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GLOSSARY OF TERMS AND ABBREVIATIONS

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GLOSSARY OF TERMS AND ABBREVIATIONS

BAK MANDI	= Concrete trough for storage of water for bathing
BANGDES	= Pembangunan Desa. Directorate of Village Development of the Ministry of Home Affairs
BAPPEDA	= Badan Perencanaan Pembangunan Daerah. The planning body at Provincial Level
BAPPEDA II	= The planning body at Kabupaten Level
BAPPENAS	= Badan Perencanaan Pembangunan Nasional. The National planning body.
BINA SWADAYA	= An Indonesian voluntary organisation for community development: "Building Self Resilience"
BNA	= Basic Needs Approach
BPAM	= Badan Pengelola Air Minum. A temporary enterprise established by Cipta Karya to operate water supply systems pending the formation of a PDAM
BUPATI	= Head of a Kabupaten
CAMAT	= Head of a Kecamatan
CIPTA KARYA	= One of the three major divisions of the Ministry of Public Works
DAB	= Direktorat Air Bersih. Directorate of Water Supply, Cipta Karya
DALAM NEGERI	= Ministry of Home Affairs
DEPKES	= Departemen Kesehatan. Department of Health
DHARMA WANITA	= An organisation of women civil servants
DHV	= DHV Consulting Engineers, the Netherlands
GBHN	= Garis Besar Haluan Negara. Main guidelines of national development
GOI	= Government of Indonesia
GURU SEKOLAH DASAR	= Teacher of primary school
IKK	= Ibu Kota Kecamatan. The Capital town of a Kecamatan

GLOSSARY OF TERMS AND ABBREVIATIONS (cont.)

IPEDA	= Iuran Pembangunan Daerah. Regional Property Tax
KABUPATEN	= Regency, the second level of local government. There are 247 Kabupaten in Indonesia
KADER	= A member of the Village Self-Resilience Body (LKMD)
KECAMATAN	= District, the third level of local government. There are approximately 3450 Kecamatan in Indonesia
KEPALA DESA	= Head of village
KEPALA RUKUN TETANGGA (KRT)	= Head of a group of families
KEPALA RUKUN WARGA (KRW)	= Head of a neighbourhood
KEPALA UNIT	= Senior operator of an IKK water system
KOTAMADYA	= Municipality. A second level of local government. There are 64 Kotamadya in Indonesia
lcd	= litres per capita per day
LKMD	= Lembaga Kesehatan Masyarakat Desa. Village Self-Resilience Body
LP3ES	= Lembaga Pendidikan Penelitian dan Penertiban Ekonomi Sosial. An Indonesian Voluntary organisation for community development
lpm	= litres per minute
lps	= litres per second
LSM	= Lembaga Swadaya Masyarakat. A generic term for Indonesian voluntary organisations for community self-resilience
O & M	= Operation and maintenance
PAB	= Proyek Air Bersih. Water Supply Project
PAB-IKK	= Proyek Air Bersih IKK. An administrative and technical section in the provincial office of the Min. of Public Works

GLOSSARY OF TERMS AND ABBREVIATIONS (cont.)

PIMPRO	= Pemimpin Proyek. Leader of a Project
PKK	= Pembinaan Kesejahteraan Keluarga. A National women's development organisation
PLN	= Perusahaan Umum Listrik Negara. The national electricity supply authority
PROVINCE	= The first level of local government. There are 27 provinces in Indonesia (including the special territories of Jakarta, Yogyakarta and Aceh)
PDAM	= Perusahaan Daerah Air Minum. A semi-autonomous enterprise which operates community water supply systems under local government authority
PU	= Pekerjaan Umum. Ministry of Public Works
PUSKESMAS	= Pusat Kesehatan Masyarakat. A Health Centre, usually one per Kecamatan.
SMA	= Senior High School
SMP	= Junior High School
REPELITA I	= First Five Year Development Plan, 1969 - 1974
REPELITA II	= Second Five Year Development Plan, 1974 - 1979
REPELITA III	= Third Five Year Development Plan, 1979 - 1984
REPELITA IV	= Fourth Five Year Development Plan, 1984 - 1989
Rp	= Rupiah (Rp 1000 = US$ 1.00)
YIS	= Yayasan Indonesia Sejahtera. Indonesian voluntary development organisation

SECTION 1. PREFACE

The IKK Water Supply Program is being implemented by the Government of Indonesia to provide a low-cost, safe, water supply to some 2200 semi-urban towns by the end of the current decade. The program employs innovative, and in some respects, untried methods of design and implementation in order to overcome the constraints of limited funds, time, manpower and technical expertise.

This report sets out the findings of a multi-disciplinary team of persons with relevant experience which has, at the request of Cipta Karya, carried out a literature review and field study of operating IKK schemes. This Review Mission was formed to assess the current state of the program and, in particular, identify problems and propose solutions where appropriate and also to recommend the direction of future monitoring and/or research to ensure the success of the program. Members of the Review Mission are listed in Appendix A.

The Mission congratulates the Government of Indonesia on its initiative in undertaking this massive and costly program and the novel and inventive way in which it has developed the IKK concept to achieve the objective of serving a vast number of semi-urban people with safe water at minimum cost.

The Mission has spent four weeks studying previous consultant and Government reports relating to IKK schemes in the field and has visited eight operating schemes in the Provinces of Aceh, North Sumatra and West Java.

The Mission feels it necessary to point out the limitations of this report as it applies to the IKK Program as a whole.

- A study of 3 provinces only cannot be assumed to represent the country as a whole and the contents of this report must be read with this limitation in mind.
- Of the schemes inspected, not one was operating according to IKK design and the divergence from the design concept was of such a fundamental nature that the Mission cannot claim to have visited

an operating IKK scheme.

- A study of four weeks duration by a team of people, most of whom were not previously involved with IKK water supplies, cannot hope to identify all the current and potential problem areas nor provide all the solutions to the problems it does identify.

This report nevertheless offers an opportunity for improvement to the IKK Program by recommending a series of modifications for staged implementation over a period of time. The need for continuing monitoring, recurrent evaluation and appropriate modification to the program is stressed.

SECTION 2. INTRODUCTION

2.1 General

The emergence of a national policy for the long term development of water supplies in Indonesia occurred during the first 5-year development plan (Repelita I) in 1969-1974. Emphasis at that time was placed on the rehabilitation of existing water supply systems constructed during the first half of this century in some of the larger cities and towns.

The Repelita II period (1974-1979) saw increased efforts in providing large and medium cities with water supply systems. Thus the water supply policy during the first two Five-Year Plan periods benefitted mostly the urban population.

The basic philosophy of development in Indonesia is incorporated in G.B.H.N. (Garis Besar Haluan Negara) which can be translated as "Main Guidelines of National Development". This states that development should be directed towards achieving equality of prosperity among the people. The GOI therefore decided that the provision of water supplies should not be limited to urban dwellers, but should also include semi-urban and sub-district populations who are generally lower on the economic scale.

As a result, during the third 5-year development plan (Repelita III, 1979-1984) the GOI proceeded to expedite the provision of water supplies to small urbanised communities throughout the country. One of the means by which it is achieving this objective is through the IKK Water Supply Program.

IKK (Ibu Kota Kecamatan) is the administrative capital of a Kecamatan, this being the level of local government administration below Kabupaten or Kotamadya level (see Glossary of Terms and Abbreviations). There are about 3450 IKK in Indonesia.

2.2 IKK Philosophy

The philosophy of the IKK water supply program is set out in the Cipta Karya publication "IKK Water Supply Program, Strategy and Scope". (Ref. No. 40).

The program is based on three premises :

- Cost effective facilities will be designed and constructed for those IKK's which are considered to be capable of supporting a water system;
- The long-term operation and maintenance of these systems is deemed to be equally as important as their construction;
- The institutional capacity to ensure both of the above is to be developed to coordinate physical, human and monetary resources.

The program aims to provide potable, reticulated water supply to 70% of the 1990 population of some 2,200 IKK's throughout Indonesia. Low cost water supply systems with standard production capacities of 2.5, 5 and 10 lps have been developed to serve town populations of 3000 to 20000. In order to achieve the requirements of minimum cost, simplicity of design, construction and operation and minimum time span, the system utilizes some novel features:

- daily peak flows are eliminated by serving all consumers at a constant rate over 24 hours through pressure independant flow restrictors. This eliminates the need for water meters;
- no central storage is provided. For public taps, a 3.5 cubic metre tank is provided; for house connections, use is made of the "bak mandi" normally found in Indonesian homes;
- standardisation has been introduced at all levels in the program, including survey, design, construction and materials.

The above features allow minimum source capacities, pump and pipe sizes and permit the use of sub-professional human resources for a large part of the process from survey to operation.

2.3 National Targets

Although the original Repelita III target was for the construction of 1700 IKK schemes, many factors including the world economic downturn saw this figure considerably reduced and by end of Repelita III, 53 schemes had been constructed and a further 346 were in the planning or implementation phase.

The national targets for Repelita IV (1984-1989) are as follows :

1984/85	-	9
1985/86	-	300
1986/87	-	391
1987/88	-	460
1988/89	-	640
Total	-	1 800

2.4 Purpose of Review Mission

The IKK strategy represents an exciting theoretical model for low cost water supplies. It would be expected that difficulties and problems would arise which could not easily have been foreseen.

The program is now well underway with many schemes operating or about to commence operation. In view of the ambitious Repelita IV target, it is vital at this stage that the program be evaluated in terms of its function, utilization and impact.

Within the limits of its restricted time span, this Review Mission was formed to identify existing or potential problem areas and make recommendations for modifications to the program to improve its effectiveness.

On the basis of early experience in the implementation of IKK schemes, the Directorate of Water Supply has already made several changes to policies and programs. The work of this Review Mission should contribute to that process.

2.5 Terms of Reference

Terms of Reference for the Mission are given in Appendix B. Briefly, the Mission is required to evaluate field studies and reports already completed and, with additional information gained from field inspections of some operating schemes :

- identify problem areas requiring further study
- propose any immediate modification to the IKK program which the Mission feels appropriate
- make suggestions for on-going monitoring or research.

2.6 Methodology

In accordance with the Terms of Reference, the Mission reviewed several reports, papers and other background information prepared by consultants and Cipta Karya (see bibliography at Appendix I).

The Mission made field visits to eight IKK schemes, seven of which were operating at the time of the inspection.

Meetings were held with PAB and PAB-IKK Project officers in the three provinces visited and also with PDAM or BPAM personnel in the Kabupatens.

Informal discussions took place with a variety of local government officials, including Bupati, Camat, Lurah and Kepala Desa and also with residents of the towns visited.

Several informal discussions with officers of Cipta Karya and Consultants also contributed to the store of information gathered by the Mission.

Details of the review methodology are given at Appendix H.

2.7 Itinerary

The field inspection itinerary of the Mission is given at Appendix C.

The following IKK were visited :

North Sumatra	: Tanjung Langkat
	Stabat
	Pantai Cermin
	Lima Puluh
Aceh	: Glumpang Minyeuk
West Java	: Rajagaluh
	Waled
	Paseh

SECTION 3. SUMMARY AND OVERVIEW

3.1 General

The Mission's observations show that the IKK Program has to this time had limited success.

The success of any water supply project can be assessed by consideration of the following three questions:

1. Is the scheme functioning in a satisfactory manner?
2. Is the scheme being utilized in a satisfactory manner?
3. Is the scheme creating a favourable impact on the people?

The Mission has found that :

- no IKK water supply scheme is at present working as designed. In all the schemes inspected, most or all of the flow restrictors had been tampered with, removed or not installed in the first place. The consumers, the contractors, PDAM/BPAM and PAB-IKK were all responsible in varying degrees;
- each 2.5 lps scheme is serving an estimated average of 1800 people instead of the 3600 designed. The average number of people per house in the areas visited did not exceed seven. In all schemes inspected, public taps were under-utilized. Hence the cost per capita of each scheme is double the theoretical figure and cost recovery is lower than calculated.
- the overwhelming majority of people with whom the Mission spoke (including consumers) regard the IKK system as a second-rate water supply scheme. Most people are disappointed and the praise-worthy efforts of the Government in undertaking this massive and costly program are not recognised by the people.

Whilst the Mission does not wish to be seen as pessimistic about the eventual success of the IKK Program, it wishes to stress that a great deal of effort must be directed towards certain areas of the Program if success is to be achieved.

3.2 Outline of the Report

Sections 1 and 2 of this report provide the background to the IKK program and the purpose of this Review Mission.

The Mission's observations and recommendations are given in Section 4 of the report in functional sequence. This section deals in some detail with the perceived problems, areas of potential improvement and specific recommendations for consideration by Cipta Karya for future incorporation in the IKK Program.

Section 5 of the report suggests a program for the phased implementation of the recommendations. A plan is detailed for the adoption of those recommendations which can readily be incorporated into the program and also for those recommendations which the Mission feels need to be tried in a practical situation.

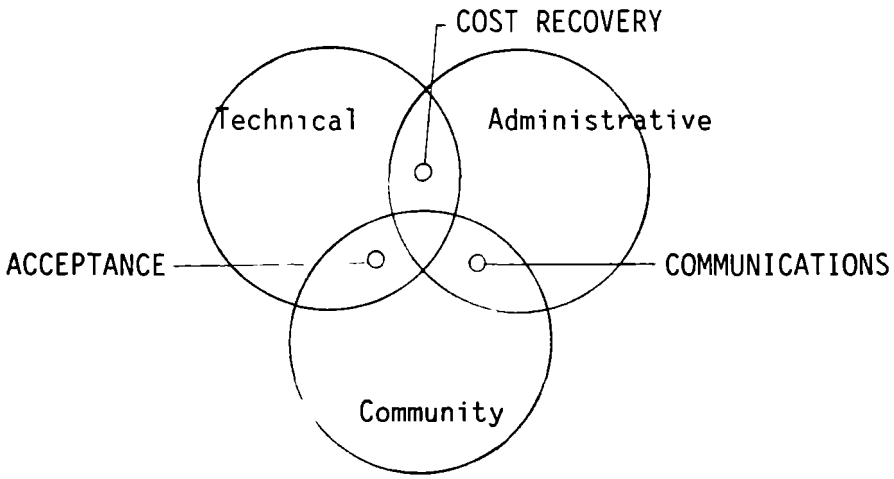
The Appendices give details of the Review Team, its terms of reference, its itinerary, details of the IKK schemes visited, cost calculations, notes on environmental sanitation and community work, details of the review methodology, the bibliography and a complete list of the recommendations.

3.3 Overview

The IKK Program should be viewed as a multi-disciplinary project with inter-disciplinary interactions. The major components of the concept are:

- Technical considerations
- Administrative considerations
- Community considerations

Some of the recommendations submitted in this report refer only to one or another of those three components, but the majority of problems identified in the program result from the inter-action between two or more of them. This is illustrated in the diagram on the next page.



The factors of acceptance, cost recovery and communications are considered to be focal points of concern which may jeopardize the success of the IKK Program.

In addition to these factors, the basic IKK concept has several inherent problems:

- IKK provides a limited supply with limited benefits. The quantity of water provided is not sufficient for all needs (drinking, cooking, defaecation, dishwashing, laundry, bathing) and so assumes the availability of a second water source;
- the discharge of drinking water directly into a 'bak mandi' in the bathroom is psychologically contradictory and hygienically unsatisfactory;
- the concept of paying for water from neighbourhood taps (public taps) is contrary to custom;
- IKK is a precise system requiring precise construction and operation and yet is intended for a situation where technical expertise is severely limited;
- standard design modules are required to be used in infinitely variable situations, both human and geographical.

Acceptance

The IKK water supply scheme provides a technical system with features outside the present experience of the people. The success of the scheme requires the people's acceptance of :

- a restricted flow
- a limited quantity of water
- a tariff for both house connections and public taps.

Acceptance depends upon a number of factors :

(i) The People's Expectation/

In most areas of Indonesia people enjoy a plentiful supply of water even though that water may not conform to desirable health standards. When people hear of a "water supply", they expect that it will provide an adequate quantity for all purposes. The Mission observed that the people have not yet accepted the concept of a restricted 24 hour flow. It is essential that people be given accurate information on the nature of the IKK supply at an early stage.

(ii) Existing Water Availability

Acceptance of a less-than-ideal supply by the people is affected by their need for water in terms of quantity, quality and availability. An IKK scheme is most likely to be accepted where people do not have an adequate existing supply. Most towns visited already had ready access to adequate shallow well or spring supplies.

(iii) Reliability

In order for people to fully accept a water supply scheme, reliability of supply is essential. This requires satisfactory workmanship, adequate maintenance and continuous operation. These requirements are not generally being achieved at present.

Cost Recovery

IKK policy requires that operation and maintenance costs be paid for by fees received from consumers, if necessary by cross-subsidy between IKK schemes within a Kabupaten.

The Mission believes that monthly payments in excess of Rp 2000 will

meet with some resistance, and even with a high payment recovery rate, this will not cover the O & M costs for the vast majority of schemes. The prospects for cross-subsidy do not therefore appear promising.

Collection of fees from users of neighbourhood taps is expected to prove difficult in most cases and some research is needed to find the best means of achieving a high return from consumers.

Communication

Communication is an essential but neglected ingredient in the IKK program. Accurate information is the first essential element if people are to understand and ultimately accept this new system. This information can only be disseminated through a determined and integrated program utilizing persons skilled in the fields of training and communications.

This report recommends the creation of a Unit within Cipta Karya responsible for communications and community education within the IKK program. This Unit would be responsible for developing the channels of communication from the national level through the provincial and local levels of administration to the people. It would involve training of personnel for PAB-IKK and PDAM offices in communications skills and the development of guidelines for the setting up of workshops, informal meetings at community level and cooperation with community leaders such as Kader of LKMD, PKK, Puskesmas, etc. Suggestions are also made in the report for increasing the level of community involvement in the program.

Monitoring, evaluation, feed-back and modification are also essential elements in the communication process and some attention is given in the report to these aspects.

3.4 Summary of Recommendations

The introduction of an IKK water supply into semi-urban environments is imposing an untried, unfamiliar and non-cultural service on to an un-informed and less than enthusiastic public. Whether the recommend-

ations made in this report can overcome the problems presently being experienced to the extent that the systems will work as envisaged can only be judged after they have been tried.

The report makes many recommendations for consideration by Cipta Karya which will improve the chances of success of the IKK program. These recommendations are detailed in Section 4 of this report and are separately listed in full in Appendix J. A suggested program for implementation of the recommendation is given in Section 5. A brief resume of the recommendations is given below.

Survey and Design

- in the selection of towns, more emphasis should be given to the need of the community for an IKK water supply;
- neighbourhood taps (public taps) should be designed for 10 families and the ratio of people served by house connections/ neighbourhood taps should be increased in favour of house connections. The present design criteria of 10 persons per house is supported;
- the provision of chlorination should be discontinued except where special circumstances exist;
- the use of hydrophores should be eliminated for all schemes;
- 24 hours per day operation should be fully supported and PLN electricity used wherever practicable;
- some pilot studies using larger flow restrictors should be made;
- criteria for source selection should be reconsidered to favour spring gravity sources up to 10 km. distant;
- more attention should be given to the location of neighbourhood taps; budget allowance should be made for purchase of land for these taps.

Construction

- the timing and sequence of contracts and material supplies should be better coordinated;
- house connections should not be made until a system is fully

operational and then only to houses with a suitable water storage receptacle. Responsibility for installation of house connections should rest with the IKK Unit;

- a small 20 litre container in the kitchen should be included in the basic IKK package;
- connection fees should be limited to Rp 15000 plus an extra charge if the service pipe exceeds 20 m. in length. The householder should be given the option to reduce connection costs by digging his own service pipe trench;
- more intensive supervision and on-the-job training should be given to inexperienced contractors in regard to contract pricing. Foreign aid projects should be requested to make due allowance for this.

Operation and Maintenance

- IKK Unit staff numbers should be limited to those recommended in Cipta Karya instructions;
- IKK Unit operating staff should be given more technical support to identify and correct operating and maintenance problems;
- adequate stocks of spare parts and materials should be held at the Unit, PDAM and PAB offices to reduce system stand-down time during emergency break-downs;
- manuals setting out preventive and corrective maintenance procedures should be provided at each Unit and appropriate training given to operators.

Management : Cost Recovery

- Cost recovery, even for direct operation and maintenance costs only, will be difficult to achieve. IKK schemes requiring treatment plants cannot expect to cover operation and maintenance costs and should not be constructed unless GOI is prepared to permanently subsidise the running costs;
- clear rules should be established to facilitate collection of fees and to enforce penalties for defaulters and for those interfering with restrictors;
- a common tariff should be applied throughout each Kabupaten;

- further research should be undertaken to find ways to encourage payment of fees by users of neighbourhood taps.

Management : Administration

- national planning targets for 1985/86 and beyond should be adjusted as necessary in light of the current year's achievements and the manpower and financial resources available;
- the development of provincial water supply and sanitation planning bodies should be encouraged;
- tariff guidelines to cover both urban and rural water supplies should be developed;
- provincial planning on the basis of community rather than administrative boundaries should be encouraged;
- institutional support for PDAM/BPAM should be increased with particular attention to career opportunities, community education and involvement in the community participation process.

Communications, including Monitoring

- conferences/workshops should form an on-going means of communication throughout the IKK program;
- the publication of an information newsletter is supported;
- a senior full-time officer should be appointed within CK to administer the monitoring and research program;
- a multi-disciplinary team not involved in the day to day running of the IKK program should conduct a similar review to this one in 12 months time;
- a "Communications and Community Work" Unit should be set up within CK to plan training programs, facilitate the communications network and prepare guidelines for PAB/PDAM/IKK Unit staff participation in community education, organisation and involvement.

SECTION 4. OBSERVATIONS AND RECOMMENDATIONS

4.1 Selection of Towns

IKK project selection is based on a priority ranking of social and economic factors. In general the following criteria are applied :

- size : IKK with larger populations have priority
- need : frequency of water borne diseases; availability of water; income (low income IKK have priority)
- cost : IKK with high population density have priority as well as those with a low cost for water resource development
- other : IKK with at least two other development projects have priority.

The selection procedure was found to be not satisfactory. Many of the schemes visited by the Mission were in towns with relatively low need for additional water supply. Most people had easy access to water from wells or springs.

Taylor (Ref. No. 49, chapter 4.2) discussed the ranking system in detail and found it discriminated poorly between towns. He proposed that population, disease attack rate, clean water availability, population density and other development projects be retained in the scoring system.

The Mission notes that health statistics on the incidence of water related diseases are inaccurate and so also are data on population density.

The Mission agrees with Taylor that household income should be omitted from the scoring system. Even if income data were available and accurate, use of income as a criterion creates a contradiction: low income would emphasise need for assistance, but cost recovery considerations favour the choice of wealthier communities.

The Mission concluded that need for water should be the primary criterion for selecting an IKK.

Recommendation 1
The need for water should be the sole criterion for selecting a site for an IKK scheme.

Recommendation 2
The factors to be considered in assessing the need for water should be:

(i) the existence of other water schemes
(ii) percentage of families with private shallow wells
(iii) the distance to existing water sources
(iv) dry season availability of water
(v) present payments for water throughout the year
(vi) water quality (people's perception of taste, smell, turbidity, etc.) of existing supplies compared to potential new supplies and safety as determined by sanitary survey and laboratory testing.

Recommendation 3
That local authorities' opinions should be given major weight in decisions about selection based on need for water.

4.2 Survey and Design

4.2.1 Survey

The Mission was informed that survey and design for IKK schemes was expected to be completed in one week per scheme. Since effectively only 2 days is available for survey, it was not uncommon for the person responsible to make the design in his office from maps because of insufficient time to visit the site. Such a procedure is highly unsatisfactory and serious errors in

locating pipelines and neighbourhood (public) taps are inevitable. The short time available prevents effective community participation.

Designs prepared in this way are then sent to Jakarta for review, modification and approval. Contracts are let without further opportunity for comment from the local authorities.

Revision of designs is theoretically possible during the construction phase, but because permissible variations are severely limited, any significant revisions must be approved in Jakarta and require about a year with consequent delay in construction. In practice, changes are rarely made.

Recommendation 4

The survey period should be extended to at least one week, with another week allowed for preparation of designs for each IKK scheme.

Recommendation 5

A visit and inspection of the town must be made during the survey period. During that visit, consultation must take place with the Camat, other officials and if possible with other community leaders and people.

Recommendation 6

The subjects of the consultations should include information about the scheme in detail, the routes for pipelines, probable demand for house connections and suitable locations for neighbourhood taps.

Recommendation 7

Training programs for surveyors should develop the attitudes and skills needed for community consultation.

4.2.2 Source Selection

According to IKK design criteria, water sources which may be used include springs, shallow or deep wells and surface water.

The financial implication of each type of source has been analysed and details of calculations are given in Appendix E.

It is shown that spring sources with gravity flow may retain a financial advantage over pumped sources up to a transmission main length of 10 km.

> **Recommendation 8**
> **The design manual should be revised to increase the permitted transmission distance for gravity flow from springs from the present 5 km maximum to a maximum of 10 km.**

Surface water sources require water treatment for purification. Treatment plants have high investment and operating costs. Calculations of operating costs (Appendix E) show that break-even point is impossible to reach at affordable tariff levels. Treatment plants will therefore need to be continually subsidised.

The Mission observed no instance of cross-subsidy occurring in any of the Kabupatens visited. The prospects for cross-subsidy appear to be very limited and most unlikely to be able to support water treatment systems. Therefore systems using water treatment will require permanent subsidy from provincial or national budgets with the effect, among others, of reducing funds available for additional IKK schemes.

In some locations there may be no source of piped water other than surface water. If the need for water is great then rainwater catchment could be considered. Although the investment costs of rainwater supply are high (approximately US$ 100 per capita), recurrent expenditure is low and there is no need to subsidise the scheme in operation.

Recommendation 9

Surface water should be rejected as a possible source for IKK schemes because of the high recurring costs of treatment unless the GOI is prepared to permanently subsidise O & M costs.

4.2.3 Volume of Water

Based on recorded use patterns in East Java (Ref. No. 34) and on other observations, water use is suggested to be as follows :

Drinking	2.5	lcd	
Cooking	7	"	
Dish-washing	2.5	"	
Defaecation :anal cleansing	1	"	
latrine flush	5	"	
hand washing	2	"	
		Cum. Total	20
Bathing	36	lcd	
		Cum. Total	56
Laundry	28	lcd	
		Cum. Total	84
Other purposes	4	lcd	
		TOTAL	88 lcd

The household allowance of 60 lcd provides enough water for drinking, cooking, washing utensils, defaecation and bathing. Laundry and other purposes are not possible.

The public tap allowance of 30 lcd provides for drinking, cooking, washing utensils, and defaecation. Bathing, laundry and other purposes are not possible.

Therefore an IKK scheme requires that the people have access to another source of water.

The standard IKK Design Criteria originally specified in the document "Strategy and Scope" (Ref. No. 40) were proposed to be modified as a result of consideration by the IKK Evaluation Team of the Directorate of Sanitary Engineering in March 1984.

The principal modifications prepared by the IKK Evaluation Team were that for planning purposes :-

1. the average number of persons per household be assumed to be 5 instead of 10;
2. the proportion of the population served by house connections and public taps could be varied, in the interests of cost recovery and local economic conditions.
3. The design populations in relation to production rates could be assumed to be :

Population	Capacity
3 000 - 6 000 (3 000-7 200)*	2.5 lps
6 001 - 10 000 (7 200-12000)	5.0 lps
10 001 - 15 000 (12001-16000)	7.5 lps
15 001 - 20 000 (16001-20000)	10.0 lps

* Design population in "Strategy and Scope" in brackets.

The Mission wishes to comment that :

(a) An allowance of 15% of water unaccounted for is unrealistically low;

(b) The proposed change in assumed household size from 10 to 5 persons is not justified because it is based on very limited observations and it would lead to a supply volume of 5x60 litres = 300 litres per 24 hours per household which is unacceptably low.
A flow restrictor to deliver 300 litres in 24 hours is not technically feasible, one standard flow restrictor to directly serve two houses is not hydraulically practicable;

(c) Flexibility in proportions of population served by house

connections and neighbourhood taps is a reasonable provision and is further considered later in this report;

(d) The changes is design population ranges are reasonable.

Recommendation 10

The allowance for unaccounted for water should be increased to a minimum of 20%.

Recommendation 11

Each household should continue to receive 600 litres daily.

Recommendation 12

Neighbourhood taps should continue to be designed to provide 300 litres per user ~~family~~.

Recommendation 13

Education about water use should emphasise the permitted uses of the IKK supply and the need to maintain some other source of water.

4.2.4 Water Quality

The Mission noted that the "IKK Water Supply Program Strategy and Scope" (p.35) proposes water that is 'biologically safe' and that it be subjectively evaluated for physical and chemical acceptability without laboratory testing.

Biological safety can be determined by survey for potential risks of pollution and by microbiological examination.

Recommendation 14

Training programs and the Survey Manual should give specific instructions for performing 'sanitary surveys' of water sources to detect possible sources of pollution.

Recommendation 15

Water from each new source should be examined in a microbiological laboratory and the results compared with GOI standards before the source is developed. These field and laboratory findings will assist decisions about the need for chlorination.

Recommendation 16

Laboratory testing of water should be performed when there is any suspicion of pollution or whenever increased numbers of cases of any water-borne disease are occurring in the people served by the water supply.

4.2.5 Chlorination

There are two reasons for chlorination : to destroy micro-organisms in the water from the source and to decontaminate water entering the pipe system through infiltration. Chlorination is costly, not only for the installation of the chlorination unit at the time of construction, but for supply of chemicals, currently costing about Rp 50 000 monthly. Chlorination is not effective against cysts which require filtration for removal.

Chlorination in a minimum-cost water supply would be justified (i) if the source water were likely to be contaminated; (ii) if water is held in storage to allow sufficient contact time for the chlorine to act; (iii) if technical procedures were followed precisely to ensure adequate residual chlorine at the most distant outlets; (iv) if the chlorination were absolutely reliable so that the consumers could be reassured that the water was always safe and (v) if operation of the water supply system was continuous. These conditions are rarely, if ever, fulfilled in IKK schemes.

Deep wells and most protected springs are bacteriologically safe. The Mission observed that chlorination units were rarely being

used at all and even when they were used there were no records of tests of residual chlorine to show whether the procedures were effective. There is no storage and therefore contact time may be inadequate.

The Mission concludes that under IKK scheme conditions, chlorination is not worthwhile. If special circumstances should arise such as water-borne disease outbreaks due to the piped water, then a chlorination unit could be installed and strenuous efforts made to ensure that the technical procedures for operation of the unit, water testing and checking of the records are adequately carried out.

Recommendation 17
Chlorination units should be omitted from IKK schemes unless special circumstances exist.

Recommendation 18
Communities should be informed that the water is not guaranteed to be bacteriologically safe.

4.2.6 Flow Restrictors

The use of flow restrictors is the unique, indispensable and most controversial characteristic of the IKK strategy. Unless every flow restrictor is functioning according to design, a system is not an IKK system.

The flow restrictor is responsible for the continuous trickle flow, the flat-rate tariffs, the equal and limited supply of water to each person in each of the groups of house connection and neighbourhood taps and an even distribution of water throughout the system.

To the flow restrictor is attributable the absence of meters, of peak flows and of central storage.

The flow restrictor, the Mission found, was responsible for the

greatest part of the disappointment and rejection expressed toward the IKK schemes by the communities in which the schemes had been constructed. The resentment had been so strong that the Mission saw only one flow restrictor on a house connection which had not been altered to allow a greater rate of flow.

The Mission was told that the trickle flow had not been expected. Construction problems resulting in blockage of the restrictors added to the disappointment. People quickly discovered ways to attack the restrictors and in this they have often been assisted by officials of PAB-IKK and BPAM/PDAM to obtain acceptance of the system and payment of tariffs. Operators defending the restrictors may have found themselves unsupported and unable to enforce the use of standard sized restrictors.

If restrictors are altered, households close to the supply point may obtain all the water they need in less than 24 hours, with a brisk flow of water when the taps are turned on. Those unfortunately living further down the distribution system, even without restrictors, are lucky to receive any water even late at night.

Flow restrictors are a new and strange phenomenon and they are the reason for the irritatingly slow flow. The system designers proposed that the water intended for drinking, cooking, washing plates as well as bathing, should be delivered and stored in the 'bak mandi'. This is not considered by the people to be a potable water receptacle nor is it constructed or maintained in a way suitable to store drinking water.

The flow restrictor is the key to the success or failure of the IKK water supply concept. Any possibility of achieving acceptance of the restrictor will involve intensive persuasion as well as information for every recipient community and continuing supervision and enforcement of its use.

Since flow restrictors are inherently unacceptable, the Mission has no basis for believing that they can be made acceptable. However, since education and enforcement measures have never been

adequate, the possibility of acceptance and continued use can not be rejected.

The Mission considers that the IKK concept has important applications in circumstances of lack of finance and trained personnel which will continue indefinitely. Regrettably, from the viewpoint of social justice, the concept will have its largest application in communities already suffering from a shortage of potable water and which are prepared to pay the cost of a limited supply which represents some improvement.

For these reasons, the Mission proposes a dual approach to the problem of flow restrictors:

(a) to conduct trials of methods for achieving acceptability, and

(b) to install systems henceforward with sufficient capacity in the transmission pipe to permit adaptation in the future if flow restrictors can not be made acceptable.

To determine acceptability, the Mission proposes a series of trials to be conducted in the course of construction of IKK schemes, with results to be applied as soon as available, i.e. an action-research method:

Trial 1 Standard flow restrictors; Intensive community education; Enforcement when operation commences.

Trial 2 Flow restrictors producing twice the standard flow, i.e. 0.9 lpm; Community education and enforcement.

Trial 3 No Flow restrictors; Community education regarding water use, because the total volume supplied will be sufficient for only 60 lpcd.

Sub-Trial 3.1 No meters, flat-rate tariff. This can probably be rejected as a practical possibility because of culturally based objections to equal tariffs for different volumes used.

3.2 No meters, use-related tariffs on an 'honour', voluntary system, where people pay according to their estimated usage, at rates determined by community consultation (musyawarah).

3.3 Meters, tariff use related; (comparable to Basic Needs Approach but 60 lpcd instead of 90 lpcd).

Education of the community about the water supply generally and the restricted flow in particular, can be done by the PAB-IKK communications staff person (see Rec. No. 85), by the PDAM communications person (see Rec. No. 86) and the town surveyor.

The methods to be used include meetings and a workshop (Appendix G, program 5); follow-up discussions with small groups and with informal leaders, including women (Rec. No. 84).

A practical demonstration of the IKK flow rate and volume by means of a working model is highly desirable to ensure understanding (Rec. Nos. 81, 82).

Education of the community should be provided :

(i) at the time of survey and design, over a 2 weeks period and

(ii) at the time the system begins operating and applications for house connections are being received.

Recommendation 19

An intensive community education process should be developed including a mobile model to show the IKK-type trickle flow and 24-hour volume.

Recommendation 20

All training programs for personnel associated with IKK schemes should ensure that the nature and importance of the IKK flow rate and restrictor is understood and acted upon.

Recommendation 21

As an adjunct to administrative action to enforcement, all flow restrictors should be installed in locked, sealed, steel boxes, placed on the supply pipe.

Recommendation 22

Trials types 1, 2, 3.1, 3.2 and 3.3 described above, should be carried out in 3 to 6 schemes each, with appropriate research design and monitoring. Such trials could be conveniently performed in schemes funded by foreign aid.

Recommendation 23

Existing incomplete schemes with public taps only should be considered for trials as in Rec. No. 22 above.

4.2.7 Neighbourhood (Public) Taps

Tanks and taps intended to be used communally are essential components of the IKK system. The households which use the water are each required to pay a monthly fee. The designation of these facilities as 'public taps' translated 'hydran umum' or 'kran umum', has tended to reduce the sense of neigbourhood ownership and responsibility for the facility. It has also led to many being located in 'public' places where few or no families are served. A change in attitudes towards these taps will be facilitated not only by the consultation procedures for location considered elsewhere in this report, but also by a change of name.

Recommendation 24

Water points comprising a storage tank and several outlet taps for communal use in residential areas, where fees are to be paid by people using them should be named "neighbourhood taps".
Similar structures located in markets, schools, bus stations, offices, mosques or other public

areas can continue to be called "public taps"

A number of problems were observed in relation to neighbourhood taps. Apparently suitable sites were difficult to obtain and many were placed in public places rather than neighbourhood areas. One reason suggested was that land owners required payment for the land allocated to the tank and taps. Far fewer than the planned 20 families were actually using each neigbourhood tap, not only because of faulty location but also because of low population density and a heterogeneous mixture of households, some wanting house connections and others using the tap. Payment of fees by users of neighbourhood tap water was difficult to obtain because other communal water supplies in their experience have been free of charge.

The Mission notes the need for adequate provision of neighbourhood taps for people who can not afford house connections and supports the government's intention to ensure that poorer people have adequate access to safe water. The policy for a national average ratio of 50-50 for populations served by house connections and neighbourhood taps is acknowledged. This policy is in conflict with the need for cost recovery which requires maximizing the number of house connections. The 50-50 policy is also in conflict with the observation that, while the demand for house connections is unpredictable, it has usually exceeded 50% of the population in schemes where house connections have been offered.

The Mission is also aware of the need for the location of neighbourhood taps to be largely decided at the design stage when pipe sizes are determined.

Recommendation 25

Hence forward neighbourhood taps should be each designed to serve ten families, therefore smaller tanks and flow restrictors with less than 4.6 lpm flow rate can be provided. A smaller concrete apron would be adequate for drainage and would discourage use of tank water for laundry.

Recommendation 26

In the survey and design stage, a minimum number of neighbourhood taps to serve 20% of the population should be planned. The remainder (to achieve up to 50% coverage) can be added later if needed depending on the ultimately expressed demand for house connections.

The calculated numbers of neighbourhood taps in each standard scheme for 20% of the population is given in Section 4.5 Cost Recovery.

It was suggested to the Mission that voluntary contribution of land for neigbourhood taps was a useful form of community involvement. However the Mission doubts whether it is reasonable to expect a few people only to make such a contribution - perhaps voluntary contributions should be made by each member. It seemed probable that the donor would expect some privilege in return for the land. In fact, the Mission was informed that the land owner for at least one neighbourhood tap did not pay fees for his house connection. In other cases, the land owner may reserve the right to limit access to the tap to certain people and exclude others.

Most important of all, donated land is unlikely to be in the most suitable location for a neighbourhood tap.

The Mission concludes that it would be preferable for land for neighbourhood taps to be purchased.

Recommendation 27

Budgets for IKK schemes should include an allocation of money for purchase of land in the most suitable locations for neighbourhood taps.

In the section of this report on Cost Recovery, the assumption is made that 90% of fees will be collected from users of neighbourhood taps. This is an optimistic assumption and its achievement will require intensive community work to form socially cohesive

groups where people will cooperate in responsible use of the limited supply of water (30 lcd) and will pay the required tariff.

Recommendation 28

The PAB-IKK communications person should undertake community organizing work before and during the survey period in order to (i) define groups of households which will use each neighbourhood tap; (ii) decide the most suitable locations for the taps in consultation with the groups of potential users; (iii) obtain agreement from the landowner in each case to sell the land and agree also on the price.

Note also Recommendation 54 which refers to collection of fees from users of neighbourhood taps.

4.2.8 Float Valves

The Mission saw few float valves in domestic water storage containers and was informed that they had proved unreliable. Most houses had a tap on their inlet which was closed when the 'bak mandi' was full. This seemed a simpler and more satisfactory arrangement than using a float valve.

Public tap tanks made of fibreglass in West Java were inspected by lifting the lid. The float valves were all operating. Tanks made of concrete in Sumatra had corrugated asbestos cement roofs sealed with cement. Many were over flowing. Either they had no float valves or the float valves were not working. Adequate maintenance by the operators should enable efficient operation of public tap tank float valves.

Recommendation 29

Taps and not float valves should be installed on house connections.

The recommendations later in this report dealing with house connections are also relevant.

Recommendation 30
Float valves should continue to be installed on neighbourhood and public tap tanks and be maintained in good working order.

4.2.9 Hydrophore

A hydrophore is intended to prevent damage to the system from water hammer and to switch off the pump when demand for water is less than the supply rate.

In IKK schemes, these theoretical reasons have very little strength. The Mission concludes that a hydrophore is not required in IKK schemes.

Recommendation 31
The hydrophore should be omitted from IKK schemes.

4.2.10 Noise

The Mission received complaints about the exhaust noise from the diesel generators. It was observed that the sound travelled a considerable distance and was likely not only to disturb the peace of the environment but to reduce the acceptability of the system.

Recommendation 32
An exhaust silencing system should be designed and installed on all generating sets situated less than 500 metres from any occupied building.

4.2.11 24 hours Operation

Delivery of the required volume of water demands continous pumping if flow restrictors are functioning to design. The

Mission observed that 24 hour pumping was rarely being achieved and that this was a serious defect in operation.

If 24 hour pumping is not to be maintained for any reason there are several implications including :

(i) pipe sizes must be increased to allow a larger flow rate to provide the required volume of water in the reduced time;

(ii) householders may need a larger 'bak mandi' to ensure they collect their 600 litres when the water is flowing;

(iii) flow restrictors will need to be enlarged or removed to enable the required volume to be delivered in reduced time;

(iv) there is risk of pollution entering the pipes when the pumps are switched off and negative water pressures result.

Recommendation 33

Finance, supervision, staffing and training in every pumped scheme should be given close attention to ensure that a continuous supply is maintained.

4.2.12 Use of PLN Electricity Supply

The Mission has concluded that wherever continuous electric power is available it has significant cost advantages over diesel generating sets.

A recommendation on this matter is to be found in Section 4.5 on Cost Recovery.

4.2.13 Increased System Capacity

In view of uncertainty regarding the acceptability of flow restrictors, the Mission believes it would be prudent to consider increasing the system flow capacity above the IKK standard levels.

Taylor (Ref. 49, ch. 4.3, p.93 et. seq.) also recommends additional capacity for a variety of other reasons. The Mission notes Taylor's reasoning and the resulting factors in design of twice the supply requirement for source, transmission and distribution capacity. Since future needs for distribution will be uncertain, it is proposed that only transmission pipe size be increased in IKK schemes. If transmission capacity is doubled, the additional project cost would be about 3%.

Recommendation 34

Transmission pipeline capacity should be installed at twice the IKK standard supply requirement in all future IKK schemes.

4.3 Construction

4.3.1 General

Construction procedures adopted for the implementation of IKK schemes are required to achieve the program objectives of low costs and speedy implementation.

In addition, Presidential Decree 14A of April 1980, Article 19, gives preferential treatment to small local (kabupaten level) contractors where simple labour-intensive work is involved.

These two constraints have led to the current tendering policy whereby:

- the central IKK office in Jakarta handles procurement tenders for most of the materials used in the construction of IKK systems such as pipe and fittings, pumps, generator sets, electrical equipment, fuel tanks, hydrophores etc. This policy is intended to ensure ready availability of equipment, easy interchange of items and the low purchase costs normally associated with bulk purchasing;
- construction packages are used for the more complex works such as deepwell drilling and equipping, installation of electrical and mechanical equipment and installation and commissioning of water treatment plants. Each package usually includes a number of IKK schemes and tends to attract larger and more experienced contractors;
- contractors drawn from the kabupaten in which the IKK scheme is being constructed are used for all civil works such as pipe laying and the construction of neighbourhood taps and house connections.

The above tendering procedures, whilst in some respects fulfilling the policies of the Government, are causing some logistic and quality problems which are contributing significantly to the poor functioning of the IKK schemes inspected.

4.3.2 Quality of Workmanship

Because of the inexperience of the contractors, the quality of pipelaying is generally poor. It must be recognised that there is a conflict between the policy of assisting small local contractors and the design philosophy of an IKK water supply. With a peak hourly demand factor of 1.0 and an allowance of only 15% unaccounted water (which is rarely if ever achieved in the best constructed and operated schemes), the successful operation of an IKK scheme requires the highest standard of construction in order to reduce losses to a minimum. This is virtually unachievable with inexperienced contractors working to a tight budget.

Recommendation 35

IKK projects should make adequate manpower and

budget allowance for more intensive formal and on-the-job training for contractors.

Complementary to the above recommendation, the Mission believes that the present two-week training course for works supervisors is inadequate. The overall question of training needs is discussed more fully in Section 4.6.4 of this report.

Recommendation 36
The two week training course for works supervisors should be supplemented by intensive on-going field assessment and instruction.

4.3.3 Supply of Materials

It is reported that many contracts are delayed due to late arrival of materials ordered from Jakarta, incorrect materials being received (i.e. wrong pipe sizes) or because of illogical sequence of receipt of materials (e.g. all pipes of one particular size only received in one shipment, making it difficult for the contractor to organise his contruction schedule).

Recommendation 37
The contract for laying of pipes should not be let until all the materials required to be supplied by Cipta Karya are delivered to the province.

It is understood that late delivery of materials can sometimes be attributed to delays by the supplier. If penalties for late delivery which are written in to specifications are not enforced, then there is little incentive for suppliers to meet target dates.

Recommendation 38
Prescribed penalities for late delivery of materials should be more rigidly enforced.

4.3.4 Sequence of Contracts

Due to the involvement of three separate contracts in the construction of each IKK scheme, two of which are funded and administered from Jakarta and the other funded and administered by the provincial IKK office, careful planning and coordination is required if timing problems are to be avoided. One such problem is described in the previous paragraph.

It was also reported that in some cases when the pipelaying contractor had finished laying his pipes before the headworks installation was completed, the contractor had left the site without pressure testing his pipework. It has proved very difficult to get such a contractor back onto the site at a later stage, especially with the prospect of being obliged to spend a lot of time and money in making good his work.

It is beyond the scope of this Review Mission to carry out a study of tendering procedures and lines of communication between provincial and central IKK offices in order to make recommendations for improvement in coordination of contracts and materials delivery. The Mission considers that raising the awareness of Cipta Karya to the problems which are occurring in the field should encourage an internal review of procedures to minimize their effects.

Nevertheless, the Mission believes that some re-ordering of construction sequence is essential if the IKK schemes are to be fully successful.

House connections should not be made before the remainder of the system is fully operational, except for one demonstration house connection in the IKK office. This will eliminate the problems which have been occurring due to:

- frustration of householders who have paid a connection fee, received a house connection and have to wait for several months before water is delivered;

- blockage of flow restrictors occurring because pipes were not flushed and tested beforehand. This has been the cause of widespread tampering with the flow restrictors;
- the high expectations of householders who cannot visualize the 0.46 lpm flow they will receive from their tap. Applications for house connections can be confirmed by the applicants after they see the actual flow rate they will receive. It is considered that this will eliminate much of the dissatisfaction now being experienced by consumers.

Recommendation 39
The sequence of construction should be arranged in the following order:

- **production unit**
- **transmission and distribution system with neighbourhood taps**
- **testing of pipework**
- **house connections**

Although the first two contracts can proceed simultaneously, it is important that the production unit be completed before the pipework contract so that water is available for pressure testing.

Recommendation 40
Provision should be made for the installation of house connections to be done by the IKK Operating Unit.

The operating staff have the training for simple plumbing work and can install the house connections as required after the system is fully operational. In this way, the Unit will have an accurate record of the number and location of all connnections.

4.3.5 Contract Prices

The Mission heard that on some occasions the local contractors were unable to finish their contract due to lack of money. The

Mission was unable to determine whether this was due to faulty estimating, inefficient construction management or the basic financial weakness of the contractor. Instances were reported where the contractor did not carry out the cleaning of water mains and where pressure testing and disinfection of pipes was not done.

Although the theory of open tendering implies that contractors are free to submit whatever price they are prepared to accept for the work involved, the GOI policy of giving preference to small and often inexperienced contractors should also carry with it the obligation to protect those contractors against financial loss due to that inexperience. In many cases, these local contractors do not have the knowledge and expertise to estimate accurately the price of work which they have not previously performed. It is understood that in some cases, the tenders are based upon Cipta Karya's own unit prices which are not necessarily up to date and which do not always make due allowance for local factors.

It is not unusual, even in more technically advanced countries, for lowest tenders to be rejected on the grounds that they are too low. Neither the contractor nor the client benefits if the contractor cannot reasonably complete his work for the contract price.

It must be recognised that GOI policy to employ inexperienced contractors carries with it the obligation to provide closer supervision and on-the-job training. The Mission has already noted that increased manpower and funds should be budgetted to allow for increased contract supervision. (Rec. No. 35).

Recommendation 41

A review should be made of standard unit prices used by Cipta Karya in budgetting and funding of schemes and, if appropriate, revisions be made to the budget allowances for the program. As part of this review, further instruction should be given

to provincial PAB-IKK officers in estimating techniques. Due consideration should be given to the different costs applicable in different areas.

4.3.6 House Connections

There are many features relating to house connections which the Mission believe to be unsatisfactory.

In some cases, particularly in Aceh Province where the use of the 'bak mandi' is not customary, house connections were seen to terminate in the front garden, some distance from the house. In this situation, the pipework was readily damaged causing leakage. Also the IKK system requires household storage facilities if it is to perform its function.

Recommendation 42
No house connection should be made to any house which does not have a suitable receptacle to receive and store the water and the connection should be constructed up to that receptacle.

The policy of discharging drinking water directly into the 'bak mandi' is both psychologically contradictory and hygienically undesirable. One of the options given in the design manual allows for the water from the house connection to discharge directly into a 20 litre container with the overflow into the 'bak mandi'. The Mission strongly believes that this should be promoted and should be included in the design to be supplied by the Government.

Recommendation 43
The design alternative of a 20 litre container in addition to the 'bak mandi' house storage should be made standard and included in all installations.

It was noticed that almost all house connections require more

than the 10 metres allowed for in the design. The Mission notes that the standard length of service pipe from the main has recently been increased to 20 metres. This measure is fully supported.

Nevertheless, house connection fees, although not officially required in the IKK program, are in fact charged by all PDAM/BPAM's. Fees range from the 'recommended' Rp 15000 to more than Rp 50000. There is usually an extra charge of about Rp 1500 per metre of house connection in excess of the standard 10 or 20 metres. This can be a financial burden on the householder and may inhibit applications for connections.

As a suggestion, the standard connection fee of Rp 15000 plus Rp 1500 per metre in excess of 20 metres could be reduced by, say Rp 250 per metre if the consumer digs his own trench for the house connection.

Recommendation 44

A maximum standard house connection fee of Rp 15 000 should be set.

Recommendation 45

Householders should be given the option of reducing the connection fee by Rp 250/metre if they dig the trench from the water main to the house.

4.4 Operation and Maintenance

4.4.1 Staff Numbers

The numbers of operators and administrative personnel in IKK Units are not always consistent with Cipta Karya instructions (Ref. No. 45 Pedoman Pengelolaan Air Bersih IKK).

Over-staffing will reduce the possibility of reaching break-even

point and under-staffing may reduce operating efficiency and adequacy of maintenance.
The mission consider that a 10 lps pumped scheme would require 5 staff to cover 3 shifts and administration.

Recommendation 46
Existing schemes should be instructed to adjust staff numbers to comply with Cipta Karya policy.

Recommendation 47
A 10 lps pumped scheme should be staffed by 5 people including the "Kepala Unit".

4.4.2 Technical Support

The Mission observed that at least some operators do not yet fully understand how to operate their systems. Due to their inexperience, they cannot yet identify when operating problems exist nor how to correct them. They can be expected to require strong and continuing technical support and advice.

Recommendation 48
Each IKK Unit should receive regular and frequent visits from an experienced technical officer or engineer. During these visits, the equipment should be inspected, problems dealt with and the operators given on-the-job training.

Recommendation 49
Where the PDAM does not possess a technical officer with adequate training and experience, the PAB-IKK should continue to provide an officer for technical support to IKK schemes.

4.4.3 Spare Parts

The Mission was informed that no stocks of spare parts were held in any of the provinces or systems visited.

Recommendation 50

Each PAB-IKK should ensure that stocks of spare parts in required quantities and of appropriate types be held at Unit, Kabupaten and Provincial level.

4.4.4 Maintenance

The Mission observed that machinery and equipment was often not being adequately maintained.

Recommendation 51

The maintenance manuals now being prepared in Jakarta should be distributed as soon as possible to all IKK schemes.

Recommendation 52

Maintenance schedules should be prepared by PAB-IKK officers for each IKK scheme and operators trained and supervised in performing correct maintenance procedures by the PAB-IKK (or PDAM) technical officer.

4.5 Cost Recovery

4.5.1 Tariffs

So far few schemes have begun collecting fees from the consumers. Where fees are being collected, the Mission noted that, at least in the case of pumped schemes, the monthly tariffs are too low to cover the cost of O & M. Moreover, it is apparently difficult to convince users of "public" taps to pay for the water. Also in view of delays incurred during construction, especially in connecting the prescribed number of house connections, nearly all IKK schemes will require subsidies from provincial or national budgets for a considerable period of time. Realising this, the local authorities (PDAM etc.) are often reluctant to assume

responsibility for the schemes. Detailed cost figures for O & M, based upon actual costs of operating schemes in North Sumatra, are presented in Appendix E. It should be noted that estimates of maintenance costs of the distribution system and office expenditure have been kept at a very low level and these may need revision in the light of experience. Moreover, overheads (PDAM, etc.) and replacements have not been taken into consideration.

In summary, monthly O&M costs for IKK schemes are :

TABLE 1

Monthly O & M Costs

Springs	2.5 lps	Rp 295 000
	5.0 lps	Rp 350 000
	10.0 lps	Rp 465 000
Shallow/deepwells	2.5 lps	Rp 642 000
	5.0 lps	Rp 973 000
	10.0 lps	Rp 1 524 000
Treatment packages	2.5 lps	Rp 1 226 000
	5.0 lps	Rp 2 016 000
	10.0 lps	Rp 3 226 000

In Rec. No. 25, the Mission recommended that neighbourhood taps should be constructed serving only 10 families (100 persons) and in Rec. No. 26 that greater flexibility be allowed in the ratio of water allocated to private house connections and "public" taps. One reason for making this recommendation is that in many IKKs it is proving very difficult, if not impossible, to find enough suitable locations for neighbourhood taps. Also from an economic point of view, there are compelling reasons to allow greater flexibility. The Mission believes that it is essential for IKK schemes to recover O & M costs, after an initial period of three years at most. Provincial and national budgets should not have to carry the burden of subsidising the schemes for a longer period of time.

On the other hand, if schemes are expected to fully cover their O & M costs after three years, as is present policy, then an

assessment is necessary of the possibility of breaking even. In Table 2 below, break-even points have been calculated based on the present 50:50 ratio, with neighbourhood taps serving 200 people. It has also been assumed for the purpose of the calculations that a 90 per cent payment rate can be achieved for both house connections and neighbourhood taps and that house connections pay four times as much as neighbourhood tap users. Such a high payment rate is an optimistic assumption.

TABLE 2

Monthly water rates necessary to recover O&M costs in 50:50 model

	Equiv. H. C.		Neighbourhood Taps	
	No.	Monthly rate (Rp)	No.	MonthlyRate (Rp)
Spring Source				
2.5 lps	180	1 457	9	364
5.0 lps	360	864	18	216
10.0 lps	720	574	36	144
Shallow/deepwells				
2.5 lps	180	3 170	9	793
5.0 lps	360	2 402	18	601
10.0 lps	720	1 881	36	470
Treatment Packages				
2.5 lps	180	6 054	9	1 514
5.0 lps	360	4 978	18	1 244
10.0 lps	720	3 983	36	996

Thus in the present 50:50 ratio model, monthly water bills would have to range between Rp 574 and Rp 6054 for house connections and between Rp 144 and Rp 1514 for users of neighbourhood taps to reach the break-even point.

The most important question in this connection is : how much are the people willing and able to pay? This question has been a subject of much debate. As the DHV evaluation report shows, "there is little consensus in existing literature on the issue". An arbitrary percentage of household income is not very helpful, especially since reliable data on income are not available for

the IKKs. Consequently any assessment is bound to be speculative and subjective.

The Mission gained a strong impression in all IKK schemes visited, that a monthly tariff of more than Rp 2000 is likely to meet with opposition and a high rate of non-payment. Many people the Mission met compared the water tariff with an average monthly electricity bill noting that electricity had greater priority, so that a water bill as high as that for electricity would not be a feasible proposition. For IKK schemes with small deep well systems and, especially, with treatment packages the implication is that they cannot reach the break-even point with a 50:50 ratio, as the required monthly rate will be much more than Rp 2000.

Hence the mission calculated O & M costs also for an 80:20 model, using neighbourhood taps for only 100 persons (ten families) each. This is given in Table 3.

TABLE 3

Monthly water rates necessary to recover O&M costs in 80:20 model

	Equiv. H. C.		Neighbourhood Taps	
	No.	Monthly rate (Rp)	No.	Monthly Rate (Rp)
Spring Source				
2.5 lps	253	1223	6	306
5.0 lps	507	724	12	181
10.0 lps	1014	401	24	120
Shallow/deepwells				
2.5 lps	253	2662	6	665
5.0 lps	507	2013	12	503
10.0 lps	1014	1577	24	394
Treatment Packages				
2.5 lps	253	5083	6	1271
5.0 lps	507	4171	12	1043
10.0 lps	1014	3337	24	834

Assumptions made in calculations for Table 3 are given in Table 4.

TABLE 4

No. of House Connections and Neighbourhood Taps for 80:20 Model

Module size	2.5 lps	5.0 lps	10.0 lps
Water available for domestic use (litres) *	162 000	324 000	648 000
Non-domestic use (5% of domestic demand)	8 100	16 200	32 400
Water available for sale	170 100	340 200	680 400
Total population served	3 000	6 000	12 000
Number of n'hood taps (10 families per tap)	6	12	24
Number of house connections	240	480	960
Equivalent house connections for non-domestic use **	13	27	54
Revenue paying house connections (equivalent)	253	507	1 014

* Calculated from the current criteria eg.180 houses x 600 lpd plus 9 public taps x 6000 lpd.

** The significance of the term "non-domestic use" in the IKK strategy is not clear. It could mean commercial and industrial uses, and would be paid for but not available for the population at large. Therefore it would produce revenue but reduce coverage.

On the other hand, "non-domestic use" could mean institutions such as schools, mosques and offices and municipal use. In that case there would be no contribution to revenue or to coverage.

Even if an 80:20 ratio is used, all break-even point rates for treatment packages remain far higher than Rp 2000. The requirement of financial self-sufficiency is an important criterion and the Mission is in total agreement with this principle. It does, however, have serious implications for the viability of the

schemes. Treatment packages are technically relatively complex systems which are totally dependent on the skill of its operators and on a regular supply of the required chemicals. To find or train operators with sufficient skill is already a difficult and costly matter. Without sufficient income, however, the regular supply of chemicals is not guaranteed, so that the schemes will break-down and/or supply untreated or partially treated water, the latter probably worse from a public health point of view if users presume that the water is safe.

Recommendations Nos. 9 and 26 refer to the rejection of schemes requiring water treatment plants and the adoption of a higher house connection/neighbourhood tap user ratio.

In the above cost calculations, only limited amounts have been set aside for the maintenance of the distribution systems. The Mission recognizes that these amounts do not suffice to pay for wilful damage to flow restrictors, etc., by the consumers. This calls for a strict policy which enforces disconnection in case of damage which, as the Mission observed, is clearly a problem in existing schemes. Yet the restricted flow is a key element in the IKK system and must be kept functioning.

Recommendation 53

Clear rules should be made for Unit staff to disconnect houses with damaged flow restrictors or connections that have been tampered with in any other way to increase the flow of water. Reconnection should be done only upon payment of the cost of the damage plus an additional reconnection fee. Consumers should be informed about this regulation.

In the foregoing calculations of required monthly fees, one major assumption was that 90 percent of the water rates from house connection and neighbourhood tap users would be collected. This is by no means achieved at present and the Mission believes that it will be necessary to pay great attention to the fee collection

aspect. Fee collection from neighbourhood tap users might be particularly difficult, as people are now used to the idea of free use of "public tap" water. Apart from measures such as those discussed in the Section 4.7.5 "Education of the Community" and the reduction of the number of neighbourhood tap users per tap, other initiatives are needed to increase contributions from neighbourhood tap users.

Recommendation 54
Steps should be taken to encourage payment of fees by neighbourhood tap users in a variety of ways and these ways should be tested in different schemes constructed over the next two years. These trials should be conducted with the guidance of a suitably experienced social scientist.

Procedures to be tested might include :

- a greater degree of community education before and while the neighbourhood taps are constructed;
- the construction of neighbourhood taps in groups of houses with traditional and/or functional affiliations to one another;
- the designation of suitable persons to collect the fees;
- determination of a "commission" to be retained by the collector;
- sale of water at the neighbourhood tap by a "water controller";
- incorporation of water charges in IPEDA or another local tax;
- coin or token-operated water dispensers on neighbourhood taps;
- collection of water charges by LKMD, religious or other community organisations for transfer to the PDAM, with a commission that would benefit and remain in the community.

The total and also the per capita construction and O & M costs per scheme differ considerably for different types and sizes of

schemes. As noted, O & M costs of spring systems are much lower than for deep well systems even though capital costs may be higher. Larger systems have lower O & M costs on a per capita basis. In order to enhance the chances of cost recovery, especially in small pumped schemes, it is important to look into the possibilities for cross-subsidy. Moreover, from the point of view of social justice, there is a case for flat rates that are the same, irrespective of the type of system or size. The Mission recognizes that it will not be easy to realize this idea in practice, but still believes that it is justified to apply it. The Government spends higher capital investment costs on spring systems and may expect the people to share the additional benefit of low O & M costs with other members of the community who are less fortunate.

Recommendation 55
Tariffs in IKK schemes, whatever the source and the actual operating costs, be set as high as possible but not above Rp 2000 per month per house connection and a proportionate amount per household for users of neighbourhood taps.

This recommendation assumes that no water treatment systems are installed.

4.5.2 The Use of PLN Electricity

In the past, various cost calculation have been made which showed that using generators was cheaper than purchasing power from PLN. However, during the past few years the cost of diesel fuel has risen dramatically, from Rp 70 to Rp 250 per litre, while PLN tariffs have increased to a much smaller extent.

The current PLN tariff is Rp 96 per KWH (kilowatt hour) plus Rp 2.8 per installed VA (volt-amp) per month. Table 5 on the following page summarizes the monthly estimated power costs.

TABLE 5

Monthly Power Costs

	Average Load (KW)	Monthly Cost Meter	Fixed	Total
Deepwell				
2.5 lps	1.7	118 000	14 000	132 000
5.0 lps	3.4	235 000	28 000	263 000
10.0 lps	6.8	470 000	56 000	526 000
Treatment Packages				
2.5 lps	2.5	173 000	14 000	187 000
5.0 lps	4.5	312 000	28 000	340 000
10.0 lps	7.0	484 000	56 000	540 000

It is obvious that these costs are considerably lower than the fuel and lubrication costs for gensets (see appendix E). Moreover, systems based on PLN could be operated with three operators in the case of deepwells (instead of 4-5) and for treatment packages at least one operator less would be required.

Installation costs for a 5 KW installation are Rp 90 per VA plus a fee of Rp 36 per VA or 5000 x Rp 126 = Rp 630 000. For 10 and 15 KW the corresponding costs are Rp 1 260 000 and Rp 2 520 000. This too compares very favourably with the cost of installing two generators, a genset house and the cost of the land required.

Recommendation 56
That PLN power be used in all schemes where 24-hours supply is available.

4.6 Management and Administration

4.6.1 Planning

The Mission observed that limited financial and manpower resources had resulted in inability to complete some IKK schemes, increased costs, loss of revenue, loss of confidence by the community and reduced coverage.

The Mission felt strongly that it would be preferable to complete to a satisfactory standard any scheme which was commenced, even if numerical targets were not met. Close attention to the need for water in the town selection procedure would ensure that schemes were provided for the people who deserved them most.

Recommendation 57

When achievements in the 1984-85 IKK program are reviewed, attention should be directed to the number of systems completed and operational according to design and the actual expenditure required to achieve fully completed schemes.

Recommendation 58

The 1985-86 program should be reviewed in the light of the finance and manpower available and the targets adjusted if necessary.

The logic of water supply planning is often inconsistent with the arbitrary boundaries set for small towns and with the existing administrative arrangements for water supply between CK, Depkes and Dalam Negeri. The Mission was impressed by the reports of the meetings of the Inter-departmental Working Group on Integration of Rural and Urban Piped Water Supplies (Ref. No.54) and also noted a report on the feasibility of community identification and water supply planning in Sulawesi Tenggara (Ref. No.21)

Recommendation 59

Tariff guidelines for piped water supplies should apply to both small towns (including IKK) and rural systems.

Recommendation 60

Consideration should be given to the formation of a "Water Supply and Sanitation Planning Team" in each province.

Such a team could report to Bappeda providing technical input

needed to enable Bappeda to fulfil its responsibility for provincial planning.

The team might comprise two engineers, with the part-time services of a hydro-geologist, an economist, a health specialist and a community organizer/educator.

4.6.2 Management

The Mission observed that BPAM and PDAM staff in some cases did not yet possess the qualifications and experience necessary for the tasks they were expected to perform.

In particular, engineering staff were difficult to obtain and it appeared that the Dept of Public Works would be asked to provide engineering assistance for IKK schemes for some years after management had been taken over by a PDAM.

The numbers of staff employed in IKK schemes and in BPAM/PDAM offices sometimes appeared to be excessive in relation to the work-load.

The Mission is aware that administrative procedures for water enterprises are steadily being evolved and that changes in policies and procedures are unavoidably creating difficulties for everyone concerned.

The Mission is also aware that an Institutional Support Project for Water Enterprises is being supported by foreign assistance, that a variety of training programs are being conducted and that the Human Resources Development Project is giving attention to the management requirements for water supplies.

Because of the importance of management efficiency to the success of the water supply program, the Mission wishes to emphasise the need to recruit and retain competent and enthusiastic staff. Water authorities are the responsibility of local governments and so opportunities for promotion are limited.

Recommendation 61

Career opportunities for water enterprise staff should be provided by developing a suitable organisation structure. A National Water Enterprise could be considered for this purpose as well as for technical and administrative reasons.

Some BPAM/PDAM officials complained to the Mission that they were not adequately informed about new schemes which they would eventually take over. They were also not clear about the responsibilities which they held and those which PAB-IKK held.

The Mission observed that its counterpart personnel were able to clarify many issues during field visits to PAB-IKK, BPAM/PDAM and to towns and water systems.

Recommendation 62

BPAM/PDAM officials should be kept well informed by the Kepala PAB-IKK about IKK schemes planned and under construction, including invitations to BPAM/PDAM officials to participate in decisions regarding location, design details, connection fees and tariffs and staff appointments and training.

Recommendation 63

In the present rapidly developing IKK program, personal visits should be made by Jakarta staff to provinces for two-way exchange of information and explanation. A visit to each province at least once in three months is suggested.

4.6.3 Monitoring

Good systems require accurate assessment of problems based on reliable information and effective corrective action. Self-evaluation, community review, peer review, supervision and written reports all have a place in achieving these aims.

Self-evaluation is the fastest and most effective form of review, leading to learning by experience and behaviour change. The attitudes required include willingness to analyse personal performance and apply self-criticism. The ability to review events and learn by experience is also necessary.

self-evaluation capacity

Recommendation 64

The capacity for self-evaluation should be developed in all personnel through formal training, constructive and helpful supervision and in-service training.

Recommendation 65

Personnel should be encouraged to discuss with water users their views about the system, to take action to investigate complaints and to make improvements.

Personal visits and informal conversations for sharing experience with people doing similar work, are helpful for improving performance.

Recommendation 66

Peer review should be facilitated by means of :

1. **exchange visits between staff of different schemes within provinces, and between BPAM/PDAM staff;**
2. **regular meetings at Kabupaten (monthly), Province (3-monthly) and National (annual) levels with the aim of sharing experience and learning from one another. Such meetings need skilled leadership.**

Recommendation 67

A seminar-workshop should be held late in 1984 of representatives of all agencies involved in IKK schemes with the aim of sharing experiences and learning from one another.

The scale, importance and innovative nature of the IKK water supply program indicate a need for close observation of its progress, in addition to regular statistical reports. The modifications to the program recommended in this Report require close observation during implementation. Monitoring should be conducted as far as possible on a personal, face-to-face basis with the aim of improving performance and achievement.

Recommendation 68

A senior officer from Cipta Karya should be appointed full time to monitor the IKK program. The officer should not be a member of the IKK project group and must be free to make whatever recommendations are needed. His duties will include observation and analysis of construction and operation of IKK schemes, observation of the testing of modifications, and direction of the application of the results of trials.

Recommendation 69

Consideration should be given to requesting technical assistance from a foreign donor in the form of an expert adviser to assist the Cipta Karya officer in monitoring and in implementing changes.

Recommendation 70

A multi-disciplinary team like this Review Mission should make a review of the IKK Program in June 1985. The field visits should include schemes in the islands outside Java where conditions may be different. The itinerary could allow time for in-service training and assistance to field staff.

The processes of communication, community education, community involvement and inter-departmental cooperation require more prolonged observation. One or more Indonesian social scientists could be employed for three years to work within at least 3 IKK schemes from the earliest stages of information to the kecamatan

through the request, survey, design, construction, operation, maintenance and administration stages.

These experts would work as participant-observers. They would actively assist the technical staff in their relationships with the communities and with other organizations. At the same time they would record and analyse the events which occur.

The outcomes of their work would be detailed descriptions of the processes of decision making and of the interaction between the parties involved. They would show what actions were successful and what activities were not helpful.

As often as necessary, but at least every 3 months, they would make reports with recommendations to improve the efficiency of the IKK program. Their findings would assist in field testing and improving training programs for staff to achieve community participation.

Recommendation 71

One or more social scientists should work in IKK schemes as participant-observers to assist in implementation and to advise on ways to increase efficiency and gain community involvement including staff training methods and content.

The purpose of monitoring is to get good systems and not merely good reports. Written reports are of little value for making changes and improving systems. If reports are to have value other than providing administrative control information, they must be acted upon.

Recommendation 72

Written reporting should be kept to the minimum necessary for administrative control

Recommendation 73

The person who has the responsibility for reading each report and taking action when necessary should be identified and held accountable for actions taken.

4.6.4 Training

The Mission observed that many of the deficiencies in the IKK schemes could be attributed to the relatively low level of formal training and the inexperience of technical and administrative personnel. These limitations are not peculiar to IKK water supply schemes and they represent a major reason for the standardisation component of the IKK strategy.

The Mission notes that a series of training programs are being conducted by the Sub-directorate of Technical Development (Subdit Pengaturan) of the Directorate of Water Supply and that foreign-assisted projects are proceeding including the Human Resources Development Program, the Organization and Management Training Program and the Community Involvement and Customer Relations Program.

Recommendation 74

As trained personnel are essential for all aspects of water supply systems, adequate resources should be provided to apply, extend, evaluate and improve programs for training for all categories of personnel.

Other relevant recommendations for training activities are to be found in the following sections :

Construction (Section 4.3)

Communications & Community Work (Section 4.7 and Appendix G)

4.7 Communications and Community Work

4.7.1 Communication Issues

The Mission observed that in some towns where IKK water supplies were already functioning, some officials such as the Camat, Kepala Desa and Dokter Puskesmas did not know that the slow flow rate is an essential aspect of the system. Many officials asked why the water flowed so slowly and when it would flow properly. In Waled the people saw the water flow copiously when the distribution was tested and now think there is something wrong with the system.

The Mission observed that a very limited program for information giving had been carried out in the recipient communities to assist their understanding and acceptance of the IKK water supply scheme. In three IKKs, a meeting of 1 1/2 hours had been held to explain the flow rate, quantity and benefits prior to the starting up of the system. In one IKK, the Kader of LKMD had visited houses to ask about house connections, but had not themselves understood the principles of the system.

The IKK Survey and Design Manual states that, at the time of the initial town survey, a briefing must be given to the Camat and other people. The Mission's observations suggest these briefings have been insufficient.

The slow flow rate of the IKK water supply system is a new type of experience in water supply for everyone concerned - people, officials, and technicians. One of the major problems facing the IKK water supply program is the non-acceptance of the flow rate which is the basis of the scheme. This is a new approach to water supply. The people have no previous experience of receiving a small flow of water throughout 24 hours to provide a set but limited quantity of water.

Education of the community to gain acceptance of the IKK water supply requires changing people's attitudes to the use of water.

Where is a recommendation on this subject?

To achieve such changes requires an understanding of the customs and habits of the people, an understanding of their previous experience and information given in a way which will enable understanding.

Accurate information is essential if people are to understand this new system. The information needed includes :

- the basic concepts of IKK water supply; that it will provide a limited supply of water, primarily for drinking and cooking; that it is a low cost system which requires that water will flow slowly so that in 24 hours a household will receive 600 litres;
- that people will pay for a house connection and a monthly tariff will be paid by householders and by neighbourhood tap users;
- that poorer people in the community will be provided for by supplying at least 20% of the population with neighbourhood taps for which tariffs are lower.

If the disadvantages of the IKK system, including the restricted flow, are to be accepted, the reason why low-cost systems are necessary must be explained. Such systems, providing only the minimum amount of safe water essential for health protection, are to be provided to large numbers of people with the limited resources available in Indonesia. If a few people get good water systems, very many people will be unable to get improved water supplies at all.

Information given must be understood if people are to accept the system. Formal meetings do not always ensure that the questioning, discussion and clarificaton required for understanding will take place.

No recommendation

To achieve understanding in his, or her, audience, the person giving information requires skill in communication methods. Those skills have to be learned. The services of a specialist in communications are needed to define the most effective methods in

different circumstances and to train people in communication methods.

Recommendation 75

Greater efforts should be made to ensure that both officials and the community are accurately informed of and understand the nature and concepts of an IKK water supply before it is introduced.

4.7.2 Community Participation

"Community participation" has been given a great deal of attention in publications about water supply. The possibility of community participation was raised in early meetings of the Mission in the Directorate of Water Supply.

The Mission therefore gave special attention to this question to consider what level of community participation would be possible within the framework of the IKK water supply program as it is currently administered.

The community is required to respond to the IKK concept by :

- accepting the limited flow rate and daily quantity allowance;
- using the water allowance appropriately;
- paying the costs of the house connection and the monthly tariff.

The Mission has identified three components of work which affects the community

1. **Communication within the Government Structure**

   An adequate system of communication is needed within the government organisation to ensure that information about the IKK system's technical, administrative and community aspects is fully understood, that information is passed on to appropriate persons, that cooperation between departments is fostered and that ultimately the local community leaders are informed.

2. **Education of the Community**

The local community leaders will be the main people available to pass the information on to the community. They will need correct information, aids to giving the information to the community and support from trained people at the Provincial and Kabupaten level. Because accepting the IKK water supply scheme requires an attitude change to the slow flow rate, use of water and payment, the people will need time to discuss, realise the implications and, if necessary, disagree.

3. **Community Involvement**

In a water supply system which is standardised in its technical design and installed by contractors there is very little scope for community involvement. A very few decisions are made by the community leaders but there is very little active work contributed by the people. The level of community involvement available to the community in the context of this scheme is discussed in section 4.7.7. Any increased community involvement would require a change in the way the system is installed. Possible changes are discussed below. This report uses the term "community involvement" because the level of activity available to the community is too limited to be called "community participation".

4.7.3 Improvement of Communication

To assist people to know about, to understand and to accept the flow-restricted IKK supply will require an inter-related set of functions to be carried out. The functions required are :

- Community involvement;
- Effective communication through government channels;
- Education of communities;
- Training of staff.

To support these functions, Cipta Karya needs the services of a specialist communications unit.

Recommendation 76

A Communications and Community Work Unit should be established in Cipta Karya to provide services to the IKK program.

Communications Unit

Principles

Communications functions for the IKK program can be performed by a 4-tiered system.

1. A specialist staff unit, whose members identify communications problems and their solutions, develop and conduct training programs and manage the work of national consultants.
2. National consultants in communications and community work contracted for specific tasks and projects.
3. Staff of the IKK system at various levels e.g. National IKK Projects Office; Provincial PAB-IKK staff; BPAM/PDAM staff; IKK scheme operators and administrators. These people must provide the information to other officials and to the community.
4. Staff of other departments involved in health education, whose work is relevant to IKK schemes.

The specialist communications unit has responsibility for planning, training and managing communications activities. The face-to-face work in government agencies and in the community will be the responsibility of the IKK project staff at each level.

Staffing

Initially, two professional staff should be appointed. Their qualifications should be :

- social science graduate
- communication skills
- adult education experience.

Two support staff will be needed for typing and secretarial duties.

Duties of the Unit

Carry out the Communications and Community Work Program by various methods including :

1. Arranging meetings and workshops to facilitate communication about IKK water supply systems at the national level within Public Works and between departments and from national to province, kabupaten and kecamatan levels;
2. Plan in consultation with national consultant:
   - regional workshops for PIMPRO PAB-IKK;
   - regional training programs for PAB-IKK staff in communication, community education and community organisation;
3. Plan in consultation with Department of Home Affairs and, if necessary, national consultants, regional workshops for training PDAM/BPAM staff in communication skills and community education;
4. Plan with regional training centre staff for communications and community education components to be added to the training of surveyors and Kepala Unit;
5. Plan with PAB-IKK and national consultant in community education for review workshops in provinces;
6. Prepare training materials;
7. Arrange training of trainers to provide one communications skills trainer in each training centre;
8. Plan and conduct training programs for PAB-IKK and PDAM staff, IKK scheme surveyors and operators;
9. Review and evaluate communications functions in the IKK systems, identify problems, prepare and test solutions, make recommendations for preventing similar problems.

Consultants

There is far too much work for two staff members to perform.

They can make use of the services of national consultants. Suitable consultants for these purposes can be found in the "Lembaga Swadaya Masyarakat" including :

- Yayasan Indonesia Sejahtera (YIS);
- Lembaga Pendidikan Penelitian dan Penertiban Ekonomi dan Sosial (LP3ES);
- Bina Swadaya.

These organisations possess suitable skills and experience. They can provided suitable training programs and all three have provided consultancy services to Cipta Karya previously.

Suggested Program for Year 1

Months 1 - 3 : 1. Orientation - reading
- field visits

2. Choice of National Consultant - Lembaga Swadaya Masyarakat
3. Plan
   (i) 3 regional workshops for PIMPRO PAB-IKK
   (ii) 3 regional training programs for selected PAB-IKK staff.

Months 4 - 6 : 3 regional workshops for PIMPRO PAB-IKK (See Appendix G).

Months 7 - 11 : 3 regional training programs for selected PAB-IKK staff (Appendix G).

Schedule for Months 7 to 11

```
Month          7           8           9           10          11
Week        1  2  3  4  1  2  3  4  1  2  3  4  1  2  3  4  1  2
Wk'shop 1  xxx------------------------xxx
Wk'shop 2              xxx------------------------xxx
Wk'shop 3                          xxx------------------------xxx
```

xxx Classroom training
--- Field work with supervision

Costs

1. Staff Salaries
   - 2 professional
   - 2 support

2. 3 Regional Workshops
   - Trainee
   - Materials

   National Consultant
   Salary : Rp 350 000/month)
   Travel : 3 x 6 man days) approx.

3. 3 Regional Training Programs
   (i) First week :
   3 x 6 man days
   - Trainee
   - Materials
   - Perdiem

   (ii) Final week - review of field work :
   - Trainee
   - Materials
   - Perdiem

4. National Consultant
   Salary : (i) 3 x 6 man days
   (ii) 3 x 6 man days @ Rp 350 000/month = Rp 225 000
   Travel :

Recommendation 77

While the permanent Communications and Community Work Unit is being established, and in view of the urgency of the program, immediate action should be taken to provide communications services by :

1. appointing a suitably skilled person in a temporary position in Cipta Karya to begin the program by using the services of a National Consultant e.g. Lembaga

Swadaya Masyarakat (LSM);

and/or 2. requesting the services of a Communications and Community Work expert from a foreign assistance agency. Such a person would function as an adviser when the communications specialists are appointed to the Unit.

4.7.4 Government Communications

Although organisation charts and linkages for all government departments and agencies show the lines of official communication, the Mission was informed that necessary information was often not received, or not understood, or not received in time at various levels.

In addition to the long chain of communication from National to Kecamatan levels through the Cipta Karya/IKK system, there is a need for effective communication to enable cooperation between Cipta Karya, the Department of Health and the Department of Home Affairs, as well as Provincial and Kabupaten government authorities including Bappeda I and II.

Regular formal meetings are useful but may not be sufficient for gaining the necessary understanding.

In view of the opportunities for improvement in IKK schemes discussed in this report and the modifications to existing policies and programs which will be occurring, there will be a need for frequent and extensive communications for technical, administrative and community - related updating.

Recommendation 78
Action should be taken to ensure adequate information about IKK systems is given to all relevant departments and levels of government.

Programs 1, 2, 3 and 4 in Appendix G set out proposals for this purpose in detail.

Recommendation 79

Each Kepala PAB-IKK should ensure, by arrangement with officials in the Department of Health including the Dokter Puskesmas in each Kabupaten, that effective health education regarding water, sanitation, and personal hygiene is undertaken with the people in conjunction with IKK water supply systems.

Newsletter

One important method of communication is a newsletter. The Mission believes there is a need for frequent and wide distribution of information about the IKK program, on subjects such as :

- technical updates;
- program plans and progress;
- administrative changes;
- aims and methods of IKK schemes;
- useful experiences to be exchanged;
- activity reports by senior officials in IKK program work;
- correspondence and readers' views;
- related activities by other departments and agencies.

Such a publication would assist cooperation between departments and agencies, would improve the flow of information to field staff, would build morale and motivation and a sense of team-work among all the people working on IKK schemes and would assist with problem solving and the dissemination of new ideas.

The newsletter could be distributed to :

- all PAB and PAB-IKK
- Bappeda I and II
- BPAM, PDAM
- staff of IKK schemes
- contractors
- consultants

- other departments including Health and Home Affairs
- cooperatives
- local governments
- community organisations including Boy Scouts, LKMD, PKK
- Dharma Wanita.

Recommendation 80
A newsletter about the IKK Water Supply program should be prepared, and distributed monthly.

4.7.5 Education of the Community

Inadequate understanding and acceptance of the IKK schemes have already been emphasized in this report. The possibility of acceptance by the people can be increased by education of the community and community involvement.

Education of the community requires:

- that the people are given the correct information about the system;
- a setting in which people feel confident to ask questions, discuss issues, clarify their ideas, understand implications, and, if necessary, disagree;
- staff trained in communication skills and informal meetings and workshops;
- on-going discussion and learning with local leaders who understand the system.

Education of the community should begin when the first activity of the project takes place in the town.

Accurate information about the flow rate, the daily quantity, the proposed cost for house connection and tariffs for house connections and neighbourhood taps will help to prevent people having faulty ideas about this water supply.

Education in the community requires accurate symbols. In the community's experience, the "Public Tap" provides free water and

is located in a public place. The IKK concept requires a neighbourhood location around which the group can be organised for use and payment. The name of the facility needs to reflect this concept.

The storage in a 'bak mandi' gives people an incorrect impression of water use. A 20 litre drinking water container is to be preferred as the first receptacle.

Every neighbourhood tap is labelled "Proyek Air Bersih". A label which indicated Air Minum (drinking water) would give people a more accurate impression of the intention of the IKK system.

Recommendations have been made in other sections of this report reflecting the view that the symbols of the IKK water supply system be neighbourhood drinking water facilities instead of "public tap" and that a drinking water container replace the "bak mandi". (Recommendation Nos. 24 and 43).

The crux of the system is the low rate of flow produced by restrictors which are vulnerable. Therefore education should endeavour to make restrictors a symbol of health achieved through sharing limited resources.

Educational Methods.

The flow rate and volume of the IKK scheme should be shown to the people by a working model which can be transported to each town where a scheme is to be constructed. The model would consist of a container to hold 600 litres of water, a small pump and a flow restricted outlet into the container and hoses for circulating the water.

Recommendation 81
A mobile working model should be designed and recommended to each PAB-IKK for construction.

Recommendation 82

A mobile model demonstrating the flow rate and daily quantity of water supplied (600 litres) should be demonstrated in every proposed IKK.

Recommendation 83

Other suitable methods of getting information to the community should be developed, e.g. printed leaflets, radio and TV messages, posters and traditional methods of communication, e.g. plays and puppets.

The mobile model provides an accurate basis for discussion and clarification. However, it is very important that the community have local leaders with whom they can discuss and clarify. Staff persons of PAB-IKK and PDAM, the surveyor and Kepala Unit should each have appropriate training in communication skills and methods. Each of these people will work with local officials and leaders to ensure their understanding, i.e. Camat, Kepala Desa, Dokter Puskesmas, Guru Sekolah Dasar, SMP and SMA. Informal leaders, Kaders of LKMD and PKK and others will be especially important in the task of discussion and clarification in the community.

may be.

Women are the main users and carriers of water. It is the attitude of women which is essential to the acceptance of the IKK water supply system.

Recommendation 84

Special emphasis should be given to the informal women leaders e.g. kaders of LKMD and PKK and the nurse of the Puskesmas, who can develop the best two-way communication with women.

Recommendation 85

An official of PAB-IKK with interest in communication activities should be selected and trained in communication methods, and appointed

full time to communications duties.

With increasing numbers of IKK systems being constructed in each province, there will be too much work for the PAB-IKK official.

Responsibility for communication work will need to be undertaken in each Kabupaten. A person from the PDAM could be responsible for education of the community and for community work in cooperation with PAB-IKK and local leaders.

Recommendation 86
A suitable person from each PDAM should be selected and trained in communication methods in regional workshops.

Communications skills will continue to be required throughout the operation of the IKK water supply scheme as attitude change is a slow process and people will need continuing explanation to overcome problems. The Kepala Unit is also a key person in gaining the cooperation of other local officials e.g. Dokter Puskesmas, LKMD and PKK.

Recommendation 87
The training of the Kepala Unit should include communication skills to enhance his ability to work with the people and local leaders.

The person who performs the town survey will be involved in briefings with local officials and with discussions with community leaders about the scheme generally and about the location of neighbourhood taps. He will need communication skills to ensure decisions are made with full understanding. The need to have better placement of neighbourhood taps requires time for field work, discussion with local leaders and people of the community.

Recommendation 88
The training of the surveyor should include one week of communication skill training.

Appendix G Program 4 sets out guidelines for community education activities.

4.7.6 Training in Communication and Community Work

Formal Courses

It is proposed that two groups of people receive special training:

- the surveyor of PAB-IKK who performs the town survey;
- the Kepala Unit or senior operator in each scheme.

These people already receive a short course of technical training. Additional instruction is required in communication.

The staff of the Communications and Community Work Unit would prepare the curriculum and in the initial stages conduct the training. The curriculum should include :

- the principles of communication;
- community education methods including how to facilitate a group meeting;
- supervised field practice.

Recommendation 89
A module of suitable length - about one week - should be added to the training courses for IKK staff to provide communications training.

In-service Training.

The personnel who specifically need additional training are the staff members appointed by PAB-IKK and by PDAM to do communications duties.

The method of training should be based on workshops and seminars.

The curriculum would be developed by the Communications and Community Work Unit staff, who would also organise and conduct the workshops.

The curriculum would include :

for PAB-IKK staff : Communication
Community education
Community organisation

for PDAM staff : Communications
Community education

Recommendation 90
A program of workshops should be conducted for in-service training of selected PAB-IKK and PDAM staff members in communication.

A proposed program is detailed in Appendix G, Programs 3 and 5.

4.7.7 The Need for Community Involvement

The Mission was surprised by the lack of acceptance of the IKK water supply scheme demonstrated by people and local leaders.

Acceptance depends on a number of factors.

1. **The People's Expectation**

In most areas of Indonesia people experience plentiful water, even though that water may be polluted.

(i) When people hear about a "water supply" they will expect that it will provide plenty of water for all purposes. Unless the people have clear information from the earliest contact with the system about the flow rate, the daily water allowance and payment, they will be disappointed and frustrated.

(ii) The IKK water supply scheme requires people to change their ways of using water. They will be asked to use IKK water for certain purposes and be required to get water from a second source for other purposes.

Changing attitudes and behaviour is a slow process. It involves a two-way educational process involving local level workers where people learn through discussion, opportunity to question and express disagreement and frustration and experience.

2. **Existing Water Availability**

The fact that the acceptance of the people is affected by their need for water has been discussed elsewhere in this report. The Mission has affirmed that an IKK water supply scheme is more likely to be accepted where the people do not have an adequate existing water supply. (Recommendation Nos. 1, 2, 3).

3. **The New System**

Acceptability will also be affected by the new scheme itself. It has been mentioned that the restricted flow rate and limited quantity are factors which require attitude and behaviour change. It is therefore important that all other aspects of the scheme are experienced positively.

The majority of this report is directed to the ways in which the existing IKK concept can be improved to make it more reliable and thus increase the possibility of people accepting the two major factors which are limiting and require attitude and behaviour change. The Mission believes that the (1) modifications and improvements to the technical and (2) administrative systems which it has proposed and the (3) introduction of a community education program are essential to the possibility of acceptance. There is, however, another possible factor favoring acceptance.

Community involvement is the remaining approach which theoretically can affect the acceptability of the IKK system to the people.

Levels of Community Involvement

The Mission observed that the existing level for community

involvement was very low :

- a person can offer land for the neighbourhood tap;
- people will pay for the water they use.

This involvement cannot be seen to be directed towards building a positive community attitude towards the scheme. In cases where people had donated land for neighbourhood taps, the Mission observed that :

- in a number of cases the tap was not accessible to many other people;
- the donor was given a free house connection and thus these appeared to have been acts of considerable self interest.

The Mission concluded that donating land does not necessarily result in an attitude of community involvement.

Decision Making.

When people have the opportunity to make decisions, it is possible to regard this as a level of community involvement. Such opportunities, representing additional, though low, levels of community involvement within the existing IKK scheme, have been identified in recommendations made by the Mission.

The Mission has proposed that house connections be installed after the distribution system has been tested. This means that there will be a specific time when people can decide to apply for house connections or use neighbourhood taps. (Rec. No. 26). If the information given to the community follows the recommendations included in the report, such as a mobile model at the time of application for house connections, other educational aids and the active involvement of local community leaders and officials, it is suggested that the decisions of the people may have a little more significance.

The second decision available at that time is whether the householder wishes to dig his own trench and receive a deduction of house connection costs. (Rec. No. 45). It is clear that these

decisions are individual household decisions and can be regarded only as a low level of community involvement.

Neighbourhood Taps

It has been recommended that "Public Taps" be renamed "Neighbourhood Taps" to give a clearer indication of the intention of their use, as well as to address the long standing attitude that public taps are free (Rec. No. 24). It can be assumed that 10 households only use one neighbourhood tap. This reflects the Mission's observation of the number of households likely to have adequate access to the tap (Rec. No. 25). Land should be purchased for neighbourhood taps (Rec. no. 27).

Intensive community work has been proposed as necessary to implement the concept of a neighbourhood group using a neighbourhood tap (Rec. No. 28). The formation of neighbourhood groups may make more suitable sites available for neighbourhood taps, ensure a wider use of the neighbourhood tap and increase the possibility of payment for water.

important This activity will require special training of a community organiser as well as a considerable allocation of time preceding the survey and design phase. This has not been costed, but will add to the communications and community work costs.

Community organisation will be required if these aims for use of and payment for neighbourhood taps are to be achieved.

> **Recommendation 91**
> **The PAB-IKK communications person should receive training in community organisation. He should work with local leaders and the community to identify groups of 10 households interested in forming a neighbourhood group with a kader of the LKMD or other local leader.**

One serious problem in this suggestion is that under present

survey and design procedures, neighbourhood groups must be identified at least 18 months before the people receive water.

Conclusion

Community involvement can only be significantly increased if a completely different approach is taken to the balance of the technical system and the community system.

The IKK technical system has features outside the experience of the people and, in some cases, is operating in opposition to their customs and habits. Community involvement is more possible when the technology used is appropriate to the customs and habits of the people. The people can then more easily take a positive attitude to the introduction of the system. This makes it possible for the people to be involved in the decision making.

The installation of the present system is carried out by contractors and does not leave any opportunity for the community to be involved actively.

The Mission observed different attitudes towards Gotong Royong in different regions and concluded that a standard approach to community involvement throughout all regions would be unlikely to be acceptable.

The Mission concludes by affirming the importance of community involvement in achieving community acceptance, while emphasising that there is little scope for such involvement in the present scheme in its technical and implementation aspects.

Were the opportunity for community involvement to be given a high priority, some modification of the technical and implementation system would be required. This would require a major change in policy, based on a review especially for that purpose and is beyond the scope of this Mission and its report.

SECTION 5. A PROPOSED PROGRAM FOR IMPLEMENTATION

Introduction

The programming of modifications to the IKK program will be a complex task in view of the large number of changes needed and their interrelationships.

The Mission arrived at the schedule which follows in the following way :

(i) Recommendations were given priorities in terms of their impact, cost/benefit, feasibility and time requirement;

(ii) The high priority recommendations were grouped according to a logical sequence :

- Need for water is the basis for town selection;
- Increased system capacity should be constructed initially to permit adaptation if flow restrictors cannot be made to work;
- Flow restrictor related issues must receive immediate attention;
- Systems must operate effectively;
- Cost recovery is necessary to keep the systems operating.

(iii) The remaining recommendations - all regarded as necessary - are proposed for implementation as soon as possible after the high priority set have been acted upon. For ease of reference, each of the recommendations from Section 4 are listed separately in Appendix J.

SEQUENCE	REC. NO.	ACTION STEPS	COMMENTS
		SYSTEM CAPACITY	
1	34	DAB instructs Design Section to prepare modifications to the transmission pipeline standard design.	
		TOWN SELECTION	
2	1) 2) 3)	DAB instructs IKK Project Office to prepare revised town selection criteria.	
3	76) 77)	DAB establishes a Communication and Community Work (C.C.W.) Unit in Cipta Karya.	
4	89	The C.C.W. Unit (possibly with assistance from a consultant), designs a curriculum for training in community education methods.	
5	85) 86)	PAB-IKK and PDAM are each assisted to designate one staff person to do communications work.	
6	85) 86) 87) 88)	The C.C.W. unit staff conduct training programs.	
7	28	After training: PAB-IKK staff consults with communities to decide location of neighourhood taps.	

SEQUENCE	REC. NO.	ACTION STEPS	COMMENTS
8	19) 20)	PAB-IKK informs people about the nature of the IKK system inc. FR's; arranges meetings in Kab.& Kec. to enable all agencies to understand IKK system.	See also Appendix G, Prog. 4C(i) & (ii)
9	85) 88)	Surveyor consults with PAB-IKK staff to ascertain location of neighbourhood taps; informs people about the IKK system. PDAM Staff informs the people about the IKK system. Kepala Unit ensures that the people understand and retain the flow restrictors.	
10	83	Training Section of DAB with C.C.W. Section produces educational aids.	
11	84	All staff engaged in community education to ensure information to and involvement of women.	
12	81	PAB-IKK constructs a mobile working model with small pump, restricted flow and tanks to demonstrate the IKK flow rate and 24-hour volume.	
13	82	The model is transported to each IKK town in the survey stage and also when distribution system is complete and house connection applications are being requested.	

SEQUENCE	REC. NO.	ACTION STEPS	COMMENTS
14	20	Training Section DAB checks to ensure that all training programs for IKK personnel teach the nature and importance of the IKK flow rate.	
		ENFORCEMENT	
15	21	DAB instructs PAB-IKK to lock and seal FR's in steel boxes.	
		ACTION RESEARCH	
16	68	DAB appoints a senior officer in CK to oversee trials and monitor programs.	
17	22) 23)	DAB writes into TOR for foreign aided projects a requirement that trials be conducted of flow restrictors.	
		GOVERNMENT COMMUNICATIONS	
18	78	C.C.W. Section prepares guidelines for a series of meetings and workshops to be conducted at all levels of government.	
19	78	C.C.W. Section ensures that the planned meetings are conducted and the methodology and outcomes are evaluated.	
20	79	PAB-IKK obtains cooperation of health education staff.	
21	80	DAB appoints an editor to produce a newsletter.	
22	62	PAB-IKK informs BPAM/PDAM about plans and progress on IKK schemes.	Appendix G Prog. 4B

SEQUENCE	REC. NO.	ACTION STEPS	COMMENTS
23	63	DAB instructs staff members to visit provinces.	
		HOUSE CONNECTIONS	
24	42	PAB-IKK ensures that applicants for house connections possess an adequate water container.	
25	43	DAB budgets for and obtains supply of 20 litre containers for installation in kitchens according to IKK design manual.	
26	44	DAB advises PDAM that: (i) house connection fee should not exceed Rp 15000.	
27	45	(ii) if people provide their own trench they are entitled to a deduction of Rp 250 per metre.	
		24-HOUR PUMPING	
28	33	DAB advises PDAM to provide personnel, funds, fuel and supervision to ensure 24 hour pumping.	
		MONITORING	
29	66	DAB advise PDAM to arrage exchange visits.	

SEQUENCE	REC. NO.	ACTION STEPS	COMMENTS
		SYSTEM MAINTENANCE AND OPERATION	
30	50	DAB instructs Central IKK office to prepare a schedule of materials, fittings and other spare parts required to be kept at IKK Unit offices, PDAM offices and Provincial PAB-IKK offices to ensure rapid repair of systems in case of break-down. DAB advises standard stock control procedures to all PAB-IKK offices. DAB arranges budget approval for such materials and arranges for delivery to the appropriate recipient.	
31	48) 49)	DAB advises each PAB-IKK of the need for regular visits by experienced technician and engineer to each IKK unit to check operation of system. PAB-IKK advises each PDAM accordingly and provides advice and manpower as required to ensure compliance.	
32	51) 52)	PAB-IKK office prepares schedule for preventive and corrective maintenance procedures for all IKK Units, based upon O & M Maintenance Manual. Schedules sent to all IKK Units.	

SEQUENCE	REC. NO.	ACTION STEPS	COMMENTS
		CONSTRUCTION	
33	37) 39) 40)	DAB advises Central IKK office and all PAB-IKK offices of the sequence requirements of contracts. Contract procedures to be altered to allow IKK Unit to install house connections.	
34	38	DAB instructs Central and PAB-IKK offices to enforce contract penalties for late delivery of materials.	
35	35) 36)	DAB makes application for increased budget allowance and manpower for the employment of experienced contract supervisors to oversee inexperienced supervisors and provide site advice to contractors.	
		COST RECOVERY	
36	25) 26)	DAB instructs design section to (i) re-design neighbourhood taps to serve 10 families and alter design manuals accordingly and (ii) alter design manuals so that initial design and constructon includes n'hood taps to serve 20% of population - remainder of n'hood taps required to be added later.	
37	56	DAB instructs all PAB-IKK and appropriate Consultants to use PLN electricity for all new schemes if 24-hour supply is available. Alter design manuals accordingly.	

SEQUENCE	REC. NO.	ACTION STEPS	COMMENTS
38	9	DAB instructs design section to alter design manual to exclude schemes requiring water treatment plants unless specifically approved by Central IKK office.	
39	55	DAB requests all PAB-IKK to promote a maximum house connection tariff of Rp 2000 per month.	
40	53	DAB asks local Government authorities to clarify rules regarding disconnecton of supply to houses who do not pay rates or who damage restrictors and to enforce those rules.	
		SURVEY	
41	4	DAB instructs PAB-IKK to allow 1 week for initial survey in addition to the 1 week allowed for design.	
42	7	DAB instructs C.C.W. to include in the training program for surveyors a segment to develop community consultation skills.	

SEQUENCE	REC. NO.	ACTION STEPS	COMMENTS
43	5) 6)	PAB-IKK instructs data collection surveyors to: - consult with Camat and other community leaders, if possible. - physically inspect the town, source site, pipeline routes, etc. - obtain consensus on most suitable locations for neighbourhood taps, distribution pipes, etc. - by informal discussion with people, pass on full information about IKK supply.	

SECTION 6. ACKNOWLEDGEMENTS

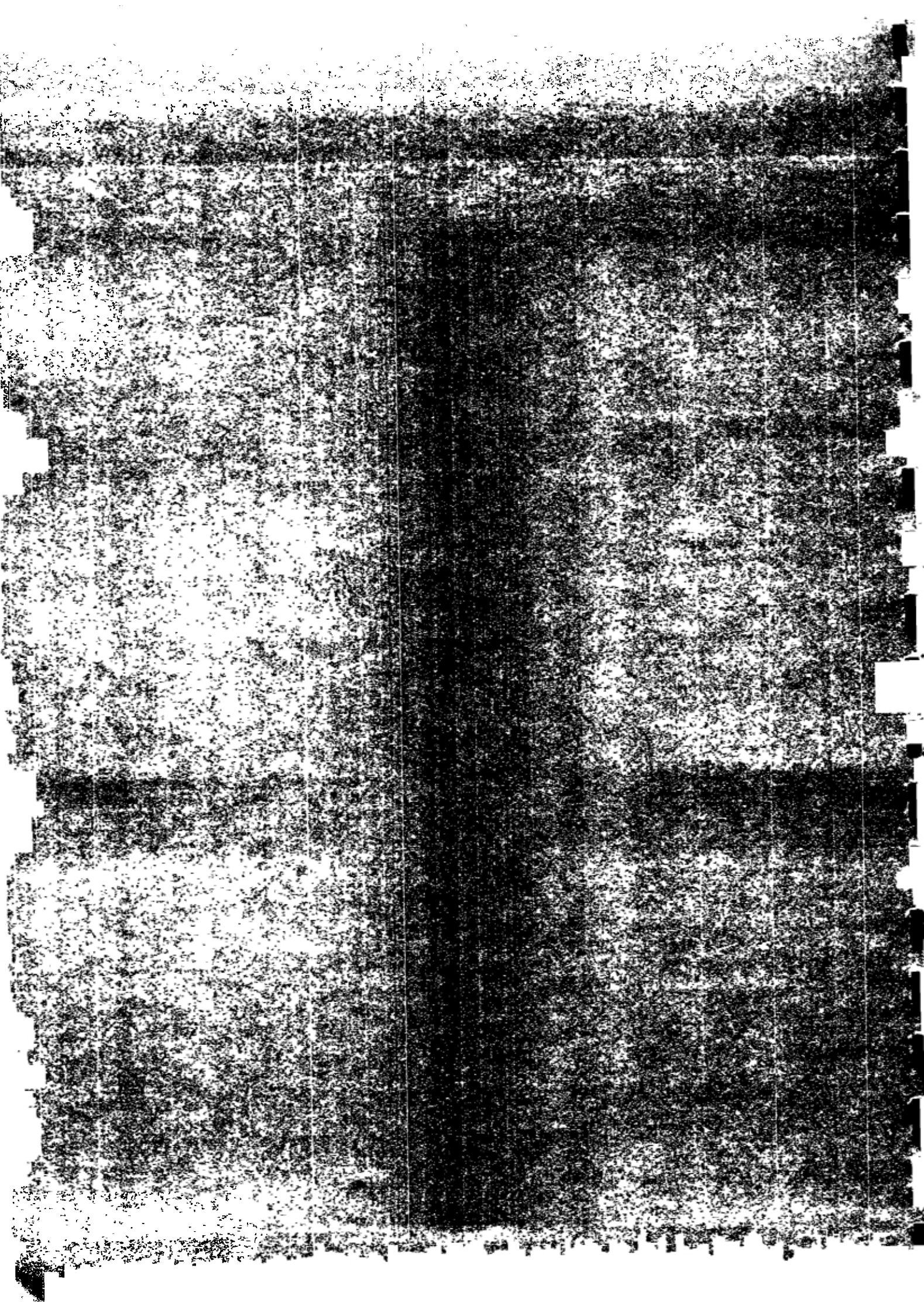
The Team wishes to thank many people for assistance given during the four weeks of the review in field visits, discussions and meetings. Special mention must be made of Director Ir Soeratmo Notodipoero, Ir Priyono, Ir Suwandi, Ir Darmawan and Ir Alizar from the Directorate of Water Supply.

In the field we were assisted by the PIMPRO of PAB-IKK in Medan, Ir Mulyono and his assistant Ir Kaban, in Banda Aceh by Ir Sjaiful and in Bandung by Ir Taufik. We were given time and assistance by officials of PAB, officials of local government, the directors of PDAM/BPAM and the Head of the IKK Units.

The Consultants of DHV and IWACO gave us valuable assistance in information, time and transport. We thank DHV Director Ir Chris Englesman, Project Manager Medan Ir Ben Blankers, Ir HV Mulligen, IWACO Team Leader Ir Johannes Mathijssen and Supervisor H Angels.

Our work has been greatly facilitated by the leader of the Australian Advisory Team Ir Andrew Macoun and the valuable work of Lilly who capably and cheerfully deciphered our writing.

Finally we thank the people in the IKK communities we visited. They were prepared to talk with us, allow us to walk through their houses to inspect house connections and water supplies and disrupt their activity around public taps, not to mention the innumerable photographs we took along the way.



APPENDIX A

THE MEMBERS OF THE REVIEW MISSION

1. Ir Chairul Sjafri Hatta
   Directorate Water Supply
   Dit Jen Cipta Karya, Dep. P U
   Design Engineer
   Water Distribution Design Section

2. Ir Djajadi
   National Office of IKK, Cipta Karya Dep. P U, Directorate of Water Supply

3. Ir Drs Susena
   Directorate of Water Supply
   Staff of Sub Directorate For Management Support

4. Mr J Allard
   Water Supply and Sanitation Engineer
   Australian Advisory Team to Dit Jend Cipta Karya, Dep. P U
   Australian Development Assistance Bureau

5. Dr Joop D Heijnen
   Economist, D H V Netherlands

6. Ir G J M Cremers
   Water Supply Engineer
   IWACO - International Water Supply Consultants - Bandung.

7. Dr R E Mylius
   Health Specialist, Health Planner
   Australian Development Assistance Bureau

8. Mrs Beth Mylius
   Community Organiser
   Australian Development Assistance Bureau

Assisted by:

Ir Nugraha	IKK - National Office
Ir Sri Endah Nurwijayati	IKK - National Office
Ir Syaifudi Riza	Sub. Directorate of Technical Planning - D.W.S.

APPENDIX B

TERMS OF REFERENCE
FOR
IKK SURVEY AND REVIEW MISSION

1. BACKGROUND

During the Repelita III five year development plan (1979 - 1984), the Government of Indonesia (GOI) commenced a program for the provision of small water supply schemes for the capital towns of Kecamatan (sub-district administrative units) with a population range of 3000 to 20,000. It is the intention that by the year 1990, 70% of the population of some 2400 Kecamatan capital towns (IKK) will be provided with a supply of potable water.

The Directorate of Sanitary Engineering developed new and unique design and implementation criteria employing a modular approach and using simple standardized design procedures in order that this vast program could be achieved with the limited technically trained human resources available for design, construction and management, including operation.

Owing to the new and unique concepts on which the IKK schemes are based such as, inter alia:

- no centralised storage
- restricted "trickle" supply
- no allowance for daily peaking factor,

special attention must be given to monitoring the schemes after operation has commenced. This has led to several reports reviewing the performance of operating IKK schemes, among which are:

- preliminary monitoring report by Dutch Consultant DHV on IKK project in North Sumatera and Aceh
- notes by Dutch Consultant IWACO on IKK schemes in West Java
- review by Professor Lauria of IKK Design Standards

In addition, DSE has established an IKK Evaluation Team to assess all available information on IKK design, construction and management criteria and, if necessary, recommend changes to those criteria.

It is now considered appropriate to review the whole IKK concept to ensure its social, economic and engineering viability. To this end, a tentative IKK Research Programme is being developed under the auspices of the Cipta Karya IKK Evaluation Team to assess all aspects of the IKK concept.

2. OBJECTIVES

These Terms of Reference propose that a small team be formed to evaluate field studies and reports already completed and, with additional information gained by inspection of several operating schemes,

- identify problem areas requiring further study or research,
- propose, if appropriate, immediate modifications considered necessary in the design, construction or management procedures presently used and
- suggest a methodology to be adopted in carrying out the proposed IKK Research Programme.

The mission will report on :

- those aspects of the IKK philosophy which are considered to require immediate modification,
- those aspects of the IKK philosophy which are considered to require further in depth study in the proposed IKK Research Programme and
- general and specific recommendations for the establishment of anappropriate methodology for the IKK Research Programme.

3. SCOPE OF WORK

The mission is required to evaluate the functioning of operating IKK Water Supply Schemes and, taking into consideration previous review reports, assess, inter alia:

- whether the systems are truly in accordance with IKK criteria
- the perceived adequacy of the supply, both quantity and supply rate
- the reliability of the systems
- the quality of the water produced and the consumers' subjective view of the quality
- the utilization of the supply by village residents
- the convenience and usage of the public standpipe supply points
- the acceptance by the residents of the restricted "trickle flow" concept
- the engineering design and construction standards
- the socio-economic aspects of the water supply system utilization
- the financial viability of the systems
- the adequacy of institutional arrangements for system management

- the ability and training of personnel operating and managing the system
- any operational or management problems being experienced.

4. METHODOLOGY

It is envisaged that the team will consist of:

- 1 engineer involved in IKK projects (preferably from Dutch Consultants IWACO)
- 1 economist involved in IKK projects (preferably from Dutch Consultants DHV)
- 1 engineer from Australian Advisory Team to Cipta Karya (from ADAB, Australia)
- 1 expatriate sociologist with experience in Indonesia (from ADAB, Australia)
- 1 expatriate environmental health planner with experience in Indonesia (from ADAB, Australia)
- 1 Indonesian engineer from IKK central design office
- 1 Indonesian engineer from the provincial IKK office in the province being inspected.

The Governments of the Nederlands and Australia will be requested to finance the Dutch and the Australian members of the team.

Tentatively it is anticipated that the mission will spend two weeks inspecting selected operating IKK schemes and gathering data from Kabupaten authorities, local camats (heads of kecamatan administrative unit) and villagers and two weeks reviewing previous reports and preparing collating and presenting its final report.

5. TIMING

A final report will be issued four weeks after the commencement of the mission.

APPENDIX C

ITINERARY OF REVIEW TEAM

Sunday 1st June

AM	BM, REM and JA met with Ir Andrew Macoun, Team Leader of Australian Advisory Team to Cipta Karya, at Cipta Karya.
PM	Literature review

Saturday 2nd June

BM and REM - Literature Review

Monday 4th June

BM and REM - Literature Review

Tuesday 5th June

9.00 - 12.00	BM and REM - met with members of Australian Advisory Team.
12.30 -14.00	BM, REM and JA met with Ir Chris Englesman - DHV representative for Indonesia.

Wednesday 6th June

AM	BM and REM - literature review at Australian Advisory Team Office
14.00 -15.30	BM, REM, JA, CSH and Dj meeting with Ir Soewandi - Manager of IKK National Office.

Thursday 7th June

BM and REM - Literature review at Australian Advisory Team Office.

Friday 8th June

10.40 -11.40	BM, REM, JA, CSH, Dj and Su meeting with Director Ir Soeratmo Notodipoero, Directorate of Water Supply. In attendance : Ir Priyono, Ir Soewandi.

Saturday 9th June

AM	BM, REM, JA, Dj, Su met at IKK National office with Ir Lukman, Sri Endah Nurwijayati, and Ir Nugraha.

Sunday 10th June	
PM	BM, REM - Literature Review. BM, REM, GJMC, JA met with Ir Johannes Mathijssen - Team Leader, IWACO. JH arrived in Medan from Bangkok
Monday 11th June	
AM	CSH, BM, REM, JA, GJMC travelled to Medan, Sumatera Utara.
12.00 - 13.00	The team (CSH, BM, REM, JA, GJMC and JH) met with Ir Ben Blankers, DHV Project Manager, Medan and Ir H v Mulligen, DHV Water Supply engineer
13.00 - 15.00	The team met at PAB - IKK, Medan office with Ir Mulyono, Director PAB - IKK, Sumut, and Ir Kaban - PAB-IKK, Sumut and Drs Pardosi - PAB, Sumut.
15.15 - 19.00	Meeting of Team
Tuesday 12th June	
08.00 - 10.00	Team with Ir Kaban and Drs Pardosi to Binjai. Meeting with Director PDAM, Langkat - J B Purba.
10.30 - 17.00	To Tanjung Langkat - inspection of IKK water supply system, technical system, discussion with women.
Wednesday 13th June	
08.00 - 16.00	Team to Stabat - kabupaten Langkat - inspected IKK system with Kepala Unit Mulyanto + DHV Consultant H v Mulligen. LEM met with Lurah REM met with Dokter Puskesmas Inspection included : - tehnical system - house connections - Public taps - talked with public tap users.
17.00	Ir Djajadi joined the team
Thursday 14th June	
08.00 - 12.00	Team to PDAM : Lubuk Pakam (Kabupaten Deli Serdang) met with Director Lancar Nainggolan.
12.00	CSH returned to Jakarta.
13.00 - 15.00	Team visit to Pantai Cermin - inspected IKK system, House Connections Public Taps

	- Talked with women and public taps users.
15.00 - 18.00	Team drove to Kisaran - kabupten Asahan.
Friday 15th June	
08.00 - 10.00	Team met with Kepala of BPAM - Asahan - Machmud Siregar
10.00 - 14.00	Team visited Lima Puluh IKK scheme - discussion with Kepala Unit - inspected system House Connections Public Taps - talked with women using public taps.
PM	Ir Nugraha and Ir Sri Endah arrived in Medan - visited Stabat IKK water supply scheme. Ir Djajadi returned to Medan.
Saturday 16th June	
09.00 - 11.30	Team meeting Ir Djajadi returned to Jakarta Ir Nugraha and Ir Sri Endah visited Lima Puluh IKK water supply scheme.
Monday 18th June	
AM	Team, joined by Ir Susena, and Ir Nugraha , Ir Sri Endah travelled to Banda Aceh.
12.45 - 14.30	Team to meeting at Dep. P U with Kepala PAB - Ir Ambari Kepala PAB - IKK - Ir Sjaiful Kakanwil PU Abdul Muluk Bappeda I Ismail Yusuf and staff of PAB-IKK
15.00 - 16.30	Team meeting
Tuesday 19th June	
08.00 - 19.00	Team visit to Sigli and Glumpang Minyeuk.
10.30 - 12.00	meeting at Bupati's office with : Drs Abd Jalam Poppott - Sekwilda Drs Usam T A - Kepala BPAM - Sigli G Tanial Abidi - Kabag Teknik, BPAM, Sigli Mahmud NH BA - Camat M Jusuf Daud - Camat - Glumpang Tiga
12.00 - 14.00	Visit to Glumpang Minjeuk

	inspected - IKK system - House Connections - Public Tap
14.30 - 15.00	talked with Kepala Desa visit Gorat - B.N.A. system for Sigli
17.00 - 18.00	Visit Seilimeum water supply scheme - pre-IKK scheme.

Wednesday 20th June

08.30 - 10.00	Team meeting
10.00 - 16.00	Team returned to Jakarta.

Thursday 21st June

07.30 - 08.30	Team travelled to Bandung
08.30 - 09.00	Brief meeting with Ir Johannes Mathijssen at IWACO office.
09.00 - 12.00	Team met at PAB - Bandung with : Kepala PAB Kepala PAB-IKK Staff of PAB, PAB-IKK and IWACO
13.00 - 16.00	Team travel to Cirebon Joined by Ir Susena

Friday 22nd June

AM	Team visited WALED IKK scheme assisted by H Angels IWACO met Ir Wiwi - Kantor Wilayah PU - P3R Contractors for Waled and Rajagaluh Camat Waled Jurutik - Lurah Inspect - IKK system - House Connections - Public Tap
PM	Team visited RAJAGALUH IKK Scheme - gravity scheme - inspected public taps - talked with people - inspected house connections

Saturday 23rd June		
	AM	Team visited PASEH - IKK scheme met staff of the Unit Visited spring source Inspected public taps
Sunday 24th June		
		Team returned to Jakarta.
Monday 26th June		
	08.00 - 13.00	Team working on report with Irs Susena, Nugraha, Sri Endah and Alizar
	15.00 - 16.00	Team met with Director Ir Soeratmo
Tuesday 27th June		
	08.30 - 16.00	Team working on report
	19.00 - 22.00	REM, BM and GJMC met with Ir Johannes Mathijssen - IWACO.
Wednesday 28th June		
	08.30 - 12.00	Team working on report
	14.00 - 15.30	Team meeting with Dutch Mission and Irs Priyono, Soewandi, Chairul, Alizar, Kartahardja and others.
Thursday 29th June		
	08.30 - 12.00	Team working on report
	13.00	Team members writing separately
Friday 29th June		
		Team members writing
Saturday 30th June		
		Team members writing
Sunday 1st July		
		Team members writing
Monday 2nd July		
	08.30 - 12.00	Team meeting re report
Tuesday 3rd July		
	08.30	Team meeting with Ir Chris Engelsman : DHV Team working on report.

Wednesday 4th July	
08.30	Team working on report
Thursday 5th July	
08.30 - 12.30	Team working on report
13.30 - 15.00	Team met with Ir Darmawan and staff at Sub Directorate for Regulation
Friday 6th July	
08.30	Team working on Report
Saturday 7th July	
08.30 - 12.00	Final team meeting an Report JH + GJMC left Jakarta
Sunday 8th July	)
Monday 9th July	) BM, REM and JA final writing of report.
Tuesday 10th July	)
Wednesday 11th July	)
Thursday 12th July	
	BM, REM and JA met with translator Mr. Ismu Gunawan
	Proof reading. BM, REM nd JA with Andrew Macoun met with 2 Australian Development Assistance Bureau Officers - Dick Harman and Ted Kowalski. Reception given by AAT, BM, REM and JA.
Friday 13th July	
	Proof reading

APPENDIX D

FIELD VISIT REPORTS

1. Ibu Kota Kecamatan : TANJUNG LANGKAT

Date of visit: 12 June 1984

LOCATION

Kecamatan	:	Salapiang
Kabupaten	:	Langkat
Province	:	Sumatera Utara
Population Tanjung Langkat	:	4 400

TECHNICAL ASPECTS

Source : Shallow well on river bank. (The first well sunk was said to be dry and was abandoned)

System : 2 diesel gensets : electric pumps in well; design flow 2.5 lps.

Connections

	Standard Design	Constructed	In use	Average Persons per House	Estimated Population served
Houses	180	146	146	7	1022
Public Taps	9	9	NIL		
				TOTAL	1022
				(Design Population)	3600

Comments : Demand for house connections exceeds 180.
Water pressure insufficent to reach public tap storage tanks
Water does not reach the end of the piping system

Construction funding : Dutch Govt. assistance

Consultant : DHV

Stage of Completion : Standard total house connections not achieved.

Flow restrictors : non-reversible type. Due to frequent blockage, all restrictors removed in January 1984.

Float Valves : not yet installed in public tap tanks

Water Quality : water is muddy, particularly when the pump is started up, the turbidity persisting for about one hour. The reason is not known.

INSTITUTIONAL ASPECTS

Management :
Eventually to be PDAM Langkat, located in Binjai, and separate from PDAM for KOTAMADYA BINJAI which will remain separate and not share finances.

PDAM Langkat has ten staff. It has been involved with installation of house connections and with guidelines for tariff setting, but has not yet taken over the Tanjung Langkat scheme which only commenced operation in December 1983.

The Director PDAM states there has been inadequate information given to him by Cipta Karya about the IKK scheme.

Staff
4 people (Cipta Karya guidelines : 4 staff for 24 hour operation).

Monitoring
Tanjung Langkat has been included in socio economic study conducted by DHV engineers. Routine reporting only is now required.

Operation
Since 20 January, 1984, operating 12 hours per day. Supply is alternated to 3 sections of the town for 4 hours at a time because reduced pressure after removal of flow restrictors supplied only outlets close to the source.
Pipes required cleaning in January 1984. The chlorinator is not working. Operators have received some in-service training. No operating manual seen. Actual system flow measured at time of visit 2.8 lps, pressure at hydrophore-zero.

UTILIZATION
Population served (estimated 1022 people) is approximately 30% of the intended coverage.

People have shallow wells and also use the river. Some wells dry up in the dry season.

FINANCES

A house connection fee was charged at approximately Rp 1000 per metre in excess of 20 metres - the first 20 metres was provided free. No fees are being collected because the supply is unsatisfactory. Rp 2500/month is proposed for house connections.

THE COMMUNITY

A meeting attended by 90 people was arranged on 18 Oct. 1983 by the Consultants to inform the community about the scheme. People are said to be disappointed and angry about delays in completing the system and the dirty water. PAB-IKK appears un-interested in involving community organisations (e.g. LKMD).

CONCLUSION

This scheme has experienced serious problems in construction, operation, management and community relations. Considerable effort will be necessary to produce a satisfactory system. Probability of acceptance of standard rate of flow is negligible.

2. Ibu Kota Kecamatan : STABAT

Date of visit : 13 June 1984

LOCATION

Kecamatan : Stabat
Kabupten : Langkat
Province : Sumatera Utara
Population : 13 125

TECHNICAL ASPECTS

Source : Deep well, now located outside the production unit fence. The original well was artesian but due to faulty drilling and development procedures the production was insufficient. The original well is now used to supply water direct to the Bupati's office using power from the IKK gen.set.

System : Submersible electric pump : 2 diesel generators : 5.0 lps. No chlorination has been installed.

Connections

	Standard Design	Constructed	In use	Average Persons per House	Estimated Population served
House	360	298	298	7	2086
Public Taps	18	18	15	Average no. of houses using each public tap = 2	210
				TOTAL	2296
				(Design Population)	7200

Comments : Operators are continuing to installL house connectionsas additional applications are received.

: Three public taps have been disconnected : one of them because a new road required the pipe to be cut. Of the remainder, one Public Tap at the mosque is possibly used by only one household; 1 public tap at the SMP; 3 public taps in public places; 1 at Kepala Lorong's house maybe used by up to 10 households.

Construction : Funds from Dutch Government Assistance.
Consultant : DHV Engineers
Stage of Completion : House connections incomplete.

Flow Restrictors
Frequent blockage of restrictors during trial runs. Many households (possible 75%) have been supplied with flow restrictors of the public tap types, delivering 4.6 lpm. Other standard flow restrictors have been modified.

Float Valves
Float valves are installed in at least some public taps. Others are controlled by a valve.

Water quality - no information available.

INSTITUTIONAL ASPECTS

Management
PAB-IKK holds responsibility at present. PDAM Langkat has participated in setting guidelines for tariffs and installation of house connections.

Staff
5 people (Cipta Karya guidelines state 4 staff for 24 hour operation).
4 operators, each Rp 36 000 per month, 1 administrator Rp 35 000 per month.

Monitoring Procedures
Stabat was included in a socio economic study conducted by DHV Engineers. It was intended to be the initial Pilot Study Town but lost its value due to delayed completion.

OPERATION

Functioning since January 1984; currently 24 hours per day.
Actual flow measured at 6.07lps during visit.
Training in service has been given to operators.
No operating manual seen.
Pressure at hydrophore was zero.

UTILIZATION

Coverage approx. 30% of planned population. Many household have shallow wells. Some wells are said to go dry in the dry season. River also used. Many public taps have hoses attached to convey

water into adjacent house. Some commercial users are said to have attached electric pumps to the pipelines.

FINANCIAL

House Connection fee of Rp 250 per metre over 20 metres charged.

Revenue	H.C.	P.T.
Tariff per month per household	Rp 2 500	Rp 925 per h.h.
Collection (approx.)	143 (50%) subscribes	Nil

Fee Collection began in April 1984.

Expenditure

Diesel fuel is provided by PAB-IKK, Medan.

THE COMMUNITY

No formal action has been taken to inform the community about the scheme. Even community leaders appeared unaware of the nature of the system and the reasons for the low rate of flow.

CONCLUSIONS

Serious failures have occurred in construction, operation, management and community relations.

Probability of acceptance of standard rate of flow is negligible.

3. Ibu Kota Kecamatan : PANTAI CERMIN

Date of visit: 14 June 1984

LOCATION

Kecamatan : Pantai Cermin
Kabupaten : Deli Serdang
Province : Sumatera Utara
Population IKK : Over 3600 (394 households)

Pantai Cermin is built on a tidal swamps.

TECHNICAL ASPECTS

Source : Deep well
System : Submersible pump, 2 diesel generators, 2.5 lps system.

Connections

	Standard Design	Constructed	In use	Average Persons per House	Estimated Population served
House	180	60	60	10	600
Public Taps	9	9	(2)	Average no. of house-holds : approx.6	120
				TOTAL	720
				(Design Population)	3600

Construction : Funds from Dutch Government assistance.
Consultant : DHV Engineering
Stage of Completion : 120 house connections, remain to be made.

Comments : Public taps poorly located e.g. liable to flooding: close to pre existing source; on road sides.

Flow Restrictors - were never installed because the water was initially dirty.
Float valves - never installed on Public Taps, tank over flows at times.

INSTITUTIONAL ASPECTS

Management : PAB-IKK at present, ultimately to be handed over to PDAM - Deli Serdang at Lubuk Pakam.

Staff : 2.(?3) (Cipta Karya guidelines: 4 staff for 24 hours operation)

OPERATION

Commenced December, 1983. Operating 24 hours/day at time of inspection.

Flow rate : measured at 3.3 lps.

Maintenance inadequate: observed broken pipes, leakages, overflows and hoses connecting public taps to houses. Chlorinator not working. A gate valve has been partly closed to maintain a pressure of 2 atm, otherwise the pump is working against hardly any head.

Operators have received some in-service training.

No operating manual seen.

UTILIZATION

Approximately 20% of the planned population is being served. Two artesian wells constructed previously by other government departments provide abundant water for people living nearby. Vendors transport and sell water from these wells to people living at a distance. The public tap at the end of the system, most needed by nearby people, receives little water.

FINANCIAL ASPECTS

Connection fee of Rp 50 000 initially imposed by PDAM Deli Serdang. After consultation with the Bupati the fee was reduced to Rp 30 000.

No consumption fees have been collected so far. Diesel fuel is being provided by PAB-IKK Medan and PDAM Deli Serdang.

THE COMMUNITY

Interest is inhibited by delayed completion, existing water supplies and high connection fee.

CONCLUSIONS

Serious problems have occurred in construction, operation, maintenance, management and community relations.

4. Ibu Kota Kecamatan : LIMA PULUH

Date of visit: 15 June 1984

LOCATION

Kecamatan	:	Lima Puluh
Kabupaten	:	Asahan
Province	:	Sumatera Utara
Population	:	582 Households.

TECHNICAL ASPECTS

Source : Deep well, positive artesian; over flowing even during pumping.

System : Submersible electric pump - two diesel generators. Designed for 2.5 lps, but 5 lps pump substituted.

Connections

	Standard	Constructed	In Use	Persons	Population Served
House	180	180	180	Est.Avge. persons per household : ? 10	1800
Public Taps	9	9	4	Est.Avge. Households per tap : ? 10	400
				TOTAL	2200
				(Design Population)	3600

Construction : Funds : Dutch Government Assistance

Consultant : DHV Engineering

Stage of Completion : Anticipated that more house connections will be made.

Flow Restrictors

Standard flow rate of 0.46 lpm was not acceptable and some were altered by householders. Flow Restrictors were officially altered by removing the rubber diaphragms and relocating the restrictors horizontally, underground, outside the house premises. The resulting flow of about 1 lpm was not sufficient for some users so that restrictors were enlarged unofficially. Flows of 2 lpm and

even 3 lpm were recorded. One house connection at the end of the pipeline was observed to deliver slightly less than 1 lpm.

Float Valves
Due to malfunction, all float valves in public tap tanks have been removed and replaced by valves.

Water Quality
The water is hot and sulphurous.

INSTITUTIONAL ASPECTS

Management
BPAM Asahan is actively participating in management even though the system has not yet been handed over.

Staff
5 persons. (Standard staff: 4 persons for 24 hours operation).

OPERATION

Commenced operation October 1983. Since December 1983, 24 hours operation. Flow rate 3.3 lps. Pressure at hydrophore zero. Chlorinator operating but flow rate indicator unservicable. No chlorine testing apparatus. Fuel in drums because unable to get bulk diesel deliveries.
Training - Operators have received in service training.
No operating manual seen.

UTILIZATION

Estimated population served: 2200 (60% of minimum design population for 2.5 lps - 30% of design population for 5 lps system).
Other sources of water: shallow wells, with buckets at many houses. However, many become dry in dry season and alternative is salty wells a long distance away.

Demand for additional house connection is still high and more will be added.

Water from private wells is often preferred for drinking, while public taps are used for laundry and bathing.

Many houses place a plastic hose on the outlet of their house connection to carry water directly to the kitchen.

FINANCIAL ASPECTS

House Connection fee: Rp 1500/metre over 10 metres, plus Rp 5000 deposit against default.

Revenue

	H.C.	Commercial	P.T.
Tariff per month	Rp 1750	Rp 3500	Rp 8000/month per P.T
Collection	Approx.90%		1 only pays

Expenditure

Diesel fuel provided by BPAM - Asahan.

THE COMMUNITY

A meeting with 110 participants was arranged by the Consultant on 14/10/83.

Acceptability appears high with flow rates two to 6 times standard.

CONCLUSION

Acceptability achieved in an area with dry season water shortage by permitting virtually unrestricted flow maintained by a 5 l/sec. pump delivered to 30% of expected population coverage.

Fee recovery from relatively small numbers of subscribers will never meet O & M costs.

The apparent success of fee collection in this scheme now, modified well outside IKK standards, gives no indication of the potential viability of IKK system.

5. Ibu Kota Kecamatan : **GLUMPANG MINYEUK AND LUENG PUTU**

Date of Visit: 19 June 1984

LOCATION

Kecamatan : Glumpang Tiga
Kabupaten : Pidie
Province : D I Aceh
Population IKK : Exceeds 7200 (design population)

TECHNICAL

Source : River
System : River intake to a sump on the river bank, with electric pump, 5 l/sec, 2 diesel generators, treatment plant.

Connections

	Standard	Constructed	Potentially In Use	Persons	Potential Ppln. Served
House	360	260	260	Per H.H ? 10	2600
Public Taps	18	9	? 9	H.H. per tap ? 10	900
				TOTAL	3500
				(Design Population)	7200

Construction : Funds : Dutch Government Aid
Consultant : DHV Engineering
Stage of completion : H.C and P.T. numbers not achieved. Only 10 m H.C. pipes installed which places the outlets standing in the open house yard; few houses possess a 'bak mandi' to which water could be delivered.

Flow Restrictors

During trial runs at least half the flow restrictors were tampered with.

Float valves: not installed

Water Quality: The river water requires treatment.

Comments: Quality of construction poor. Located on a disused road beside the river, beside a mosque, in a populated area and the worship services and nearby residents are disturbed by the noise of the diesel engine. Different sub-contracts were completed at different times, making connections difficult. The river bank has been eroded and the concrete sump is in danger of collapsing. The genset room is fully lined with no ventilation.

INSTITUTIONAL ASPECTS

Management

By PAB-IKK Aceh and Cipta Karya Seksi Sigli. Eventually to be taken over by BPAM - Pidie, at Sigli.

Distribution and installation of house connections was arranged jointly by local government, PAB-IKK and contractor.

Staff 1 (Standard: 5 persons)

Monitoring : None

OPERATION

Not functioning

Trials commenced in March 1984. Battery has been stolen. The steel treatment plant was rusting and needed repainting. At the time of the inspection there was no indication of activity going on to complete the system. Many of the house connection standpipes are leaking and will require repair. No water meter had been installed.

No training has been conducted.

No operating manual seen.

UTILIZATION

If the system were to function, not more than 50% of the design population would be served.

Existing water sources from wells and river are stated to be considered adequate by at least some of the people. The people customarily bucket water directly from a well for bathing, either in their houses or in public bath shelters, therefore they do not have bak mandi in their houses.

FINANCIAL ASPECTS

House connection fees have not been paid, and only the standard 10 metre allowance of pipe has been installed, leaving a vulnerable

standpipe in open space outside the house of each consumer who applied for a connection.

It is the opinion of local officials that the maximum tariff payable by householders will be Rp 1000/month.

THE COMMUNITY

Participation: no efforts appear to have been made to inform or involve the community in the water system. Most of the inhabitants are farmers and sociologically the area is rural rather than urban.

It is note-worthy that gotong-royong is a feature of this community for other purposes. A program for health improvement, nutrition , home gardens, and family planning is proceeding actively. The doctor Puskesmas is energetic and well-respected. A new building for the PKK will soon be built, only the foreman to be paid and most work will be performed voluntarily by the people.
A public well, built by the people, with no fees payable, appeared to be well used.

Acceptability
The people were disappointed when testing delivered muddy water through the pipes. They are unwilling to pay any fees until the supply is satisfactory. The noise of the gensets disturbs not only the mosque but residents as well.

Need
The people cannot understand why Glumpang Minyeuk and Lueng Putu have received a water supply and yet a community just 3 kms distant (but not a Kecamatan Capital) with saline ground water, does not.

CONCLUSIONS

A surface water treatment system seems inappropriate for this community and failures in construction and faulty location have compounded the problems.

The acceptability of the scheme has been seriously jeopardized by lack of knowledge of the community and failure to give information and to seek cooperation of other departments including the Health Department. The prospects for rehabilitation of the system are not encouraging.

6. Ibu Kota Kecamatan: WALED

Date of visit: 22 June 1984

LOCATION

Kecamatan : Waled
Kabupaten : Cirebon
Province : Jawa Barat
Population IKK : 8783

TECHNICAL ASPECTS

Source : Deep well
System : Submersible electric pump, 2 diesel generators, 5 lps. Chlorination unit.

Connections

	Standard	Constructed	In Use	Persons	Population Served
House	360	360	360	per households ? 10	? 3600
Public Taps	180	18	? 18	H.H. per tap ? 10	1800
				TOTAL	5400
				(Design Population)	7200

Construction : Funds : Dutch Government Aid
Consultant : IWACO B.V.
Stage of completion : Completed.

Flow Restrictors

Most have had rubbers reversed or other changes, permitting about twice the standard flow.

Float Valves

Said to be unreliable.

Water Quality

Said to have had initial laboratory tests.

Comments

Reported to have been a long interval between completion of production and distribution systems.

INSTITUTIONAL ASPECTS

Management: Dinas Pekerjaan Umum, Kabupaten Cirebon. (PDAM/BPAM not visited).

Monitoring - no special procedures.

OPERATION

Operating 8 - 10 hours/day (24 hours immediately before the Missions visit).

Date commenced : ? Construction was completed about 1 year ago but PDAM/BPAM still not organised enough to operate it.

No water meter installed, therefore cannot check flow rate.

System was being operated with hydrophore full of air: operator did not realise it was not supposed to operate like that.

Water is supplied to only about 70% of the system, presumably due to leakages and enlarged flow restrictors. The chlorination unit was not working. Maintenance in progress by a "trouble shooting team".

Training - by IWACO, through PAB-IKK and PDAM. No operating manual seen.

General construction standards better than average (casual impression)

UTILIZATION

Estimated population served : approx. 70% of design.

Other sources of water: river and wells. There is a shortage of water in the dry season and the people want an improved water supply. System water is being used for laundry and bathing as well as drinking and cooking.

At least some public taps are located in house yards where they are relatively inaccessible and are used by 2 or 3 households only.

FINANCIAL ASPECTS

Connection fees are said to be payable; the amount and collections not known.

No consumption fees are being collected while the operation of the system is still inadequate.

THE COMMUNITY

The camat and a lurah's office assistant said that they did not know that the trickle flow was intentional. They thought the system was just not yet working properly.

The community was not informed about the nature of the scheme nor about the uses for which the water is intended. They apparently

expected to have enough water for all purposes.

The failure of the system so far to function adequately has been disappointing to the recipients.

Land for public taps has been difficult to obtain.

The consultant appears to have had little contact with the local officials. The camat had not met the operator and was not familiar with this responsibilities.

CONCLUSIONS

This area has a shortage of water in the dry season and the people want a water supply.

Acceptability and therefore willingness to pay have been seriously prejudiced by defects in construction and operation, and almost complete failure to inform the community or even officials about the nature of the system.

7. Ibu Kota Kecamatan : RAJAGALUH

Date of visit: 22 June 1984

LOCATION

Kecamatan : Rajagaluh
Kabupaten : Majalengka
Province : Jawa Barat
Population IKK : 6640

TECHNICAL ASPECTS

Source : Spring, about 70 metres above the town and 3.5 km distant. The source was not visited.

System : Gravity flow; 5 lps with a "break-pressure" tank, the transmission line controlled by adjusting the inlet valve (possibly not according to design).

Connections

	Standard	Constructed	In Use	Persons	Population Served
House	360	360	360	Avge.per h.h. ? 7	?2520
Public	18	18	18	H.H. per tap ? 10	? 1260
				TOTAL	3780
				(Design Population)	7200

Construction Funds : Dutch Government Aid
Consultant : IWACO B.V.
Stage of Completion: Completed

Flow Restrictors
Most have been altered or removed.

Float valves - none seen

Water quality: subjectively satisfactory.

Comments
The spring produces much more water than required for the IKK standard 5 l/sec system. The people have shown considerable initiative in arranging bamboo pipes and plastic hoses, concrete tanks and ponds in parallel with the IKK system, supplying houses

both within and outside the design population, for which of course they can not be asked to pay fees.

Restriction of the IKK scheme to 5 l/sec when the supply potential is much greater has reduced the acceptability of the scheme, reduced its efficiency, permitted pollution, reduced revenue, and removed the possibility of cross-subsidy from this scheme to other less fortunate populations.

INSTITUTIONAL ASPECTS

Management : PAB-IKK Bandung (PDAM/BPAM not visited).

Staff : ? (Standard : 3 persons)

Monitoring : ?

OPERATION

Commenced early 1984 : 24 hours. Many leakages and unofficial diversions exist and together with altered flow restrictors the result is that some parts of the system do not get water.
No flow meter, therefore cannot check flow.

The people themselves operate control valves to direct the water in four-hourly rotations to different areas.
One house connection measured at 12.6 lpm (27 times design flow)

Maintenance
Pipe lines poorly maintained. Spring protection said to need repair.

Training - no information obtained.
No operating manuals seen.

UTILIZATION

Population served approx. 50% of design. Wells and surface sources are also used. Water from the system is used for all purposes.

FINANCIAL ASPECTS

No fees collected.

THE COMMUNITY

There is no evidence that the community has been informed about the system or involved in its implementation.

There is a great deal of initiative and self-help demonstrated in the "alternative" system and in modifications to the IKK system.

Acceptability
The flow restictions are not acceptable.

CONCLUSIONS

It seems inappropriate to have applied a standardised 5 lps restricted supply to a high-volume spring supply delivered by gravity and imposed the limited system on a community with good pre-existing sources.

8. Ibu Kota Kecamatan : PASEH

Date of visit: 23 June 1984

LOCATION

Kecamatan : Paseh
Kabupaten : Bandung
Province : Jawa Barat
Population IKK : 12500

TECHNICAL ASPECTS

Source : Spring. The supply appears to be fully utilized.
System : Gravity 5 lps. Chlorinated. The IKK system has been added to a spring captation originally built by the Health Dept. in 1975.

Connections

	Standard	Constructed	In Use	Persons	Population Served
House Connection	360	227	227	Per H.H. ? 10	2270
Public Taps	18	18(?19)	18(?19)	H.H. per tap ? 10	1800
				TOTAL	4070
				(Design Population)	7200

Construction
Funds : APBN (Indonesian Government budget)
Construction by : PAB - Dinas PU - Jabar.
Stage of completion : House connections do not yet fulfill the standard.

Flow Restrictors
All damaged, subsequently replaced and located underground. Flow rates measured in several houses on this inspection were approximately twice the standard rate. Presumably the restrictors have been altered again.

Float Valves
Some observed working.

Water Quality
Subjectively satisfactorily.

Comments
The IKK system serves part of the town, while the pre-existing Health Dept piped system serves another part of the town with public taps, no house connections and no flow restrictors. The same tariff is payable for the Health Dept. taps as for the IKK scheme, but fees are collected by LKMD.

INSTITUTIONAL ASPECTS
Management - PAB-IKK Bandung (PDAM/BPAM not visited)

Staff : 6 persons (Standard : 3 persons)
Four staff persons are receiving lower than minimum salary rates. The remaining two are employees of Dinas PU.

Monitoring procedures - routine only.

OPERATION
Operating since 1982 - 24 hours/day
Maintenance- appears adequate. Chlorinator was working.
No water meter, therefore cannot check flow.

Training
Operators said to have received no training (?)
No operating manual seen.

UTILIZATION
Population served approximately 60% of design. Most houses also have satisfactory wells. Piped water is used for all purposes.

FINANCIAL ASPECTS
House connection fee : not known.

Revenue

	H.C.	P.T
Tariff/month	Rp 1000	Rp 5000
Collection rate (270 subscribers)		?

Fees have been collected since mid. 1983. Paseh is a relatively prosperous village.

Comment

Over-staffing and low tariff make it unlikely that this scheme can make a profit to allow a cross-subsidy to other schemes which require pumping.

Expenditure

Cash book shows expenditure equal to revenue.

THE COMMUNITY

No information was available about community involvement.

ACCEPTABILITY

The standard flow rate has been shown by peoples' actions to be unacceptable to consumers.

Inter-departmental cooperation.

It was stated that Cipta Karya may undertake maintenance of the Health Dept. section of the water supply.

CONCLUSION

It is possible that the PAB and Depkes schemes could be operated together, improved and expanded and tariffs charged at a rate to allow cross-subsidisation of other towns. Since it has proved impossible to enforce the IKK supply level, consideration might be given to upgrading to a BNA-type scheme and installing meters.

APPENDIX E

FINANCIAL CALCULATIONS

1. Source Selection - Gravity Flow Transmission Distance

Assumptions

1. Investment and recurrent expenditure cost estimates are based on 1984 data from IKK schemes constructed in North Sumatra.
2. Pumping uses diesel gensets.
3. P.V.C. transmission pipes with diameters 75, 100, or 150 mm diameters are used.
4. To calculate Present Value of operating costs, use 15 year lifetime for the systems and
5. Discount rate 10% p.a.
6. Deepwell investment costs include well, pump, gensets and genset house.
7. Operating costs are for materials only: labor costs assumed to be equal in each type of scheme.

Calculations

	Investment Costs Rp	
	Springs	Deepwells
2.5 lps		
Captation	7 500 000	
Transmission		
5000m x Rp 7 500	37 500 000	
Total	45 000 000	35 000 000
5.0 lps		
Captation	7 500 000	
Transmission		
5000m x Rp 10 000	50 000 000	
Total	75 500 000	40 000 000
10 lps		
Captation	7 500 000	
Transmission		
5000m x Rp 17 500	87 500 000	
Total	95 000 000	65 000 000

Operating Costs Rp

Deepwells exceed Springs by :

	per annum	Present Value
2.5 lps	4 200 000	35 000 000
5.0 lps	8 700 000	72 000 000
10.0 lps	12 700 000	106 000 000

Total Cost Comparison 15 years @ 10% Rp. Million

	Springs			Deepwells				
	Inv.	Op.	Total	Inv.	Op.	Total	Net Benefit in favour of springs Rp.m.	Equiv. Transm. Line
2.5 lps	45		45	35	35	70	25	8.3 km
5.0 lps	75.5		75.5	40	72	112	54.5	10.4 km
10.0 lps	95		95	65	106	171	76	9.3 km

2. Monthly Operating Costs

A. 2.5 lps deepwell		
Generator 5KW, fuel 1.29 x 24 x 30 x Rp 250	Rp	232 000
Lubricants	Rp	45 000
Filters	Rp	35 000
Tools, paint, repair	Rp	10 000
Chlorination	Rp	25 000 *
Salaries 4 x 36 000 + rice	Rp	150 000
Administration, local travel	Rp	20 000
Sundry, repair distribution system	Rp	125 000
Total	Rp	642 000
B. 5 lps deepwell		
Generator: 10 KW Fuel 2.6 x 24 x 30 x Rp 250	Rp	468 000
Lubricant	Rp	85 000
Filters	Rp	35 000
Tools, paint, repair	Rp	10 000
Chlorination	Rp	50 000*
Salaries 4 x 36 000 + rice	Rp	150 000
Administation, local traval	Rp	35 000
Sundry, repair distribution system	Rp	140 000
Total	Rp	973 000
C. 10 lps deepwell		
Generator Fuel 4.52 x 24 x 30 x Rp 250	Rp	814 000
Lubricant	Rp	125 000
Filters	Rp	45 000
Tools, paint, repair	Rp	10 000
Chlorination	Rp	100 000*
Salaries 5 x 36 000 + rice	Rp	190 000
Administation, local travel	Rp	40 000
Sundry, repair distribution system	Rp	200 000
Total	Rp	1 524 000

D. 2.5 lps Spring, gravity

Tools, paint, repair	Rp	10 000
Chlorination	Rp	25 000
Salaries 5 x 36 000 + rice	Rp	115 000
Administration, local travel	Rp	20 000
Sundry, repair distribution system	Rp	125 000
Total	Rp	295 000

E. 5.0 Lps Spring, gravity

Tools, paint, repair	Rp	10 000
Chlorination	Rp	50 000*
Salaries 3 x 36 000 + rice	Rp	115 000
Administration, local travel	Rp	35 000
Sundry, repair distribution system	Rp	140 000
Total	Rp	350 000

F. 10 lps Spring, gravity

Tools, paint, repair	Rp	10 000
Chlorination	Rp	100 000
Salaries 3 x 36 000 + rice	Rp	115 000
Administration, local travel	Rp	40 000
Sundry, repair distribution sytem	Rp	200 000
Total	Rp	465 000

* This report recommends discontinuation of chlorination.

APPENDIX F

ENVIRONMENTAL SANITATION

Excreta disposal, drainage and solid wastes disposal, together with personal hygiene, are subjects on which action must be taken at the same time as improved water supplies are provided, if maximum health benefits are to be achieved. The Director PLP has requested the Mission's observations on sanitation in IKK towns.

The Mission's terms of reference did not allow detailed consideration of these issues, but some comments can be made.

Excreta Disposal

Some townspeople have septic tanks, others have pour-flush latrines, but many use open pit latrines, water courses and open fields.

The volume of supply available within IKK design standards would allow domestic pour-flush latrines and hand washing

Drainage

Waste water from over-flowing water containers and from bath rooms frequently lies stagnant in inadequate gutters outside houses. Neighbourhood tap drainage was generally adequate to nearby ditches, but those ditches were themselves unsatisfactory as drains.

Solid Wastes Disposal

Collection from houses, commercial premises and markets is generally inadequate. Most small towns have rubbish dumps on vacant land in residential areas. Effort is needed to improve solid waste disposal.

Personal Hygiene

IKK water supplies can be expected to make it easier to wash hands after defaecation and before eating. Health education should be aimed at improving these practices.

These issues are primarily the responsibility of local authorities, the Health Dept and the Dept of Home Affairs. Nevertheless, Cipta Karya staff have opportunities for stimulating effective action through cooperation with those agencies.

Recommendations

- The recommendations elsewhere in this report foreffective communication and cooperation with other departments and agencies are relevant.
- In view of the familiar problems of public toilets and the limited water supply provided by IKK schemes, it is recommended that
  - : within the survey procedures for IKK schemes, the feasibility of and need for public toilets in the supply area be ascertained from the camat. Information required include the ability to collect revenue from users to pay for cleaning and maintenance.
  - : the IKK scheme design should allow for the equivalent of one public tap supply to be available for each public toilet, assuming the toilet is in a busy public area. Arrangements for payment of fees for water will have to be made by the camat in advance.
  - : laundry facilities can never be supported by a standard IKK scheme flow and therefore should not be constructed.
  - : bathing can not be done with the standard IKK scheme supply to public taps, therefore public bathing facilities should not be constructed.
- Cipta Karya and Water Enterprise staff are encouraged to work with other agencies to develop an integrated approach to health education, water use and sanitation.

Water Quality

The Mission noted that the 'IKK Water Supply Program : Strategy and Scope' (p.35) proposes water that is 'biologically safe' and subjectively evaluated for physical and chemical acceptability without laboratory testing.

Biological safety can be determined by survey for potential risks of pollution and by microbiological examination.

Recommendations

- Training programs and the Survey Manual should give specific instructions for performing "sanitary surveys" of water sources to detect potential sources of pollution.
- Water from each new source should be examined in a microbiological laboratory and the results compared with GOI standards before the source is developed. These field and laboratory findings will assist decisions about the need for chlorination.

- Laboratory testing of water should be performed when there is any suspicion of pollution or whenever increased numbers of cases of any water-borne disease are occurring in the people served by the water supply.

APPENDIX G

COMMUNICATION AND COMMUNITY WORK

Program, Methodology, Personnel and Costs

Program 1 - Communication at National Level

AIM : To ensure adequate information about the IKK system is disseminated at the national level.

IKK National Office ensures adequate information about the IKK water supply system is given to :

(a) Other offices in Dept of Public Works

Method : - meetings
- working paper
- informal meetings

Personnel: - oversight by Communications and Community Work Unit

(b) Other departments at National level

- BAPPENAS - DEPKES
- FINANCE - DEPT OF DALAM NEGERI

Method : - meetings
- working group
- workshop for new issues and coordination

Personnel: - oversight and
- planning workshops C & C W Unit.

Frequency: - one workshop per year

(c) Provincial Level
- Governor
- PAB

Program 2 - Communication from National to Provincial Level

AIM : IKK National office ensures that PAB-IKK has full understanding of IKK water supply system for implementation

5 day workshop for PIMPRO PAB-IKK in 3 regions. To cover 27 provinces. No more than 20 participants per workshop.

- concepts
- philosophy
- principles of IKK
- procedures
- methods of communication from PAB-IKK to the community
- problems encountered in the field
- cooperation with other relevant departments

- training for IKK
- education of community for IKK
- tariffs and tariff setting
- operation and maintenance
- cost recovery
- water and health
- acceptance by the community
- community involvement
- modifications to the technical system
- chlorination

Method

- discussion of present experience
- field visit to provide common experience for workshop discussion
- discussion of field visit
- focus an particular issues and problems of concern to the group
- input of new information

Personnel

- PIMPRO PAB-IKK of region (9 or 10 provinces)
- IKK National staff for discussion on these topics
- Other departments for contribution on Key issues e.g. Health
- Foreign funded project personnel with relevant experience
- One staff of C & C W Unit
- National Consultant (Lembaga Swadaya Masyarakat) as facilitator (YIS, LP3ES, or Bina Swadaya).

Cost

- Incentives
- Travel
- Perdiem
- National Consultant
- Workshop materials

Program 3 - Training at Provincial Level

AIM : To train a suitable person in PAB-IKK in communication, education of the community and community organisation to achieve community acceptance of IKK.

Training Workshop for a selected PAB-IKK staff

- Communications, Education of the Community and Community Organisation
  One staff of PAB-IKK with ability and interest

Coverage - concepts of communication
- education of the community
- community organisation
- relevance to IKK water supply scheme
- skills training in : communication
education of the community
community organisation
- planning and facilitating meetings and workshop

Method - one week classroom teaching (two weeks if an emphasis to be given to Community Organisation for Neighbourhood Taps)
- one week classroom teaching
- two months field work with specified work experience and field notes - on the job recording for review
- one week review of field experience and refresher on skills

Personnel- 9 or 10 PAB-IKK staff trainees
- trainer from C & C W Unit
- 1 National Consultant - Lembaga Swadaya Masyarakat

Program 4 Communication within the Local Government System

AIM : To achieve cooperation from local government officials to ensure acceptance by community and appropriate town selection.

A. Provincial Level

Meetings to be held with relevant departments and organisations e.g. - BAPPEDA I
- BANGDES
- DEPKES
- PKK

Coverage
- to provide information about IKK water supply system
- to discuss need for education of the community
- to gain cooperation
- to outline training

Method
- information given with visual aids and mobile model
- discussion of IKK system
- concept
- principles
- philosophy
- practical application at community level
- education of the community

- involvement of Kaders and informal community leaders

Personnel

- PAB-IKK person trained in communication, education in the community and community organisation
  - arrange meeting
  - prepare program
  - facilitate discussion

B. Kabupaten Level

1. Meeting to be held with relevant departments, organisations and leaders

- BUPATI	- PKK
- BAPPEDA II	- CAMATS
- DEPKES	- PDAM OR BPAM

Coverage)
Method) Same as Provincial Level
Personnel)

2. More detailed meeting to be held with Camat, PDAM or BPAM to achieve understanding and action
3. Training Workshop for PDAM staff in Communications Skills

AIM : To train a suitable person from each PDAM in Communication skills
- to assist PAB-IKK communication education officer
- to ensure adequate education of the community

Requires coordination and cooperation with Dept Dalam Negeri and Bupati

Coverage : - Communication skills
- principles of community education
- skills training

Method : One week workshop

Personnel: Planned by National Communication and Community Work Unit
- in cooperation with Dept Dalam Negeri

Costs : In one year
- 3 Workshops/in each of 3 regions.
  Each workshop - 27 PDAM staff i.e.
  3 Kabupatens from TRAVEL
  9 Provinces from PERDIEM
- One week each

- Trainers per workshop
  1 National C & C W Unit - Travel
  - Perdiem
  2 LSM National Consultants
  - Salary
  - Trainee
  - Living Expenses
  Training materials

C. Kecamatan Level

(i) Meeting to be held with relevant departments and organisations : Camat
Kepala Desa
Kep. R T and Kep R W
Dokter Puskesmas
Guru-Guru
Kader - LKMD
PKK
Other Community Leaders

Coverage
- to provide information about IKK water supply system
- discuss the need for education of the community
- gain co-operation
- agree on approach and strategy including 2 day workshops for local leaders

Method
- information given with visual aids and mobile model
- discussion of IKK system
  - what - the concept
  - the system
  - why - philosophy - water and health
  - how - the flow rate
  - the cost
  - house connections
  - neighbourhood taps and neighbourhood groups
  - potential difficulties
  - the need for education of the community
  - who will do it
  - how will it be done
  - what teaching aids
  - plan for follow up workshop of local leaders

Personnel
- PAB-IKK person trained in communication, community education and community organisation
  - arrange meeting

- prepare program
- facilitate discussion

(ii) Workshop in Desa of IKK with local leaders: Approx 12. persons

AIM :- to ensure full understanding
- to consider best siting of distribution line and neighbourhood taps
- plan for community organisation for neighbourhood groups around neighbourhood taps
- to ensure that accurate information will be given by Kaders and other local leaders to the community.

Coverage
- explanation, discussion and clarification of the system
- how to introduce the system to the community
- the concept of neighbourhood groups
- possible sites for neighbourhood taps and land availability
- community organisation around neighbourhood taps

Method
- information giving with visual aids
- discussion and clarification
- likely problems
- possible solutions
- use all available aids
  - mobile model
  - leaflets
  - health education material

Personnel
- Facilitator : PAB-IKK assistant for Communication and Community Work and PDAM Communications staff person - to plan and facilitate the workshop in consultation with the Camat
- Other attenders for information
  - Surveyor
  - Dokter Puskesmas

Costs
- Travel
- Perdiem
- Training Materials

(iii) The Kepala Unit to continue to give accurate information to the people
- encourage understanding and acceptance
- day to day contact

Additional training in Communication in Course for Kepala Unit

3 days Unit on
- Communication skill
- Education of the Community

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Program 5 - Review and On-going Training in Communication and Education of the Community

AIM : - To increase the skills of the Communication and Community Work personnel
- To build on the short initial training by using experience for review.

A three day workshop in the province for :
- PAB-IKK Communication and Community Work staff
- PDAM Communications staff
- Surveyors
- Kepala Units

To be held every 6 months. Approx. 20 people.

Coverage
- review - problems encountered
- success experienced
- more skills training
- recommended improvements
- presenting recommendations

Method - Workshop sessions

Facilitators
- planned by National IKK Communication and Community Work Unit
- Trainer from the Unit or National LSM Consultant, YIS, LP3ES or Bina Swadaya

Cost : - Travel
- Perdiem
- Trainee/facilitator

Programme 6 - *Community Involvement*

AIM : - To improve people's acceptance of IKK water supply
- To establish neighbourhood groups around neighbourhood taps.

1. PAB-IKK Communication & Community Work staff trained in :
- communication skills

- community education
- community organization

should spend several days in thecommunity before the local survey begins. He will work with Kader and other informal leaders towards identifying 6 neighbourhood groups in order to site the first 6 neighbourhood taps.

Method

- workshop with Kader, and community leaders
- field work and discussion with community leaders
- field work and discussion with the people to determine:
  - the households who would expect to use a neighbourhood tap
  - groupings of these households
  - locate land for neighbourhood taps in relation to these groups

2. The Surveyor spends 1 week in the community. He will hold discussion with community leaders and the people to determine :
   - the distribution line
   - location of neighbourhood taps and discuss house connection. This activity will overlap Step 1 and be integrated with it.

Method

Once 1 week

- discussions and meetings
- field work : - visit sites for neighbourhood tap location

Personnel

Surveyors to have training in : - communication
- field work

in addition to technical training.

One week to be added to training and planned and provided by :

- National Communication and Community Work Group or
- National LSM Consultant e.g. YIS, LP3ES or Bina Swadaya.

APPENDIX H

REVIEW METHODOLOGY

The Mission used a phased participation process to gain maximum benefit from its multi disciplinary membership. The steps in the Mission's work program is described.

1. Terms of Reference, briefing by DAB, reading, and personal experience were used to develop a set of subjects and topics as the basis for enquiries.

TABLE 1

Subjects	Topics
Payment	How much; paid to whom; how often; % default; action taken. Poor people. Connection fees. Willingness to pay ; ability to pay.
Acceptability	Perceptions of adequacy; purposes; flow rate; volume; quality, accessibility. Drink from bak mandi; boiling. Social class differences.
Operation; Reliability	Breakdowns - frequency; duration; cause; corrective action. Level of water in public taps tanks; outlet discharge rate. Hours of operation.
Maintenance	Restrictors; illegal connections. State of machines. Leakages.
Variation from design	House connections; public taps; other design criteria (see list).
Quality of Water	Perceptions. Testing; laboratories; where; how often; chemical and bacteriological. Treatment. Testing for chlorine.

Utilisation	Population served, not served; area; season; other and previous sources; purposes; volume; home storage. Distances to public tap; by whom; waiting time; how often. Animals. Irrigation. Other users.
Construction	Standardisation. Date started and completed. Costs and budget. Contractors; supervision; quality of work; training of contractors.
Household economics	Income and expenditure. Time saved. Occupation.
Sanitation - household	Knowledge, attitudes and practices re. hygiene personal, food, house. Latrines and use. Drainage. Solid waste. Boil water ? Health education.
Management and Institutions	Financial viability. Who manages; competence. Cost recovery; cross subsidy.
Operator staff	Training; competence; numbers; duties; selection; salary; supervision; perception of functions. Manuals. Maintenance of restrictors; materials; equipment, tools.
Community Participation	Selection of this town. Information about the system. Education about use; by whom; when; possible methods.
Land	Ownership of source; plant; public taps.
Monitoring	Recording and reporting; to whom; action.
Coverage	Population served. Definition of area. Exclusions ?
Source	Type; potential capacity.

2. These topics were allocated to various members of the team to ensure that information was obtained on each topic while allowing each person to follow his own interests and obtain maximum information to be shared with the group. The topic allocation is shown in Table 2.

3. A summary table of available information was prepared for each scheme to be visited. This is shown in Table 3.

4. A list was prepared of potential sources of information during field visits :

   Personal observation
   Records, reports, maps
   Consultants
   Cipta Karya - Jakarta
   PAB-IKK
   BPAM/PDAM
   Camat
   People - at public taps
   People - with house connections
   People - not served by the system
   Health Centre staff, Dokter Puskesmas
   Other departments - Dalam Negeri etc.

5. The methodology for field visits was as follows:

   Aims : - To identify potential subjects for detailed investigation;
   - To identify opportunities and difficulties in collecting information;
   - To develop approaches to solutions of major problems including operation, maintenance, payment of fees, community participation;
   - To guide planning by foreign aid agencies

   Sources of information : key informants
   water users

   Methods : Open ended guided interviews.
   No statistical procedures in view of time limitations and nature of data required.
   Seek what is good as well as problems

TABLE 2
FIELD VISIT TASKS

Subject	Engineers (4)	Economist	Community Organiser	Health Specialist
Payment		x		
Acceptability			x	
Operation	x			
Maintenance	x			
Variations - from Design	x			
Quality of Water				x
Utilisation			x	
Construction	x			
Household - economics		x		
Sanitation				x
Management		x		
Operators	x			
Community			x	
Land		x		x
Monitoring	x			x
Coverage				x
Source	x			

6. In the evenings after field visits, group meetings were held as required to exchange information, plan the report preparation and share ideas.

7. After field visits were concluded, the group met to draft the Report. An analytical process produced a list of problems and suggested solutions. A process of synthesis showed inter-relationships and relative priorities.

ANALYSIS

(i) "Problem census" by full and free listing of all the issues as seen by each member of the group.

(ii) Clarification and grouping of the issues and problems by the group jointly.

(iii) Allocation of subjects to group members individually to write up.

TABLE 3

IKK	Popn.	Urban or Rural	Source	Capacity		Connections	Operation	Management	Operating Time	Promotion meeting	Financial	Other
				H.C	P.T							
Tanjung Langkat												
Stabat												
Pantai Cermin												
Limapuluh												
Glumpang Minyeuk												
Rajagaluh												
Waled												
Paseh												

(iv) Draft chapters exchanged between group members and comments given to and received by each person.

(v) Group discussion for comment, clarification and to discover duplications and omissions.

(vi) Chapters re-written, recommendations prepared.

8. Prioritizing process

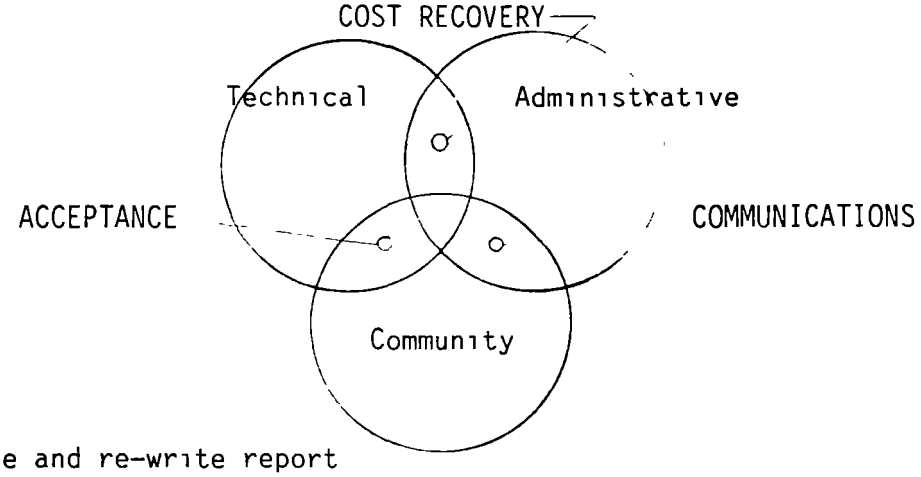
All recommendations were written on sheets of paper and information recorded against each one under these headings :

ACTION	:	Action steps. By whom. When begin. When completed.
PRIORITY RANKING	:	Based on feasibility, complexity, difficulty, policy implications.
COST	:	and cost benefit
IMPACT	:	importance, urgency, range of influence, effects on viability of IKK
INTER RELATIONSHIP	:	with other fields of action and recommendations.

9. Thinking and discussion, to discover themes, linkages, patterns.

SYNTHESIS

Outcome was the IKK Model :



10. Revise and re-write report

11. Prepare Program for Implementation

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SKB No 3 in 1984 (no. 26/KPTS/1984). Concerning the procedures for water supply proposals, temporary management and handing over arrangements.
SKB No 4 in 1984 (no. 27/KPTS/1984) - concerning guidance for PDAM
SKB No 5 in 1984 (no. 28/KPTS/1984) - concerning manuals of water supply management.
Lampiran 1. Pedoman Struktur dan Perhitungan untuk menentukan tarip air minum.
This series of decisions is the major basis for procedures in water supply management.

44. Scott W D & Co Pty Ltd and others (March 1984) Institutional Support Project for Water Supply sector. Inception Report. Dir. Gen. Cipta Karya Jakarta.
The scope, direction and scheduling of a consulting work program is described. The consultancy project is intended to strengthen the overall management of the water supply sector. The project will be directly relevant to IKK schemes especially in relation to administration and training for PDAM's and a study of water tariffs and financing. The project will focus on East Java, West and Central Java.

45. Soeratmo Notodipoero (26 January, 1984). Pedoman/Petunjuk Pengelolaan Air Bersih Ibu Kota Kecamatan. Dep. PU., D-J Cipta Karya. Direktorat Teknik Penyehatan. Circular letter.

46. Subdit. Pengembangan, Dir. Air Bersih (April 1984) Evaluasi Instalasi Paket Pengolahan Air Bersih Ibu Kota Kecamatan di Pontang,Beji, Carenang, Gintung, dan Tambun.

47. Supply and Sanitation Programmes. A literature Review. Technical Paper No.12. International Reference Centre for Community Water Supply and Sanitation, the Netherlands.

48. Tangerang Kabupaten, West Java 27-31 December,1983. Dept Dalam Negeri.

49. Taylor J and Sons (International) London for Department of Public Works, Directorate General Cipta Karya and the Asian Development Bank (April 1984). Technical Assistance for IKK and Small Towns Water Supply Sector Project in Indonesia
Final Report - Vol I :Report
Vol II : Appendics
The Report describes results of studies by Consultants towards identification of a project acceptable to the Asian Development Bank which would be appropriate for support by lending agencies. The studies also determine an appropriate number of IKK's and small towns to receive water supplies and propose an implementation program for the recommended project.
The Report discusses issues relating to IKK water schemes in detail, providing a useful source of relevant data and mentioning many problems in implementation. The Report lists 250 towns to be provided with water supply sytems. It appears to accept the feasibility of the IKK strategy but recommends twice the flow rates, "to meet long term variations in consumer needs and maintain acceptability,.... (and) introducing increased flexibility."

50. UNDP (1984) Report of the Water Supply and Sanitation Review and Programming. Mission, November - December 1983. UNDP Jakarta.

51. Van Wijk Sijbesma C (1981) Participation and Education in Community Water Supply and Sanitation Programmes. A Literature Review. Technical Paper No. 12. International Reference Centre for Community Water Supply and Sanitation. The Netherlands.

52. White, A (1981) Community Participation in Water and Sanitation. Concepts, Strategies and Methods. Technical Paper No. 17. International Reference Centre. The Netherlands.

53. Whyte, A (1983) Guidelines for Planning Community Participation in Water Supply and Sanitation Projects. World Health Organisation. Geneva.

54. Working Group on Integration of Rural Piped Water Supplies with IKK Programme. Report and Terms of Reference (March 1984). D-J Cipta Karya.

This report makes comprehensive recommendations for national planning and implementation of piped water supply schemes. The individuals responsible for taking action to implement the recommendations are not named.

55. World Health Organization for UNDP (1980). Rural Water Supply East Java Indonesia. Report on Organization, Management, Socio-Economic and Financial Studies. Volume Two : Main Report.

This Report presents the results of a study to develop management plans for rural water supply development including planning, design, financing, construction, operation, maintenance and monitoring of operations. It describes the implications of various courses of action and makes recommendations.

56. World Health Organisation (1983). Minimum Evaluation Procedure (MEP) for water supply and sanitation projects. WHO - Geneva.

57. World Health Organisation (1983). Maximizing Benefits to Health. An appraisal of methodology for water supply and sanitation projects. WHO - Geneva.

This report, together with the report of Bali Workshop I on DWS&SD held in 1981, constitutes the major basis for urban and rural water supply policy and planning.

APPENDIX J

LIST OF RECOMMENDATIONS

Recommendation 1
The need for water should be the sole criterion for selecting a site for an IKK scheme.

Recommendation 2
The factors to be considered in assessing the need for water should be:

(i) the existence of other water schemes
(ii) percentage of families with private shallow wells
(iii) the distance to existing water sources
(iv) dry season availability of water
(v) present payments for water throughout the year
(vi) water quality (people's perception of taste, smell, turbidity, etc.) of existing supplies compared to potential new supplies and safety as determined by sanitary survey and laboratory testing.

Recommendation 3
That local authorities' opinions should be given major weight in decisions about selection based on need for water.

Recommendation 4
The survey period should be extended to at least one week, with another week allowed for preparation of designs for each IKK scheme.

Recommendation 5
A visit and inspection of the town must be made during the survey period. During that visit, consultation must take place with the Camat, other officials and if possible with other community leaders and people.

Recommendation 6
The subjects of the consultations should include information about the scheme in detail, the routes for pipelines, probable demand for house con-nections and suitable locations for neighbourhood taps.

Recommendation 7
Training programs for surveyors should develop the attitudes and skills needed for community consultation.

Recommendation 8
The design manual should be revised to increase the permitted transmission distance for gravity flow from springs from the present 5 km maximum to a maximum of 10 km.

Recommendation 9
Surface water should be rejected as a possible source for IKK schemes because of the high recurring costs of treatment unless the GOI is prepared to permanently subsidise O & M costs.

Recommendation 10
The allowance for unaccounted for water should be increased to a minimum of 20%.

Recommendation 11
Each household should continue to receive 600 litres daily.

Recommendation 12
Neighbourhood taps should continue to be designed to provide 300 litres per user family.

Recommendation 13
Education about water use should emphasise the permitted uses of the IKK supply and the need to maintain some other source of water.

Recommendation 14
Training programs and the Survey Manual should give specific instructions for performing 'sanitary surveys' of water sources to detect possible sources of pollution.

Recommendation 15
Water from each new source should be examined in a microbiological laboratory and the results compared with GOI standards before the source is developed. These field and laboratory findings will assist decisions about the need for chlorination.

Recommendation 16
Laboratory testing of water should be performed when there is any suspicion of pollution or whenever increased numbers of cases of any water-borne disease are occurring in the people served by the water supply.

Recommendation 17
Chlorination units should be omitted from IKK schemes unless special circumstances exist.

Recommendation 18
Communities should be informed that the water is not guaranteed to be bacteriologically safe.

Recommendation 19
An intensive community education process should be developed including a mobile model to show the IKK-type trickle flow and 24-hour volume.

Recommendation 20
All training programs for personnel associated with IKK schemes should ensure that the nature and importance of the IKK flow rate and restrictor is understood and acted upon.

Recommendation 21
As an adjunct to administrative action to enforcement, all flow restrictors should be installed in locked, sealed, steel boxes, placed on the supply pipe.

Recommendation 22
Trials types 1, 2, 3.1, 3.2 and 3.3 described above (in Section 4.2.7), should be carried out in 3 to 6 schemes each, with appropriate research design and monitoring. Such trials could be conveniently performed in schemes funded by foreign aid.

Recommendation 23
Existing incomplete schemes with public taps only should be considered for trials as in Rec. No. 22 above.

Recommendation 24
Water points comprising a storage tank and several outlet taps for communal use in residential areas, where fees are to be paid by people using them should be named "neighbourhood taps".
Similar structures located in markets, schools, bus stations, offices, mosques or other public areas can continue to be called "public taps"

Recommendation 25
Hence forward neighbourhood taps should be each designed to serve ten families, therefore smaller tanks and flow restrictors with less than 4.6 lpm flow rate can be provided. A smaller concrete apron would be adequate for drainage and would discourage use of tank water for laundry.

Recommendation 26
In the survey and design stage, a minimum number of neighbourhood taps to serve 20% of the population should be planned. The remainder (to achieve up to 50% coverage) can be added later if needed depending on the ultimately expressed demand for house connections.

Recommendation 27
Budgets for IKK schemes should include an allocation of money for purchase of land in the most suitable locations for neighbourhood taps.

Recommendation 28
The PAB-IKK communications person should undertake community organizing work before and during the survey period in order to

(i) define groups of households which will use each neighbourhood tap;
(ii) decide the most suitable locations for the taps in consultation with the groups of potential users;
(iii) obtain agreement from the landowner in each case to sell the land and agree also on the price.

Recommendation 29
Taps and not float valves should be installed on house connections.

Recommendation 30
Float valves should continue to be installed on neighbourhood and public tap tanks and be maintained in good working order.

Recommendation 31
The hydrophore should be omitted from IKK schemes.

Recommendation 32
An exhaust silencing system should be designed and installed on all generating sets situated less than 500 metres from any occupied building.

Recommendation 33
Finance, supervision, staffing and training in every pumped scheme should be given close attention to ensure that a continuous supply is maintained.

Recommendation 34
Transmission pipeline capacity should be installed at twice the IKK standard supply requirement in all future IKK schemes.

Recommendation 35
IKK projects should make adequate manpower and budget allowance for more intensive formal and on-the-job training for contractors.

Recommendation 36
The two week training course for works supervisors should be supplemented by intensive on-going field assessment and instruction.

Recommendation 37
The contract for laying of pipes should not be let until all the materials required to be supplied by Cipta Karya are delivered to the province.

Recommendation 38
Prescribed penalities for late delivery of materials should be more rigidly enforced.

Recommendation 39
The sequence of construction should be arranged in the following order:

- production unit
- transmission and distribution system with neighbourhood taps
- testing of pipework
- house connections

Recommendation 40
Provision should be made for the installation of house connections to be done by the IKK Operating Unit.

Recommendation 41
A review should be made of standard unit prices used by Cipta Karya in budgetting and funding of schemes and, if appropriate, revisions be made to the budget allowances for the program. As part of this review, further instruction should be given to provincial PAB-IKK officers in estimating techniques. Due consideration should be given to the different costs applicable in different areas.

Recommendation 42
No house connection should be made to any house which does not have a suitable receptacle to receive and store the water and the connection should be constructed up to that receptacle.

Recommendation 43
The design alternative of a 20 litre container in addition to the 'bak mandi' house storage should be made standard and included in all installations.

Recommendation 44
A maximum standard house connection fee of Rp 15 000 should be set.

Recommendation 45
Householders should be given the option of reducing the connection fee by Rp 250/metre if they dig the trench from the water main to the house.

Recommendation 46
Existing schemes should be instructed to adjust staff numbers to comply with Cipta Karya policy.

Recommendation 47
A 10 lps pumped scheme should be staffed by 5 people including the "Kepala Unit".

Recommendation 48
Each IKK Unit should receive regular and frequent visits from an experienced technical officer or engineer. During these visits, the equipment should be inspected, problems dealt with and the operators given on-the-job training.

Recommendation 49
Where the PDAM does not possess a technical officer with adequate training and experience, the PAB-IKK should continue to provide an officer for technical support to IKK schemes.

Recommendation 50
Each PAB-IKK should ensure that stocks of spare parts in required quantities and of appropriate types be held at Unit, Kabupaten and Provincial level.

Recommendation 51
The maintenance manuals now being prepared in Jakarta should be distributed as soon as possible to all IKK schemes.

Recommendation 52
Maintenance schedules should be prepared by PAB-IKK officers for each IKK scheme and operators trained and supervised in performing correct maintenance procedures by the PAB-IKK (or PDAM) technical officer.

Recommendation 53
Clear rules should be made for Unit staff to disconnect houses with damaged flow restrictors or connections that have been tampered with in any other way to increase the flow of water. Reconnection should be done only upon payment of the cost of the damage plus an additional reconnection fee. Consumers should be informed about this regulation.

Recommendation 54
Steps should be taken to encourage payment of fees by neighbourhood tap users in a variety of ways and these ways should be tested in different schemes constructed over the next two years. These trials should be conducted with the guidance of a suitably experienced social scientist.

Recommendation 55
Tariffs in IKK schemes, whatever the source and the actual operating costs, be set as high as possible but not above Rp 2000 per month per house connection and a proportionate amount per household for users of neighbourhood taps.

Recommendation 56
That PLN power be used in all schemes where 24-hours supply is available.

Recommendation 57
When achievements in the 1984-85 IKK program are reviewed, attention should be directed to the number of systems completed and operational according to design and the actual expenditure required to achieve fully completed schemes.

Recommendation 58
The 1985-86 program should be reviewed in the light of the finance and manpower available and the targets adjusted if necessary.

Recommendation 59
Tariff guidelines for piped water supplies should apply to both small towns (including IKK) and rural systems.

Recommendation 60
Consideration should be given to the formation of a "Water Supply and Sanitation Planning Team" in each province.

Recommendation 61
Career opportunities for water enterprise staff should be provided by developing a suitable organisation structure. A National Water Enterprise could be considered for this purpose as well as for technical and administrative reasons.

Recommendation 62
BPAM/PDAM officials should be kept well informed by the Kepala PAB-IKK about IKK schemes planned and under construction, including invitations to BPAM/PDAM officials to participate in decisions regarding location, design details, connection fees and tariffs and staff appointments and training.

Recommendation 63
In the present rapidly developing IKK program, personal visits should be made by Jakarta staff to provinces for two-way exchange of information and explanation. A visit to each province at least once in three months is suggested.

Recommendation 64
The capacity for self-evaluation should be developed in all personnel through formal training, constructive and helpful supervision and in-service training.

Recommendation 65
Personnel should be encouraged to discuss with water users their views about the system, to take action to investigate complaints and to make improvements.

Recommendation 66
Peer review should be facilitated by means of :

1. exchange visits between staff of different schemes within provinces, and between BPAM/PDAM staff;
2. regular meetings at Kabupaten (monthly), Province (3-monthly) and National (annual) levels with the aim of sharing experience and learning from one another. Such meetings need skilled leadership.

Recommendation 67
A seminar-workshop should be held late in 1984 of representatives of all agencies involved in IKK schemes with the aim of sharing experiences and learning from one another.

Recommendation 75
Greater efforts should be made to ensure that both officials and the community are accurately informed of and understand the nature and concepts of an IKK water supply before it is introduced.

Recommendation 76
A Communications and Community Work Unit should be established in Cipta Karya to provide services to the IKK program.

Recommendation 77
While the permanent Communications and Community Work Unit is being established, and in view of the urgency of the program, immediate action should be taken to provide communications services by :

1. appointing a suitably skilled person in a temporary position in Cipta Karya to begin the program by using the services of a National Consultant e.g. Lembaga Swadaya Masyarakat (LSM);

and/or 2. requesting the services of a Communications and Community Work expert from a foreign assistance agency. Such a person would function as an adviser when the communications specialists are appointed to the Unit.

Recommendation 78
Action should be taken to ensure adequate information about IKK systems is given to all relevant departments and levels of government.

Recommendation 79
Each Kepala PAB-IKK should ensure, by arrangement with officials in the Department of Health including the Dokter Puskesmas in each Kabupaten, that effective health education regarding water, sanitation, and personal hygiene is undertaken with the people in conjunction with IKK water supply systems.

Recommendation 80
A newsletter about the IKK Water Supply program should be prepared, and distributed monthly.

Recommendation 81
A mobile working model should be designed and recommended to each PAB-IKK for construction.

Recommendation 68
A senior officer from Cipta Karya should be appointed full time to monitor the IKK program. The officer should not be a member of the IKK project group and must be free to make whatever recommendations are needed. His duties will include observation and analysis of construction and operation of IKK schemes, observation of the testing of modifications, and direction of the application of the results of trials.

Recommendation 69
Consideration should be given to requesting technical assistance from a foreign donor in the form of an expert adviser to assist the Cipta Karya officer in monitoring and in implementing changes.

Recommendation 70
A multi-disciplinary team like this Review Mission should make a review of the IKK Program in June 1985. The field visits should include schemes in the islands outside Java where conditions may be different. The itinerary could allow time for in-service training and assistance to field staff.

Recommendation 71
One or more social scientists should work in IKK schemes as participant-observers to assist in implementation and to advise on ways to increase efficiency and gain community involvement including staff training methods and content.

Recommendation 72
Written reporting should be kept to the minimum necessary for administrative control

Recommendation 73
The person who has the responsibility for reading each report and taking action when necessary should be identified and held accountable for actions taken.

Recommendation 74
As trained personnel are essential for all aspects of water supply systems, adequate resources should be provided to apply, extend, evaluate and improve programs for training for all categories of personnel.

Recommendation 82
A mobile model demonstrating the flow rate and daily quantity of water supplied (600 litres) should be demonstrated in every proposed IKK.

Recommendation 83
Other suitable methods of getting information to the community should be developed, e.g. printed leaflets, radio and TV messages, posters and traditional methods of communication, e.g. plays and puppets.

Recommendation 84
Special emphasis should be given to the informal women leaders e.g. kaders of LKMD and PKK and the nurse of the Puskesmas, who can develop the best two-way communication with women.

Recommendation 85
An official of PAB-IKK with interest in communication activities should be selected and trained in communication methods, and appointed full time to communications duties.

Recommendation 86
A suitable person from each PDAM should be selected and trained in communication methods in regional workshops.

Recommendation 87
The training of the Kepala Unit should include communication skills to enhance his ability to work with the people and local leaders.

Recommendation 88
The training of the surveyor should include one week of communication skill training.

Recommendation 89
A module of suitable length - about one week - should be added to the training courses for IKK staff to provide communications training.

Recommendation 90
A program of workshops should be conducted for in-service training of selected PAB-IKK and PDAM staff members in communication.

Recommendation 91
The PAB-IKK communications person should receive training in community organisation. He should work with local leaders and the community to identify groups of 10 households interested in forming a neighbourhood group with a kader of the LKMD or other local leader.