network exceeds 4 bar (40 mwc).

Alternative watersources include four strategically placed public artesian wells, a river, salty wells and the sea.

Most consumers, especially those in the fishing settlement, were very happy to have tapwater, considering it healthier and more convenient than other supplies as well as much cheaper than the water previously bought for drinking. The iron content in the water did not appear to concern them.

The IKK is striving very hard to make the system financially viable and recently cut the connection fee from Rp. 30,000 to 'cigarette money', or approximately Rp. 6,000 - Rp. 7,500 in the hope of attracting more consumers.

In the two months previous to the visit 30 new consumers bought house connections as a result. A few consumers shared a house connection to cut down costs. Billing efficiency was 65 %, most families keeping just two months behind to prevent being cut off. The IKK head was reluctant to lose costumers by cutting off, however in a recent two month period five non-payers lost connections. Rp. 3,500 is charged for reconnection as a disincentive. The IKK head shrugged his shoulders over non-paying government officials.

Those not connecting gave expense and an alternative supply as the major reasons. Also some have adopted a 'wait and see' attitude, having been disillusioned by previous breakdowns and questioning the convenience of the system with taps connected to the yard boundaries only. This group accounted for a number of families for whom Rp. 2,000 per month (25 flow restrictor) would in fact not be a burden. Dissatisfied with the small flow nine families have changed to 50 flow restrictors at Rp. 5,000 per month and one wealthy family had installed a 75 flow restrictor. Some other families have expressed their dissatisfaction by removing the seals from the flowrestrictors.

Most families visited had not yet put in more storage tanks. They often turned the tap off rather than waste water, meaning they were not receiving their full daily quota. This applied also to those with larger quotas (50 F.R.). Many storage facilities were temporary and often the tins and drums used and the surroundings (with no drainage) were unhygienic, with the increased quantities of waste water. These unhygienic conditions reflected conditions in many parts of the village, especially areas near the sea which are flooded daily by the incoming tides.

The public taps were a victim of contractors and the package deal of nine public taps. As a result most locations were not strategic and people in the environs claimed that the first they knew of the taps was after construction. However, the water was free at the time and unrestricted so they used it. But after a short time a flow restrictor was attached and the consumers were informed they must pay Rp. 10,000 per public tap. With one exeption people refused, complaining the amount was too high, especially when the supply was erratic. The taps were only used from one to four months and no further efforts - by the consumers or IKK staff - have been made to open them again.

In Pantai Cermin the IKK system is 'taking off'. Most people, especially on the coast, need clean water desperately, at least for drinking and cooking. In the past providing water for their families was an arduous and often expensive business. At the time of the visit people were at the stage of adjusting to the small and limited flow and the regularity of the supply was gradually deleting disillusionment with the past.

It was ironical that on the visit the PPSAB officials had to inform the IKK head of a threatened cut off of funds for operational costs, the total amount of Rp. 200,000 per month. The IKK heads reaction was intense disappointment. How, he asked, will consumers react to yet another breakdown in the service?