GOVERNMENT OF THE NETHERLANDS MINISTRY OF FOREIGN AFFAIRS
DIRECTORATE GENERAL FOR INTERNATIONAL COOPERATION

IDENTIFICATION AND FORMULATION
OF WATER SUPPLY PROJECTS IN INDONESIA
8 JULY – 8 AUGUST 1984

MISSION REPORT

JAKARTA, AUGUST 1984

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TABLE OF CONTENTS PAGE

ANNEXES

1. PREFACE

Within the framework of the cooperation-programme in the field of clean water supply it was decided to identify more precisely the projects decided upon during the discussions between the Government of Indonesia and the Government of the Netherlands of March 1984. If possible projects should be formulated. The projects to be decided upon are situated in:

- Bandung, Sukabumi and Bogor

  These are towns in West Java where the water supply is in need of improvement either because of the increase of their population or because the existing piping system is urgently in need of a thorough overhaul or both. Also it was felt necessary to devote more attention to increasing present knowledge on existing and renewable water reserves. It seems that existing knowledge on the Bandung as well as the Bogor (catchment)-areas is insufficient to advocate or devise a sound water management system. Especially the situation in the Bogor-area where the increasing water-needs of the Bogor - Jakarta - Tangerang - Bekasi region exert more and more pressure on the available water resources calls for a more precise inventory of water-resources than seems to be available.

- IKK's in West-Java and D.I. Aceh

  The identification of a certain number of Ibu Kota Kecamatan is in line with the role the Netherlands have assumed hitherto in the development of the IKK-programme. In the report a certain number of suggestions is made to improve its efficiency and its effectiveness once put into operation. In particular suggestions on linking up IKK-systems with systems devised for rural areas are put forward.

- Rural areas in West Java

  If possible also projects or programmes in the rural areas would have to be identified. The mission was aware of several proposals emanating from the Provincial Government and from consultants, in which suggestions were put forward to direct Dutch assistance to projects situated in eight selected Kabupatens. These suggestions are being processed by the responsible authorities. This procees had not been finalized at the end of the mission's stay in Indonesia. As an annexe to this report a

description is included of an introductory stage of three months leading to the second stage of the involvement of the Netherlands in rural watersupply. In this period preparation of the work to be performed during the subsequent stage will be carried out.

The mission consisted of five persons: Ir. F. Deeleman, leader of the mission, ms. Dr. M.S. Muller, Sociologist, Mr. C.J. Willems and Mr. C. Sprey, each Director of a Watersupply Enterprise in the Netherlands and Ir. A.N.G. Jansen, adviser to the mission, Staff member of the National Institute for Public Health and Environmental Hygience, Bureau for Development Cooperation Projects, the Netherlands.
The task of the mission was carried out in the period July 7 - August 12, 1984.
During that period it was possible to collect a number of project-proposals which may be included in the 1985/86 cooperation program.
It is the mission's sincere wish that the result of their work will contribute in a significant manner to the execution of Indonesian as well as Dutch policies. If that turns out to be the case, it is mainly due to the wealth of information made available by the Indonesian authorities at all levels, who patiently and very frankly provided the information in written form and orally on which the mission could base its findings, its conclusions and its recommendations.

2. GENERAL OBSERVATIONS

The mission has been able to get acquainted with the financial, the socio-cultural, the economic and the technological aspects of water supply and sanitation in rural as well as in the urban areas. It also got acquainted with the possibilities of improving the systems in use by applying the results of innovative research. It seems therefore appropriate to offer some observations of a general nature.
These observations should be placed against the background of the Indonesian Government's objectives to supply 60% of the rural population with clean water by the end of the Waterdecade (1990) and 75% of the urban population.

Jawa Barat Rural and Urban areas

At the start of the fourth Plan-Period (1984), according to the figures made available, in Jawa Barat ± 28% of the population had been provided with clean water. That is, if all installations were still to function properly. However, the Indonesian authorities estimate that only 70% of the installations is still functioning as planned, so in fact the figure of 28%, in reality should be revised downwards.
If in the calculations of persons to be served, the population increase, estimated at 26/1000/year, would be included, the actual number of new consumers to be served each year up to the end of the Decade would amount to 1.9 mil. in the rural areas alone in order to achieve the targets set.
It has been indicated, that Netherlands' assistance will be requested to provide 675.000 new consumers with clean water over the next five-year period. It is probable that assistance will also be requested for the rehabilitation of the systems fallen into disrepair.
A similar picture can be painted for the urban areas, where problems of rapid growth put a heavy strain on the existing water supply system, which moreover are beset by a host of other problems. In the relevant sections of the report indications are given of the nature and the size of these problems. In those sections indications are to be found also on the focus and the amount of assistance requested.

Appropriate measures

The past years have - with increasing clarity - uncovered the problems inherent to new schemes of the size and the diversity of Indonesia's water-supply programme, and decisionmakers were well aware of the necessity to take appropriate measures in order to continue to be able to cope with this enormous programme.
So, over the years the results of deliberate interventions begin to show, f.i. in the fields of construction-management, the management of the operation and maintenance itself and in the field of community involvement in the life of the projects where its effect is best felt.
In the earlier years of the programme, foreign consultants played a major role in all fases of the programme; from the conceptual fase to actual supervision of the construction of the systems. Over the years however, their involvement diminished considerably, due in large measure to the effects of the different training programmes, which in the early fases were linked to the different projects, but which have been merged quite recently into a centrally managed "Human Resources Development Programme", set up to serve all those persons, within and without the Government services, who in one way or another have to contribute to the execution of the watersupply programme. This goes for Government-involvement in watersupply to urban and urbanizing areas (from Metropole to IKK). Similar measures have been taken by the Department of Health with regard to systems destined to the rural areas, though the focus of those programmes is probably different.
If there exist results of a comparative study on the effect of both training programmes, the authors of this report are not aware of them. Whatever be the case, management has taken an important place in the development of the necessary manpower to operate and maintain the watersupply systems, be they big or small. The end of these training programmes in their present form seems to be nowhere near, given the backlog of manpower still to undergo initial training. Although the results of the different training-programmes seem to be commendable, continuous improvement and adaptation to the changing designs have to be done in order to keep these programmes worthwhile.

Community involvement

Another area in which changes of opinion are very clear is the area of community involvement with the installation of water supply systems in rural areas and IKK-townships.
Several factors may have contributed to this change of opinion. First there is the growing notion that the provision of clean water free of charge would in the end lead to an unbearable burden on the national budget. It is now adopted policy that all consumers should pay for the services rendered whether in the form of a public tap or of a house connection. It is in this activity, the paying of monthly contributions, that public participation is obviously indispensable.
Further, as implementation of the water supply programme proceeds, the realization grows that the management of many small, dispersed systems does not fit easily within the present management organization. It has proven necessary and feasible for members of the community to take over responsibility for daily operation, maintenance and small repairs. Experiments are already underway with a type of district organization which can be supportive to water committees in villages or small towns.

Financing

Another feature that deserves attention is the possibility of attracting commercial financing for the construction of the new systems. The possibility of extending the present practices in order to try to alleviate the stress on the government budget should be explored. It may well be, that part of the Netherlands' assistance would be usefully spent if used to set up a revolving fund for the financing of either complete systems or the construction of house connections.

Change of responsibilities

One other gradual change of policy is noteworthy. If in the early years of the programme the construction of supply systems in urban-(izing) areas was the responsibility of the Deparment of Public Works and the provision of the rural areas the responsibility of the Department of Health, as of April 1, 1985 Public Works will assume responsibility for all more complicated piped systems (construction), while the Department of Health will retain

the responsibility for the construction of simple systems e.g. systems based on handpumps, and for the quality control of water. In this connection another new development is to be signalled: the linking up of IKK-systems with systems providing the surrounding rural areas with clean water, a development which probably will contribute to a more even distribution of the water supply over the country-side than has been the case up till now.
It is moreover to be expected that gradually all the existing watersupply companies, structural as well as non-structural, will eventually merge into one big national watersupply company modeled on the example of the Perusahaan Listrik Negara (PLN), the national electricity company.
This will provide its employees more job-security and career opportunities.

Research and water-resources study

Finally two areas have to be mentioned where changes are perceptible. One is the fact that it is being realized that the adduction of clean water has to be accompanied by disposal facilities, if the improvement of public health is not be counteracted by diseases finding their source in unhealthy pools of waste-water. Encouraging in this respect is the fact that both the Departments of Public Works and Health have installed since April 1, 1984 separate directorates for waste treatment, which gradually start to execute their functions. It seems that Netherlands assistance to this new development is appropriate, because it is in line with earlier recommendations to treat watersupply and its disposal as one system.
It is hoped, that these changes will engender more research-activities in water treatment methods as in waste water treatment. It seems in order to advocate original research to be carried out under tropical circumstances, which may yield systems which are totally different from those hitherto known but more appropriate for conditions prevailing in Indonesia. Joint research on the one hand and foreign (Dutch) Universities and/or Institutions on the other could be set up to carry out research under the Direction of f.i. Cipta Karya or the Department of Health. These programmes could easily be action-oriented and produce original results.
The same goes for research into the development of appropriate water production schemes and solid waste treatment schemes, which often could benefit from better cost-consciousness of their managers. Especially when changes are considered from one system into another.

Water-resources study

The other area pertains to the production of water, either from groundwater resources (renewable or non-renewable) or from surface water. It appears, that there is a growing consciousness among responsible authorities to perceive, at national level as well as at provincial level (Government of Jawa Barat) this subject.

Time has come to look more closely into this subject-matter than seems to have been the case in the past. The urbanizing and industrializing province will need more and more water to accomodate the growing needs of metropoles and industry.

Already signals are being perceived that some unbalance is appearing in the groundwater-(eco) system. It would seem advisable to heed those signals and to improve on the available knowledge on water-resources in order to be able to decide on their most appropriate uses.

It is with these general observations on the development of the national water supply programme, that the team would like to introduce its report, and in doing so try to indicate that this programme is well equipped to help start up development in weaker strata of society, in the urban as well as in the rural areas.

3. SUMMARY OF PROJECT REPORTS

3.1. Urban projects

Sukabumi

The municipality of Sukabumi is being inhabited by 115.000 persons of which 15-20% persons are being served through 3.400 connections to the piping system. The actual delivery of (spring)- water is between 16 and 80 l/sec, while the calculated quantities are about 23 l/sec. At the end of the dry season only 70% of the already low share of the population being served can actually be provided with water.
The distribution system dating mostly from 1926 is in bad condition, resulting in unacceptable percentages of losses.
It is being proposed to replace the existing system, which will influence the production of water favourably (est. 30 l/sec). Increasing the production-capacity without improving is therefore not to be advocated.
The quantities delivered are estimated to be 1.370.000 m^3.
The average price Rps. 55/m^3. In 1983 there was a positive result of Rps. 1,300,000.00. Tariff rates could be redesigned on the basis of the proposals put forward for the tariff-structure of the Bandung-waterenterprise. In the meantime a rate increase of 50% is being carried out. The financial perspective of the enterprise seems to be satisfactory.
Also in Sukabumi the personnel has to be continuously up-graded to be equipped to carry out the tasks ahead. Several proposals are being put forward for improving the organisation. Proposals are also being put forward for increasing production and distribution facilities.

Bandung

Because of its special position the Provincial capital of Jawa Barat is experiencing an explosive population-growth.
In 1983 the number of inhabitants within the limits of the municipality was 1.500.000, of which 45% were provided with drinking water. Of the 500.000 persons outside these limits also 45% were provided with drinking water. The actual (1983) deliveries were $\pm$ 60 l/cap/day. Present production-capacity is 1470 - 1650 l/sec. Through a rapid improvement programme this capacity could be increased by 200 l/sec.

At present a total of 46 million m^3 is being distributed of which 27% is being paid for. The number of houseconnections is 74.400, and 625 public taps.
The water is being delivered at the price of Rps. 106/m^3; the average quantity per connection is 420 m^3/year; the average yield is ca Rps.45,000 /year. Proposals are being produced for another tariff-structure, in order to increase the yield without increasing the rate for social groups.
The organisation is being discussed and the necessity felt to improve continuously on the quality of the personnel (664 persons). The chapter on Bandung ends with a number of proposals of which a realistic feasibility-study leading up to an 'integrated design' for the execution of fase II is to be executed as a first priority.

Bogor

Bogor supplies at present only 50% of its 300.000 inhabitants with clear water, yet, the imminent boundary extension will lead to a doubling of its population, mainly with low income people living in the peri-urban areas.
The water distribution system is in good condition and also the administration of the water enterprise is in good order.
Loss through leakage is relatively low. But consumption/capita is unexpectedly high. Before deciding on new production capacity, it is necessary 1) to determine the causes of high consumption rates; and 2) to locate new long-term water sources. The water enterprise seems financially strong enough to apply for a commercial loan with a government guarantee.

3.2. Joint identification visit to D.I. Aceh for IKK water supply

Two members of the mission visited D.I. Aceh with the purpose of identifying IKKs to be included in the bilateral development cooperation programme. Townships were visited on the north-east coast, where the availability of fresh water is severely limited: ground water is often brackish, while surface water is sometimes polluted by industry.
The team noted that some IKKs had been surveyed several times without this resulting in improved water supply. As many IKKs are too small to meet the criteria of the IKK programme, a plea is made to include the nearby desa's with an IKK, or to combine several IKKs to be served by one system. A planning process should be started covering whole kecamatans, including all

components of a well-functioning water supply system. Training of personnel is urgently needed.

3.3. Rural water supply and ibu kota kecamatan in West Java

Two team members visited several villages of the OTA-33 project in West Java. It was noted that experience with the technical aspects of rural water supply had been consolidated, and that attention is now being directed to developing a management organization in the Districts; on making the water system self-financing; and on guiding community involvement in water supply projects. The introduction of house connections (paid by the owners) seems to be successful. Eight Districts have already indicated their priority areas for inclusion in a new rural water supply programme. In West Java too the coastal areas experince the greatest problems with water.

In addition IKks were identified suitable for inclusion in the IKK-programme. It is strongly suggested to plan the water supply of Kecamatans as a whole, including both township and rural area, and to begin the planning process in the Districts Indramayu, Karawang, and Cirebon.

4. PROJECT PROPOSALS AND RECOMMENDATIONS FOR THE 1984/85 PROGRAMME AND SUBSEQUENT YEARS

4.1 Urban Projects: Sukabumi, Bandung and Bogor

4.1.1 Sukabumi

Phase 1 : Improvement of the existing situation

- Pulau Air Kubang (20 l/sec)
  - o to bring into production the existing deepwell: E/M installation, total estimated : Nfl. 50,000.-
  - o to design and build a transmission system (abt. 2 km); total estimated: TA: Nfl. 25,000.-
    installation and material costs : Nfl. 200,000.-
- Site determination and drilling of a deepwell near Selabintana (15-20 l/sec)
  - o site determination TA: Nfl. 15,000.-
  - o drilling the deepwell : Nfl. 100,000.-
  - o supervising this work TA: Nfl. 15,000.-
  - o installation of pipes, piping and E/M equipment : Nfl. 50,000.-
  - o design of transmission system TA: Nfl. 15,000.-
  - o and execution of the work : Nfl. 50,000.-
- Batu Karut Spring (25 l/sec)
  - o preliminary geo-hydrologic survey to determine the correct place TA: Nfl. 30,000.-
  - o design of deepwell TA: Nfl. 30,000.-
  - o execution of the work : Nfl. 200,000.-
  - o E/M installation : Nfl. 100,000.-
  - o supervision TA: Nfl. 25,000.-
  - o design and installation of matching transmission system TA: Nfl. 20,000.-
    installation and material : Nfl. 70,000.-
- Installation of 3500 water meters at existing connections and at the sources:
  - o TA for preparation and supervision of the execution of the work : Nfl. 30,000.-
  - o acquisition and fitting : Nfl. 550,000.-

- Renovation of existing, worn out part of the distribution system; according to data at site this is a length of abt. 16 km.
- Re-study and where needed adjustment of the existing Master Plan, and further design of a replacement system incl. supervision of the work : all this in relation with the installation of a new extension of the distribution line) TA: Nfl. 300,000.-
  - o installation & material for 16 km of distribution line : Nfl. 3,000,000.-

Phase 2

- Design of a new spring captation: Cigunung (250 l/sec)
  - o design of the intake and pumping work incl. transmission system (incl. supervision) TA: Nfl. 500,000.-
  - o installation work and building of: intake booster pump-station and matching transmission system : Nfl. 5,000,000.-
- Extenstion of existing and renovated distribution system incl. installation of 7300 house connections.
  - o design and supervision of the work TA: Nfl. 500,000.-
  - o installation & material, incl. house connections : Nfl. 5,000,000.-
- Institutional development aimed at the improvement of the internal enterprise structure in the broadest sense of the word TA: Nfl. 500,000.-

Sukabumi, summary:

Phase 1:	TA	FA	GOI
- Pulau Air Kubang (20 l/sec)	25,000	125,000	125,000
- Selabintana (15-20 l/sec)	45,000	100,000	100,000
- Batu Karut (25 l/sec)	75,000	185,000	185,000
- Water meters	30,000	275,000	275,000
- Renovation distribution line	300,000	1,500,000	1,500,000
Phase 1, total	475,000	2,205,000	2,205,000

Phase 2:	TA	FA	GOI
- Cigunung plant (250 l/sec)	500,000	2,500,000	2,500,000
- Extension distribution system	500,000	2,500,000	2,500,000
Phase 2, total	1,000,000	5,000,000	5,000,000
Institutional development	500,000	--	--
Sukabumi total	1,975,000	7,205,000	7,205,000

4.1.2 Bandung

Crash program

- Cleaning of existing transmission pipe-line (± 100 l/sec) by foampigs.
  - o consultancy and expert operator — TA: Nfl. 90,000.-
  - o material & execution — : Nfl. 200,000.-
- Leakage control program; starting in 1984,
  - o during 10 yrs (1984-1994) — TA: Nfl. 100,000.-
  - o execution of program — : Nfl. 500,000.-
- River water intake: 1 km transmission line to existing treatment plant (200 l/sec) 1984:
  - o design and control — TA: Nfl. 360,000.-
  - o execution & material — : Nfl. 400,000.-

Phase 2, Stage 1a (600 l/sec)

- Feasibility study on the planned river intake and treatment plant: 1984 (co-financer ADB) — TA: Nfl. 500,000.-

Bandung, summary:

	TA	FA	GOI
- Crash program			
o cleaning pipe-line	90,000	100,000	100,000
o leakage control	100,000	250,000	250,000
river-water intake & pipe-line	360,000	200,000	200,000
- Feasibility study (evt. 1,000,000)	500,000		
Total Bandung:*	1,050,000	500,000	550,000

4.1.3 Bogor

- Pre-design study, based on the geo-hydrological possibilities and with a view on the possibility of constructing a transmission pipe-line to the city — TA: Nfl. 300,000.-
- Study to determine for what purposes the produced water is used in the present operation conditions — TA: Nfl. 420,000.-

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* If a feasibility study is made of Nfl. 1 million, instead of Nfl. 0,5 million the total TA will be Nfl. 1,050,000.

Total project proposals

	TA	FA	GOI
Sukabumi	1,975,000	7,205,000	7,205,000
Bandung**	1,050,000	550,000	550,000
Bogor	780,000		
Total (in Nfl.)	3,805,000	7,755,000	7,755,000

4.2. Ibu Kota Kecamatan Programme in D.I. Aceh

1. A through survey and inventory of townships should be carried out in four Kabupatens which are Aceh Besar, Pidie, Aceh Utara and Aceh Timur. The survey and inventory should focus on collection of population data and the assessment of the need and demand for improved water supply facilities. Based on the survey additional townships could be added to the list of selected townships.
   The selection should be based on a thorough evaluation of possibilities. The possibility of linking up water supply to surrounding rural area's should be considered.
   Linking the programme to only four Kabupaten is recommended in view of increasing the efficiency and effectiveness of the programme and of strengthening the ongoing GOI-GON water supply programme in Aceh to the maximum extend possible.

2. The townships recommended to be included in the programme at this stage are 1) Lawang, 2) Lapan, 3) Lhok Sukon, 4) Seunoddon, 5) Panton Labu, 6) Simpang Ulin, 7) Idi Rayeux, 8) Lambo Biru and 9) Kuta Bagok. The total number of townships should preferably be increased to 15 or more in order to achieve a sufficient level of cost efficiency of the programme.

3. An in depth water resources survey should be conducted to identify adequate water sources for each of the selected townships and surrounding area's.
   Particular attention should be paid to the identification of water sources which do not require extensive treatment.

** If a feasibility study of Nfl. 1 million is executed, the total TA will be adjusted accordingly.

4. For the above mentioned kabupaten indicative plans should be drawn up outlining for each of the kabupaten a staged development of water supply facilities within the frame work of the national objectives as set forth in the Repelita II. The plans should support the GoI-GoN programme.

5. At kecamatan-level a planning process should be started by devising a coordination system under supervision of the relevant kabupaten authorities.
   The coordination system should draw upon all relevant resources. This process should be initiated in those kecamatan which are most in need of improvement of water supply facilities. The available resources including foreign assistance should be used in the most efficient and effective way so that surveys lead to prompt implementation of the planned water supply facilities and water enterprises responsible for operation and maintenance.

6. For the selected townships detailed designs and tender documents should be prepared in order to enable implementation of the water supply facilities during financial year 1985/86. For this purpose pipe materials and possibly also pumping equipment, generator sets and others should be purchased on stockpile basis in an early stage of the project.

7. For carrying out and initiating the activities mentioned under points 1 up 6 a TA-budget of about Nfl. 0.5 million should be made available. Mainly for purchase of materials an amount of approximately Nfl. 3 million should be allocated as Financial Assistance.
   The requested allocations are in accordance with the amounts mentioned in the Agreement between GoI and GoN in March 1984.

   It is recommended to increase the FA-share of the implementation costs above the presently accepted 50/60 ratio (i.e. 70/30).

8. A close liaison with the programme in West Java should be kept in order to share experience beneficial to both programmes.
   Purchase of materials should be arranged combined by both programmes in order to reduce costs.

4.3. Rural Water Supply and Ibu Kota Kecamatan in West Java

1. It is recommended that continued assistance be given to rural water supply and sanitation programmes, using the proposal of the West Java Provincial Government as a starting point and making use of the experience of the OTA-33 project.

2. It is recommended that such assistance be given in two stages, of which the first stage be no longer than three months. The first stage is to be used to a) develop a plan of operations for the next five years b) rehabilitate existing water supply systems which are no longer in functioning order together with training their operation and maintenance personnel.

3. It is recommended that continued assistance be given to the IKK-programme in West Java, taking into account the changes in project implementation the Indonesian Government may decide upon.

4. It is recommended that an in-depth survey be carried out as soon as possible in the 15 IKKs proposed, as preparation for project implementation.

5. It is recommended that the possibility of linking the supply of water to an IKK with the supply to the surrounding rural area be seriously considered.

6. It is recommended that training of operation and maintenance personnel of District water enterprises and IKK-units be continued as an integral part of IKK projects; and that such training should include the improvement of skills to communicate with the community.

7. It is recommended that local leaders and other interested inhabitants take part in the planning process, starting with the survey of social, economic and physical conditions. This can be considered as a first step towards implementing recommendation number 4 of the Global Review.*

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* Global Review: Netherlands' Contribution to the Clean Water and Sanitation Sector in West Java, Indonesia, July 1984.

8. It is recommended that, if useful to both parties, information exchange be promoted between the West Java Rural Water Supply and Sanitation project and the UNDP (Indonesia) project "Promotion and Support for Women's Participation in the IDWSSD. This can be considered a first step towards implementing recommendation number 8 of the Global Review.**

9. It is recommended that Nfl. 0.5 million be made available in Technical Assistance and no more than Nfl. 1 million in Financial Assistance for the rural water supply project proposed by the West Java Provincial Government (first stage); and that Nfl. 0.5 million in Technical Assistance and Nfl. 3.6 million in Financial Assistance be made available for IKK projects in West Java. The financial outlay should be charged against the 1984 commitment for assistance to Indonesia.

IBU KOTA KECAMATAN PROPOSED FOR THE DUTCH ASSISTANCE PROGRAMME 1985/86

No.	KABUPATEN	IBU KOTA KECAMATAN	
		FIRST PRIORITY	SECOND PRIORITY
1.	Serang	Cinangka	
2.		Mancak	
3.			Padarincang
4.			Walantaka
5.	Tangerang	Legok	
6.		Curug	
7.		Pasarkemis	
8.	Bekasi	Sukatani	
9.	Karawang		Cilamaya
10.			Jatisari
11.	Indramayu	Cikedung	
12.		Kandanghaur	
13.		Karangampel	
14.		Sindang	
15.			Haurgeulis

** INT/83/003: Promotion and Support for Women's Participation in the International Drinking Water Supply and Sanitation Decade.

No.	KABUPATEN	IBU KOTA KECAMATAN	
		FIRST PRIORITY	SECOND PRIORITY
16.	Cirebon	Lokasari	
17.		Babakan	
18.	Majalengka		Jatitujuh
19.	Garut	Semarang	
20.	Subang		Kalijati
21.	Kuningan		Kadugede
22.			Lor Agung
23.	Ciamis	Cimanggis	
24.		Pamarican	
25.	Tasikmalaya		Salopa

5. AREAS IDENTIFIED FOR CONTINUED BILATERAL COOPERATION BETWEEN THE GOVERNMENT OF INDONESIA AND THE GOVERNMENT OF THE NETHERLANDS IN THE FIELD OF WATER SUPPLY AND SANITATION

In this context the mission had several discussions with representatives of a number of Directorates of Cipta Karya (Department of Public Works) e.g. Directorate for Planning and Programming, Water Supply, Environmental Sanitation as well as with representatives of the Public Works Board for Research and Development. The picture that emerged from these discussions is one of Cipta Karya putting quite some emphasis on Integrated Urban Development (IUD). This conception, covering the execution of integrated water supply and sanitation projects (Solid waste, storm-water drainage and wastewater disposal) in conjunction with Kampung Improvement/Rural Housing Improvement is supported wholeheartedly, this development being in line with earlier suggestions in this field.

The Indonesian authorities have moreover indicated, that expatriate assistance increasingly will be requested for specialist tasks. The execution f.i. of the IKK-programme will increasingly be the task of local consultants. Finally it was stressed again that great importance continues to be attached to the execution of the Human Resources Development Programme, complementary to the realisation of watersupply- and sanitation projects.

Next to these subjects importance is being attached to the development of action-oriented research programmes resulting in appropriate solutions for water supply and sanitation in Indonesia.

Within this policy-framework a number of project proposals have been formulated for execution on the 1985/86 programme which will be introduced through the proper channels with the Netherlands' authorities.

Similar discussions have taken place with the authorities of the Ministry of Health and with authorities at provincial level. Foremost were the discussions with the Vice-Governor of the Province of Jawa Barat, Mr. Aboeng Koesman, who made the mission aware of the importance he attaches to rural water supply. Subsequent discussions with the Bupati's of several Kabupatens underlined that opinion. It appeared during the mission's stay how much importance is being attached by the provincial authorities to an efficient coordinating mechanism to handle rural watersupply. Such a coordinating body is being considered among other things in the framework of the project proposal to be put forward to the Netherlands' authorities through the Department of Health.

The reader is referred to the relevant project proposals once they become available.

7. SUMMARY OF FINANCIAL OUTLAY (DUTCH) FOR 1984

Result of discussions with the Director of Programming and Planning and Staff on July 28, 1984.

Big Cities Programme

	Technical Assistance (Nfl.)	Financial Assistance (Nfl.)
Bandung - Feasibility	0.5 [1]	
- Rehabilitation	0.55	0.65
Bogor - Masterplan		
- Water resources study	0.75	
Sukabumi- Imm. Improvement Programme	1.47	7.20
- Org/Man/Train. Prog.	0.50	
IKK	1.00	7.5
Rural Water Supply		
- Fysical Implement	--	1.00
- Engineering/Inst.dev.	1.00	
KIWA	1.8 [2]	
Ongoing IKK/11-15-Cities	0.45 [3]	
Committed in March 1984	10.45	20.00
Sum total proposals	8.02	16.25
Reserve for addit. proposals	2.43	3.75 [4]

Notes:

1) Reserve add T.A. to execute socio-cultural study (TOR ADB) (Estimate Nfl. 0.5 million)
2) Earlier reservation of Nfl. 3.3 million. However Nfl. 1.5 is to be charged against Nfl. 2.5 million grant for package treatment plants.
3) After suggested evaluation study has been carried out.
4) Request by GOI-authorities to use F.A.-reserve for altering GON-GOI financing ratio for project-financing.

Possible alternative uses of TA/FA reserve 1984

	TA	FA
- Immediate improvement programme IKK	1.0	--
- Evaluation/Monitoring waste-water treatment plant Tangerang	0.48	
- Rehabilitation Tasikmalaya water main	0.26	1.0
- Regional geohydrological study	1.2	
- Rehabilitation rural water supply installations		0.5

These figures do not represent more than a rough first estimate and have to be refined subsequently.

The mission's opinion is, that some priority should be attached to the execution of these proposals with the exception of the geohydrological study, which could also be included in the 1985/86 programme.

URBAN PROJECTS

BANDUNG, SUKABUMI, BOGOR

Ing. C.J.Willems
Mr. C.Sprey

1. ASSIGNMENT of the Mission for the drinking water supply in Bandung, Sukabumi and Bogor, based on the results of the arrival consultations on development cooperation ~~penditure~~ of March 1984: having taken note of the present situation at the local companies, have come to project proposals.

2. ANALYSIS of the ASSIGNMENT
   - 2.1. Total cognizance of the present situation and of the existing plans of or with respect to the companies (see T.o.R. a through h)
   - 2.2. To make project proposals which may lead to improvement of the existing situation (see T.o.R. a, b, e, f, h, j, k)
   - 2.3. State which object groups are most served with the realization of the project(s). (T.o.R. c, d)
   - 2.4. State which financial capacity exists for the realization of the project(s) T.o.R. e)
   - 2.5. State in which form Dutch aid might be given (financial/technical; consultancy/twinning
   - 2.6. State which priorities may be followed
   - 2.7. State which institutional conditions may stimulate a successful finalization of the project.

3. EXECUTION of the ASSIGNMENT
   - 3.1. As preparational work extensive cognizance was done of (writte and verbal) information made available.
   - 3.2. Prior to the planned visits the companies were given questions in writing, based on the Mission's assignment, in order to get an insight in the present situation of the companies, their specific needs and existing plans, in technical, financial as well as organisational sense.
   - 3.3. Then the companies were visited by some members of the Mission during which the given questions were discussed and, if necessary, the situation at site was observed.
   - 3.4. Due to the limited time the Mission was forced to limit its visits to the companies to two days in Bandung (July 10 & 11). one day in Sukabumi (July 12) and two days in Bogor.
   - 3.5. Prior to the visits to the companies PAB-Bandung (on July 9) had organised an informative, orientation meeting.

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3.6. On the visits to the companies the Mission was accompanied by officials of Cipta Karya (Bandung and Sukabumi) and an employee of PAB Bandung.

3.7. The written and verbal information made available to the Mission members during the visits to the companies was then classified, studied and interpreted, and further prepared for use in the reports.

3.8. Based on the existing experience in this kind of companies and on the insight obtained, during the discussions aimed at the project proposals and further during the formulating of the project proposals, great value was attached to the following company health aspects which were not mentioned as criteria in the T.o.R., e.g.

- for a drinking water transporting and distributing system, seen from the public health point of view, it is essential that day-in-day-out during 24 hrs/day the transporting and distributing pipe lines are filled with drinking water under pressure;
- if not, the drinking water in the distributing system may very easily be contaminated by the soil in which the pipelines were laid, so that instead the system will function as distributor of pollution and thus will achieve the opposite of what it intended to, i.e. to serve public health !
- in case of possible structural shortages in produced drinking water during parts of the day and/or the year, so that not everywhere in the pipeline system the same pressure can be guaranteed, it is urgently advised to temporarily switch off parts of the distributing system.

therefore, it is also most important to keep the distributing system technically well maintained, without an unacceptably high leaking percentage; this will, furthermore, save investment costs of production material, not cause unnecessary wasting of well water and usually save high costs of energy.

3.9. After a temporary judgement based on the information obtained and the locally observed situation, a first orientation meeting took place (on July 18) with representatives of Cipta Karya, a.o. things to investigate how far temporary priority advises and the temporary judgement on the projects' contents might agree with the conceptions living within CK.

3.10. During a first meeting at the Embassy (July 20) to discuss the ~~temporary~~ preliminary plan of reserving funds for Bandung, Sukabumi and Bogor in the form of TA and FA, it then turned out that with regard to ~~the expenditure consult~~ annual consultations on development cooperation, the Embassy had started from other data than which were available to the members of the Mission, e.g. the T.o.R. (12,5 million for Sukabumi and/or rural water supply!)
Although this verbal information obtained had led to an adjustment of the proposals (see par. 5) they were not entirely amended. The reason is that with the proposed adjustment, according to the Mission members, Sukabumi gets enough attention and a justified solution can be obtained without this being emphatically and unbalancedly done at the expense of other urban and ~~borderline~~ peri-urban territories.

3.11. Eventually, on July 27, the project proposals were discussed with the Cipta Karya staff members in question. Afterwards, the fixation of the project proposals by the Mission took place.

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4. FINDINGS

4.1. Bandung

4.1.1. General

Bandung is West Java's capital and since olden days it has taken a unique place. Consequently, the city has developed enormously, resulting in a total population in 1983 of 1 500 000 people within the city's walls. Further, some 500 000 people are living direct around the city in areas of the Bandung regency. Of the people living within the city walls, in 1983, abt. 45 % were supplied with drinking water. It is estimated that in 1990 the numbers of inhabitants will be 1780 000 and 58 000.

If, in connection with the urban character of the supply, 75 % of the inhabitants, i.e. 1 770 000 people, according to the standards of Repelita IV , e.g. 120 l/h/d, including industrial and commercial usage, plus leakage loss (30 %), should be provided with drinking water, this would mean a required production capacity of average abt. 2400 l/s.

Therefor, in order to meet the delivery demand, very extensive expansions in the production as well as in thedistribution sectors will be necessary. If we calculate the number of liter/inhabitant/day based on the in 1983 delivered quantity, we will see that this is $\frac{32 \times 10^6}{365 \times 1.5 \times 10^6}$ = abt. 60 (58) l/h/d.

Because in the central government's financing policy the turning point between grants and loans is fixed at 60 l/h/d, it will be necessary to seek/attract loans for the necessary extension, except for studies, designs, supervision for which possibly aids in the form of technical assistance might be obtained.

In view of the recovery it would therefor be necessary, simultaneously with the extensions in the production domain, to make large numbers of connections.

4.1.2. Production

Present sources:

- springs 100-200 l/sec
- ground water (drilled wells) 620-700 l/sec
- surface water 750 l/sec

Total capacity: abt. 1470-1650 l/sec

As may be seen from the above figures, the yield from springs as well as ground water is not constant. Some causes of this may be mentioned, such as the ever progressing urbanisation coupled with surface coverage and disforesting within the catchment area of the springs, as well as practically uncontrolled withdrawal of ground water by third parties from the water feeding package, so that the ground water level in the wells is constantly sinking.

The last mentioned source, e.g. surface water, is for the withdrawn amounts, due to its character, not liable to changes/fluctuations, but during the last few years the contribution to theproduction process has, in absolute sense, gone down from abt. 950 l/sec to 750 l/sec.
This is because the transporting pipe lines which carry the water from the collecting point to the production installation (length ca. 32 km) are dirty on the inside and possibly corroded. Because the treatment installation, where the by this means transported water will be processed, has designed capacity of abt. 1000 l/sec (abt. 20 %), the rehabilitation of the pipeline system up to a condition as much as possible nearing the designed capacity, will form an important possibility of increasing the real production on a short term.

If wished, the execution of the work can be started on a short term.
As one of the most important factors of difficulty may be mentioned that because the pipeline system is executed in single only and within the Production equipment/installation there is not enough buffer capacity, there should be no or only very short interruptions in the delivery.
It is for this reason that it is advised to have the design for the cleansing of the pipeline system as well as the definite execution done in cooperation with and under supervision of in this matter experienced water system technicians. In this respect it is being considered to involve the Drink-waterleiding Rotterdam (DWL), since this company has the required know-how and meanwhile has agreed to a cooperation with the Bandung water company, In the form of the so-called twinning.

It should furtner be noted that during the cleaning process the existing, now brokendown, ventilators should be replaced by new ones. Most probably the trapped air caused by not-functioning of the ventilators leads to a shrinking of the diameter and thus to a capacity decrease.
It is expected that the rehabilitation will lead to an immediate increase of the production capacity, with abt. 100 l/sec.

Further, there is another possibility to come to an immediate capacity increase, e.g. by building a simple "boosting station" with a transporting system, as from the Cikapundung river to the existing water treatment/ purifying installation. The execution of this project on a short term will lead to a capacity increase of abt. 200 l/sec.

It is not entirely sure if the proposed amount of water on site may actual be withdrawn. Nevertheless, for this too a proposal has been taken up. As for the definite capacity increase of the production apparatus reference is made to the chapter on "plans".

For relativation reasons it should be noted that the budgeted yearly amount to be dlivered in 1984, e.g. abt. 49 mill. m3, requires an average production capacity of 1553 l/sec. If on this amount we apply a factor of 1,2 for the maximum required daily amount, this will lead to a required production capacity of abt. 1860 l/sec. This is already 20 % more than the capacity now available during the dry season (1470 l/sec). As for the production company an overall checking is considered important in view of energy saving , because it so often happens that exactly in these very companies big electro motors are running (almost) 24 hrs/day. With an incorrect dimensioning big losses very quickly arise and together with those, unnecessary expenses.

4.1.3. Distribution

Of the amount of abt. 46 mill. m3 which during 1983 was put into the distribution network by the production installations, abt. 27 mill. m3 was paid by the consumers. This means that abt. 41 % was lost by leakages and measuringdifferences. This amount represents a production capacity of abt. 650 l/sec. The number of connections to which was delivered was abt. 75 000, among which were abt. 625 public taps. It means that of 120 connections there is now one public tap, which ratio in 1975 was 1:75 and in 1979 1:87. Thus, relatively, the number has decreased.

However, it may be expected that with the considerable increase in due time of joining houses of lower-income inhabitants at the city's periphery, the number of public tapswill increase substantially.

As the building/installing of these facilities form an important item of the Dutch policy, it is necessary in the following phase to give extra attention to a maximum balanced development.

Furthermore, in this connection the circular issued by the Directorate of Technical Healthcare of Jan. 30, 1984 regarding the policy to be followed, should not be overlooked, which states that in executing the nationally required ratio of 50/50 between house connections (SR) and public hydrants (HU),"a relative flexability should be considered with regard to one city in comparison with another". In this case the regional situation with respect to the organisation as well as the community should be taken into consideration. Moreover, the idea that is now more and more coming forward, e.g. to create only facilities which because of cross-subsidies have more survival chances, will influence the abore mentioned ratio between the numbe of connections and public taps.

Regarding the materials used for the house connection, the following may be said:

- abt. 35000 connections are made of galvanised tubes.
  Upon checking it was said that in these connections leaks caused by corrosion have appeared already within 5 yrs after installation.
- abt. 40 000 connections are made of pvc tubes and accessories

Among the house connections abt. 17 different water meter types were found.

As for the size of the distribution network it may be stated that there are still big areas with many houses but because of a lack of the necessary water quantity as well as lack of funds no distribution network with house connections could be built, as yet.

Regarding the overall situation, the loss by leaks already mentioned before as much as 40 % must be considered unacceptably high.

In our opinion, special attention should be given to the tracing down of the above leaks which might be caused by leakages, incorrect water meters as well as clandestine connections, which should be done as soon as possible, by experts. The tracing down of the now considered lost water quantities might save important, unnecessary investments in the production apparatus and costs of exploitation (energy). Consequently, one of the identified projects is this "leakage control".

Since this is a project requiring specific knownow and knowledge, which we know is present at the Dutch water companies, we propose in this respect to also consider "twinning".

At stake is here a longterm (abt. 10 yrs) project which needs technical and financial aid. It is expected that during the currency of the project on a yearbasis, an improvement of abt. 20 l/sec can be achieved.

The fact that the distribution network can't be kept under pressure for (a continuous) 24 hrs/day, must be considered as practically unacceptable, seen from the public health point of view.

4.1.4. Financial procedure

Some data of 1983:

- invoiced : 31700 000 m3
- total invoices : Rp 3374 000 000
- average price/m3 : abt. Rp 106
- irrecoverable debts : Rp 393 000 000
- " percentage: 11,6 %
- booking method: directly debited to the booking year in question
- irrecoverable debtors reserves: none
- average delivery per connection: abt. 420 m3
- " revenue " " : " Rp 45.000

Regarding the administration and the monthly billing system which is based on meter readings, both systems are done by modern computer installations. As for the ratestructurethe interconnection of the various groups appears to be based on a rurally prescribed model. However, the highness of the rates within the groups thus formed is determined by the company and the municipality. Most consumers are found in groups 1A/B/C which are household group It should be noted that abt. 62000 out of 75000 consumers are found in these groups. Group 1B contains absolutely the biggest number of consumers, e.g. 37000. These consumers have an average annual consumption of abt. 300 m3.

The above statements have the more meaning if one critically observes the figures indicating the financial expectations for year 1985 and afterwards. Now it is expected already that because of increased exploitation costs for 1985 there will be a shortage of abt. Rp 1800 mill.

In order to overcome said shortages on a short term, a 74 % rate increase is being prepared which is expected to be effectuated within 2 years. A perfunctory calculation for 1985 indicates that to erase the shortage an average rate increase of abt. Rp 55/m3 is required. Against the average 1983 price of Rp 106/m3 this means an abt. 52% rate increase. With respect to the further development of the rates, the company intends to adjust the level to those valid in the area of the regency (kabupaten) surrounding the city.

The rate structure is laddered according to its character,

0	-	15	m3	-	Rp. 60/m3
15	-	30	m3	-	" 90/m3
	>	30	m3	-	" 130/m3

The meaning of such a ladder must be considered big for a drinking water plant in development. In view of the present average annual consumption (300 m3) it could be considered to adjust the laddering, for instance as follows,

0	-	15	m3	-	Rp. 60/m3
0	-	30	m3	-	" 90/m3
	>	30	m3	-	" 130/m3

Studying the cash-flow projection for the coming 10 years shows that f.i. the repayments on closed longterm loans are strongly mounting up. It certainly should be considered, whether with maintenance sensitive companies such as this company type, mounting burdens on the long run won't be a hindrance for operations and maintenance.

Finally, on the item "finance" it should be noticed :

- that the distribution territory of the company encloses such huge areas as universities, government buildings, military compounds etc. which badly influences the yield per hectare for urban supply because such government agencies enjoy a "free" waterconsumption.
- that it should be considered to charge the municipality for the 500 hydrants which are enclosed in the network for fire-fighting.
- that it should be considered, for the building of so-called MCK (bath-wash-toilet) facilities, to have the donor countries grant prospective starting subsidies for the first 5 years with regard to the water-consumption and maintenance. The present situation is such that the water company often stops the watersupply because of failure of payment These places then quickly become filthy and form concentrated sources of disease spreading. Since the water company has no social task in this respect in the form of subsidizing the water, it is important that when creating such facilities in f.i. the KIP (Kampung Improvement Projects), more and better attention should be given to their follow-up.

4.1.5. Organisation of the company

Upon request the mission received a socalled organigram of the organisation which should manage the company. The organigram is based on a national more or less prescribed model. It is built according to the socalled vertically structured line-staff model and is headed by a General Director assisted by 3 other directors, e.g. a director for general affairs, a director for drinking-water affairs and a director for waste-water affairs The General director is responsible to a body composed of members of the Municipality. On 16.7.84 a total of 664 persons are employed in the company.

For "training reasons" employees are regularly being transferred to other departments within the company.

The personnel, divided in 5 educational categories, are educated as follow

I Elementary school	290
II Intermediate school	104
III High school	218
IV Bachelor degree	23
V University degree	29
	664

Because of the huge task, the company finds itself confronted with, the management is offering the various categories, as far as this is possible, chances of additional training/education. In this matter too a socalled "twinning partner" can give an important contribution.

4.1.6. Plans

It is ofcourse clear that in an organisation with such an important task to fulfill, the plans made are for the greater part rather ambitious ones However, when defining the problem position once again, as follows, the priorities are automatically indicated, e.g. :

- insufficient raw-water flow
- insufficient production possibilities
- big, irresponsible losses, thus unnecessary occupation of production-capacity (and finances)
- parts of the distribution network intermittently under pressure
- large numbers of houses in districts without distribution network
- large numbers of houses therefor not connected
- places with no available public drinking water facilities, neither are there other possibilities to meet the needs for usable water (f.i. shallow wells)
- consequently, in the eastern and central parts of the city there are areas with "waterborn" diseases
- substantial growth of the population especially in the city's periphery
- here mostly low-income people
- therfor target groups for double-track policies
- still big potential for new house connections (for stage II estimated at 50.000 already)

- therefor recovery possibilities, however one must be alert in case the installation is not synchronous with the expansion of the production apparatus.

Apart from the already proposed projects, the mission advises, anticipating stage II, to make a feasibility study. Anyway, the possibility to install in the newly connected areas a distribution network with modern materials that for the time being will not be connected to the old network because of the leakage losses in this network, should be studied.
With a really successful installation a leakage-loss percentage between 10 % - 15 % (now 40 %) must not be considered impossible.
It should be guarded that the study gets too general a character. It should state facts and data on which an integrated design can be made for the production network as well as the herewith inseparably connected distribution network. In this light one should neither start rightaway from an extension in two phases of 600 l/sec.

4.2. Sukabumi

4.2.1. General

The town of Sukabumi has at present abt. 115.000 inhabitants. Although we have heard several visions regarding the development of the population, e.g. an expected increase as well as a decrease of the population, this may be of hardly any influence on the problem.
Only 15 % - 20 % of the population now receives water from the public drinking water facilities through abt. 3400 connections. The tasks to reac a supply of abt. 70 % are so comprising here that in fact the marginal differences in population development are in this matter of little influence. Should the population in the course of time indeed decrease somewhat this will probably happen at a moment when the so-called water-civilization of the remaining population increases, so that there will rather be too big a demand than too little for the created capacity.

The surface of the municipality is 1215 ha, while the present area of supply of the water company is 425 ha. The thickest population density is in the centre, at the eastern side, north and south of the railway. In the south-east corner the population density is the least, e.g. less than 50 inhabitants per ha. From the above figures it may not and should not be immediately deducted where the distribution network must be extended first. In this case should also be taken into consideration the need for water as a result of the presence c.q. absence and/or the pollutedness of water which is suitable for consumption. Of course such a selection method will considerably influence the degree of acceptance and thus the survival chances of the new facility.

4.2.2. Production

Up to now the water company has two natural sources to its availability. e.g. the Batu Karut Spring with a 0-50 l/sec capacity and the Cigadog Spring with a 16-30 l/sec capacity. The strong variation (difference) in yield is greatly caused by the season's influences (dry and wet season). For the Cigadog spring a further cause is that the available capacity at a certain moment is influenced by a number of deep well drillings in the neighbourhood and by the height of the spring's inflow chamber.

If we start from the fact that now actually for the supply of abt. 23000 inhabitants (20 % of 115000)with a quantity of 60 l/h/d (Basic Need Approach) $\frac{23000 \times 60}{1000}$ = 1380 m3/d would be required, based hereupon it can be calculated that the supply capacity, if taken into consideration a rush factor of 1,8 and leakage loss of abt. 20 %, need only to be

$$\frac{1,2 \times 1380 \times 1000 \times 1,2}{24 \times 3600} = 23 \text{ l/sec.}$$

However, since the total sum of the quantity supplied by the Springs varies between 16 l/sec and 80 l/sec, and even if the irresponsible consumptions (leakage losses) will indeed be only 20 %, the available quantity in the dry season will be able to cover only $\frac{16}{23} \times 100 = 70$ % of the needs.

But as the irresponsible consumption appears to be 60 % (or more), which considering the condition of the distribution system - upon which we will come back later - is nothing to be amazed of, the supply must at least be 30-35 l/sec, if while maintaining the high leakage losses one wishes to have sufficient coverage.

When further contemplating, we start from a production capacity of 80 l/sec as mentioned in the master plan submitted on March 22, 1983. In paragraph 2.5.1. of this plan it is indicated that with the quantity of 80 l/sec abt. 87000 inhabitants or amply 60 % of the population can be supplied with a quantity of 60 l/h/d (BNA Approach). To bring the production capacity at the desired level a large number of possibilities seem to be available. But when examining these possibilities quite some of the potential withdrawal points fall away as it turns out that the water for instance already has another destination (mostly agrarian), which will make it difficult to get an "approval" for withdrawal. However, a further contemplating of the meaning, particularly, of pure ground water for the drinking water supply (public health), when giving priorities for the allotment of the available water sources, will be of great importance.

Finally, it is noted that the capacity of the means, especially during the dry season, is absolutely insufficient, which leads to most undesirable situations, in which during long periods large parts of the distributing system are without pressure.

4.2.3. Distribution

The main part of the distributionsystem dates back from 1926. The last big ex nsion of the system was done in 1972 when the Batu Karut Spring was

taken into production. In 1926 the supply started with abt. 1500 connections, which now, almost 60 yrs later, is about doubled until 3400 connections.Considering the population growth in the town, this increase of connections may called poor. The system is in very bad condition , especially the old pipes. Of the 3400 house connections only 40 % or abt1 1400 connections are provided with a water meter. Of the existing water-meters , abt. 1000 are out of order. The others have never been replaced and thus are never maintained, so that it is seriously doubted whether they work correctly. . Thus, large amounts of water are lost by leakages, are not measured and so far a larger part are delivered unpaid/ free of charge; distribution according to sector and timewise is done especially during the dry season. All in all, sufficient arguments to start an extensive rehabilitation of the distribution network. In this respect it should be taken into consideration that large parts of the main pipeline system (abt. 16 km) must be completely renewed. Repairing these pipeline systems parts by cleansing the inside followed by for instance inside cementation in this case may be considered useless.

During a visit to the company a part of the old cast-iron pipeline system was opened especially for the Mission. Over a pipe length of 4 or 5 m, 4 places were visibly repaired by bandages of (autocar) innertube strips. Only touching the pipe wall with the tip of a pocket knife already made a big hole. Over the years the cast iron pipes appeared to having totall deteriorated, e.g. probably, sulphatisation of the cast iron has caused the iron to disappear from the pipe wall leaving only a carbon frame which at the least touch disintegrates.
For the replacement of the bad parts of the pipeline system, the damaged (house) connections as well as the defective water meters, a proposal is included in the project proposals. (sub item 5.11.[illegible])
It should be noted that improvement of the old pipeline network incl. connections is most beneficial, not only for the public health and seen from the managerial/economic point of view, but thus an important part of the production capacity, which is cautiously estimated at 30 l/sec (during the periods the springs supply sufficiently), will become available again to the consumers. In view of the above, in our opinion it is no use at all to extend the production capacity, if, to limit leakages and contamination, the above mentioned renovation is not carried out at the same time.

4.2.4. Financial procedure

The invoiced water deliveries during the last 5 yrs give the following picture,

1979	-	Rp 80,2	million
1980	-	" 84,5	"
1981	-	" 85,0	"
1982	-	" 76,9	"
1983	-	" 92,6	"

It should be noted that consumers/houses with defective water meters are charged a monthly amount which is based on a 15 m3 consumption.
The above figure series show the great dependency of the water resource with regard to the possibilities of invoicing. Because of the very long dry season of 1982, it was impossible in that year to provide the consumers with water. Against 1981 this has caused a decrease in revenue of abt. 10 %
Comparing this with the list of payments received (e.g. the invoices sent deducted by the irrecoverable ones) we may see the following.

1979	-	69,9	billing efficiency	-	87,5 %
1980	-	70,6	" "	-	84,5 %
1981	-	79,1	" "	-	93,0 %
1982	-	64,1	" "	-	83,2 %
1983	-	75,4	" "	-	81,4 %

Quite some amounts (in 1983 even 18,6 %) were irrecoverable. From talks it was apparent that this was mainly caused by not working or very irregularly working provisions. (although one has the money, for some reason he does not pay). If, based on the amount of money gotten from invoices sent in 1983, the apparent quantity of water delivered to the consumers is to be calculated in order to know how far the financial estimations (which were made necessary because there were not enough water meters) are nearing the reality, the following picture is visible,

$$\frac{92.6 \quad 10^6}{55} = 1.370\ 000 \text{ m3}$$

(Average price per m3 received from the company)
Converted into the daily quantity this would be,

$$\frac{1.3710^6}{565} = 2440 \text{ m3}$$

Converted into numbers of inhabitants using the BNA Approach (60 l/h/d) it would mean that

$$\frac{2440 \quad 10^3}{60} = \text{abt. } 40\,000 \text{ inhabitants}$$

could be supplied.
If we express this figure in percentage of the total number of inhabitants this will be

$$\frac{40\,000}{1150} = 35\ \%.$$

This is 15 % - 20 % more than the percentage mentioned in the master plan sub par. 4.1. (15 % - 20 %).
It could mean that

- either considerably overestimated consumption is being charged (which after the installation of water meters would cause a loss of revenue)
- or the present 600 consumers where the meters are still functioning are using considerably more than 60 l/h/d which probably will mean that this behaviour will continue with new house connections. This would offer important financial perspectives, but in course of time will make an attempt on the production capacity, except if the quantity to be consumed by the new, would-be connections are correctly limited.
- or in some way or other, through the existing connections, water can be supplied to much more inhabitants than the number of 17250 - 23000 mentioned in the master plan, more than apprently can be covered by the estimated quantities.

From the financial figures it further appears that under the present management, which in our opinion is unsatisfactory in operation and maintenance, in 1983 a nett revenue of Rp. 1,3 million was made. Of this amount 35 % must be contributed to the municipality which on the other hand will flow back as contribution in personnel expenses.
As for the rate structure, reference is made to what is stated in this regard in par. 4.14.
In the Sukabumi company too a plan for adjustment of the rates has been made, this in view of the increased exploitation costs, the expectations around this increase which is already apparent through the electricity and other raw material prices. A rough evaluation indicates an increase of 50 %. As date of effectiveness Sept. '84 is proposed. As the percentage of house connections forms abt. 70 % of the total and brings in 66 % of the revenue, and the consumers now already show "payment reactions" on delivery or non-delivery, it is still to be seen how this price increase will augment the total of irrecoverable bills, except if on a short term a 24-hours delivery can be achieved.

Since not only the mayor, in an interview, has announced that in his municipality there is quite a potency for new connections, but this is also apparent from an analysis of the situation the company's financial future doesn't look too bad, provided it is taken care of that extensions in the production and distribution spheres are always done synchronous with an extension in the number of connections, this to prevent under-covering losses. In view of the above, good expectations may exist with regard to cross-subsidy, if in the course of time groups of low-income houses are connected, through public taps.

4.2.5. Organisation of the enterprise

In its general outlines, PDAM's organisation is one conform the guidelines issued by the central government (Cipta Karya) for this type of enterprise. The (president) director is abt. 3 months with the company and thus not yet entirely worked in. Regarding this (correct) education level and the supplementary diplomas there was no immediate information available.
In view of the big problems the organisation faces in the production as well as distribution spheres it is urgenly required that on a short term good attention be paid to the organization itself and the training/educatio
The present number of employees is 65 which may be called high compared with the amount of m3 delivered. In this connection it should be noted that the whole administration including the monthly preparing of the bills is still done manually.
If in the near future the total of connections, conform what is indicated by us in the chapter "Plans" , increases upto abt. 10600, it would be advisable, not only in view of the in-time preparing of the bills but also to save unnecessary personnel expenses, to think of some kind of automatisation in the organisation, for instance by using a computer, which might further also supply much management information.
As the company itself for 1985 is planning an extension of abt. 800 connections, it is now already speaking of an expansion in the total number of employees by adding 6 persons, which will mean 1 employee for abt. 150 connections.
It is therefor absolutely necessary that, if possible during the planning phase of the company's expansion, the organisation plus its means are evaluated and a strategy is already mapped out.

4.2.6. Plans

Although in the immediate improvement program the rehabilitation of the Cigadog as well as Batu Karut Springs are discussed, this topic was not taken as starting point by the Mission in its proposals.
As the first spot where in a simple way a production capacity of abt. 20 l/sec can be created an already drilled deep well at the Pulau Air location is being considered. This is a deep well which was drilled in Bandung in the scope of a survey programme on ground water by the PAB (Projectbureau Air Bersih) of West Java.
Based on the knowledge of the composition of the water feeding packages found, and the pumping check done, it is expected that this well can deliver the quantity mentioned above. There is no public electricity network yet at the location, so that it will be necessary to build a genset house there. Together with a transporting system, which is yet to be built, the well can be connected to the existing transporting system which is still in a good condition and goes from the Batu Karut Spring to the town.
As a second place where, also by a deep-drilling, a production possibility can be created Selabintana is being considered. Although the right place has still to be found by a "place defining examination" our starting point is the good site situation, at a distance of max. 500 m from the existing transporting line, which goes from the Cigadog Spring to town. Whether there is a public electricity network at this location can't be determined yet. Anyhow, the proposal includes a genset house.
Based on the drilling statistics as well as the data on capacity of wells drilled in the surrounding neighbourhood which were available to us, a yield of abt. 20/sec may be expected, provided that the well is supplied with a 200 mm filter of the right perforation and the correct turningover, during the drilling a minimum quantity of rinse is used, and after it is finisned a development of aquifer is done by sectionwise cleanpumping.
As a third place for again a deepdrilling we are thinking of a location situated on the track connecting the existing deep well at Pulau Air with the Baru Karut Spring. Because, in the neighbourhood of the Pulau Air deep well there is another very big spring (abt. 1000 l/sec), called Pulau Air Kubang, while although in the dry season the spontaneous outstreaming of water from the Batu Karut spring has stopped, nowhere in a survey has it come out that for instance the ground water level has not stopped only a few meters below the outpour opening of the reservoir.
All in all, enough perspective to assume that without any objections, but

with extraordinary efforts, another location can be found for an additional deep-drilling with a capacity of abt. 20 l/sec. By creating this production possibility in this very neighbourhood a further advantage is that the water to be abducted can be transported by a transporting pipeline system which is to be built still (estimated to be max. 500 m long) up to the existing transporting system of the Batu Karut Spring.
The calculated transporting capacity of the above pipeline system mentioned in chapter 4.2.2.6. of the master plan turns out to be amply sufficient to take in the now proposed additional quantities.
As for the electricity supply, again for the last location a genset house was proposed. In case of a location selection which is situated relatively near the existing Pulau Air deep well, it should be considered to make a combination with the genset house to be built at this end. A simple calculation including a comparison of the costs for acquisition and fixing/installation of then needed cables, against the "stand-alone" building and exploiting af a second genset house, can give a decisive answer in the course of time.
Synchronous with the execution of the above activities at the production side of the enterprise, a number of steps should be taken in the distribution sector, e.g. the installation of abt. 3500 new water meters in order to not only achieve a better financial payment-settlement basis, but also to get insight in the effectively delivered quantities. This replacement includes therefor also the main water meters which have been installed in Cigadog and Batu Karut Spring but are also defective/out of order.
Only after placing said new meters in the production means, to which top priority should be given, will it for the first time be possible to determine the real capacities (not those obtained by estimation etc.). This is also absolutely necessary for determining the irresponsible consumption, which might be caused a.o. by clandestine connections. The following project would be the already above as most urgent indicated replacement of the old cast iron pipeline network. For this too a sum is reserved in the chapter "Projects". Only the re-installing with modern material, on the now qua consumption, traffic, pavement, ground property etc. right places, will be the right solution.
When making the replacement design of course the future perspective should be kept in mind when determining the transporting capacity. At those places where future extensions will be made accessories, if possible, should already be built in, so that the network can later be kept under pressure and be kept from getting unnecessarily filthy.

Now the plans are point of discussion which in fact are part of Stage I, after the immediate improvement program.
As the first project a new captering with boost station and transportation system from the Cikunung River to the city's centre, is mentioned.
This place is chosen because of the following reasons,
- this river allegedly still has some 250 l/sec available
- the water quality is very good
- it is situated in a remote area
- therefor the place might be relatively easy to protect.

Simultaneously with this project the existing distribution system must be extended (in size as well as number of connections).
It is necessary that in the designing phase of the extensions, it is maturely considered where exactly the largest needs for water are, so that it is possible to achieve an effective, within the 2-track policy of the Dutch government fitting, input of the available means.
Finally, it is urgently advised to include in the needs determination the population centers wich are situated at the newly to be built transporting line which goes from the source to the town. The reason is because, in the first place, the newly to build captage is situated in the Sukabumi regency and secondly because it may be hardly expected that the people living along the transporting system will be sympathetic to usage of the river water. (They would probably think of irrigation problems, in spite of the river's large capacity).
Further, the installation of the transporting lines through their lots/ places will then get another character and, as we assume, another form of cooperation.

4.3. Bogor

4.3.1. General

The number of inhabitants that now live within the present municipal boundaries of Bogor is estimated at abt. 267.000.
If within a certain time, we think of 1985, (the official proposals herefor have meanwhile been submitted) the territory of the city of Bogor in the scope of JaBoTaBek measures has expanded, the population will be about doubled. Since abt. 135.000 inhabitants, which is abt. 50 %, are supplied with water by the water company, one can easily imagine what problems the company will be faced with by this city growth.
It should further be noted that in the areas which are directly adjoining the existing city boundaries, rather large groups of people are living who may be reckoned to the low-income category, which will considerably influence the remunerative character of the provisions to be created.

4.3.2. Production

The enterprise has to its availability 4 production possibilities, e.g.
- the Bate Kambing source - 170 l/sec
- the Tangkil source - 170 l/sec
- the Kota Batu source - 70 l/sec
- the Bantarjati deep well - 10 l/sec

In fact, the last source provides a single area on which houses have been built.
Therefor, for the general analysis this drilled-well group is not further discussed.
The real available production capacity can thus be fixed at a total of 410 l/sec. Calculations and measurings have proved that the capacity neede to provide the consumers during 24 hours with water is abt. 530 l/sec.
It means that, apart from extensions for already present inhabitants as well as for those who shortly, because of re-registration, will live withi the city's boundaries, a capacity of abt. 120 l/sec must be additionally installed. The present shortage causes periodical and sectorwise distribution of the water over the distribution lines, while only 10 % of the people gets water during 24 hrs.
A note must be added to the above figures, e.g. it may be assumed that the per capita usage which can be calculated from these figures is quite high (incl. an irresponsible consumption of abt. 23 %); i.e.

$$\frac{530 \times 3600 \times 24}{135\,000} = 339 \text{ l/h/d.}$$

Nett home (without leakage loss) this would mean, 261 l/h/d.
(Could it be that to many more inhabitants deliveries are made ?)
Although the Management gave the following reasons for the above, e.g. that
- the sources could not supply all day long (to be further checked)
- the consumers are not careful/efficient enough in their use because of the low M3 price
- the consumers leave their taps open day and night, so that they would get a maximum intake during the periods ofsectionwise distribution.

Since at the moment, not only because of the now already existing (supposed) capacity shortage, but also in view of the near future, a larger source of a 500 l/sec capacity is sought, the Mission is of the opinion that in the first place now clearance should be given about the how and why of the present deliveries per capita perday, and about the possibilities to meet these demands on a structural way (see chapter "Plans").

4.3.3. Distribution

Through the present distribution system in 1963 a quantity of abt. 12,6 million m3 was transported. As large parts of the network during a couple of hours of the day are not under pressure, during which period no water is transported, the network's capacity is considerably overestimated.
Of the quantity brought into the pipeline network 9,8 million m3 was effectively consumed by the consumers, which means that abt. 23,0 % of the quantity is lost on its way as irresponsible consumption (mismeasurings by meters excluded). Compared with leakage losses which are concluded with other companies the above percentage may be considered low.
Because for all consumers, based on the consumption according to the meter readings, monthly bills are drawn up by which the delivered quantity of 9,8 million m3 forms the sum of these invoices, it turns out that, based on these figures, $\frac{9{,}8.\ 10^6.\ 20^3}{135\ 000 \times 365}$ = 199 l/h/d have been charged to the consumers.
Otherwise, it turns out that, by comparing this quantity (199 l/h/d) with the quantity which under chapter "Production" is calculated at a capacity of 530 l/sec, e.g. 267 l/h/d, this is only 76 % of it.

More or less unanswered remains the question whether with the additional 120 l/sec the company will supply the already provided consumers better and more continuously or whether with a leakage loss of 23 % (0,77) it will at the most supply

$$\frac{0,77 \times 530 \times 3600 \times 24}{199} = 177\,000$$ inhabitants, with the same quantity which it now delivers per capita.

As for the technical condition of the pipeline network it can be stated that this is relatively good, which may also be deducted from the percentage of leakage loss. The fact that the company, in its own management, not only installs the house (outer) connections, but also the connections inside the houses, while these inner connections before being taken into operation are pressed through, will certainly help a lot.

Regarding the state of the water meters we may report that the company has abt. 5 makes in use (so-called "dry runners"). The company has a meter repair workshop where now a new gauge equipment is being installed.

Further, the company has made attempts to limit the so-called delivery capacity with the consumers. For this purpose it has acquired 10 000 limiters which, however, are not really limiters, but more a kind of kaliber plates. Because the passing capacity is too high chosen, e.g. at abt. 600 l/hr, the fixing of such device has almost no effect on the present quantity use.

Further, it may be stated that the company presently has abt. 17.350 connections. Through abt. eleven public taps abt. 2200 inhabitants are supplied with water.

Although the sectorwise and periodical distribution of the water through the disbribution system, so far, according to the company, has caused no water-born diseases because of considerable extra chlorine additions to the pure water, it should be considered necessary that within the shortest possible time this incorrect managing of this part of a public water conduit system be stopped.

4.3.4. Financial procedure

On this subject we can be short.

The administration is very well organised. The invoicing for the water deliveries are done by modern computer installation.

As for the rates, in their structure they may be altered in the same way as advised for Bandung and Sukabumi.

In the short run there is an 80 % rate increase planned, not so much to cover financial shortages as to somewhat decrease the consumption and bring the rates to a level more balanced with the rural rates. In spite of the relatively very low rates the company is making quite some profit. In 1983 a nett revenue of abt. Rp 650 million was achieved. Of the nett revenue 55 % is contributed to the municipality of Bogor.
Although the company even has a deposit on the balance (of abt. Rp 500 mill.) it will not have enough own money available to for instance make investments of Nfl. 20 million in the technical apparatus.
On the other hand, the company has the potency to meet the interest and redemption obligations which go with such loans. Thus, it might very well be considered for commercial financing, with or without government guarantees (also possible: GON/and/or twinning partner).

4.3.5. Organisation

The company has a clear organisation structure which is derived from the central model. At the moment of our visit the General (Pres.) Director happened to be moved to a new function in Jakarta. The present technical director, ir. Chusfani Kartadihari acted as general director and received us. At present the company has abt. 215 employees, which number from 1983 against 1982 was decreased with 2, so that we can't speak of a "parkison growth".

4.3.6. Plans

The company has planned many extensions and (new) buildings, but according to the Mission at the moment only one independent project has the first priority, e.g. in the shortest possible time to make a feasibility study on the water withdrawal possibilities in the vast area of Bogor (slopes of Mt. Gedeh and Mt Salak). In this case the needs of others are to be considered too (for instance the agrarian wishes, etc.), so that the localised sources on a long term will effectively be available for drinking water supply and can get authorization as such.
Furthermore, the possibilities of protection should be investigated.
Based upon these studies and in accordance with their results, in due time, after discussions with and on responsibility of the authorities concerned, it must be possible to make long term choices.
Since extension of the distributing apparatus of a water company is in fact only a financial matter which, however, in a certain financial shortage may be a problem too, but to have or have not on a long term available the for

for a water company most essential raw material of "water" is of definite overall importance, this matter must be given top attention.
The second project which must be considered is, in our opinion, a similarly necessary study, which must indicate where the now produced water is going, as well as precisely what production capacity and distribution system are needed in the future and where.

PROJECT PROPOSALS AND RECOMMENDATIONS FOR THE 1984/85 PROGRAMME AND SUBSEQUENT YEARS

Urban Projects: Sukabumi, Bandung and Bogor

1. Sukabumi

Phase 1 : Improvement of the existing situation

- Pulau Air Kubang (20 l/sec)
  - o to bring into production the existing deepwell: E/M installation, total estimated : Nfl. 50,000.-
  - o to design and build a transmission system (abt. 2 km); total estimated: TA: Nfl. 25,000.-
    installation and material costs : Nfl. 200,000.-
- Site determination and drilling of a deepwell near Selabintana (15-20 l/sec)
  - o site determination TA: Nfl. 15,000.-
  - o drilling the deepwell : Nfl. 100,000.-
  - o supervising this work TA: Nfl. 15,000.-
  - o installation of pipes, piping and E/M equipment : Nfl. 50,000.-
  - o design of transmission system TA: Nfl. 15,000.-
  - o and execution of the work : Nfl. 50,000.-
- Batu Karut Spring (25 l/sec)
  - o preliminary geo-hydrologic survey to determine the correct place TA: Nfl. 30,000.-
  - o design of deepwell TA: Nfl. 30,000.-
  - o execution of the work : Nfl. 200,000.-
  - o E/M installation : Nfl. 100,000.-
  - o supervision TA: Nfl. 25,000.-
  - o design and installation of matching transmission system TA: Nfl. 20,000.-
    installation and material : Nfl. 70,000.-
- Installation of 3500 water meters at existing connections and at the sources:
  - o TA for preparation and supervision of the execution of the work : Nfl. 30,000.-
  - o acquisition and fitting : Nfl. 550,000.-

- Renovation of existing, worn out part of the distribution system; according to data at site this is a length of abt. 16 km.
- Re-study and where needed adjustment of the existing Master Plan, and further design of a replacement system incl. supervision of the work ; all this in relation with the installation of a new extension of the distribution line) TA: Nfl. 300,000.-
  - o installation & material for 16 km of distribution line : Nfl. 3,000,000.-

Phase 2

- Design of a new spring captation: Cigunung (250 l/sec)
  - o design of the intake and pumping work incl. transmission system (incl. supervision) TA: Nfl. 500,000.-
  - o installation work and building of: intake booster pump-station and matching transmission system : Nfl. 5,000,000.-
- Extenstion of existing and renovated distribution system incl. installation of 7300 house connections.
  - o design and supervision of the work TA: Nfl. 500,000.-
  - o installation & material, incl. house connections : Nfl. 5,000,000.-
- Institutional development aimed at the improvement of the internal enterprise structure in the broadest sense of the word TA: Nfl. 500,000.-

Sukabumi, summary:

Phase 1:	TA	FA	GOI
- Pulau Air Kubang (20 l/sec)	25,000	125,000	125,000
- Selabintana (15-20 l/sec)	45,000	100,000	100,000
- Batu Karut (25 l/sec)	75,000	185,000	185,000
- Water meters	30,000	275,000	275,000
- Renovation distribution line	300,000	1,500,000	1,500,000
Phase 1, total	475,000	2,205,000	2,205,000

Phase 2:	TA	FA	GOI
- Cigunung plant (250 l/sec)	500,000	2,500,000	2,500,000
- Extension distribution system	500,000	2,500,000	2,500,000
Phase 2, total	1,000,000	5,000,000	5,000,000
Institutional development	500,000	--	--
Sukabumi total	1,975,000	7,205,000	7,205,000

2. Bandung

Crash program

- Cleaning of existing transmission pipe-line (± 100 l/sec) by foampigs.
  - o consultancy and expert operator — TA: Nfl. 90,000.-
  - o material & execution — : Nfl. 200,000.-
- Leakage control program; starting in 1984,
  - o during 10 yrs (1984-1994) — TA: Nfl. 100,000.-
  - o execution of program — : Nfl. 500,000.-
- River water intake: 1 km transmission line to existing treatment plant (200 l/sec) 1984:
  - o design and control — TA: Nfl. 360,000.-
  - o execution & material — : Nfl. 400,000.-

Phase 2, Stage 1a (600 l/sec)

- Feasibility study on the planned river intake and treatment plant: 1984 (co-financer ADB) — TA: Nfl. 500,000.-

Bandung, summary:

	TA	FA	GOI
- Crash program			
o cleaning pipe-line	90,000	100,000	100,000
o leakage control	100,000	250,000	250,000
river-water intake & pipe-line	360,000	200,000	200,000
- Feasibility study (evt. 1,000,000)	500,000		
Total Bandung:*	1,050,000	500,000	550,000

3 Bogor

- Pre-design study, based on the geo-hydrological possibilities and with a view on the possibility of constructing a transmission pipe-line to the city — TA: Nfl. 300,000.-
- Study to determine for what purposes the produced water is used in the present operation conditions — TA: Nfl. 420,000.-

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* If a feasibility study is made of Nfl. 1 million, instead of Nfl. 0,5 million the total TA will be Nfl. 1,050,000.

Total project proposals

	TA	FA	GOI
Sukabumi	1,975,000	7,205,000	7,205,000
Bandung**	1,050,000	550,000	550,000
Bogor	780,000		
Total [in Nfl.)	3,805,000	7,755,000	7,755,000

ACTIVITIES OF ING. C. WILLEMS AND SPREY IN THE PERIOD 09.07.84 - 29.07.84

- Monday 09	: Visit ir. A. Kartahardja dir. PLP - Bandung : Visit ir. Sugandi Pimpro PAB Jabar - Bandung
- Tuesday 10 and Wednesday 11	: Visit PDAM - Bandung
- Thursday 12	: Visit PDAM - Sukabumi Visit Kodya- Sukabumi
- Friday 13	: Visit Kodya - Bogor : Sprey, visit ir. Sugiardo, dir. Bina Kota, Dep. Dalam Negeri
- Saturday 14	: Report writing
- Sunday 15	: Rest
- Monday 16	: Visit ir. Razak Manan (twinning)
- Tuesday 17	: Visit PDAM Bogor
- Wednesday 18	: Discussion with Bina Program at Cipta Karya, report writing
- Thursday 19	: Report wwriting; visit Embassy; internal discussion

- Friday 20 : Visit Embassy; report writing

- Saturday 21 : Cipta Karya, visit ir. Soeratmo N. preparing visit Tasik Malaya

- Sunday 22 : Visit prepared spings Bogor

- Monday 23 : Report writing

- Tuesday 24 : Sprey: visit Tasikmalaya

- Wednesday 25 : Report writing

- Thursday 26 : Report writing & discussions Embassy

- Friday 27 : Report writing & discussions

TASIKMALAYA

July 24 - July 25

C. Sprey

TASIKMALAYA

Visited on the 24th and 25th of July

Tasikmalaya is still suffering from the damage caused by the eruption of the Galungung mountain.
Early in 1982 a lava-stream caused by the eruption passed the CIPONDOK river and totaly damaged the water transmission pipeline that connected the CIPONDOK-spring with the watersupply transmission and distribution system of Tasikmalaya.
The spring itself has not been damaged and is still giving superior groundwater in an amount of approximately 1,000 l/sec.

At the end of 1982 the watersupply of Tasikmalaya was repaired on a lower level (70 l/sec), by making a crash-connection and putting in two gensets (total 175 kVA).

Because of the high costs of energy and the limited amount of water (70 l/sec) that can be transported to Tasikmalaya, it is of a great impact to overcome the water shortage by installing a new transmission pipe through the safe line from lava flood, so that also the gravity flow can be restored.
A transmission line of approximately 3000 m with a passing capacity of 275 l/sec will be sufficient up till the year of 2000.

JOINT IDENTIFICATION VISIT TO

D.I. ACEH FOR IKK WATER SUPPLY

12 - 19 JULY 1984

DIRECTORATE GENERAL OF CIPTA KARYA

DIRECTORATE OF WATER SUPPLY

Ir. J.B. Nugraha.

NETHERLANDS GOVERNMENT MISSION

Ir. F. Deeleman.

Dr. M.S. Muller.

JAKARTA, JULY 1984

Tabel of Constens.

Annexes.

Preface.

In the framework of the bilateral Cooperation Programme of the Government of the Netherlands and the Government of Indonesia it was decided to carry out a brief identification mission to the D.I. Aceh in order to identify projects to be carried out in fiscal year 1985/1986.*)
The mission consisted of ir.J.B.Nugraha, Government of Indonesia Dep. PU. Dir.Gen Cipta Karya and ir.F.Deeleman and Dr.M.S. Muller (Government of the Netherlands).
The team was generously assisted by the services of the Daerah Istimewa Aceh, at Provincial level as well as at Kecamatan and mukim level. The team is indebted to all these persons,who were willing, often long after the official working hours, to receive it and provide the information requested. For the Terms of Reference of the team, its schedule of travel and persons encountered, the reader is referred to the relevant Annexes.
Due to the relatively short period of time the team had at its disposition, it was not possible to visit all the small towns proposed by the Propincial Government of the D.I. Aceh . It had therefore to make a choice, which small towns to visit. It was subsequently decided to try to visit as many towns as possible around the provicial Capital of the D.I. Aceh, Banda Aceh, and along the main road linking Banda Aceh with Medan. This choice was deliberately made because of the physical conditions of the areas to be visited, and based on the information, that living conditions in same parts of these areas were extremely harsh, especially with regard to the provision of clean water(information which turned out to be correct.
The choice made does not indicate that the other townships proposed for asistance from the Netherlands do not have to cope with problems of a similar nature.
It only provides a second opinion for decision makers on the seriousness of the problems of clean water the population has to cope with.

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*) Note :

In all probability the project will be executed only in the course of fiscal year 1985/1986.
The Netherlands contribution is to be made available as part of the 1984-allocation as indicated in the Agreed Minutes of the Indonesian-Dutch discussions of march 1984.

As it appeared during the travel, that in several townships surveys had been carried out previously, it is hoped, that the work of the mission will lead to positive decisions with regard to the construction of installations for the supply of clean water. It is recommended that these decisions be carried out without undue delay, so that the actual situasian be improved in the shortest possible time. In the following pages a number of reason are put forward to support the teams opinion.

Short description of the area.

The Special Province of Aceh is situated at the most northern tip of the island of Sumatera. Its total surface is apr. 55.390 km2. More or less through the middle of the province there runs mountain range so three different ecological zones can be distinguished:
- the northern coastal plains (total surface: 18970 km2).
- the mountainous area : 15210 km2.
  Consisting of the landlocked kabupatens of Aceh Tengah and Aceh Tenggara.
- the West coast (total surface = 21010 km2).

The number of inhabitants of each area is given as follows :
- Northeren provinces including the coastal plains and the Municipalities of Sabang (pop. 24.253) and Banda Aceh (pop. 75.397) : 1.806.247.
- the mountainous area (kabupatens Aceh Tengah and Aceh Tenggara) : 332.344.
- the West coast : 598.699.

The total population of the Special Province of Aceh (incl. the islands) amounts to 2.737.290 inhabitants which gives an average rate inh/km2 of 49, with a high of 121 (Kabupaten Aceh Utara) and a low of 29 inh/km2 for Aceh Tenggara.
The northern provinces are the more densely populated ones, and although the team could not lay hands on the population density figures per kecamatan, the impression is, that most of the population is located in the coastal plains where income-earning opportunities are larger: agriculture, trade, fisheries , etc..
The average per capita product of the D.I. Aceh increased from Rps 71.843 in 1975 to Rps 111.010,. in 1981 (non gas/oil). if gas and oil were included in these figures, the following picture would emerge : Rps 86.062,. in 1975 against Rps 225.180,. in 1981. These are in constant prices of 1975. If these figures were calculated against current prices the following picture would emerge :

	1975	1981
per capita product non oil.gas	71.843,.	278.748,.
per capita product incl. oil & gas	86.062,.	768.021,.

These figures seem to indicate that the average per capita product is somewhat below the level of the figures for Indonesia as a whole, as far as the per capita non oil/gas product is concerned.
Administratively the D.I. Aceh consists of two Kotamadya (Municipalities) and eight Kabupatens. There are 133 kecamatan, 594 mukim (desa) and 5.462 village (kampung).
The kecamatans visited were all situated in the lowland area, bordering the sea where (salt) water plays an important role in the daily life of the population. It is in these areas that living-conditions seem to be quite harsh with regard to the condition of the road-system whose quality increased considerably over the years, but still presents major difficulties for transportation) and the availability of clean water of a reasonable quantity and quality. Although water-borne diseases according to the data collected did not seem to present a major problem, deaths do occur especially at the end of the fasting period (end of June). By and large the clean water situation is a difficult one. More than once the team was told that water,acceptable for the production of drinking water was only to be found at great distance , so that in some instances prices as high as Rps 500 were paid for a jerrycan of riverwater (20 l). It is against this background, that the conclusions and recommendations of the team have to be judged.

Note :

The figures presented in the section "Short descripton of the Area" are taken from D.I. Aceh publication "Aceh in Figures, 1982".

Plan of work/Findings of the Team

The team was provided with a list of possible townships to be provided with clean water, based on the list of townships put forward by the project manager of the Proyek Air Bersih IKK at Banda Aceh. During further discussions in Banda Aceh a list presenting townships where living conditions justify priority assistance was put together. (See annexe III).
Although the name of the village of Maheng was not on the list of townships to be visited, it was suggested to view an artesian well system, that had been constructed under the responsibility of the Department of Health. During the trip the names of two other townships were suggested by the Secretary of the Kabupaten Aceh Utara, mr T.S. Syahbuddin Harny :
- Lapan in the Kecamatan Tanah Pasir
- Baktia in Kecamatan Baktia
Though none of these townships were visited Lapan because of the road conditions, (which permitted traffic by Jeep or Landrover only) in subsequent discussions an eloquent plea was made for the inclusion of Lapan in the priority list to be put together for assistance from the Netherlands. A plea which has been honored.
Before starting its work, the team prepared a number of questions designed in such a manner, that the answers would provide a reseemblance of a profile of the townships visited. These questions pertained to the environment of the project (see Global Review of The Netherlands Contribution to the Clean Water & Sanitation Sector in West Java) and more in particular to the technological situation, the social situation and the economic situation.
These questions were preliminary to an explanation of the workings of the IKK-system and the final question whether the Camat had the impression that people were willing to pay for the service rendered. Invariably the answer was positive. The impression lingers on, that this explanation was well understood and appreciated. Even if drinking water was not the first priority if a free choice could be made the estimate was that the population would be willing to pay for service, that renders clean water.
At this stage the reader is referred to annex IV for indicative profiles of the townships visited. From this profile and on the basis of earlier surveys the following townships can be identified as falling within the present population criteria of the IKK-Programme (more than 3000 inhabitants).

Kabupaten	Kecamatan	Township
Pidie	Muara Tiga	Laweung
Aceh Utara	Tanah Pasir	Lapan
	Lhok Sukon	Lhok Sukon
	Seunoddon	Seunoddon
	Tanah Jambo Aye	Panton Labu
Aceh Timur	Simpang Ulim	Simpang Ulim
	Idi Rayeu	Idi Rayeu

Of the townships mentioned in Annex III the following is to be said:

1. One township, Kacang Baru Kecamatan Karang Baru Kabupaten Aceh Timur, will in all probability be provided with clean water by the system already in operation in the township of Kuala Simpang. The watermains were under construction at the time the team visited Karang Baru. More over there still exists the premises of a prewar hospital, which could be used to set up a treatment plant for treating water from the nearby river. The water purification-system of that hospital was still in use for its own purposes. The provincial planning had been that Karang Baru would be provided with water in FY 1985/1986.

2. Lubuk, the first township the team visited in Aceh Besar does not seem to be in need of on IKK-system. Each house approximately had its own shallow well, with water of a reasonable quality. Moreover there had been installed at the village prayer-house a shallow well equipped with a Sanyo electrical pump, which was tended by the Head of the Village himself and which gave at the moment of the visit an abundant flow of water when put into use.

3. Jabal Qafur, which was suggested by the Bappeda to be included in the list is a township where according to plan a new University is being built. The University-complex will be provided with water paid for from the relevant budgetary resoursees. The township itself did not answer to the IKK-criteria, although the water situation was said to be difficult.
Mila, the neighbouring township lies on a river. Each house seems to have its own shallow well, which does not fall dry at the end of the dry season. In the discussion with the village chief it came out that clean water was certainly not the first priority of the villagers, while electricity was. Although Mila falls

within the criteria of the IKK-program the team was of the opinion that it should not be included in the list.

4. Iriene Sading, although qualifying if only the numbers criterium were applied, did not make the list either because of the same reasons applicable to Mila: the presence of water at practically each house (shallow wells) available throughout the year, and different set of priorities (irigation-water).

5. Krueng Raya (Aceh Besar), did not make the list because it turned out, that the village had already been provided with clean water from the well approximately 10 Kms away, which gave clean and clear water. The water was available at different public taps, and the system appeared to function properly, also during the dry season. The system had been constructed under the responsability of the Ministry of Health.
Although the flow of water seemed not to be over abundant, it does not seem warranted in include Krueng Raya in the list, especially as it may well be, that alternative solutions might be found. One of them being the improvement of the existing water-supply system and another one to explore the possibility to use the nearby facilities built for the port of Krueng Raya, Malahayati, whose deep well is now being used exclusively for the portfacilities.

6. Lambro Biru (Kecamatan Kota Baru, Kabupaten Aceh Besar) did not qualify, because the townships number of inhabitants was insufficient (2.500). However it should be stated, that the water situation is bad indeed. Most of the shallow wells give salty water, and the situation did not improve with the venue of a number of handpumps, installed under the responsibility of the Minstry of Health . These pumps were said to pump salty water also and were apparently not in use.
The village, which has the appearance of a trade center, has only one shallow well at its disposition giving reasonably clean water (according to the Camat) and this well was being used by the whole village. Water vendors also made use of that well, selling the water to inhabitants of the village at rather high prices.

Notwithstanding this state of affairs the Camat gave as the priorities of the village : 1. Irrigation water, 2. Road improvement, 3. Drinking water.
Notwithstanding this statement, it is suggested by the team that this townships be considered to be taken up in the list. One additional reason being, that the health situation seems to offer room for improvement. Especially with regard to waterborne diseases there were complaints.

7. Kuta Bagok (Kabupaten Aceh Timur) did not qualify for an IKK-water supply system , because the number of inhabitants of the township is too low. However on every other count the village would qualify for the provision of a clean water system, as the quality of the available water is widely known to be extremely bad. Fresh water is available only at high prices or from a river which is quite some distance away. The Camat of the village made an eloquent plea, which was supported by his colleques of Panton Labu and Idi Rayeu. to include his township in the list. After what the team has been able to see, there is a strong tendency to support that plea. Especially as it seems, that the surrounding villages are not much better off and would profit from the construction of a water supply system. It is therefore recommended to include Kuta Bagok in the list,because it suffers from so many adverse natural disadvantages.

Time did not permit the team to visit the other - townships on the list of annex III. There is no doubt, that the circumstances in most of them would justify an intervention of the type under discussion now. From an efficiency point of view however it does not seem advisable to use dutch assistance for construction all over the D.I. Aceh. We would advise to complement the list of townships proposed above with a number of townships situated in the Kabupatens of Aceh Besar, Pidie, Aceh Utara and Aceh Timur. We would also suggest, that before doing so, a thorough survey be carried out to be able to make a reasoned choice, taking into account the possibilities of linking up the water supply of surrounding rural areas with the supply system to be constructed.
As well form the point of view of efficiency as well as from the point of view of effectiveness of the intervention with regard to the impression it would leave with the population as a whole, from a technical point of view the choice for such a course would seem natural.
It is strongly recommended, that once the decision has been taken to conduct such an indepth survey, the actual execution of the works should follow in the shortest possible period of time.

Another finding of the team is the apparent lack of coordination between the services of Cipta Karya and the services of the Department of Health. Even the Camat in a number of cases was not aware of the Depkes activities in his Kecamatan or of the precise number of illnesses and their classification. The impression exists, that whatever data were made available were based rather on hearsay than on facts. In some cases it also appeared that the Camat was not able to provide

figures on the number of pupils at the schools of different types in his Kecamatan, because these figures had to be dispatched to the relevant services at Kabupaten level without him being imformed.
The Camat was however generally, amazingly well informed about the data necessary for his administration, as appeared when the figures he had provided were checked against the official data.
Questions about the state of the water provision were answered without any hesitation.Subsequent tours in the village confirmed in a general way the data provided by the Camat.
Another feature which struck the team was the interest and patience shown. Although not in all cases the question was asked it can be assumed, that more then once survey teams have visited the different villages without their visits (as yet) showing any result. Some of such survey-reports prepared under a previous assignment under the dutch aid programme is attached to this report as an annex.
It seems worthwhile to investigate more thoroughly this finding of the team, because this practice seems not to yield the results one would hope for when spending the scarce financial resources available.
As the watersituation in the different villages is probably a matter of continuous concern (without the village being able to do very much itself to improve it), also in these matters the Camat was very knowledgable.

The questions ranged from the availability of fresh water to its quality, its taste, the location of the shallow wells the place where people went to wash or fetch drinking water and to the price usually paid for a jerrycan of fresh water of doubtful quality. This information was also readily available from other villagers, who were always willing to volunteer information on the subject. Generally speaking the people in the lowlands bordering the sea have limited access to water of a reasonable quality, which can be either used directly as drinking water or can only be obtained in neighbouring villages quite often at quite some distance from the village proper. People are forced by that situation to pay exorbitant prices for their drinking water.

Electrification of rural townships is progressing steadily but as it seems not fast enough to the taste of the population. In most townships electricity in one form or another was available. If PLN had not been able yet to include the village in its service-net, all forms of electricity-production were found: private companies selling electricity to a few clients at Rps 100/Watt/month or cooperatives providing electricity and even the village itself had managed in one instance

to provide electricity. Electricity scores high in the order of oriority in the minds of the people, in some instances higher than the provision of clean water, even if the available water was of a doubtbful quality. In one instance this order of priority was explained by a Camat as being forced "to choose between your father and mother which is impossible as both were of equal importance". Finally the team was made aware of old systems installed many years ago, some even far before the first world war, which were still functioning properly, without falling dry at the end of the dry season. One is tempted to conclude that the results from hydro-geological surveys were at the basis of these succesful ventures. It would be worthwhile to investigate whether relevant maps still exist.

Discussion.

As a result of the geographical situation fresh water is not always available in sufficient quantities nor is it of acceptable quality. The problem has been complicated by the waste water of the Sugar Factory at Cot Girek, that apparently is of such bad quality that occasionaly fish and cattle die from the polluted water. More over the oil industry has made arrangements, which makes it difficult for the fishermen to ply their trade as they used to do. Tha above is pertaining to the villages lying between the Krueng Jamboaye and the Krueng Pusa, compounding the difficulties already existing in the past. In general it seems that groundwater is salty or brackish with colour ranging from light yellow to black. In one instance it was observed that the water contained methanol gasses, which disappeared after a certain while leaving the water reasonably discoloured and tasteless. This water was used in a Medical Clinic. A complaint often heard was the high degree of acidity of water.

The provision of fresh water.

The source of fresh water if one could be said it to be is in most cases water from a (nearby) river, which would necessitate the construction of treatment plants of different sizes, using possibly different treatment processes. The feasibility of shallow well based - embankment infiltration systems preferably for groups of townships should however be investigated alternatively.
Ideally the future provision of water should originate in springs or artesian wells, requiring little to no maintenance. Even if initial financial outlay would in most cases increase because of the length of the adduction, the lack of maintenance inherent in these sys-

tems presents some attraction. The old systems encountered still provide water of good quality and have been funtioning practically ,maintenance-free at no cost at all!
Also the design of these systems will be less expensive, and could be performed by less experienced personnel.
The Terms of Reference of the team mentions specifically to identify small townships, fitting into the philosophy and more specifically into the criteria of the IKKprogramme.
However, most of the people live in hamlets and - villages not fitting into the IKKcriteria. It appears - therefore advisable to investigate in which way the resources of the Department of Public Works, the Department of Health and the Department of Internal - Affairs could be made to support each other's efforts. This recommendation seems to be in line with recent changes in regulations per taining to the responsabilities of Cipta karya and Dep.Kes. for rural water supply systems. The knowhow of these departments are really complementary in this specific field and there is no reason to suppose that the different budgetary provisions could not be applied in that manner either.
It would be logical to try to put these resources to work within the framework of a masterplan, drawn up at Kecamatan level and monitored by the Kabupaten, to provide coordination and combination of the plans of the different kecamatans. In these plans the possibilities of commercial funding could be considered.
Such a planning process will need to be carried by skilled personel, which can not be expected to be available from local resources in the quantities needed. The training of such personnel will ask for time. It is doubtful that the execution of the water supply program will be slowed down to accomodate the planners. It seems therefore advisable to start the process by introducing a simple coordination-system covering the main factors of the systems: population cooperation, construction of the extended systems, funding and where necessary the operation and maintenance including cost recovery methods as well as tariff setting.

1. Activiteit :
2. Lokatie :
3. Looptijd :
4. (Sub-)sector:
5. Ned bijdrage :
6. Ool. bijdrage:
7. Ref. no. :

8. Samenvatting activiteit:

9. (Verder liggende) doelstellingen:

10. Directe projectresultaten:

11. Activiteiten:

12. Middelen:

13. Voorstel afkomstig van:
14. Voorgestelde startdatum:
15. Behoefte aan verdere informatie, studie, analyse; aan een formuleringsfase:

16. Eerste conclusie t.a.v. activiteit:

17. Behandelende post
en ambtenaar :
Datum :
Paraaf beh. ambt.:

Handleiding voor het invullen van een identificatiememo

1. Activiteit: Vul de volledige/standaard betiteling of naam van de activiteit in. Standaardisatie van de activiteitsnaam is van groot belang.
2. Lokatie: Vul de naam in van het land waar de activiteit plaatsvindt, alsmede plaats of regio,indien mogelijk (b.v. Soedan, Bor)
3. Looptijd: vul maand en jaar in, waarin de activiteit start en maand en jaar, waarin de activiteit afloopt (indien mogelijk)(b.v. 8/82 - 7/84)
4. (Sub-)sector: Gebruik hiervoor de DAC-code (deze is te vinden in-de Masterchecklist. Vul de naam in met tussen haakjes het (sub-)sectornummer.
5. Ned. bijdrage: indiceer de gevraagde of aan te bieden Ned. bijdrage in Ned. guldens. Erachter tussen haakjes de categorie, waaruit financiering dient plaats te vinden.en of het financiële hulp (FH), dan wel technische hulp (TH) betreft.
6. Ool. bijdrage: indiceer de totale bijdrage van het ontvangende land of de ontvangende instantie in guldens met tussen haakjes het equivalent in de lokale currency (b.v. 2 mln. gulden (8 mln. rupees)).
7. Ref.no.: Hier dient - indien reeds aanwezig - een activiteitennummer te worden aangegeven of een ander bij referentie naar deze activiteit meest gebruikte aanduiding (OTA 17 of SUD/81/531). Voorkeur voor het nummer van de computerinvoer.
8. Samenvatting activiteit: Beschrijf kort de inhoud van de activiteit.
9. (Verder liggende) doelstellingen: Wat is de motivering voor de activiteit vanuit de betrokken sector, regio of beleidsdoeleinden? Welke betekenis kan het hebben?
10. Direct verwachte resultaten: Welk concre(e)t(e) doel(en) wil men met de activiteit bereiken? Welke veranderingen of verbeteringen wil men teweeg brengen?
11. Activiteiten: Beschrijf kort de acties, die ondernomen moeten worden om de doeleinden sub 10 te bereiken,
12. Middelen: Beschrijf kort de goederen en diensten, welke door resp. donor en recipiënt worden geleverd (deskundigen, equipment, etc.)
13. Voorstel afkomstig van: Geef de naam van de verantwoordelijke instelling, die het voorstel heeft ingediend. Bij voorkeur niet alleen de naam van het coördinerend orgaan (planning commission o.i.d.), maar ook van de daadwerkelijke opstellers van het voorstel. Hier kan ook een andere initiërende instantie genoemd worden.
14. Voorgestelde startdatum: Datum.waarop volgens redelijke schattingen de committeringen resp. de eerste daadwerkelijke stappen voor de activiteit ondernomen kunnen worden.
15. Behoefte aan verdere informatie, studie, analyse: Hierbij dient met name vermeld te worden of en zo ja wat tijdens een formuleringsfase dient plaats te vinden: b.v. het uitvoeren van een kosten-baten analyse, van een feasibility study, van een verder gedetailleerd technisch plan, van een uitgebreid vaktechnisch advies. Samenvatting van hetgeen onder D2 in het memo vermeld is.
16. Eerste conclusie t.a.v. de activiteit: Hier dient een samenvatting gegeven te worden van hetgeen onder D in het memo vermeld.
17. Behandelende post en ambtenaar: In te vullen de plaatsnaam waar de post is gevestigd (b.v. Jakarta, Dakar, Sana'a) en de naam van de ambtenaar, die het memo heeft opgesteld, niet het hoofd van de betrokken afdeling of van de post (tenzij deze het heeft opgesteld). De behandelend ambtenaar dient ook zijn paraaf en de datum van zijn eindparaaf te zetten, waaraan de chef de poste zijn paraaf kan toevoegen. Onder verantwoordelijkheid van de betrokken chef de poste wordt de brief geschreven, waarbij het memo wordt aangeboden.

Bij de stelling van het identificatiememo ent na invulling van de titelpagina n volgend model formulieren gebruik emaakt te word Volgende pagina's dienen eenzelfde del te volgen, waartoe voorgedruk formulieren ter beschikking komen.

A.1. Beschrijving activiteit

B.1. Algemene toetsing aan relevantie

B.2. Toetsing aan Nederlandse beleidsuitgangspunten

a. Algemene uitgangspunten

b. Uitgangspunten betreffende categorie

c. Uitgangspunten landenbeleid

B.3. Toetsing aan prioriteiten/ beleid ontvangende instantie

III. TOELICHTING OP IDENTIFICATIEMEMO

De hier volgende toelichting vormt een richtlijn bij het beantwoorden van de onderwerpen die in het identificatiememo ter sprake kunnen komen;en als vermeld sub II.2. De detaillering van de beantwoording zal van geval tot geval verschillen. Indien voldoende duidelijke documentatie voorhanden is, kan per onderwerp daarnaar verwezen worden.

ad A.1. Beschrijving activiteit

In die beschrijving dient een redelijk beeld geschetst te worden van het voorstel. In die gevallen waar reeds een voorstel van regeringszijde ontvangen is, kan grotendeels, zo niet geheel, teruggevallen worden op dit voorstel, mits dit de componenten, welke hier beschreven zijn, omvat. Indieneen dergelijk voorstel niet aanwezig is, dient de beschrijving alsnog hierin opgesteld te worden. Het dient de volgende essentiële componenten te bevatten:

- het kader
  - achtergronden
  - lange termijn doelstellingen
  - direct verwachtbare resultaten
- de activiteiten
  - de werkzaamheden die verricht dienen te worden
- de middelen
  - inputs Nederland
  - inputs ontvangende instantie
- de organisatie

Deze beschrijving wordt in de formulerings- en uitvoeringsfase nader uitgewerkt in vergelijkbare volgorde. De beschrijving hoeft hier slechts globaal te zijn.

Er bestaat geen bezwaar tegen indien A. in de werktaal (Engels, Frans of Spaans) wordt geschreven, als bijlage wordt toegevoegd aan het ID memo en in feite een aanzet vormt voor de formuleringsfase en het uitvoeringsdocument.

ad B. Toetsingen

Onder dit hoofd vallen een viertal toetsingen. Positieve conclusies naar aanleiding van deze vier toetsingen vormen een conditio sine qua non voor doorgang van de activiteit. Mocht men reeds tot een negatieve conclusie komen, dan hoeft aan de verdere onderdelen van het memo geen aandacht meer te worden besteed en kan de aandacht beperkt worden tot de conclusie sub D.1.

ad B.1. Relevantie

Zijn er nu reeds aanwijzingen die vraagtekens oproepen omtrent de noodzakelijkheid van het project? Of algemene omstandigheden die de uitvoering van het project onnodig of onmogelijk maken?

ad B.2. Nederlandse beleidsuitgangspunten

a) Toetsing aan algemene beleidsuitgangspunten
   - Welke zijn de effecten van het voorstel voor armere groepen in het ontvangende land?
     Zijn er schadelijke neveneffecten mogelijk?
   - Is de opinie van de "doelgroep" van deze activiteit ingewonnen? Welke?
   - Welke te verwachten gevolgen heeft het voorstel voor vrouwen?
   - Welke effecten heeft het voorstel in ecologische zin?
   - Welke zijn de effecten van het voorstel voor de economische verzelfstandiging van het ontvangende land?

b) Toetsing aan de uitgangspunten van de Categorie, waaruit het voorstel gefinancierd zou dienen te worden. Hierbij dient te worden aangegeven uit welke Categorie men het voorstel denkt te financieren en op grond van welke toetsing. Ambassades kunnen terzake advies van OS inwinnen.

c) Indien financiering lastens de jaarlijkse allocatie voor een concentratieland wordt voorgesteld, dient globale toetsing aan de uitgangspunten, zoals neergelegd in het landenbeleidsdocument of discussiestuk of daarmee vergelijkbaar stuk plaats te vinden.

ad B.3. Toetsing aan prioriteiten/beleid ontvangende regering

Hier dienen de volgende vragen beantwoord te worden:
- Valt het voorstel binnen de ontwikkelingsprioriteiten van de ontvangende regering? Waar en op welke wijze is dit vast te stellen?
- Heeft de ontvangende regering de aanvraag ingediend?
  Is zij accoord met de eventuele uitvoering van de activiteit?
  Is aannemelijk te maken dat de ontvangende regering het project te zijner tijd zal uitvoeren c.q. voortzetten zonder buitenlandse steun?

Accoord en instemming van de ontvangende regering is niet altijd in dit stadium noodzakelijk, indien aannemelijk gemaakt kan worden dat die instemming wel later wordt verkregen.
Bij een aantal categorieën is de instemming van de regering van het land, waarin de activiteit plaatsvindt niet nodig. In die gevallen dient de houding of de te verwachten houding van de betrokken regering tegenover de activiteit hier beschreven te worden.

ad B.4. Toetsing aan de gecheckte opinie van andere donoren op het betrokken terrein

Hier een korte aantekening omtrent eventuele andere donors, waarvan bekend is dat zij in de betrokken sector of subsector vergelijkbare activiteiten (willen) ontplooien. Tevens weergave van hun opinie.
Een negatieve opinie van de donors hoeft overigens niet automatisch te leiden tot negatieve conclusies t.a.v. de activiteit, doch dit dient evenwel beargumenteerd te worden. Hetzelfde geldt mutatis mutandis voor een (te) positieve opinie.

ad C. Verdere concrete zaken (indien beschikbaar)

Deze details dienen behandeld te worden indien op grond van B1, B2, B3 en B4 positief over de activiteit geconcludeerd mag worden. Dan verdienen zij alle n enige of uitgebreidere aandacht afhankelijk van de activiteit. De zwaarte van deze aspecten en hun eventuele invloed op een positieve of negatieve conclusie staat ter beoordeling van de opsteller en dient in de conclusie tot uitdrukking te komen.

ad C.1. Counterpartorganisatie

Hier dient opgenomen te worden een oordeel omtrent de capaciteit van de counterpartorganisatie om de activiteit uit te voeren. Ook indrukken omtrent beperkingen van de counterpartorganisatie.

ad C.2. Inputs van Nederlandse zijde

- Wat is de rol van de Nederlandse hulp bij de uitvoering?
- Welke is de geschatte bijdrage in guldens uitgedrukt van Nederlandse zijde?
- Betreft het technische of financiële hulp, lening of schenking?
- Welke materiële inzet dient geleverd te worden? Zijn leveranties van goederen inbegrepen? Zo ja, gaarne globale beschrijving, inclusief beantwoording van de vraag waar de equipment vandaan komt/kan komen. Zijn er problemen met de toepasselijke bindingsregel te verwachten? (indien het financiële hulp betreft)
- Welke personele inzet is wellicht nodig? Op welke wijze te leveren? (consultants, lokale deskundigen/consultants, Nederlandse adviseurs, deskundigen, vrijwilligers).
- Zijn lokale kostenfinancieringen inbegrepen? Zo ja, welke? Percentages?

ad C.3. Inputs van de ontvangende instantie

- Wat is de rol van de ontvangende instantie?
- Welke is de geschatte bijdrage van deze instantie in geld uitgedrukt (lokale valuta)?
- Welke zijn de personele en welke de materiële inputs, welke van de ontvangende instantie verwacht mogen worden?
- Welke verdere institutionele, socuale of fysieke infrastructuur is nodig voor de activiteit en draagt daarvoor zorg?

ad C.4. Inputs andere donoren

Wordt een deel der inputs door andere donoren geleverd? Welke?
Gaarne zonodig beschrijving.

ad C.5. Follow-up

- Welke follow-up is nodig na afloop van de activiteit en zo ja, hoe?
- Kan de ontvangende regering, die in principe voor de follow-up verantwoordelijk is, de follow-up financieren? Zijn daarvoor additionele donorinputs nodig? In het laatste geval: in welk stadium dient of kan van Nederlandse zijde erige zekerheid worden verkregen omtrent follow-up financiering?
- Bestaat er de mogelijkheid dat men nu, danwel achteraf genoodzaakt zal zijn voor een kwalitatief goede follow-up een beroep te doen op Nederland of een donor voor recurrent costs financing?

ad C.6. Overige relevante factoren

Te denken valt daarbij aan:
- politieke prioriteiten of problemen (b.v. steun aan minderheden)
- sociale aspecten welke niet eerder ter sprake kwamen;
- welke zijn de noodzakelijke randvoorwaarden voor succes van de activiteit?
- evidente vaktechnische en financiële factoren, die:
  1. de conclusie t.a.v. de activiteit beïnvloeden;
  2. de conclusie bemoeilijken.

ad D.1. Slotconclusie

Gaarne een korte samenvatting van de conclusie en aanwijzing van de belangrijkste redenen waarom U al dan niet de verdere formulering en eventuele uitvoering aanbeveelt. Tenslotte een definitief oordeel; wel aanvaarden of niet aanvaarden.

ad D.2. Verdere actie

Indien U positief concludeert dan gaarne beschrijving - zo concreet mogelijk - van verdere stappen, welke voor een goede beoordeling en uitvoering noodzakelijk zijn. Te denken valt met name aan:

- Is een kosten-baten analyse nodig?
- Is een formuleringsfase nodig? In algemene zin of alleen voor bepaalde delen of aspecten van de activiteit? Welke?
- Is voor de formulering van de activiteit expertise van buiten nodig of kan de ontvangende instantie dit zelf behartigen, eventueel met steun van ambassade of Den Haag?
  Indien steun van buitenaf nodig is, kan deze lokaal ingeschakeld worden of is inzet vanuit Nederland nodig? Welke?
- Is het schrijven van een activiteiten- en uitvoeringsdocument (of projectdocument) nodig?
- Welke vaktechnische en/of financieel-economische aspecten verdienen aandacht, nadere bestudering, advisering?
- Welke zijn de consequenties van verdere behandeling voor werklast van de post, het Ministerie of anderen (zeer globaal).

Proposals.

1. A thorough survey and inventory of townships should be carried out in four kabupaten which are Aceh Besar, Pidie, Aceh Utara and Aceh Timur.
The survey and inventory should focus on collection of population data and the assessment of the need and demand for improved water supply facilities. Based on the survey additional townships could be added to list of the selected townships.

   The selection should be based on a thorough evaluation of the priorities. Possibilities for linking up water supply to surrounding rural dese's should be considered.
Limiting the programme to only four Kabupaten is recommended in view of increasing the efficiency and effectiveness of the programme and of streng thening the ongoing SOI-SON water supply programme in Aceh to the maximum extend possible.

2. The townships recommended to be included in the programme at this stage are (1) Laweng, (2) Lapan, (3) Lhok Sukon, (4) Seunoddon, (5) Panton Labu, (6) Simpang Ulim, (7) Idi Rayeuk, (8) Lambro Biru, and (9) Kuta Bagok. The total number of townships should preferably be increased to 15 or more in order to achieve a sufficient level of cost efficiency of the programme.

3. An in depth water resources survey should be conducted to identify adquate water sources for each of the selected townships and surrounding area's. Particular attention should be paid to the identification of water sources which do not require extensive tretment.

4. For the above mentioned Kabupaten indicative plans should be drawn up outlining for each of the Kabupaten a staged development of water supply facilities within the frame work of the national objectives set forth in the Repelita IV. The Plan should support the SOI-SON programme.

5. At Kecamatan level a planning process should be started by devising a consistant coordination system under supervision of the relevant kabupaten authorities.
The coordination system should draw upon all relevant resources.This process should be initiated in those kecamatan which are most in need of improvement of water supply facilities. The available

resources including foreign assistance should be used in the most efficient and effective way so that surveys lead to prompt implementation of the planned water supply facilities and water enterprises responsible for operation and maintenance.

6. For the selected townships detailed designs and tenderdocuments should be prepared in order to enable implementation of the water supply facilities during financial year 1985/1986. For this purpose pipematerials and possibly also pumping equipment, generator sets and others should be purchased on stockpile basis in an early stage of the project.

7. For carrying out and initiating the activities mentioned under points 1 up to 6 a TA-budget of about Nfl 0.5 million should be made available. Mainly for purchase of materials an amount of approximately Nfl 3 million should be allocated as Financial Assistance. The requested allocations are in accordance with the Agreement between GOI-GON in March 1984.

It is recomended to increase the FA-share of the implementation costs above the presently accepted 50/50 ratio (i.e 70/30).

8. A close liaison with the programme in west Java should be kept in order to share experience beneficial to both prgrammes.Purchase of materials should be arranged combined by both programmes in order to reduce costs.

Annex I

SCHEDULE OF MISSION

July

12 Departure for Banda Aceh

Ir. F. Deelaman

ms Dr. M.S. Muller

13 Briefing Ir. J. Jellema
Sanitary Engineer 11 Cities Water Supply Project

Briefing Ing. H. Van Mulligen
Project Manager 11 Cities Water OMT Project DHV, Medan

Deparature for Aceh

Ir. J.B. Nugraha,Planning staff, IKK Pusat

Visit to Jantho, new capital-city of Kabupaten - Aceh Besar (water treatment plant)

14 Briefing by drs. T. Syaiful Achmad, B.Mu.E.
Proyek Air Bersih IKK Propinsi D.I. Aceh
Proyek Perencanaan Tata Ruang & Wilayah, Pemimpin

Briefing by ir. H. Abdul Muluk, head of Dinas Pekerjaan Umum Daerah Istimewa Aceh, and
Ir. Achmad Syarkawi, Kepala Bagian Cipta Karya

Briefing by mr. Jaenal, vice-Chairman of Bappeda Propinsi D.I. Aceh

15 Field visit to :

Kecamatan Ingin Jaya,desa Lubuk

Kecamatan Indrapuri,desa Maheng

Kecamatan Kuta Baro, mukim Lambro Biru

Kecamatan Seulimeum,Krueng Raya

Accompanied by :

ir. T. Andrian Madjid, Arsitek,
Cipta Karya Kanwil Dep.PU. D.I. Aceh
and mr. Syahrial

July

16 Kecamatan Muara Tiga, IKK Laweung

Kecamatan Mila, IKK Jabal Gafur/Mila

Kecamatan Trieng Gading, IKK Trieng Gading

17 Courtesy call to mr. T. Syahbuddin Harny, Secretary of the Kabupaten Aceh Utara, Lhok Seumawe

Kecamatan Tanah Pasir, IKK Matang Panyang

Kecamatan Lhok Sukon, IKK Lhok Sukon

Kecamatan Seunuddon, IKK Seunuddon

Kecamatan Tanah Jambo Aye, IKK Panton Labu

18 Kecamatan Tanah Jambo Aye, IKK Panton Labu

Kecamatan Simpang Ulim, IKK Simpang Ulim

Kecamatan Nurusalam, towns visited, Kuta Bagok

Kecamatan Idi Rayeu, IKK Idi Rayeu .

Kecamatan Karang Baru, IKK Karang Baru

Travel to Medan

19 Travel to Jakarta

The team was assisted during its travel on 16,17,18, and 19 July by drs. Ilyas Yacob, of the Proyek Air Bersih , D.I. Aceh, and on 17 and 18 July also by ir. C. Engelsman, Representative of D.H.V. consultants.

Annex II

REVIEW OF WATER SUPPLY SYSTEM OF LHOK SUKON

1. INTRODUCTION

The town of Lhok Sukon is one of the 23 Ibu Kota Kecamatan of the Kabupaten Aceh Utara. The Kecamatan has been divided into 97 desas of which 6 will be included in this project (see FIGURE 1). The present population living in the proposed supply area is 5035.

The town of Lhok Sukon is located in the middle of the coastal plain just east of the Arun Gas Field. The distance to the sea is about 20 km and to the hills only 5 km. The town is situated along the road Medan - Banda Aceh at a distance of about 305 km of Banda Aceh and 35 km to Lhok Seumawe.

Compared with the region the infrastructure of the town can be described as good. The local health centre is in a reasonable condition, while PLN supplies from 18.00 p.m. to 07.00 a.m. Good road connections to Banda Aceh and Medan are available however a drinking water supply system does not yet exist.

The main employments in the region are in oil/gas industry, retailing and some agriculture.

2. PRESENT CONDITION OF WATER SUPPLY AND HEALTH

Because Lhok Sukon has not yet a water supply system most people use shallow ground water or river water.
In the wet period of the year sufficient shallow ground water is available. During the dry time most of the about 6 m deep wells are however falling dry. When they are dug deeper the water becomes brackish.
At that time most of the population shifts to river water, which is also sold for Rp. 2,-/l.

In view of the poor water supply situation in the dry period of the year, a bad health situation could be expected. In 1979 and 1980, 170 and 70 cholera cases have been diagnosed respectively of which 8 and 7 cases were fatal.
Besides also other water borne deseases like skin and eye infections and dysentery are rather frequent.

3. WATER DEMAND AND DESIGN CAPACITIES

3.1. Population

In the close vicinity of the Ibu Kota 6 desas are situated, some of which only partly will be supplied by the system.

Desa	1980 pop.	% to be served	1980 pop. to be served	Remarks
1. Kota Lhok Sukon	2587	100	2587	Ibu Kota
2. Mns Dayah	827	100	827	-
3. Mns Pante	530	80	424	-
4. Mns Blang	496	100	496	-
5. Mns Ceubreh	624	80	499	-
6. Mns Beurinjin	338	60	203	-
Total			5036	

Based on the average growth rate of the Kecamatan of 3,0% the 1985 population to be served is 5840 persons.

3.2. Water demand

The water demand based on the standards for the IKK project for supply areas between 2500 and 8500 inhabitants in 1985 are :

- domestic	2,37 l/s
- non domestic	0,24 l/s
- leakage/losses	0,39 l/s
- average day	2,99 l/s
- maximum day	3,44 l/s
- peak hour	7,48 l/s

3.3 Design capacities

- source	5	l/s
- transmission main	5	l/s
- reservoir	100	m^3
- distribution scheme	7,5	l/s

4. WATER RESOURCES

4.1 Ground water

Shallow ground water with reasonable quality is not available in sufficient quantities during the whole year.
During the dry period, most of the wells are falling dry.
Increasing the depth of the wells results in brackish water with a very high colour and turbidity.
The water quality analysis made during the field visit (see TABLE I) learns that the turbidity and colour of the water is rather high. The water can be described as moderately hard and slightly scaling. Based on local information it is expected that as a result of the high quantity of clay in the top layers of the soil, the permeability of the soil is also limited.

The most important development of ground water from deep-wells in the Province of Aceh has been undertaken in the Lhok Sukon area. The Mobil Oil Co. has sunk some 13 wells for the purpose of supplying villages in the vicinity of the Arun Gas Field.
Also in the town of Lhok Sukon a well has been sunk upto 130 m depth. Electrical logs have been made up to 120 m and indicate that no fresh water aquifers exist.
About 5 km north-west of this location several wells with good water quality have been found.
In FIGURE 2 the locations of the wells, data about the depth of the aquifers and the production capacity are shown. Small aquifers of sand and gravel within 100 m of the surface have been found.
Unfortunately no controlled pumping tests have been undertaken on these wells. The pumping test data available indicate however rather poor productions.

As in general in the outcrops north of Lhok Sukon the alluvial deposits appear to consist mostly of fine grained silts and clay, so a limited potential could be expected. (1)

The water quality of the water of deep wells at the Arun Gas Field (see TABLE I) can be described as rather clear, very soft and moderately scaling. The water contains considerable NH_4 while the salinity is just below the taste limit. To use this water for drinking water at least removal of NH_4 by chlorination is required.

The banks of the Keureuton River consists of clay layers and are rather steep. No good location for embankment infiltration has been found during the site visit.

Springs are not known in the surroundings of Lhok Sukon.

4.2 Surface Water

At the west side of Lhok Sukon the Keureuton River is passing the town. This very polluted river has a width at the town side of about 100 m and even during low flow a depth of more than 3 m exist. This typical tidal river with a large tidal volume is expected to have a low flow more than 10 m^3/s and a peak flow of over 200 m^3/s.

In view of the topographical situation salt intrusion is not expected to reach the town, which assumption was confirmed by local people.

During low flow the water colours yellow to brown while during floods the colour changes to dark brown.
Floods are coming up within two days and continue most times for more than one week. Both river banks are flooded during this period. To use this river as source for drinking water this very polluted water, which is soft and neither scaling nor aggressive, requires a full river water treatment with flocculation, sedimentation, filtration and chlorination.
In view of the high sediment load, high turbidity and colour during floods additional pre-chlorination and pre-sedimentation are possibly required.

(1) Water resources and potentially irrigable land of Daerah Istimewa Aceh.
Draft Report 1980

4.3 Evaluation

As good shallow and deep ground water is not available in sufficient quantities, springs are not known and embankment infiltration is considered to be not feasible, river water is the only remaining source.
In view of the high turbidity and colour during low flow (see TABLE I) and expected sediment load during floods an extensive river water treatment is considered to be required.

Summary of water resources with respect to water supply

Source	Quantity	Quality	Required treatment	Energy	Remarks
Shallow ground water	not sufficient	bad	-	pumping	-
Deep ground water	not sufficient	fair	NH_4 removal	pumping	-
Embankment infiltration	not sufficient	fair	-	pumping	-
Kereuton River	sufficient	bad	full treatment (+presedimentation)	pumping 2 x	-

5. PRELIMINARY LAY OUT WATER SUPPLY SYSTEM

The proposed water supply system of Lhok Sukon will exist of the following units:

a) River water intake with hoisting equipment for pumps

b) Two submersible pumps for raw water with a capacity of 5 l/s and a head of 20 m

c) Pre-sedimentation basins with loads of 0,3 m/h (if required)

d) Pre-chlorination unit (if required)

e) Standard water purification plant based on the design of the Directorate of Sanitary Engineering for a production of 5 l/s.

f) Clear water reservoir with booster station with a capacity of 20 m^3.

g) 2 high lift pumps to pump water from the booster station to the elevated reservoir with a capacity of 5 l/s and a head of 30 m.

h) Required power (380 V - 10 kW) can be obtained from PLN. An additional 600 m high tension line with transformer should be installed by PLN.

i) 600 m Ø100 mm PVC transmission main from the clear water reservoir to the elevated reservoir near the Camat Office.

j) 100 m^3 elevated reservoir with a minimum elevation of 15 m above town level.

k) A distribution system of approximately 4650 m of PVC pipes with diameters of 100, 75, 50 and 40 mm.

l) Operation building at the intake site.

m) 88 yard connections.

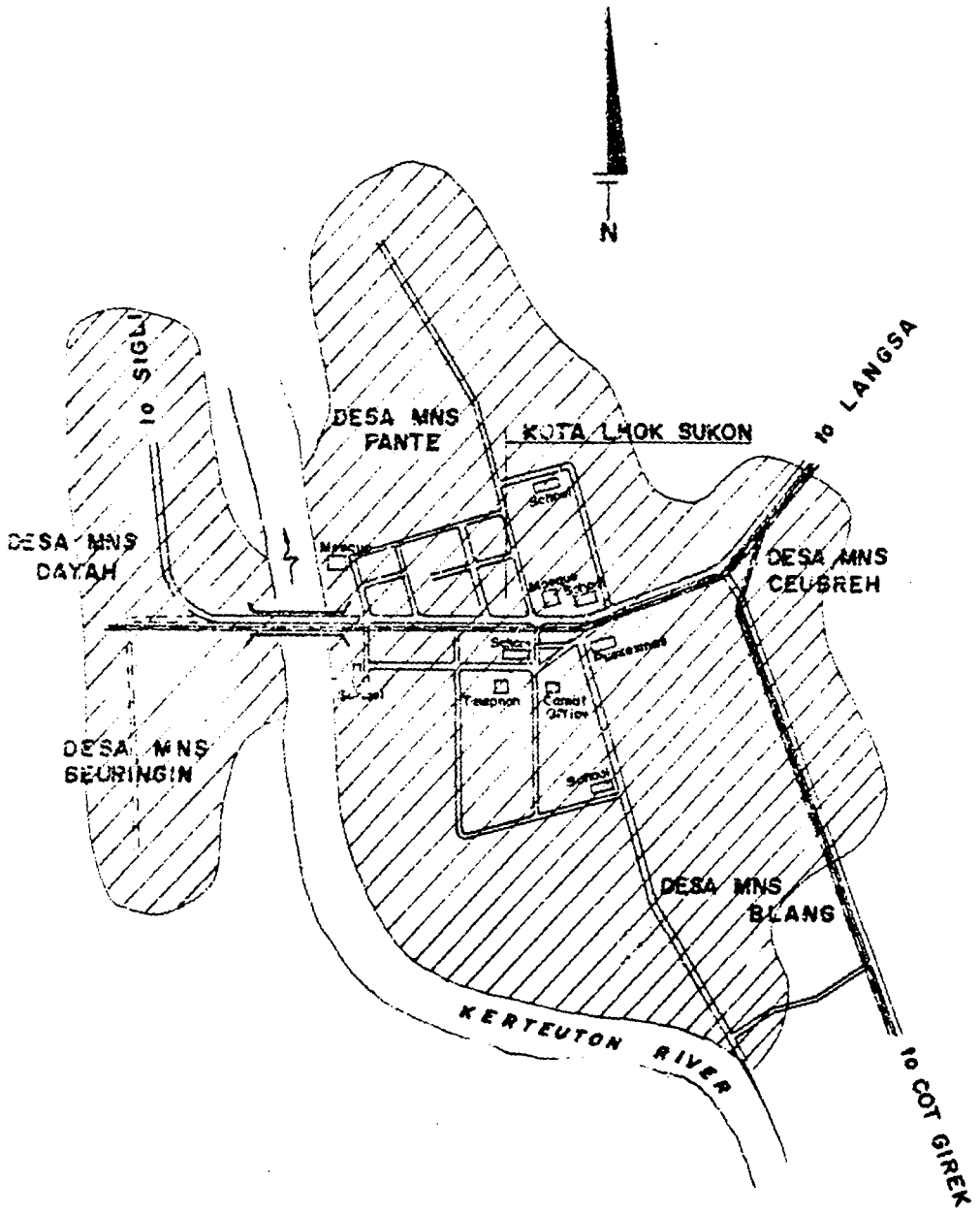
n) 25 public hydrants with 3 taps each serving 200 persons per hydrant on the average.

6. REQUIRED ADDITIONAL SURVEYS

To complete detailed designs the following additional surveys have to be executed :

- town mapping and topographical surveys
- water quality analysis specially during floods
- soil investigation survey at water tower and treatment site
- selection of good intake location.

JAC/yt.
27/3/81



LEGEND :

- Road
- Railway
- Bridge
- Area to be Supplied

Figure: I

LHOK SUKON

SCALE - 1 : 10.000

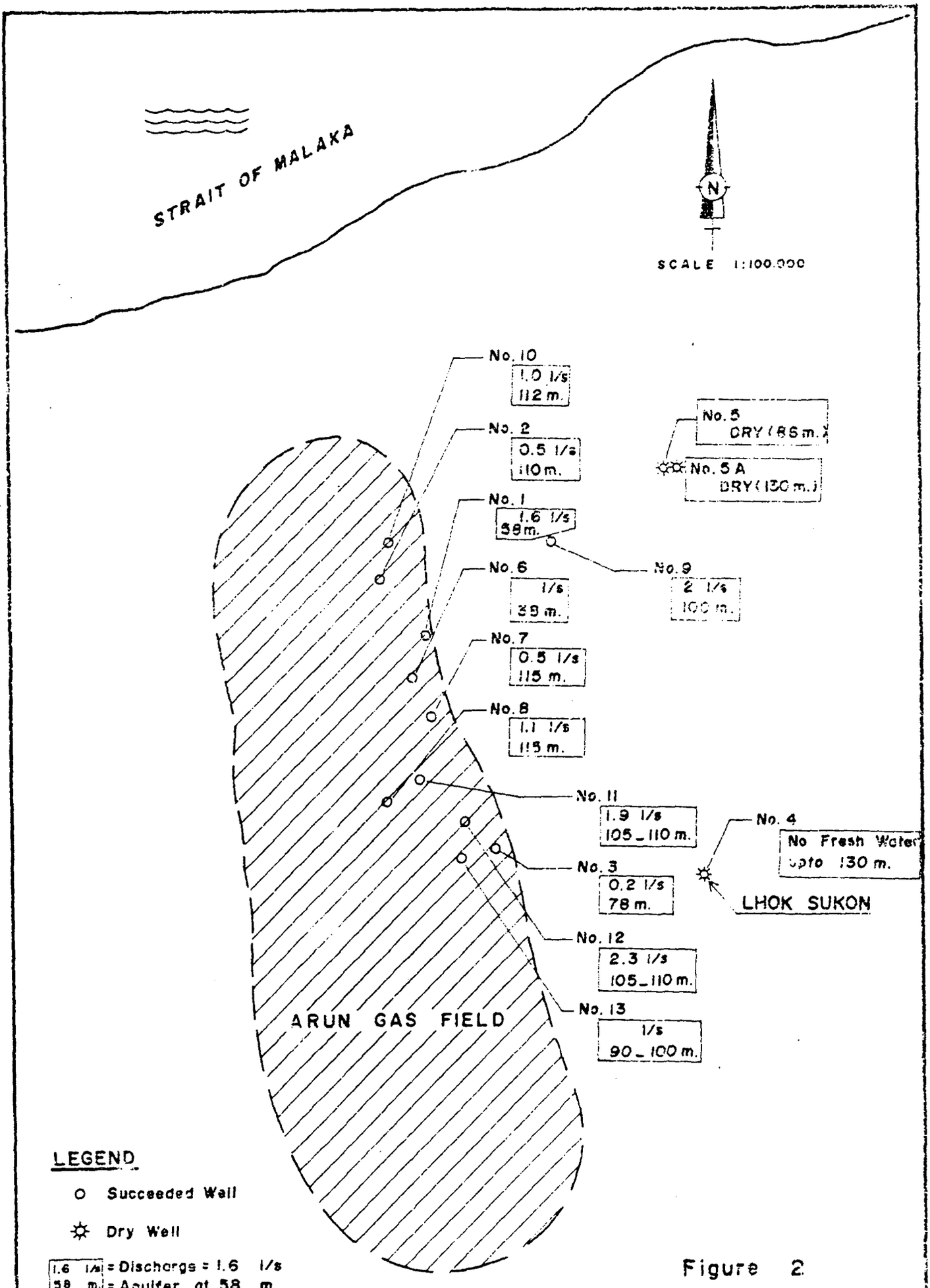


Figure 2

DEEP WELL DATA IN THE SURROUNDINGS OF THE ARUN GAS FIELD

FIELD ANALYSIS OF WATER QUALITY by Hach-kit DR-EL/2,3&4 Methods and Millipore-kit Faecal Coliform Method		DHV CONSULTING ENGINEERS P.O. BOX 349, MEDAN - INDONESIA			
Province		Aceh			
Kabupaten		Aceh Utara			
Kecamatan		Lhok Sukon			
Town		Lhok Sukon			
Location		1	2	3	4
Date		16/3/81			
Time					
Sample number					
Analysed by		JAC/SH			
Temperature	°C	33	32	34	30
CO_2	mg/l	28	-	16	64
HCO_3^- - $CaCO_3$	mg/l	370	80	540	370
pH	-	7,3	7,7	8,0	7,0
Ca^{++} - $CaCO_3$	mg/l	200	60	50	240
Fe - total	mg/l	1,0	0,4	0,7	2,0
Mn	mg/l	0,4	1,0	0,2	1,6
NH_4^+ - N	mg/l	-	-	2	-
$NO_3^=$ - N	mg/l	-	-	1,5	-
$NO_2^=$ - N	mg/l	-	-	-	-
O_2	mg/l	-	-	-	-
H_2S	mg/l	-	-	-	-
EC	µS/cm	840	160	1300	720
Turbidity	FTU	50	150	30	160
Colour	Pt	150	450	80	325
Smell	-	good	bad	good	good
Appearance	-	good	bad	good	good
Faecal Coliforms	MPN/100 ml	-	-	-	-
CO_2 - aggressive	mg/l*)	-	-	-	-
Ryznar - index	-*)	6,30	8,25	6,50	6,60
Langelier - index	-*)	+0,45	-0,30	+0,75	+0,20

*) calculated

Remarks :

1. Camat house town centre
2. River Kereuton near bridge
3. Deepwell 109 m Lhok Sukon landing
4. Shallow well near River Kereuton kampung Mns Blang

TABLE I

A7 REVIEW OF WATER SUPPLY SYSTEM OF PANTON LABU

1. INTRODUCTION

The Kecamatan of Tanah Jambo Aye with Ibu Kota Panton Labu is one of the 23 Kecamatans in the Kabupaten Aceh Utara. A total number of 76 desas are distinguished in the Kecamatan of which 5 will be supplied by the project. Three of these desas will only be supplied partly as the outskirts of these areas are too rural (see FIGURE 1). The coastal plain near Panton Labu is rather wide. The distance to the sea is about 15 km and to the foothills 30 km. The area around the Ibu Kota is mainly used for rice fields. The distance to Banda Aceh is 330 km and to Lhok Seumawe 60 km.

The infrastructure of the town is reasonable compared with the region. The local health centre is in a good condition, while electricity supply is available in sufficient capacity. In view of limiting the operational costs electricity is supplied between 18.00 p.m. and 07.00 a.m.

Road connections to Banda Aceh and Medan are good. A water supply system does not yet exist.

The main employments are in agriculture and some fishing and retail trade.

2. PRESENT CONDITION OF WATER SUPPLY AND HEALTH

Notwithstanding the poor quality of the shallow ground water most people use this source for all purposes. To clear the water a self made sand filter with a thickness of about 0,50 m is used. In the dry period of the year salt water intrusion increases and shallow ground water is not suitable anymore for drinking. For this purpose water is used from Desa Rawang Itik situated at about 1 km from the town centre. This water is sold for Rp. 2,5.-/l.

As frequently found in the brackish areas along the coast, cholera epidemics are breaking out, when the drinking water is getting salt. In the years 1979 and 1980, 116 and 210 cases respectively have been diagnosed as cholera or cholera suspected cases of which 6 and 3 cases were fatal respectively.

3. WATER DEMAND AND DESIGN CAPACITIES

3.1. Population

In the close vicinity of Panton Labu 5 desas are located which can be described as peri-urban. It is remarked that only the urban part of the desas will be supplied.

desa	1980 pop.	% to be served	1980 pop. to be served
1. Kota Panton Labu	2234	100	2234
2. Ms S. Kurom	1093	60	656
3. Ms Panton Labu	1176	100	1176
4. Tg. Cengai	785	60	471
5. R. Itik	1093	60	656
Total			5193

Based on the average annual growth rate of 2,8% of the Kecamatan Tanah Jambo Aye the 1985 population to be supplied is 5965 persons.

3.2. Water demand

The water demand based on the standards for the IKK project, for supply areas between 2500 and 8500 inhabitants in 1985 are :

- domestic	2,42 l/s
- non domestic	0,24 l/s
- leakage/losses	0,40 l/s
- average day	3,06 l/s
- maximum day	3,51 l/s
- peak hour	7,65 l/s

3.3. Design capacities

- source	5	l/s
- transmission main	5	l/s
- reservoir	100	m^3
- distribution scheme	7,7	l/s

4. WATER RESOURCES

4.1. Ground water

Shallow ground water is found up to a depth of 5 m below surface level during the whole year. The transmissibility is reasonable but the water quality is very poor. The water colours brown and smells badly while the salinity is always close to the taste limit. During the dry time of the year the salinity increases mainly as a result of intrusion of salt water from the river (see TABLE I).

At about 500 m from the banks of the river the salinity of the shallow ground water reduces strongly. The colour and turbidity however do not improve while also the iron content is rather high. Besides the water can be described as soft and moderately aggressive.

To reduce the colour, turbidity and iron rather extensive treatment efforts are required, like flocculation, sedimentation and filtration while also some aeration is required to improve the taste of the water.

To investigate the transmissibility of the soil a hand drilling test has been executed. The log data indicate that a reasonably aquifer of medium sand is found at a depth of 6 m (see TABLE II).

Based on the grain size analysis (see TABLES III and IV) a transmissibility of 100 m^3/day has been estimated.

A medium deep well has been drilled by Kesehatan in February 1981 at the border of the town. Also the water quality of this well can be described as very poor. Besides the high sediment content which is a result of inaccurate development and screening of the well, the EC of the well was higher than 3500 μS/cm and so unsuitable for drinking water.

No deep wells have been sunk in the surroundings of Panton Labu. In the Lhok Seumawe - Langsa plain alluvial deposits of fine grained silts and clays can be expected in the vicinity of major rivers. The potential of these aquifers is rather poor [1] .

However in deeper layers the so-called Idi and Julu Rayeu formations can be expected. The Idi formation in this area consists mainly of gravel and coarse sand while the Julu Rayeu formation consists basically out of clays and sands. Both layers have some potential, of which the Idi formation is the most promising aquifer. No information can be given about the quality of the water. In the coastal region wells penetrating through the alluvium into the under laying Idi formation are believed to have high iron contents.

No springs are known in the surroundings of Panton Labu.

4.2 Surface water

At the east side the town of Panton Labu is passed by the Jambo Aye River. The river colours most times brown and smells bad. At about 20 km upstream of the town the river is dammed for irrigation. For several months of the year all the water is used for this irrigation.
By tidal influence the "dead" water behind the dam becomes salt till about 10 km upstream of the town during the dry period of the year.

During the field visit the river was still fed by water from upstream of the dam, and salt intrusion took no place at that time.

4.3 Evaluation

It is not very clear which water source could be chosen for the water supply system of Panton Labu. As springs are not known, river water is salt for several months a year, the remaining alternatives are deep and shallow ground water. A cost comparison between both alternatives learns that exploitation of deep ground water is cheaper. However the chance of failure in the case of deep wells makes a system based on shallow ground water near Desa Rawang Itik more attractive.

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(1) Water rescurces and potentially irrigable land of Daerah Istimewa Aceh.
Draft Report 1980.

Summary table of water resources with respect to the water supply

Source	Quantity	Quality	required treatment	Energy	Remarks
shallow ground water	sufficient	bad	full treatment	pumping	2 x pumping + 1 km transmission
deep ground water	not known	not known	not known	pumping	-
medium deep ground water	sufficient	salt	-	pumping	-
River Jambo Aye	not sufficient	salt	-	pumping	-

5. PRELIMINARY LAYOUT OF WATER SUPPLY SYSTEM

The proposed water supply system of Panton Labu will exist of the following units:

a) 2 shallow wells along the road to Banda Aceh near Kampung Rawang Itik situated at about 1 km west of the town centre. The wells should have a distance to each other of 50 m and a depth of about 12 m.

b) A submersible pump with a capacity of 5 l/s and a head of 20 m in each well.

c) Full treatment with flocculation, sedimentation, filtration, chlorination and aeration while also chemical dosing should be provided.

d) Clear water reservoir with pump house with a volume of 20 m^3.

e) 2 high lift pumps to pump the water from the clear water reservoir to the elevated reservoir with a capacity of 5 l/s and a head of 30 m.

f) Required power (380 V - 10 kW) will be supplied by PLN. An additional 1000 m high tension line and transformer should be installed by PLN.

g) 1000 m Ø100 mm transmission main from the treatment location to the elevated reservoir near the Camat Office.

h) 100 m^3 elevated reservoir with a minimum elevation of 15 m above town level.

i) A distribution system of approximately 5500 m of PVC pipes, with diameters of 100, 75, 50 and 40 mm.

j) Operation building at the treatment site.

k) 90 yard connections.

l) 34 public hydrants with 2 taps each serving 150 persons per hydrant on the average.

6. REQUIRED ADDITIONAL SURVEYS

To complete detailed designs the following additional surveys have to be executed :

- town mapping and topographical surveys
- water quality analysis
- pumping test to investigate exact permeability at proposed intake location
- soil investigations at water tower and treatment site.

JAC/yt.

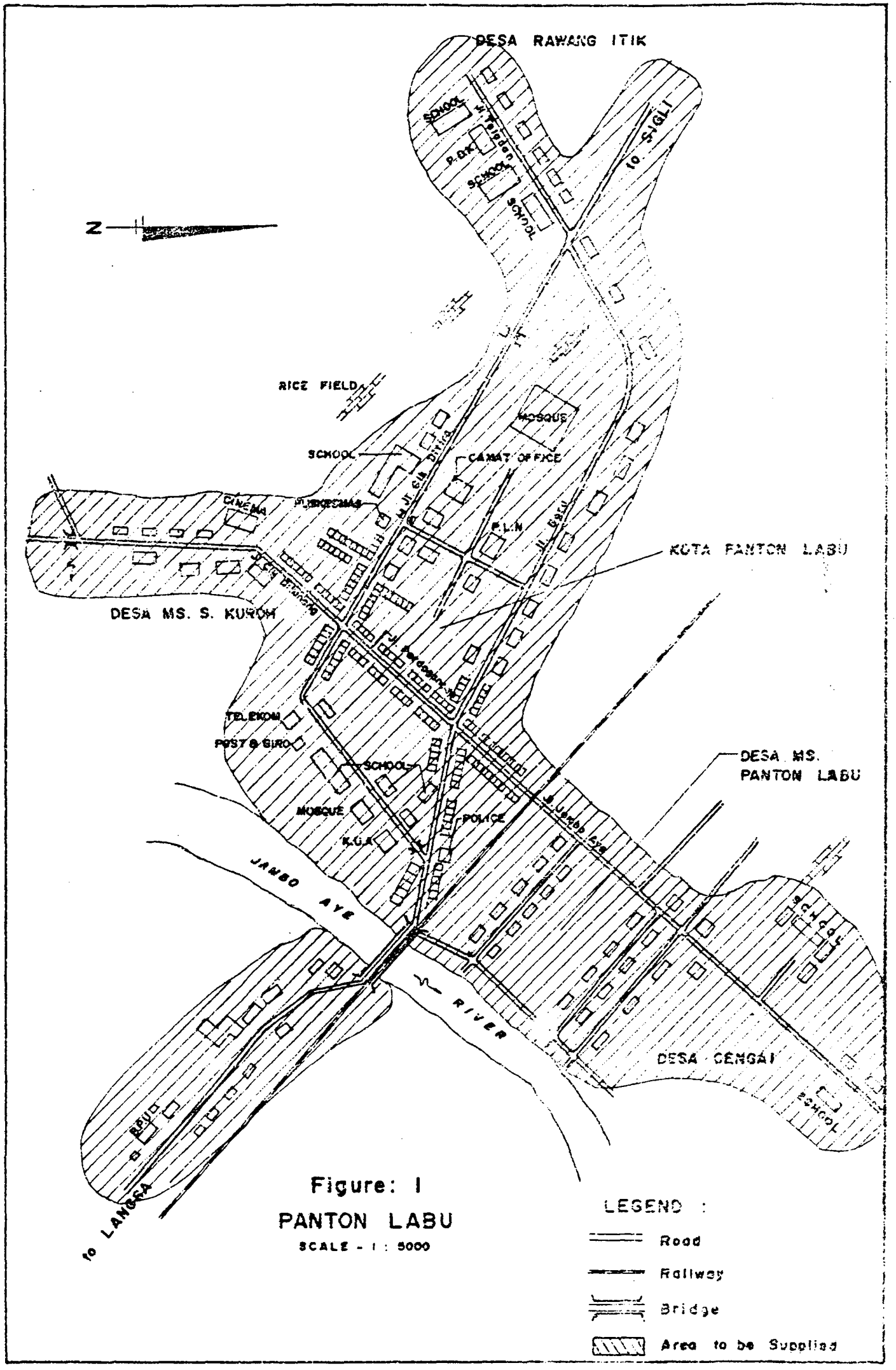


Figure: I

PANTON LABU

SCALE - 1 : 5000

FIELD ANALYSIS OF WATER QUALITY by Hach-kit DR-EL/2,3&4 Methods and Millipore-kit Faecal Coliform Method	DHV CONSULTING ENGINEERS P.O. BOX 349, MEDAN - INDONESIA

Province		Aceh				
Kabupaten		Aceh Utara				
Kecamatan		Tanah Jambo Aye				
Town		Panton Labu				
Location		1	2	3	4	5
Date		----------	----------	16/3/81	----------	----------
Time		----------	----------	11.30	----------	----------
Sample number						
Analysed by		----------	----------	JAC/SH	----------	----------
Temperature	°C	32	32	31	33	30
CO_2	mg/l	? 320	64	-	-	52
HCO_3^- - $CaCO_3$	mg/l	1180	210	550	65	160
pH	-	6,9	6,6	7,2	6,9	6,75
Ca^{++} - $CaCO_3$	mg/l	250	120	305	50	115
Fe - total	mg/l	0,5	2,1	0,08	2,20	2,0
Mn	mg/l	1,25	1,5	1,6	0,5	1,0
NH_4^+ - N	mg/l	-	-	-	-	-
NO_3^- - N	mg/l	-	-	-	-	-
NO_2^- - N	mg/l	-	-	-	-	-
O_2	mg/l	-	-	-	-	-
H_2S	mg/l	-	-	-	-	-
EC	µS/cm	3600	1500	1550	240	440
Turbidity	FTU	»500	160	10	100	100
Colour	Pt	»500	550	50	320	360
Smell	-	bad	bad	bad	bad	bad
Appearance	-	bad	bad	bad	bad	bad
Faecal Coliforms	MPN/100 ml	-	-	-	-	-
CO_2 - aggressive	mg/l*)	-	-	-	-	-
Rysnar - index	-*)	5,70	8,00	5,80	9,30	8,10
Langelier - index	-*)	+0,60	-0,70	+0,70	-1,20	-0,70

*) calculated

Remarks :

1. Medium deep well desa Ms. S. Kurah
2. Shallow well desa Ms. S. Kurah
3. Shallow well Camat Office
4. River Jambo Aye
5. Shallow well desa Rawang Itik

TABLE I

TEST DRILLING LOG

Map sheet :

Bore hole No. : I

Date : 24 & 25 - 1 - 1981

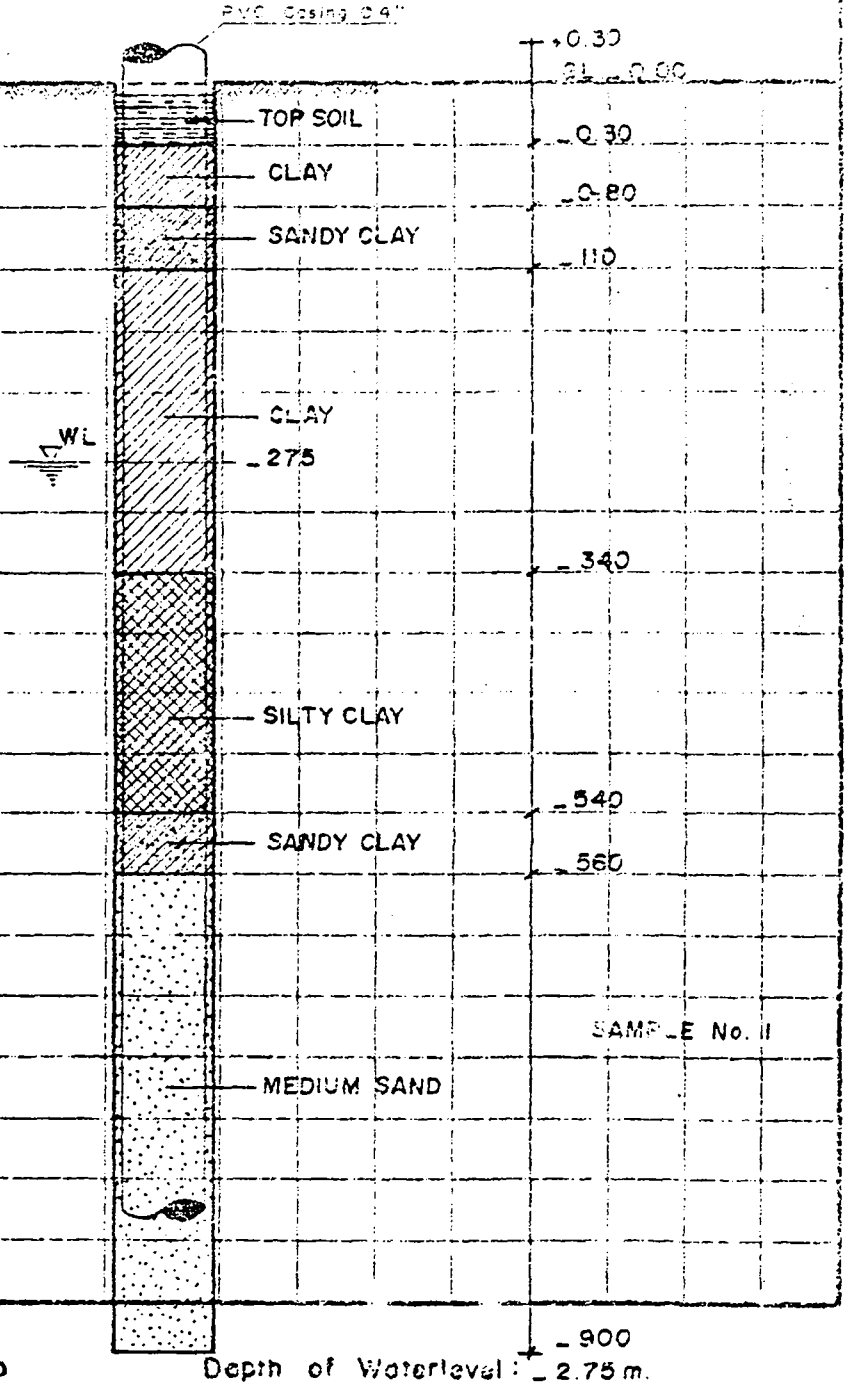
Drilled by : T.P. HUTAURUK

Village : DESA RAWANG ITIK
PANTON LABU

District : PANTON LABU (ACEH UTARA)

Drilling methode : HAND AUGER

Depth in cm	Major part	Colour
000 - 030	TOP SOIL	BROWN
030 - 080	CLAY	BROWN
080 - 110	SANDY CLAY	BROWN
110 - 160	CLAY	BROWN
160 - 210	CLAY	BROWN
210 - 260	CLAY	BROWN
260 - 310	CLAY	BROWN
310 - 340	CLAY	BROWN
340 - 390	SILTY CLAY	BLUE
390 - 440	SILTY CLAY	BLUE
440 - 490	SILTY CLAY	BLACK
490 - 540	SILTY CLAY	BLACK
540 - 560	SANDY CLAY	BLACK
560 - 600	MEDIUM SAND	BLACK
600 - 650	MEDIUM SAND	BLACK
650 - 700	MEDIUM SAND	BLACK
700 - 750	MEDIUM SAND	BLACK
750 - 765	MEDIUM SAND	BLACK
765 - 815	MEDIUM SAND	BLACK
815 - 865	MEDIUM SAND	BLACK
865 - 900	MEDIUM SAND	BLACK



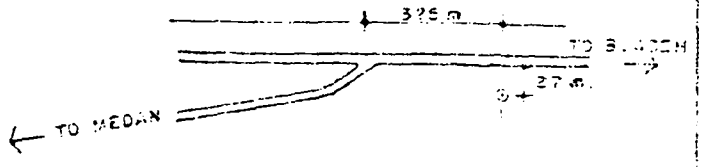
Well clogging yes/no

Water Sampling yes/~~no~~

Pumping Test yes/~~no~~

Depth of Waterlevel : - 2.75 m.

Remarks :



ESCONSOIL LABORATORY
JL. KOL SUGIONO No. 3A MEDAN

GRAIN SIZE ANALYSIS
(ES. L. 05 A).

SOIL SAMPLE : PANTON LABU_DESA RAWANG ITIK
BORING NO : I
SAMPLE NO : I

TEST NO : –
DATE : 25_3_1981
TESTED BY : –

Sieve No :	Sieve Opening In m.m.	Weight Sieve In gr	WT. Sieve + Soil In gr	WT. Soil Retained (gr)	Percent Retained	Cumulative % Retained	Percent Finer
4	4. 75	533,70	533.70	0.00	0.00	0.00	0.00
8	2. 36	466.70	466.70	0.00	0.00	0.00	0.00
20	0.850	451.90	451.90	0.00	0.00	0.00	0.00
40	0.425	444.20	444,40	0.20	0.03	0.03	99.97
80	0.180	367.60	904.00	536.40	79.91	79.94	20.06
100	0.150	355.80	394.70	38.90	5.79	85.73	14.27
200	0.075	350.40	428.50	78.10	11.63	97.36	2.64
Pan	–	465.60	483.30	17.70	2.64	100.00	0.00
				Σ :			

$$Cc = \frac{(D30)^2}{D60 \cdot D10} = \frac{(0.303)^2}{(0.375)(0.131)} = 1,85$$

$$Cu = \frac{D60}{D10} = \frac{0.375}{0.131} = 2,86$$

PROJECT : IKK PROJECT
LOCATION : DESA RAWANG ITIK PANTON LABU.
PAGE :

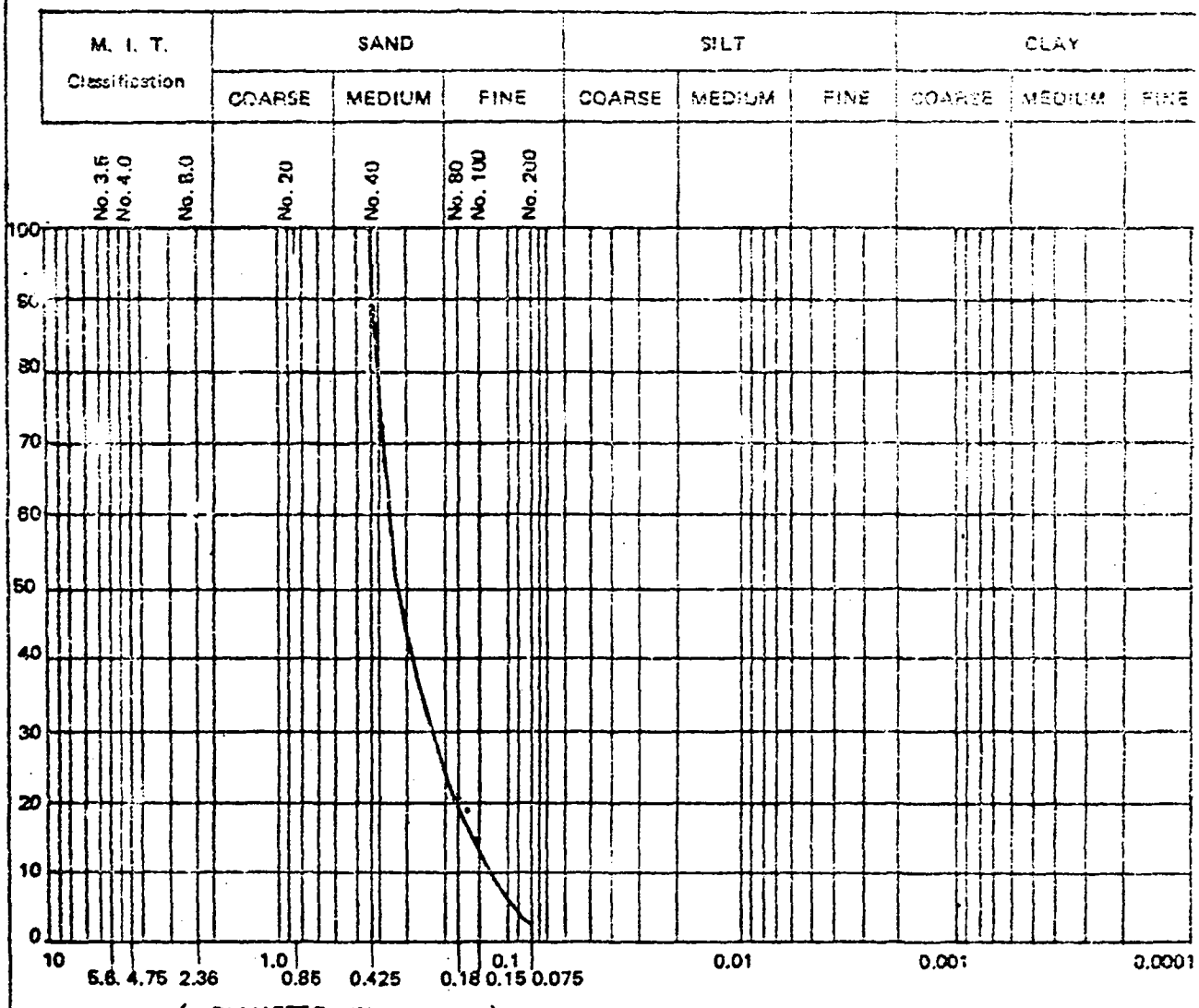
TABLE III

ESCONSOIL LABORATORY
JL.KOL.SUGIONO No. 3A MEDAN.

GRAIN SIZE ANALYSIS
(ES. L. 05 B)

SOIL SAMPLE : PANTON LABU _ DESA RAWANG ITIK
BORING NO : I
DATE : 25_3_1981

SAMPLE NO : I
TESTED BY : _



GRAVEL	:	-	%
SAND	:	97,36	%
SILT	:	2,64	%
CLAY	:		%

PROJECT : IKK PROJECT

LOCATION : DESA RAWANG ITIK
KEC. PANTON LABU.-

PAGE

TABLE IV

3.3 REVIEW OF WATER SUPPLY SYSTEM OF IDI

1. INTRODUCTION

The town of Idi is one of the 16 Ibu Kota Kecamatan in the Kabupaten of Aceh Timur. In the Kecamatan Idi Rayeuk 121 desas are distinguished of which 12 are included in this project. Seven of these desas have been included in the supply area because they are situated in the swampy area along the coast where good drinking water is hard to obtain. Some of the kampungs will only be supplied partly because the outskirts of these areas are too rural (see FIGURE 1 and 2).

The town of Idi is located at the border of the plain coastal valley at about 1,5 km from the sea and about 10 km from the foothills. The distance to Banda Aceh is 324 km and to Langsa 66 km.

The infrastructure of the town can be described as good compared with regional standards. The local health centre is in a good condition while electricity supply by PLN is available between 17.00 p.m. and 07.00 a.m.
A water supply system does not exist.
In view of the bad water supply situation in the surroundings of Idi the Health Department has placed several hand pumps in the areas.

It is remarked that the town has been listed on the 60 Packages River Water Treatment Project but as a result of salt intrusion upto several km upstream of the town, a drinking water system based on river water is not feasible.

The main employments are in agriculture, fishing and retailing.

2. PRESENT CONDITION OF WATER SUPPLY AND HEALTH

In general the water supply situation can be described as bad. During the dry period of the year the shallow ground water is salty while no fresh water can be found in the desas along the coast during the whole year.

Most people have their own shallow well, which they use for washing, bathing and also for drinking purpose in the wet period of the year. In the dry time of the year drinking water is used from desas land inward or river water tapped during low tide. The water is sold for Rp. 1,-/l.

In view of the poor water supply situation also a poor health situation could be expected.
In 1979 and 1980, 1069 and 720 cholera or cholera suspected, cases have been diagnosed of which 22 persons died in 1979. Also other water borne diseases like dysentery skin and eye infections are rather frequent.

3. WATER DEMAND AND DESIGN CAPACITIES

3.1 Population

In the vicinity of the Ibukota four other desas with peri-urban built-up areas are located which will sometimes partly be supplied by the system.
Besides seven desas have been added to the project in view of the poor drinking water situation.

Desa	1980 pop.	% to be served	1980 pop to be served	Remarks
1. Kampung Jawa	2707	100	2707	Ibu Kota
2. Keude Aceh	1006	100	1006	-
3. Kampung Aceh	850	100	850	-
4. Tanah Anou	1739	30	522	-
5. Kampung Blang	731	30	219	-
6. Blang Geulumpang	680	80	544	salty water
7. Kampung Tantong	276	60	166	salty water
8. Kuala P.Puntung	730	40	292	salty water
9. Snb Ranbang	862	40	345	salty water
10. Kampung Baru	596	60	358	salty water
11. Kuala Idi	391	60	235	salty water
12. Ktp. Mameh	713	40	285	salty water
Total			7529	

Based on the average growth rate of the Kecamatan of 2,4 % annual, the 1985 population to be served is 8480 persons.

3.2 Water demand

The water demand based on the standards for the IKK project for supply areas between 2500 and 8500 inhabitants in 1985 are :

- domestic	3,44 l/s
- non domestic	0,34 l/s
- leakage/losses	0,57 l/s
- average day	4,34 l/s
- maximum day	4,99 l/s
- peak hour	10,86 l/s

3.3 Design capacities

- source	5	l/s
- transmission main	5	l/s
- reservoir	100	m^3
- distribution scheme	10,9	l/s

4. WATER RESOURCES

4.1 Ground water

During the wet period of the year the shallow ground water of Idi has a salinity just below the taste level, but when the dry period starts, more and more shallow wells are tasting salt.

The border line of salt intrusion is not very clear. Shallow wells within a distance of 500 m to the sea have always EC-values higher than 2000 μ S/cm, while it is said that some wells in Kampung Tanah Anou located between the two tidal River Idi and River Puntung at a distance of about 2 km of the border of the sea have always fresh water (see FIGURE 1). The transmissibility of the soil is expected to be sufficient for production wells but in view of the location of the wells between the brackish area along the coast and the salty rivers, salt intrusion is not to be excluded.

The shallow ground water in desa Tanah Anou (see TABLE I sample 3 and 4) can be characterized as soft and very aggressive. The wells are moderately contaminated with coliforms and other organisms. The turbidity and colour are both low during the whole year. Treatment efforts required for this water are stabilization of the calcium dioxide-lime equilibrium by marble filtration and safety chlorination.

At the border of the sea local fish retailers have sunk their own medium deep wells. These two wells have a depth of 42 and 63 m respectively. Up to this depth only sand layers have been found. These 2" wells are of a poor construction without slots and gravel package. They have a discharge of more than 0,5 l/s. The colour and turbidity of the water is rather poor, most probably as a result of the poor development of the wells. The salinity pattern of the wells is rather interesting. The 42 m deep well has an EC-value of 2400 μS/cm while the 63 m deep well has a value of 1200 μS/cm. Because all the water is pumped from aquifers below the pipe end, these values indicate that the salinity decreases with the depth.
Also an old arthesian well in the town which is said to have a depth of 50 m, subscribe to this opinion (EC = 1400 μS/cm). This water can be described as soft to very soft and slight scaling. Besides it is expected that the water contains NH_4^+.

No deep wells have been sunk in the region of Idi up till now. Based on geological data and well lithologies of some layers at other locations in Aceh Timur and Aceh Besar, the ground water potential of the area has been described in [1] .
In general the alluvial deposits appear to consist mostly of fine grained silts and clays of which only limited water water bearing capacities are expected.
Formations sedimentated before this period are expected to consist of coarse sand and sandy material with high permeability and/or clay, mud stone, silt and sand stone layers of which the sand and sand stones appear to be moderate permeability.

In the surroundings of Idi no springs are known.

4.2 Surface water

The town of Idi is crossed by the River Idi.
The perennial river with a moderately tidal volume has a width of about 60 m and a depth of about 5 m at the town. In the dry time of the year salt intrusion is said to occur upto over 5 km upstream of the town. During low flow the river water is clear but during flood it colours brown to yellow. During big floods the main parts of the town are unudated for several days.

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(1) Water resources and potentially irrigable land of Daerah Istimewa Aceh. Draft report 1980.

4.3 Evaluation

As springs are not available and river water is salty for over 5 km upstream, two possible alternatives remain as source of the water supply system of Idi Rayeuh. The best alternative is considered to be deepwells drilled along the main road Medan - Banda Aceh. Based on the data of a recently sunk medium deepwell and the expected lithological situation, good prospects for deep ground water is considered to be available.

Shallow ground water exploitation at sufficient distance from the salt water areas along the coast and the rivers is considered to be the second best alternative.
The crucial point for this alternative is the sufficient distance to the brackish areas. A location of about 1,5 km land inward of the town centre between the Puntung and Idi Rivers is expected to be a reasonable intake point.

Summary table of water resources with respect to water supply

Source	Quantity	Quality	Required treatment	Energy	Remarks
shallow wells	sufficient	good (?)	CO_2 - removal	pumping	1,5 km trans-mission
deep well	sufficient	good (?)	NH_4 - removal	pumping	-
medium deep well	sufficient	brackish	NH_4 - removal	pumping	-
Idi River	sufficient	salt	-	pumping	-

5. PRELIMINARY LAYOUT OF WATER SUPPLY SYSTEM

The proposed water supply system of Idi Rayeuh will exist of the following units:

a) 2 deepwells along the main road Medan - Banda Aceh with a distance of 500 m to each other and an expected required depth of 100 m.

b) A submersible pump with a capacity of 5 l/s and a head of 50 m in each well.

c) A combined chlorination unit for NH_4^+ removal and safety on top of the elevated reservoir by dosing system MOM.

d) Required power (380 V - 10 KW) at both deepwell locations to be supplied by PLN. A transformer should be installed by PLN.

e) 700 m Ø100 mm transmission main from the deep well locations to the elevated reservoir near the Camat-Office.

f) 100 m^3 elevated reservoir with a minimum elevation of 15 m above town level.

g) A distribution system of approximately 15.500 in length of PVC pipes, with diameters of 100, 75, 50 and 40 mm.

h) Operation building at one of the deepwell sites.

i) 127 yard connections.

j) 48 public hydrants with 2 taps each serving 150 persons on the average per unit.

6. REQUIRED ADDITIONAL SURVEYS

To complete detailed designs the following additional surveys have to be executed:

- town mapping and topographical surveys
- soil investigations at water tower site
- groundwater investigations during construction of the first test/production well

JAC/yt

28/3/81

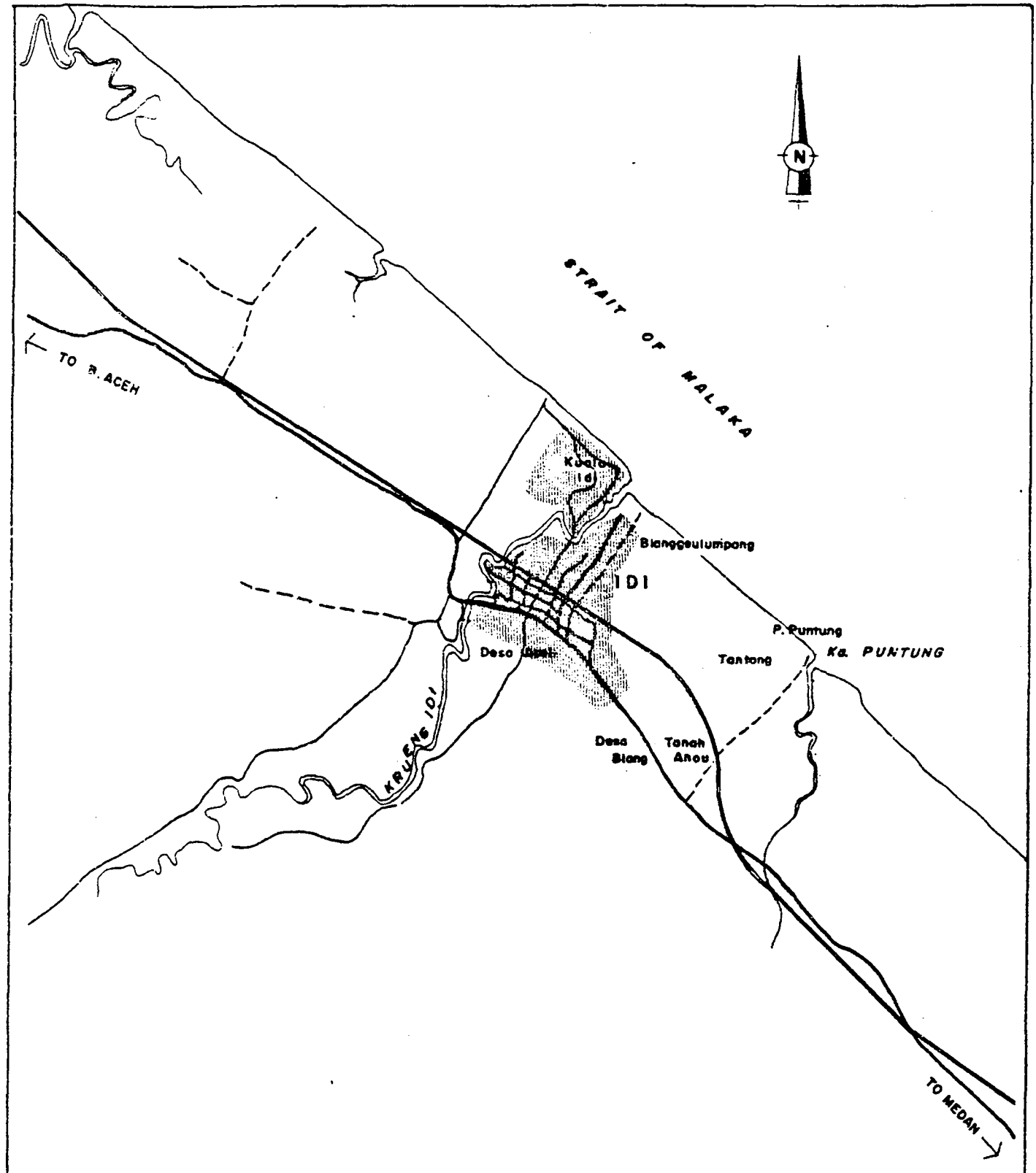
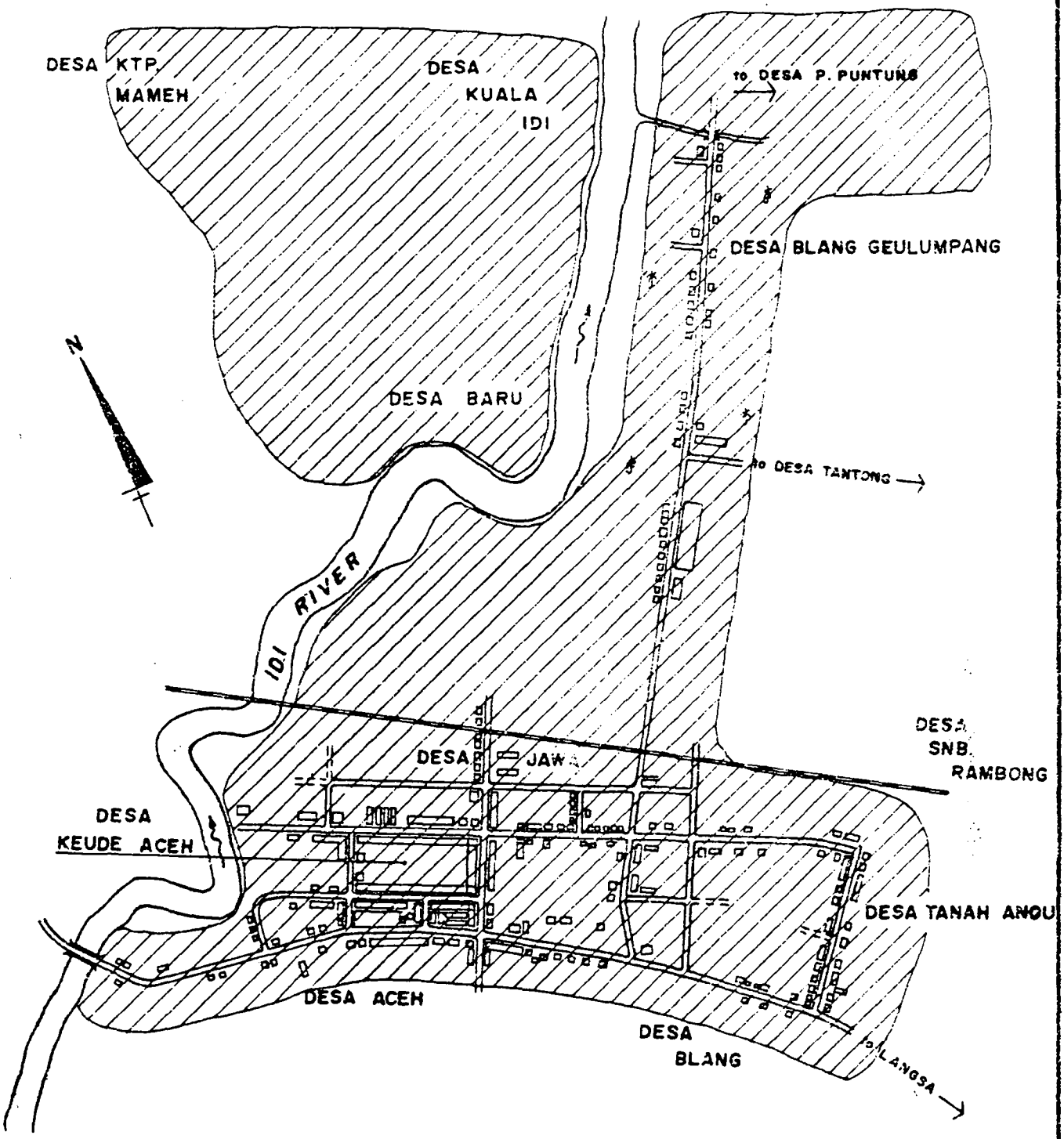


Figure : 1

IDI RAYEUK

SCALE 1 : 50000



LEGEND:

- Area to be Supplied
- Rail Way
- Road
- Bridge

Figure : 2

IDI RAYEUK

SCALE 1 : 10.000

FIELD ANALYSIS OF WATER QUALITY by Hach-kit DR-EL/2,3&4 Methods and Millipore-kit Faecal Coliform Method		DHV CONSULTING ENGINEERS P.O. BOX 349, MEDAN - INDONESIA				
Province Kabupaten Kecamatan Town		Aceh Aceh Timur Idi Rayeuk Idi				
Location		1	2	3	4	5
Date		----------	----------	18/2/81	----------	----------
Time						
Sample number						
Analysed by		----------	----------	JAC/SH	----------	----------
Temperature	°C	33	32	31	31	-
CO_2	mg/l	-	-	-	-	-
HCO_3^- - $CaCO_3$	mg/l	540	690	40	65	-
pH	-	7,75	8,0	6,0	6,75	-
Ca^{++} - $CaCO_3$	mg/l	110	40	35	90	-
Fe - total	mg/l	0,25	0,10	0,20	0,45	-
Mn	mg/l	-	-	-	-	-
NH_4^+ - N	mg/l	-	-	-	-	-
$NO_3^=$ - N	mg/l	-	-	-	-	-
$NO_2^=$ - N	mg/l	-	-	-	-	-
O_2	mg/l	-	-	-	-	-
H_2S	mg/l	-	-	-	-	-
EC	µS/cm	2400	1200	130	320	5300
Turbidity	FTU	17	19	3	7	-
Colour	Pt	60	70	15	20	-
Smell	-	good	good	good	r.good	bad
Appearance	-	r.good	good	good	good	bad
Faecal Coliforms	MPN/100 ml	-	1000-5000	500-1000	-	-
CO_2 - aggressive	mg/l*)	-	-	-	-	-
Ryznar - index	-*)	7,0	6,6	10,9	9,3	-
Langelier - index	-*)	+0,3	+0,8	-2,4	-0,9	-

*) calculated

Remarks :

1. Deep well Kampung Blang Geleumpang; depth 42 m
2. Deep well Kampung Blang Geleumpang; depth 63 m
3. Shallow well Local Health Centre
4. Shallow well Camat Office
5. Shallow well Kampung Blang Geleumpang

TABLE I

FIELD ANALYSIS OF WATER QUALITY by Hach-kit DR-EL/2,3&4 Methods and Millipore-kit Faecal Coliform Method		DHV CONSULTING ENGINEERS P.O. BOX 349, MEDAN - INDONESIA				
Province Kabupaten Kecamatan Town		Aceh Aceh Timur Idi Rayeuk Idi				
Location		6	7			
Date		---- 18/2/81 ----				
Time						
Sample number						
Analysed by		---- JAC/SH ----				
Temperature	°C	3	31			
CO_2	mg/l	-	-			
$HCO_3^- - CaCO_3$	mg/l	885	-			
pH	-	8,1	-			
$Ca^{++} - CaCO_3$	mg/l	35	-			
Fe - total	mg/l	0,05	-			
Mn	mg/l	-	-			
$NH_4^+ - N$	mg/l	-	-			
$NO_3^= - N$	mg/l	-	-			
$NO_2^= - N$	mg/l	-	-			
O_2	mg/l	-	-			
H_2S	mg/l	-	-			
EC	µS/cm	1400	>10000			
Turbidity	FTU	50	-			
Colour	Pt	180	-			
Smell	-	r.good	bad			
Appearance	-	good	bad			
Faecal Coliforms	MPN/100 ml	100-250	>> 5000			
CO_2 - aggressive	mg/l*)	-	-			
Ryznar - index	-*)	6,4	-			
Langelier - index	-*)	+0,8	-			

*) calculated

Remarks :

6. Arthesis well in town
7. River Idi

TABLE II

Annex III

DAFTAR USULAN KOTA - KOTA BANTUAN BELANDA

No	Propinsi	Kabupaten	Nama IKK	Jumlah Penduduk
11	DAERAH ISTIMEWA ACEH	ACEH BESAR	1. PEUKAN BADA	
			2. KRUENG RAYA	
			3. ULEE KARENG	
			4. LUBUK	
			5. KUTA BARO	
		P I D I E	1. TRING GADENG	
			2. JABAR GAPUR/ MILA	
			3. LAMENG	
		ACEH UTARA	1. LHOK SUKON	
			2. PANTON LABU	
			3. SEUNEDON	
			4. Kr. GEUKUH	
		ACEH TIMUR	1. IDI RAYEUK	
			2. KUTA BAGOK	
			3. SIMPANG ULIM	
			4. KARANG BARU	
		ACEH SELATAN	1. SINGKIL	
			2. SIMPANG KANAN	
			3. SUBULUSSALAM	
		ACEH BARAT	1. SUAK TIMAH	
			2. KRUENG SABE	
			3. LAGEUN	
		ACEH TENGAH	1. BADAR	
		ACEH TENGGARA	1. LAWE SIGALA-GALA	

Banda Aceh, 14 Juli 1984.-

Pemimpin Bagian Proyek Air Bersih Ibu Kota
Kecamatan D.I.Aceh,

= Drs.T.Syaiful Achmad, BMuE =
NIP. 39004877.-

Annex IV

List of townships visited.

Name of Township	Inhabitants Kecamatan	Inhabitants Township	Desa's Number
Lubuk		1.600	85
Krueng Raya		2.700	66
Labro Biru	16.000	2.500	57
Laweung	10.000	4.500	17
Jabal Gafur/Mila			
Trieng Gading	23.000	3.000	
Lapan			29
Lhok Sukon	46.000	13.000	99
Seunuddon	15.000	5.000	33
Panton Labu	36.000	9.200	69
Simpang Ulim	32.000	6.000	70
Kuta Bagok	10.000	2.500	45
Idi Rayeu	46.000	10.000	121
Karang Baru	32.000	5.000	45

Annex V

Terms of Reference for an identification/project-formulation mission for water supply projects in Indonesia

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Introduction

During the bilateral talks between the Government of the Netherlands (GON) and the Government of Indonesia (GOI) from 22 till 24 March 1984, Nf 20 million for financial aid and Nf 10 million for technical assistance have been allocated: Moreover it has been decided that - before final allocati will be made - a GON mission at short notice should appraise the following projects:

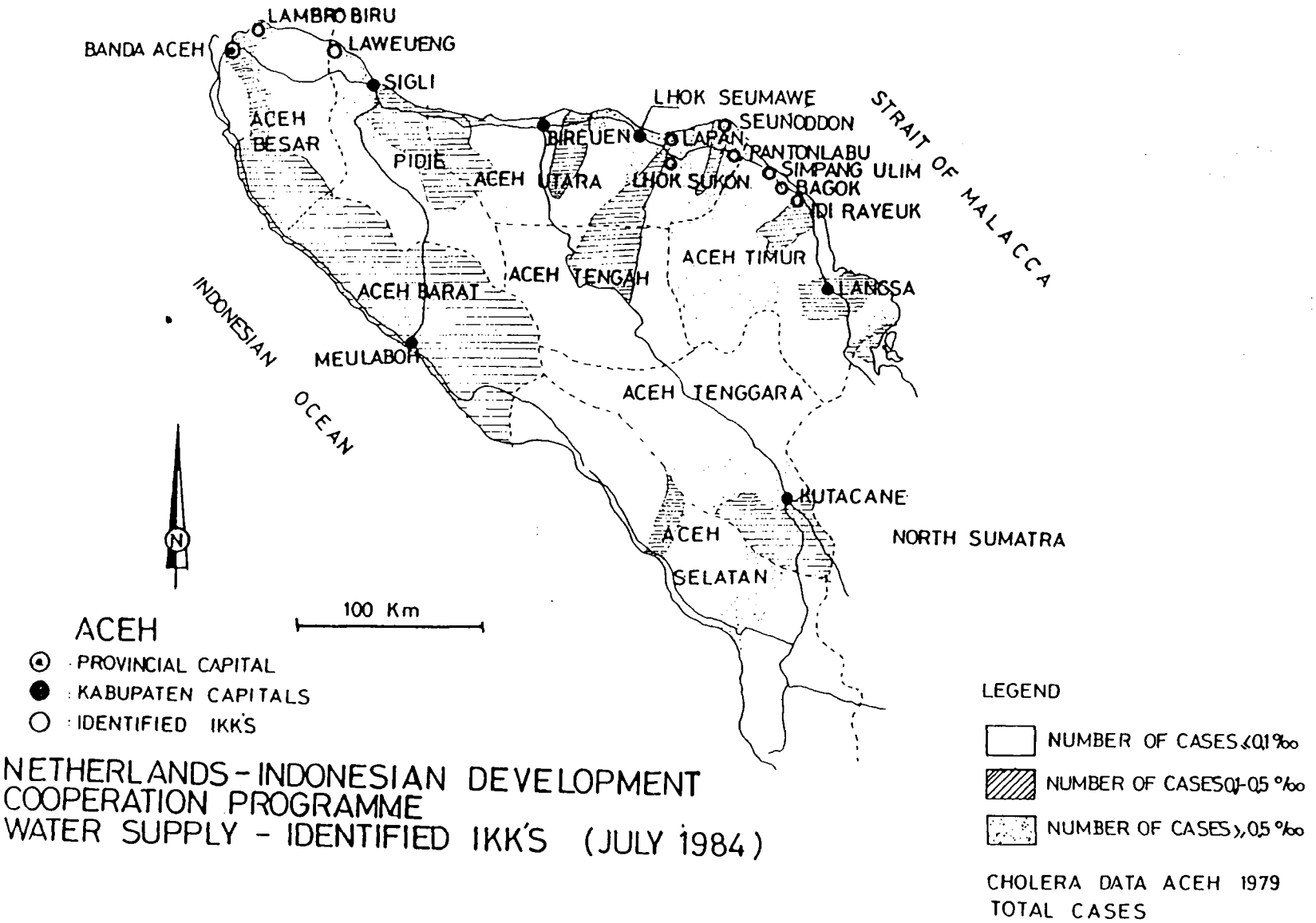
- Bandung Water Supply phase II (parallel financing with the Asian Development Bank);
- Sukabumi Water Supply;
- Bogor Water Supply;
- Rural Water Supply West-Java;
- IKK project.

Background information on the projects will be given in separate annexes.

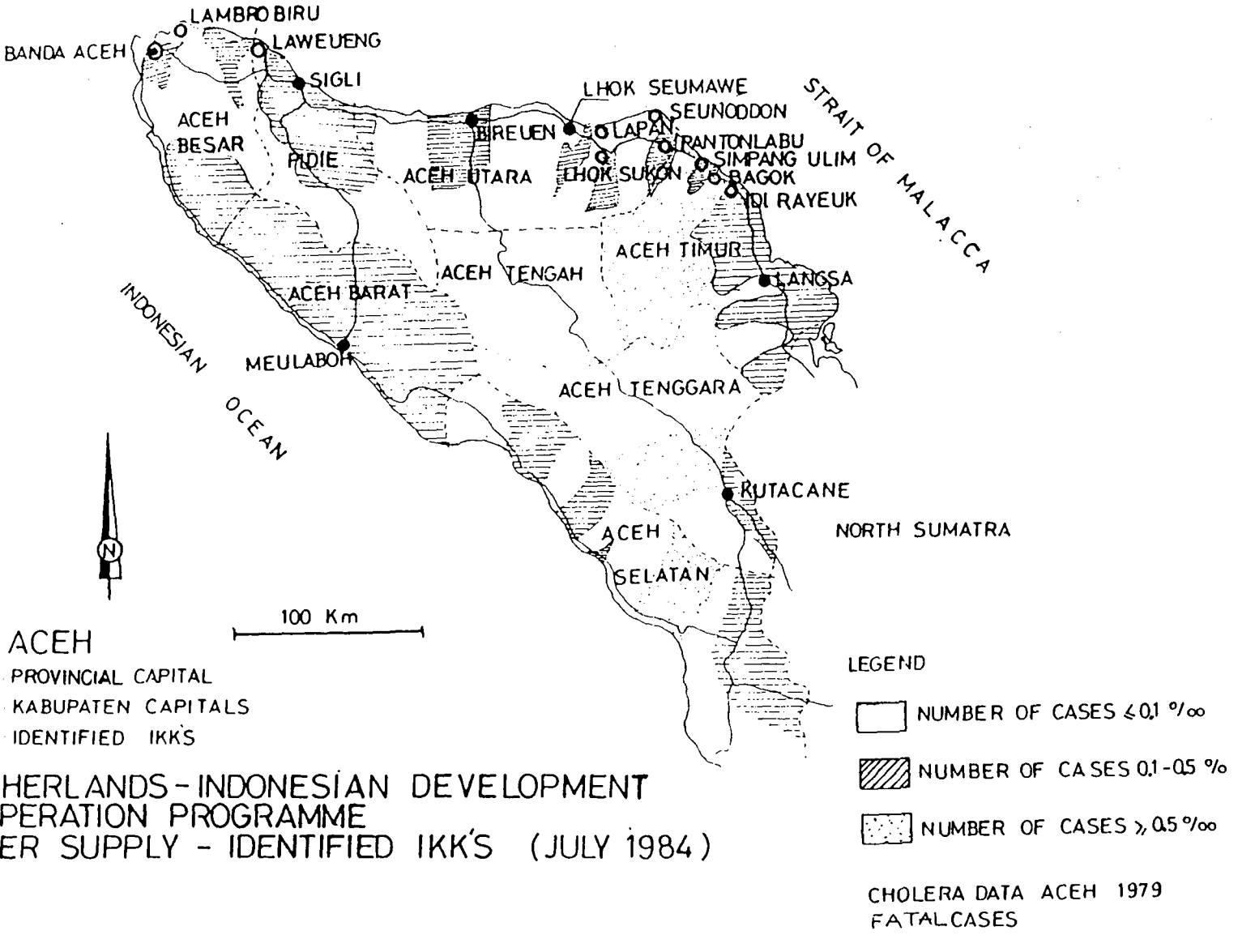
The tasks of the mission should include, but not necessarily be limited to:

1. IKK programme

   a. Assess the required project-aid funds for the continuation of the IKK-programme in West-Java and Aceh;
   b. Assess the number of IKK's in both concentration regions, to be financed in the GON-GOI bilateral co-operation in 1984 in close consultation with Cipta Karya;
   c. Recommend on the project financing ratio GON-GOI 50/50, 60/40, 70/30,
   d. Drafting of a preliminary project administrative arrangement between GON and GOI.



NETHERLANDS - INDONESIAN DEVELOPMENT COOPERATION PROGRAMME
WATER SUPPLY - IDENTIFIED IKK'S (JULY 1984)



NETHERLANDS - INDONESIAN DEVELOPMENT COOPERATION PROGRAMME
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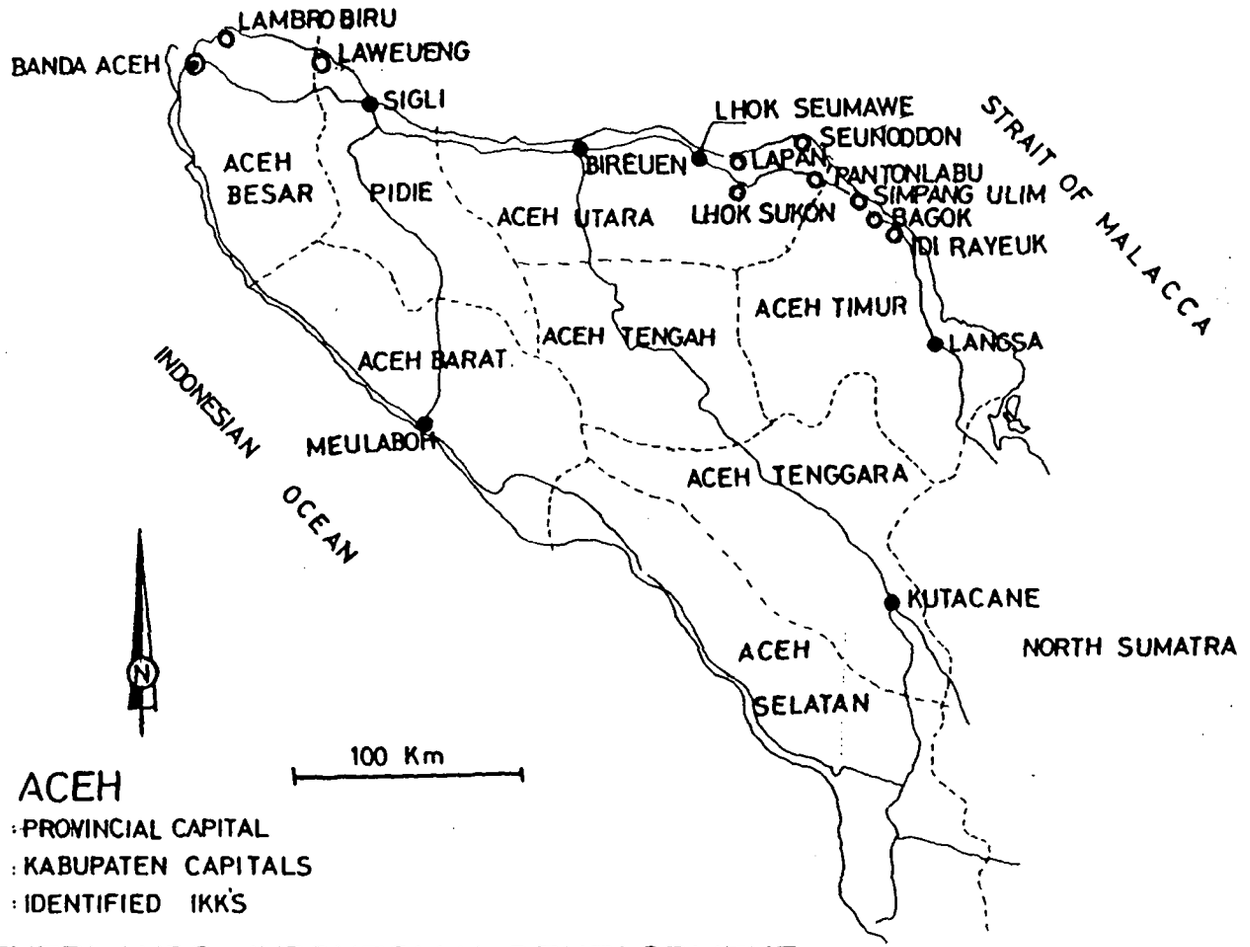


NETHERLANDS - INDONESIAN DEVELOPMENT COOPERATION PROGRAMME
WATER SUPPLY - IDENTIFIED IKK'S (JULY 1984)

RURAL WATER SUPPLY AND IBU KOTA KECAMATAN IN WEST JAVA

REVISIT AND IDENTIFICATION OF NEW PROJECTS

JULY 21 - JULY 25, 1984.

Netherlands Government Mission:
Ir. F. Deeleman
&
Dr. M.S. Mulier

Bandung, Augustus 1984.

TABLE OF CONTENTS

ANNEXES

RURAL WATER SUPPLY AND IBU KOTA KECAMATAN IN WEST JAVA, REPORT ON A RE-VISIT AND IDENTIFICATION OF NEW PROJECTS, JULY 21 - JULY 25, 1984

1. PREFACE

Two members of the mission, ir. F. Deeleman and Dr. M.S. Muller have made a tour through West Java from the 21st through the 25th of July 1984. The purpose of the tour was twofold, i.e. to complete the evaluation task of the mission and to identify new projects.
In May 1983 an Evaluation Mission visited a number of rural water supply projects. Several of these projects have been visited this time again, not with the purpose of evaluating them again, but rather to observe the development that had taken place since. In addition one village has been visited because the Bupati of Karawang wanted to draw the mission's attention to the serious water shortage in that area; while also two Ibu Kota Kecamatan (IKK's) have been visited at the request of the Bupati of Cirebon, where Dutch-aided projects experienced some problems.
During the tour the mission had meetings with the Bupati and/or Sekwilda of four Kabupatens in order to hear their views on rural water supply policy and practices, and their suggestions for new projects.

The following Kabupatens and Villages/IKK's have been visited:
In Karawang: the villages Kutaampel [revisit] and Pedes;
In Indramayu: the villages Lobener [revisit], Jatisawit, Sukareja and Kalianyar;
In Cirebon: the IKK's Karangsembung and Waled;
In Tasikmalaya: the village Salawu [revisit].

The report consists of two parts. The first part contains the findings of the revisit to three villages, followed by some general observations made on the basis of what the mission heard and saw during this field tour. The second part of the report contains a description of two

identified projects in the rural water supply sector and the IKK program. Preliminary discussions about these projects have taken place with the Authorities concerned, but need to be followed up by detailed discussions and investigations.

The Terms of Reference of the team and a schedule of persons met are attached in the Annex.

2. RECOMMENDATIONS

1. It is recommended that continued assistance be given to rural water supply and sanitation programmes, using the proposal of the West Java Provincial Government as a starting point and making use of the experience of the OTA-33 project.
2. It is recommended that such assistance be given in two stages, of which the first stage be no longer than three months. The first stage is to be used to a). develop a plan of operations for the next five years; b). rehabilitate existing water supply systems which are no longer in functioning order, together with training their operation and maintenance personnel.
3. It is recommended that continued assistance be given to the IKK programme in West Java, taking into account the changes in project implementation the Indonesian Government may decide upon.
4. It is recommended that an in-depth survey be carried out as soon as possible in the 15 IKKs proposed as preparation for project implementation.
5. It is recommended that the possibility of linking the supply of water to an IKK with the supply to the surrounding rural area be seriously considered.
6. It is recommended that training of operation and maintenance personnel of District water enterprises and IKK-units be continued as an integral part of IKK projects; and that such training should include the improvement of skills to communicate with the community.
7. It is recommended that local leaders and other interested inhabitants take part in the planning process, starting with the survey of social, economic and physical conditions. This can be considered as a first step towards implementing recommendation number 4 of the Global Review.*'
8. It is recommended that, if useful to both parties, information exchange be promoted between the West Java Rural Water Supply and Sanitation Project and the UNDP (Indonesia) project "Promotion and Support for Women's Participation in the IDWSSD." *2. This can be considered a first step towards implementing recommendation number 8 of the Global Review.

9. It is recommended that Nfl. 0,5 million be made available in Technical Assistance and no more than Nfl. 1 million in Financial Assistance for the rural water supply project proposed by the West Java Provincial Government (first stage); and that Nfl. 0,5 million in Technical Assistance and Nfl. 3,6 million in Financial Assistance be made available for IKK projects in West Java. The financial outlay should be charged against the 1984 commitment for assistance to Indonesia

*' Global Review : Netherlands' Contribution to the Clean Water and Sanitation Sector in West Java, Indonesia, July 1984.

*2 INT/83/003 - Promotion and Support for Women's Participation in the International Drinking Water Supply and Sanitation Decade.

3. RURAL WATER SUPPLY PROJECTS REVISITED

As an introduction to the general findings a summary follows of the information received during the revisit to three villages, Kutaampel, Lobener and Salawu.

3.1. Kutaampel (Karawang)

In the village of Kutaampel two installations were constructed: one to serve as a Pilot Plant and one, developed from the Pilot Plant, called the Permanent Plant. Both were designed for use of surface water as a basis for the production of clean water. The Permanent Plant was put into operation late 1982; the Pilot Plant which was to be used as teaching material and for that purpose had been transferred to the services of the Department of Health, had not been in use since and consequently had been losing much of its equipment.

The mission was informed that the Permanent Plant is in operation every day of the week, for approximately 5½ hour/day; and that the management of the Plant is now in the hands of the PDAM of Karawang which provides operating funds and technical expertise. The actual operation is performed by personnel from the village itself.

According to the information received, 24 house connections were installed, at the price of Rp. 35,000.- per connection. During the discussion on this item it came out that this price could be an impediment to the increase of the number of house connections and so prolong the period that the village is not selfsupporting in this respect.
The monthly fee for a house connection is set at Rp. 3,000.- but is not collected yet. According to the information received the monthly operating cost is about Rp. 300,000.- à Rp. 400,000.- entirely borne by the PDAM of Karawang. The village leaders observed, that the operating cost was high, and expressed the hope that more

house connections could be installed so that the system would be operating on an economically much sounder basis. It was even suggested that all public taps be closed so as to oblige people to obtain house connections, but the Director of the PDAM who accompanied the mission, declared that it was Government policy to provide public taps for those who cannot afford a house connection.

As far as the public taps are concerned, it seems that they have been accepted by the village. One such tap was visited and it was observed, that the inhabitants were making abundant use of the "new" facility. The price of the use of the taps was set at Rp. 25.- per day per house, a fee which was supposed to be collected by the plant operators who are also responsible for the maintenance of the system. (In this instance it was observed that one tap was losing water, because it could not be closed. The operator was not aware of that fact and was either not informed, or he could/would not repair the faucet).

The acceptation of the system has improved considerably. It seems that operating it, however, will prove to be quite some burden for the village.
The fact that it is being considered to put the Pilot Plant back into operation proves in our view, that solutions can be found for the economic flaws. It was the intention to use the plant both for water supply and electricity generation.

3, 2. Visit to Lobener (Indramayu)

Last year, when the evaluation mission visited this village, discussions about the desirability of a watersupply system had just started.
This time a MCKS-unit [1] serving 3.000 people was in full use. Both public taps and house connections had been installed and people paid their monthly dues regularly. The system could run on the revenue collected, something which could not be said of many village systems.
The OAMP[2] of the village (made up of LKMD[3] members) was responsible

1. MCKS : Unit Combining Facilities for Mandi (bathing), Cuci (washing) Kakus (toilet) and using Saringan (filtration) system.
2. OAMP : Organisation for Village Clean Water Supply.
3. LKMD : Village Community Endurance Institution (Village Dev. Committee)

for managing the system. One woman was a member of the committee: she was responsible for information about the watersupply. The committee kept a perfect administration of revenue and expenses. In short, the village was a shining example of what community involvement in the planning of the watersupply system and in its management could achieve. The Village Head was well aware of the effect this system had on his community, and was proud of the fact that his village could serve as an example to other villages. He was prepared even to offer advice about how to overcome obstacles to the installation of a clean water system.
The Village Head stated that the "look of the village had improved", because "the water tower made the village look like a city"; that security had increased as women did not have to cross the road anymore on their way to the river; and that the incidence of water borne diseases had been reduced.

During the meeting,the Village Head made several requests: he asked for an extention of the system so that the remaining quarter of the village could be served as well; he needed a pump to clean the filter; and he needed fencing for the reservoir, which could not be paid from the village's own revenue.
Standing the meeting the officials declared that the Kabupaten's OAMP could help with these requests.

3.3. Visit to Salawu (Tasikmalaya)

During its visit to this village in 1983, the mission was told that the main problem with the watersupply system was its high operating cost.
Apparently, until now no solution has been found for this. The village receives water from two springs on which electrical pumps are placed to distribute water to 40 public taps. Total running cost per month are Rp 165.000,- which includes the cost of electricity. These costs are prohibitive to the desa's budget, as the population does not pay for the use of public taps. The sale of house connections will under the present tariff policy not provide a solution for this village, although 100 people have declared to want a house

connection and be prepared to pay the price. Yet, the price of Rp 35,000,- as connection fee, and a monthly rate of Rp 2,000.- to Rp 3,000.- appears exhorbitant. If the number of connections could be increased to say 600, the monthly payment could be reduced to Rp 1,000.-. It is certain that a sizeable number of people are able to pay for house connections, as many people even now have an electrical "Sanyo" pump installed on their own wells.

The problem is complicated by the fact that the system has not yet been handed over to the PDAM of Tasikmalaya. Until that is done the monthly rates cannot be fixed, so that no revenue can be raised to operate the system. The Village Head felt that the provincial government can be requested to allow a social electricity tariff for Salawu, rather than the usual commercial one.

Standing the meeting officials of the Bupati's office announced that the procedure would be started immediately to transfer the system to the PDAM. In order to get the house connections installed, the people are prepared to advance 50% of the connection fee. And to honour this gesture the consultant stated his readiness to advance the remainder of the total cost of construction.

4. GENERAL OBSERVATIONS

Brief visits to the villages and discussions with officials about the projects have made the mission aware of some positive effects of the water supply projects on village life and of some remaining problems.

4.1. Effect on Village Life

It was clear that the village of Lobener was proud of its water supply and derived self-confidence from this achievement. Similarly, the people of Sukareja who had participated in planning the MCKS system, felt motivated to work for further improvements in the village, such as the upgrading of houses and the development of a cooperative shop run by women.

One indication that villagers have begun to appreciate the supply of clean water is their growing willingness to pay for water, if this is delivered by private house connection. Several motives may play a role here, such as the social status value of a house connection, its convenience, as well as knowledge about the effect of clean water on health.

4.2. Financial Problems

The evaluation report of 1983 mentions the problem of running cost of the water supply systems. At that time the systems had only public taps, for which it proved difficult to collect payment. At the same time a change of policy was announced whereby the watersupply systems were required to become self-financing. Consequently in late 1983, the "marketing" of house connections was started in the villages served by the OTA-33 project. Inhabitants could acquire a house connection, if they paid a connection fee (covering at least construction costs) and paid a monthly rate covering at least running expenses.
The financial problems have not yet been completely solved, one of the reasons being that there are not yet sufficient applications for a house connection. This is probably due to high connection fees, or to the requirement to pay monthly fixed rates.

The latter condition is difficult to meet when income is earned only once or twice a year. The aim of developing a financing structure which allows a village watersupply system to operate on a self-sufficient basis, and which includes an element of cross-subsidisation is not easy to achieve.
The mission was informed that much attention is still needed to solve issues of tariff-setting and collection of monthly constributions.

4.3. Technical Aspects

It is the mission's impression that the pilot systems constructed in the framework of the rural water supply project OTA-33 have served their purpose. The treatment plant in Kutaampel and the MCK-units with or without a slow sand filter are producing clean water to thousands of people and have provided useful experience to the designers. The time is ready to start implementing these systems on a much larger scale.
The necessity of combining watersupply with environmental sanitation should be stressed again as was done in last year's report.
The mission was shown a public tap in an IKKwhich had recently been constructed without a concrete slab and without a drain.
One could foresee that this tap, once in use, would cause serious environmental problems.

4.4. Organisational Aspects

Now that many rural watersupply projects have reached the operational stage, the Provincial Health Departement, under whose responsibility these projects have been implemented, aims to transfer responsibility for operation and maintenance to the District Gorvernment. However, as yet no suitable unit exists within Local Government to operate such small rural water systems.
The mission was informed about two solutions to this organisational problem, i.e. to create a special unit within the District Government, with sole responsibility for rural systems (Indramayu, Tasikmalaya) or to make the "urban" PDAM also responsible for rural systems (Karawang).

Everybody agreed that the village community through the LKMD should carry responsibility for daily operation and maintenance, but that a back-up organisation in the District Government is necessary to support the villages. It was sometimes suggested to make the village water committee an official section of the LKMD.

If a PDAM operates both urban and rural systems, at least two issues should be considered. A PDAM, facing this task, needs time to develop differentiated policies. A fee and tariff structure applied in urban areas, may be wholly inappropriate for rural areas.
The second issue concerns the financial consequences of a take-over by the PDAM of rural systems. Although watersupply systems must aim to become self-sufficient, all of them require a period of subsidy of one or more years. A form of cross-subsidy must therefore be practiced within the PDAM , which must be financially strong enough to execute such a policy.

Provincial authorities are aware of the need to develop an organisational structure to streamline the implementation and operation of rural water systems. The mission was informed that the Provincial Government is studying the various possibilities for a District Government unit which can carry responsibility for the operation of rural water supply systems.

4.5. Community Involvement

The need for community involvement is obvious, the mission was told by several officials. This involvement concerns responsibility for daily operation and maintenance, for paying for the water service, and for using the watersupply in the manner the designers intended.
Two approaches have been observed during the mission's tour. The formal approach based itself exclusively on the duty of the LKMD to cooperate with government officials in the interest of village development (as per Presidential Degree no. 28,1980).

Officials applying this style tend to be contend with giving instructions at a couple of formal meetings with Kecamatan and village leaders.

The other approach acknowledged this formal aspect, but developed in addition many informal contacts with the village community and stimulated the exchange of information within and even between villages. The effect of this latter approach was observed in Lobener and Sukareja, where successfull water projects had stimulated people to continue working for the development of the village.

Formal recognition is given to women in the LKMD, as a presidential instruction (March 1984) states that the Second Vice-Chairman of the LKMD must be a woman. Although the mission indeed observed that the visited villages have implemented this instruction, the effectiveness of this measure with regard to the influence of women must still be awaited. As for watersupply projects, it is generally considered that the role of the Women's Organisation is to inform women about the proper use of clean water. Although this implies that women are involved only after the system has been constructed, maybe a basis has been laid to involve women still further in the planning, operation and maintenance of watersupply systems.

5. COMMENTS FROM THE BUPATI'S

The Bupati's visited, had several requests and suggestions to make regarding future rural water supply projects.
The Bupati's stressed that management, maintenance and extension of systems, obtaining materials for repairs, and acquiring funds to execute these tasks are proving to be unexpectedly difficult.
It was suggesteld that to carry out these tasks, a strong organisation is required which is funded by the Provincial government, has a career structure for its employees, and can train its own specialists.
The suggestion was also made that a future project should select large areas, including many adjacent villages, to be provided with clean water, rather than separate villages.

The mission encountered this type of thinking, which favoured the enlarging of the scale of a project (thus increasing the population served) by utilizing the technical possibilities of the supply systems, in several government quarters.

It was further thought appropriate to reconsider the 50:50 ratio of the bilateral financial contributions.
A ratio of 25:75, it was said, will actually result in greater equality when the value of land contributed by the Indonesian authorities and of community labour is taken into account.

A number of specific projects have been mentioned.

a. The authorities of Karawang preferred that a new project would start in three Kecamatans at the north coast where the quality of water is deteriorating fast due to the increasing salination of groundwater.
b. In Cirebon too the authorities gave priority to 33 villages located at the north coast.
c. The authorities in Indramayu were developing a proposal for the construction of two large water reservoirs to serve the coastal areas.

d. The authorities of Tasikmalaya had identified three Kecamatans in the south-west as being urgently in need of a clean water supply.

The suggestions from the Bupati's of Karawang, Cirebon and Tasikmalaya have earlier this year been conveyed to the Governor of West Java and have been included in the identified project proposal.

6. IDENTIFICATION OF A RURAL WATER SUPPLY PROJECT.

In order to identify future project areas for a new rural water supply project, the mission has made use of information received from Provincial and District Authorities.
In May 1984 the Bupati's of 8 Kabupatens have informed the Provincial Government about the situation in their Districts as regards the availability of clean water. Subsequently the Dutch identification mission visited four of these Kabupatens and held discussions with the authorities about their policies and preferences.
In correspondence with the Provincial authorities each Bupati has indicated which Kecamatans experience the greatest difficulties in obtaining clean water, and again how many people in each Kecamatan are considered to be most urgently in need of a clean water supply.
The data are summarised in the following table:

Table 1. Areas in need of clean water supply in eight Kabupatens in West Java*

Kabupaten	Number of people with			Total
	no problems	not enough water	urgent need	
Karawang	-	-	40,133	40,133
Tangerang	13,327	39,603	13,368	66,298
Serang	27,509	-	568,808	596,317
Garut	-	-	40,529	40,529
Tasikmalaya	14,794	25,289	179,639	219,722
Indramayu	54,926	57,040	28,974	140,940
Cirebon	-	103,326	119,856	223,182
Cianjur	11,207	23,531	63,946	98,684
Total	121,763	248,789	1,055,253	1,425,805
%	8.5	17.4	74.1	100

* Data refer to selected Kecamatans in each Kabupaten with the most serious water shortage.

Considering the Table and Maps* together, the following comments can be made. Almost the whole of the Kabupaten Serang has an urgent need for the improvement of the supply of clean water.
In more than one third of the area in Indramayu, Cirebon, Garut and Tangerang, the water supply conditions are extremely bad; while in Karawang, Cianjur and Tasikmalaya less than a third of the area is badly in need of clean water.

Comparing this information with the map of hydrogeological conditions*, the following remarks can be made.
All the coastal Kabupatens experience great difficulty because groundwater is becoming increasingly brackish to salty. These are the Kabupatens Serang, Tangerang, Karawang, Indramayu and Cirebon.
Tasikmalaya, Garut and Cianjur are only partly located in the central magmatic belt, where springs and seepage zones can provide fresh water.
The Kecamatans indicated as experiencing urgent shortages are, however located in the tertiary sedimentary terrains. If the distance to mountain springs proves too large, only deep wells are likely to yield good water.

At the start of OTA-33 those Kabupatens were selected which experienced the greatest problems with clean water. For a new project additional selection criteria should be used.

1. The project should be concentrated in one region of West Java, so as to cut down on travel time and use consultant personnel efficiently.
2. Within each project region sub-areas should be selected in such a manner that a number of adjacent villages can benefit from the improved water supply. Possibly whole Kecamatans can become project areas.
3. Full use should be made of the experience OTA-33 has acquired in the following technical and non-technical aspects of project implementation:

* See Annex

a. OTA-33 has gained experience with a style of community involvement which stimulates informal discussions within the community;
b. OTA-33 has gained experience with developing an organisational structure which supports the operation and maintenance of village water supply systems;
c. OTA-33 has developed a relatively cheap and simple surface water treatment plant which can be manufactured in Indonesia;
d. OTA-33 has introduced MCK-units in a rural environment, which combine the two complementary functions of water supply and sanitation;

The mission has learned from its discussions with Central, Provincial, and District authorities that these particular technical and non-technical aspects will require much more attention in the implementation of rural water supply schemes. Without implying that the particular solutions developed by OTA-33 are the best ones, it is worthwhile to consolidate the present experience and adjust and adapt the solutions to the various project environments.

The mission is of the opinion that it is advisable to start a new rural water supply project in the Kabupatens Karawang, Indramayu and Cirebon because of the serious problems at the north coast. Within these Kabupatens the local authorities should select the project areas where a string of adjacent villages are most urgently in need of improved water supply.
Second priority have the Kabupatens Serang and Tangerang which, lying on the north coast, have problems at least as great as the first priority Kabupatens. OTA-33 has however, acquired less experience in these Kabupatens with the non-technical aspects of rural water supply.
Third priority, in the mission's view, have the Kabupatens Garut, Tasikmalaya and Cianjur, where the likelihood of finding good quality groundwater - albeit through deep wells - is greater. Site investigations should in any case qualify these recommendations.

7. IDENTIFICATION OF IBU KOTA KECAMATAN PROJECTS.

The consider the IKK (small capital towns of Kecamatans) programme in the context of a rural water supply programme, may not seem appropriate. Yet, there are sound reasons for doing so:

1. It is from a social and economic point of view more attractive to select relatively large project areas to be provided with water services than to select separate project villages.
2. The utilization of piped systems in the rural area makes it technically feasible to plan for the coverage of a relatively large area.
3. The boundary between a small capital town and the surrounding rural area is often not clear. Even if there is a boundary in a legal sense, there may be little difference in living conditions between the two areas, in particular as regards the availability of clean water. To select one section only of that total area for the provision of improved water, may therefore be hard to justify.
4. The population of an IKK may be on a borderline of whether or not to install a water system of a particular capacity. The inclusion of the surrounding rural population may make it feasible to operate the larger capacity system on a cost-effective basis.
5. The planned governmental reorganisation, whereby the Department of Public Works will become responsible for the construction of piped water systems in rural areas, will make it in an organisational sense practical to link the IKK programme with a programme to supply water in rural areas surrounding IKKs.

These considerations have been gleaned from discussions with authorities on different government levels and are fully supported by the mission. It might be added, however, that an extensive rural water supply programme does not necessarily take the capital town as its focal point. It depends on the situation in the particular Kecamatan whether this link-up is desirable and feasible.

Suggested IKKs.

PAB-IKK West Java has given to the mission a list of IKKs which it would wish to see included in the future bilateral aid programme. The list, set forth in table 2 indicates which towns have first and second priority according to PAB-IKK norms. The last column of this table notes whether the Kecamatan is on the priority list of the Kabupaten in terms of an urgent need for a clean water supply.

Table 2. IBU KOTA KECAMATAN PROPOSED FOR THE DUTCH ASSISTANCE PROGRAMME 1985/1986 SUGGESTED BY PAB/IKK, WEST JAVA PROVINCE

No.	KABUPATEN	IBU KOTA KECAMATAN		JUMLAH PENDUDUK	BUPATI's PRIORITY KECAMATAN
		FIRST PRIORITY	SECOND PRIORITY		
1.	Serang	Cinangka		4.230	
2.		Mancak		5.050	yes
3.			Padarincang	?	
4.			Walantaka	3.150	
5.	Tangerang	Legok		5.350	
6.		Curug		8.960	
7.		Pasarkemis		4.560	
8.	Bekasi	Sukatani		12.863	
9.	Karawang		Cilamaya	10.860	yes
10.			Jatisari	6.935	
11.	Indramayu	Cikedung		8.454	
12.		Kandanghaur		14.148	
13.		Karangampel		4.714	
14.		Sindang		14.041	
15.			Haurgeulis	20.868	
16.	Cirebon	Losari		6.838	yes
17.		Babakan		9.548	yes
18.	Majalengka		Jatitujuh	7.922	
19.	Garut	Semarang		5.520	
20.	Subang		Kalijati	8.325	
21.	Kuningan		Kadugede	4.465	
22.			Lor Agung	6.686	
23.	Ciamis	Cimanggis		?	
24.		Pamarican		5.530	
25.	Tasikmalaya		Salopa	6.354	yes

2. In the previous section of this report the mission has given its reasons for a priority listing of Kabupatens which are to receive Dutch assistance with their rural water supply programme. In general the same reasoning applies to the IKK programme. It should be added, however, that the mission has had no opportunity to visit the listed Kecamatans, so that it will be necessary to follow up this recommendation by investigations in the field. Only then can a priority listing of Kecamatans be made.

Terms of Reference for the Identification of a Rural Water Supply Project in West Java

The present rural water supply project is executed under the responsibility of Departemen Kesehatan, Ministry of Health. Since 1st April 1984, it is said that the responsibility for piped rural water supply schemes will come/be under the responsibility of Cipta Karya; Departemen Kesehatan will remain responsible for small systems, handpumps, rainwater collectors, MCKS etc.
GON and GOI have decided to continue their co-operation in the rural water supply sector for West Java.

a. Asses the field of responsibility of local authorities for rural water supply schemes in West Java on central, provincial and local levels;

b. Commend on new and continued project activities for the rural water supply;

c. Estimate the period of further co-operation and the yearly required funds, manpower, etc., both for GON and GOI.

Elements for Terms of Reference Mission to Assist Indonesian Authorities in the Identification and subsequent formulation of Rural Watersupply Projects.

Reference:
- Tel Schoo 091183
- Tel van den Broek 160584
- Kerangka Acuan Kerjasama Penyediaan Air Bersih Pedesaan Antara Pemerintah Republik Indonesia dengan Pemerintah Belanda. 1984.
- Report of Joint Evaluation Mission OTA-33/J-7 West Java Rural Water Supply Project.

The report of the mission, that was put together to evaluate the results of the Rural Watersupply Project OTA33/J-7 contained a certain number of recommendations which have been accepted by the Dutch Minister of Development Assistance and which have been translated into terms of Reference of a mission of the above-mentioned character (tel Schoo 091183).
To a certain extent they have also been taken into account in the project identification document mentioned under no. 3 above.
In that document eight Kabupatens have been identified as being eligible for Netherland's Assistance: Serang, Tanggerang, Karawang, Cirebon, Indramayu, Tasikmalaya, Cianjur and Garut. In that same document a certain number of objectives have been indicated, such as:
- the period of time in which 60% of the rural population have to be provided with clean water;
- this amounts to the clean water provision to 135.000 inhabitants per year;
- the document contains also models for the coordination between different levels of Provincial Government i.e. between the Level of the Provincial Government and the level of the desa. It contains moreover indications of the views of the authors of the document on the management of the project.

In a document emanating from the Provincial Government, sent to the Director General of the Ministry of Public Health the authorities are even more precise. In that document an indication is given of the different kinds of systems to be used and their financial consequences.
It seems that the mission should take into account the work already done and supplement that with their own views. These could contain the following:
Given the choice of the Kabupatens made by the Indonesian authorities (which could be questioned?) we would proceed as follows.

1. Identification in the field of the Kecamatans to be served and determine their order of priority on the list;
2. Draw up a masterplan/kecamatans for the watersupply works taking into account the differences in income and the wishes of the population with regard to house connections;
3. Determine the cost of the system to be installed and define the way cost recovery is to be calculated and to be organised;
4. Make sure there are provisions to get the population acquainted with the new way of watersupply and solicite their views on the location of the public taps;
5. Make sure some kind of coordination is provided with other sectors of the local economy in order to avoid duplication;
6. Draw up a map of the available waterresources (groundwater, surfacewater, rainwater) and indicate their availability throughout the year;
7. Make sure that in the masterplan provision is made for sanitation measures which could be taken in a later stage;
8. Be sure sufficient personel is being trained to maintain the system and operate it;

It may be necessary, once in the field that more items should be added to this list. However, it is felt the above is the minimum that should be done in order to create simple, cheap and dependable systems.

On the basis of this list of kecamatans, the different systems to be installed, the coordination with other sectors of the economy, the preparation of the populations etc. it will be possible to draw up a list of the necessary resources, both human and material and their eventual cost, divided between the Netherlands and the Indonesian Government. This list is the basis of the project to be formulated, together with the appropriate project (management)-organisation.
In formulating the project and its appropriate organisation it is felt necessary to make use as much as possible of the existing Government machinery. It would be too difficult for the Indonesian authorities to set up a separate organisasion to serve for the Dutch assistance only.

Summarizing the above, the project consists of the following elements:

- Draw up maps of water resources and their availability throughout the year.
- Draw up a list of kecamatans to be served and their priority in time.
- Draw up a list of systems to be installed and their numbers, material needed, their operational cost, cost-recovery system, maintenance and operation.
- Draw up a masterplan/kecamatans for the watersupply and the physical location of the different outlets. Do not forget to draw up provisional or definite measures for sewerage disposal. This masterplan should be drawn up on the basis of a socio-economic survey and be coordinated with plans in the other sectors of the economy in order to avoid duplication.
- Draw up a masterplan or compaign to get the population acquainted with the new watersupply system and its benefits;

- Advise on adequate coordination between different levels of government and suggest strong project organisation, making use of available resources inside and outside government.
- Suggest measures to provide for sufficient personnel to maintain and operate the system including cos recovery.

Travel Schedule and list of Persons Met

1. Saturday, July 21, 1984 visit to the Kabupaten Karawang

1.1. The meeting with the Secretary of the Kabupaten Karawang Drs. Badami, representing the Bupati who was in Jakarta attending on official ceremony with the Head of State relating to West Java Province started at 07.30.
Also present were:

1. The Head of the Bappeda, Chair, SH.
2. The Inspector of the Kabupaten, Drs. Dimyati.
3. The Head of the law departement, Ganjar Hutman, BA.
4. The Head of the District's Development Departement.
5. The Head of the Welfare Departement, Drs. Mursid.
6. The Head of the Office for Urban Watersupply Instalation Cipta Karya, Maman Suherman, BE.

1.2. Visit to Kecamatan (Subdistrict) Pedes, one of the Kecamatans in the district of Karawang mentioned by Bappeda as an area in need of clean water.

1.3. Visit to Kecamatan (subdistrict) Kutaampel where the former Pilot Plant and the Permanent Plants constructed by OTA-33 are located.
Meeting with the Camat, Drs. Rachmat and the Kepala Desa/ Village Head, Sakim Dulhakim.

1.4. Visit to the Karawang Watersupply Instalation, still a unit of the Cipta Karya, headed by Maman Suherman, BE. He was accompanied by his assistant Tony Pamudji, BSc.

2. Sunday, Juli 22, 1984 visit to the Kabupaten Indramayu

2.1. Visit to the subdistrict Lohbener, where the MCKS 3000 constructed by the OTA-33 is located.
Meeting with the Village Head, Maksudi,
the Chairman of LKMD, Sudjana,
and its staff.
Present as guests were the Village Head of Jatisawit, Sudireja.
the Chairman of LKMD of Jatisawit, Sakirman.

2.2. Visit to the plant in Lohbener, where discussions have been held with women, who are involved in the activities of the watersupply.

2.3. Visit to the village of Jatisawit, where discussions were held in relation to further programmes of the construction of watersupply schemes in the village. A survey on the impact of clean water on the human health condition is being held in the village where a sample of some hundreds respondents have been selected.

3. Monday, July 23, 1984.

3.1. Visit to a new constructed MCKS 3000 selected in Desa Sukareja. An observation has been carried out to the plant and two public taps which scattered in the village. Some discussions were held with the local inhabitants at the location of the two public taps as mentioned.

3.2. Meeting with the Bupati and his staff
Presence were:

1. Bupati Djahari, SH, a retired colonel of the Indonesian police force.
2. Staff members present at the meeting were:
   2.1. Secretary, Drs. Prawoto.
   2.2. Head of the Bappeda and others.

3.3. Visit to a new constructed MCKS-3000 in the village of Kalianyar, accompanied by Harry Siswoyo Adjie, BSc, a consultant member and Rachmat, BA, the head of the OAMP a water management organisation for the Kabupaten Indramayu.

4. Tuesday, July 24, 1984 visit to the Kabupaten Cirebon

4.1. The secretary of the Kabupaten Drs. Oscar Mohamad, SH welcomed the mission. Presence were also the Kabupaten Staff members:

1. The Head of the Bappeda, Drs. Sukarman.
2. Member of the Bappeda, Ir. Triyuni S.
3. Representatives of the Cipta Karya (Departement of Public Works) in charge with the IKK Programme in the Cirebon District .

4.2. A field trip to Karangsembung and Waled, both IKK projects in the Kabupaten Cirebon, still in construction were carried out.

Discussion with the Camats/District Head.

After the field trip, a meeting with the Bappeda Head, representing the Secretary and Bupati was resumed to submit some conclusions and suggestions relating to the field visit as mentioned.

5. Tuesday, July 24, 1984 at 16.00 the mission proceeded to Kabupaten Tasikmalaya.

5.1. Wednesday, July 25, 1984 at 07.30 meeting with the Bupati Tasikmalaya, Mr. Hudly Bambang Aruman (retired Colonel of the Army) and his staff was held.

Assisting the Bupati were also present the following personnel :

1. The Secretary of the District ..... : Adang Rusman,SH
2. Head of the Bappeda II ..... : Rustijo, SH
3. Head of the Development Dept. ..... : Drs. O. Urawan
4. Head of the Public Health Dept. ..... : dr. Sodik, SKM
5. Head of the Environmental Health ..... : Mustakim, BSc.
6. Head of the District Public Work ..... : Sarjan, BE
7. Head of the District Water Enterprise (PDAM) ..... : Dra.Ellin Yuliasih
8. Staff member District Water Enterprise : Achmad, BE
9. Staff member Bappeda II ..... : Asep Rasid, BA
10. Staff member Bappeda II ..... : Aji, SH
11. Head of the Cipta Karya Section ..... : Atang Rahayu, BE
12. member Cipta Karya Section ..... : Panji
13. member Cipta Karya Section ..... : Maksum.

5.2. After the meeting with the Bupati and Staff, a trip to Salawu subdistrict and village enroute to Bandung was held.

Note :

On Saturday, July 21, 1984 in Karawang,
On Monday, July 23, 1984 in Indramayu,
On Tuesday, July 25, 1984 in Tasikmalaya;

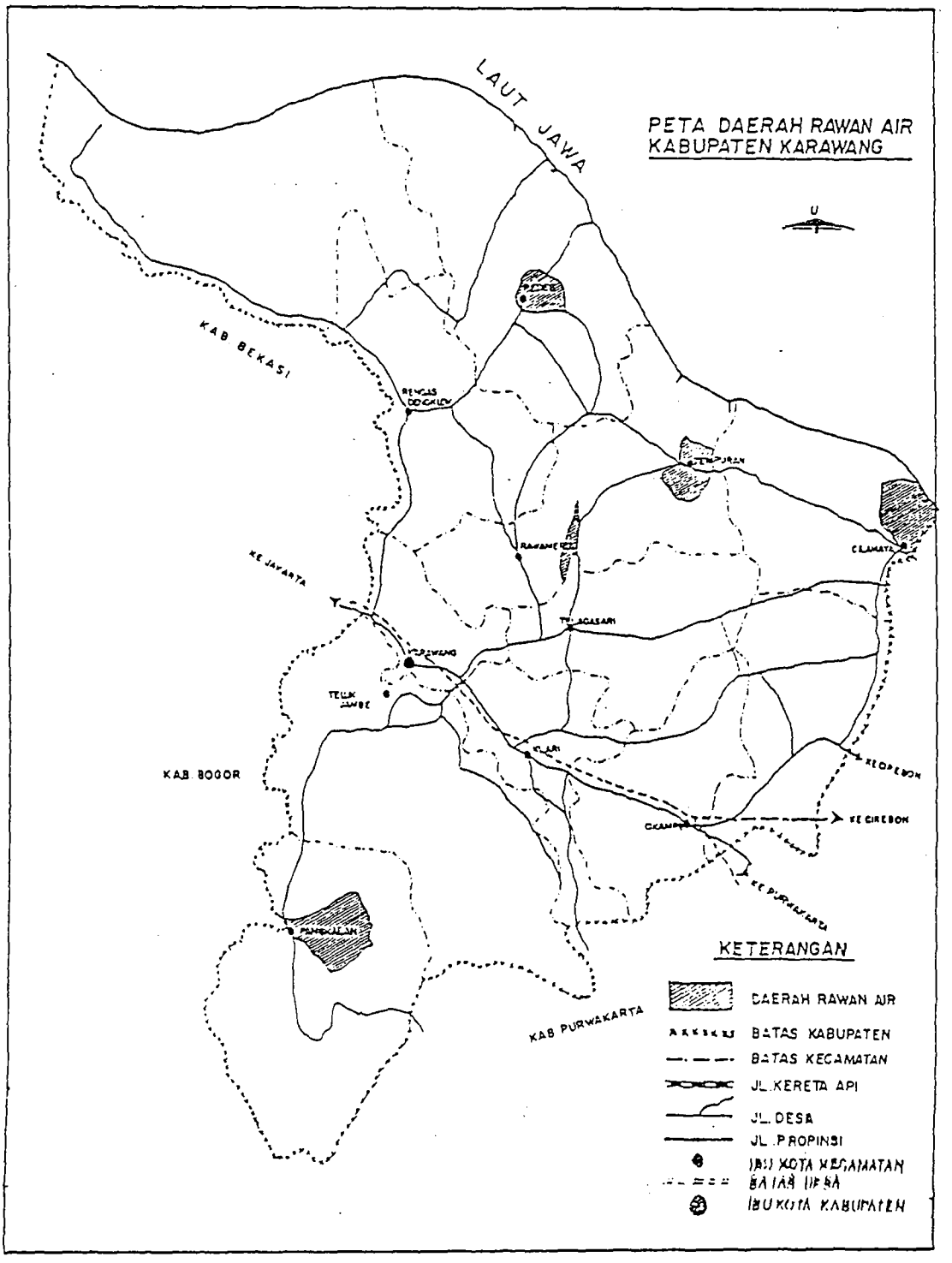
Representatives of the Provincial Government namely:

1. Drs. Endang Daryani (Head of the Public Health Departement).
2. Ir. Syamsul Anhari Yusuf and
3. Hoelman Soelaiman, BSc. Both the Project Leaders of the OTA-33 projects were also present.

KETERANGAN GAMBAR / LEGEND

	DAERAH RAWAN AIR	–	URGENT WATER SHORTAGE AREA
	DAERAH KURANG AIR	–	WATER SHORTAGE AREA
xxxxxxxx	BATAS KABUPATEN	–	DISTRICT BOUNDARY
–·–·–	BATAS KECAMATAN	–	SUBDISTRICT BOUNDARY
------	BATAS DESA	–	VILLAGE BOUNDARY
▣/●/■	IBU KOTA KABUPATEN	–	DISTRICT CAPITAL
●	IBU KOTA KECAMATAN	–	SUBDISTRICT CAPITAL
———	JLN.NEGARA/PROPINSI	–	MAIN ROAD
———	JLN.KABUPATEN/DESA	–	REGIONAL ROAD
	SUNGAI	–	RIVER
O/▣	KAWEDANAN	–	SUBDISTRICT COORDINATOR

Gambar 1.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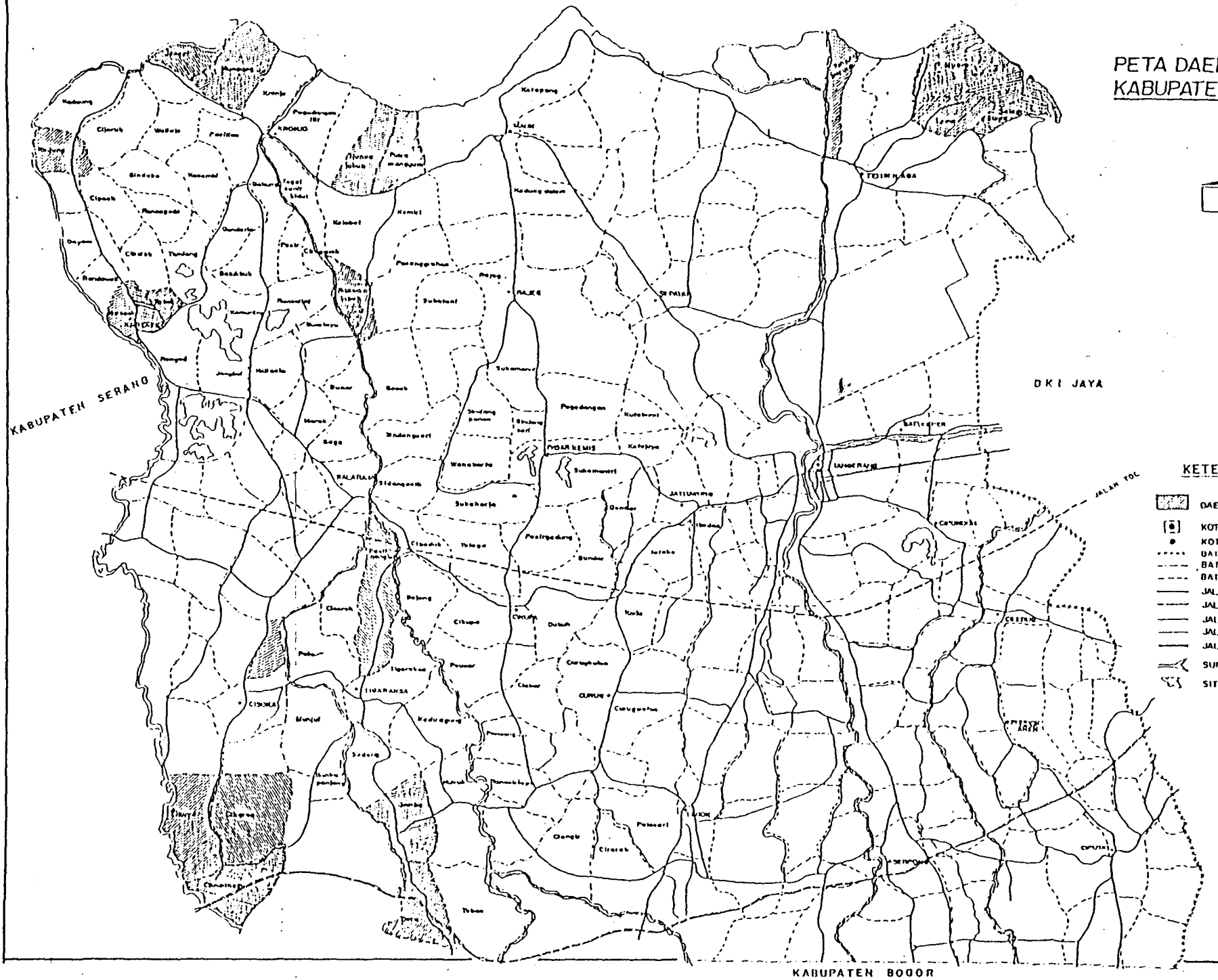
KABUPATEN KARAWANG
LAUT JAWA
U
KAB. BEKASI
KE JAKARTA
KAB. BOGOR
KAB PURWAKARTA
KE CIREBON
KETERANGAN
DAERAH RAWAN AIR
BATAS KABUPATEN
BATAS KECAMATAN
JL. KERETA API
JL. DESA
JL. PROPINSI
IBU KOTA KECAMATAN
BATAS DESA
IBUKOTA KABUPATEN

PETA DAERAH RAWAN AIR
KABUPATEN TANGERANG.



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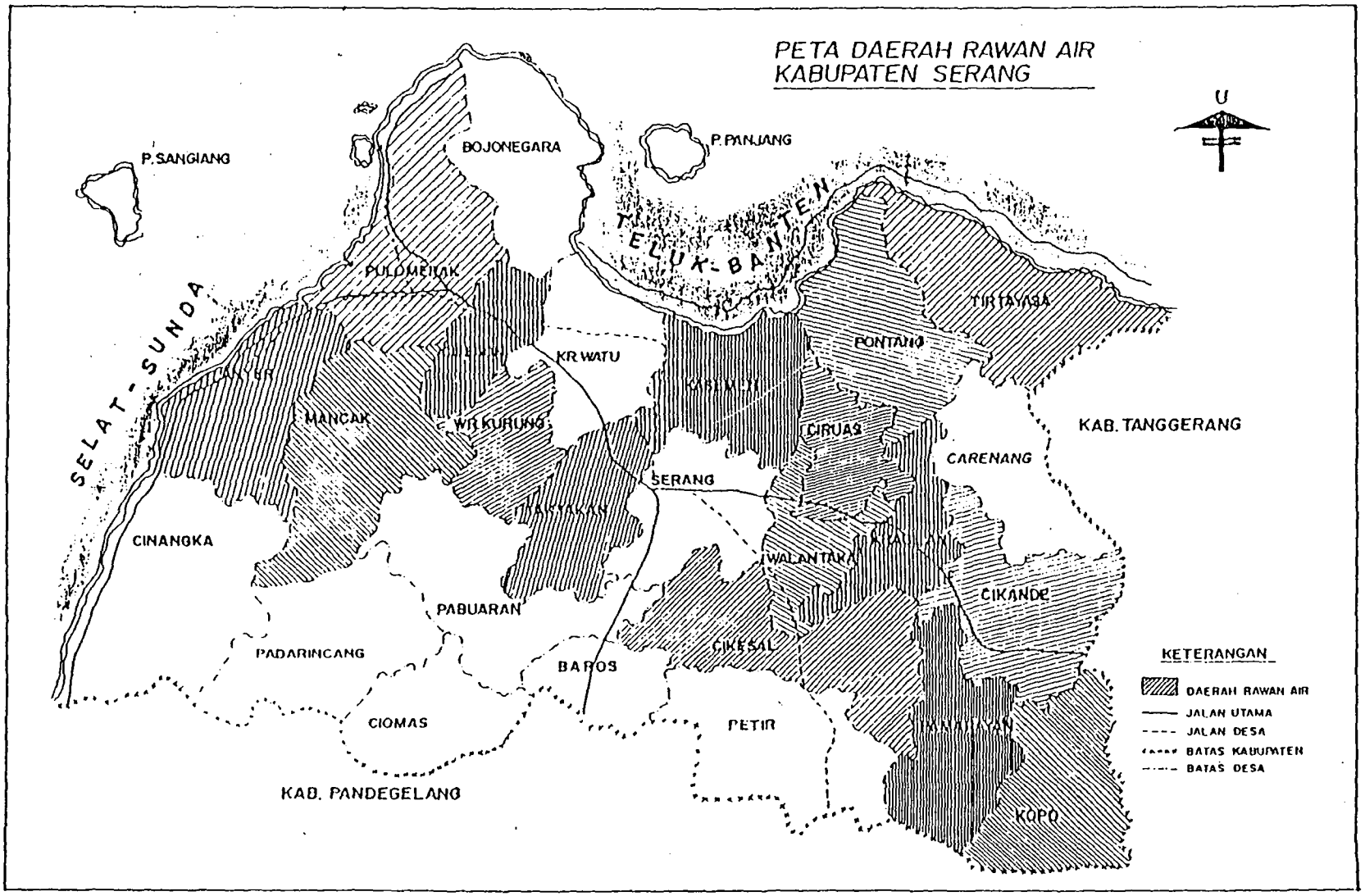
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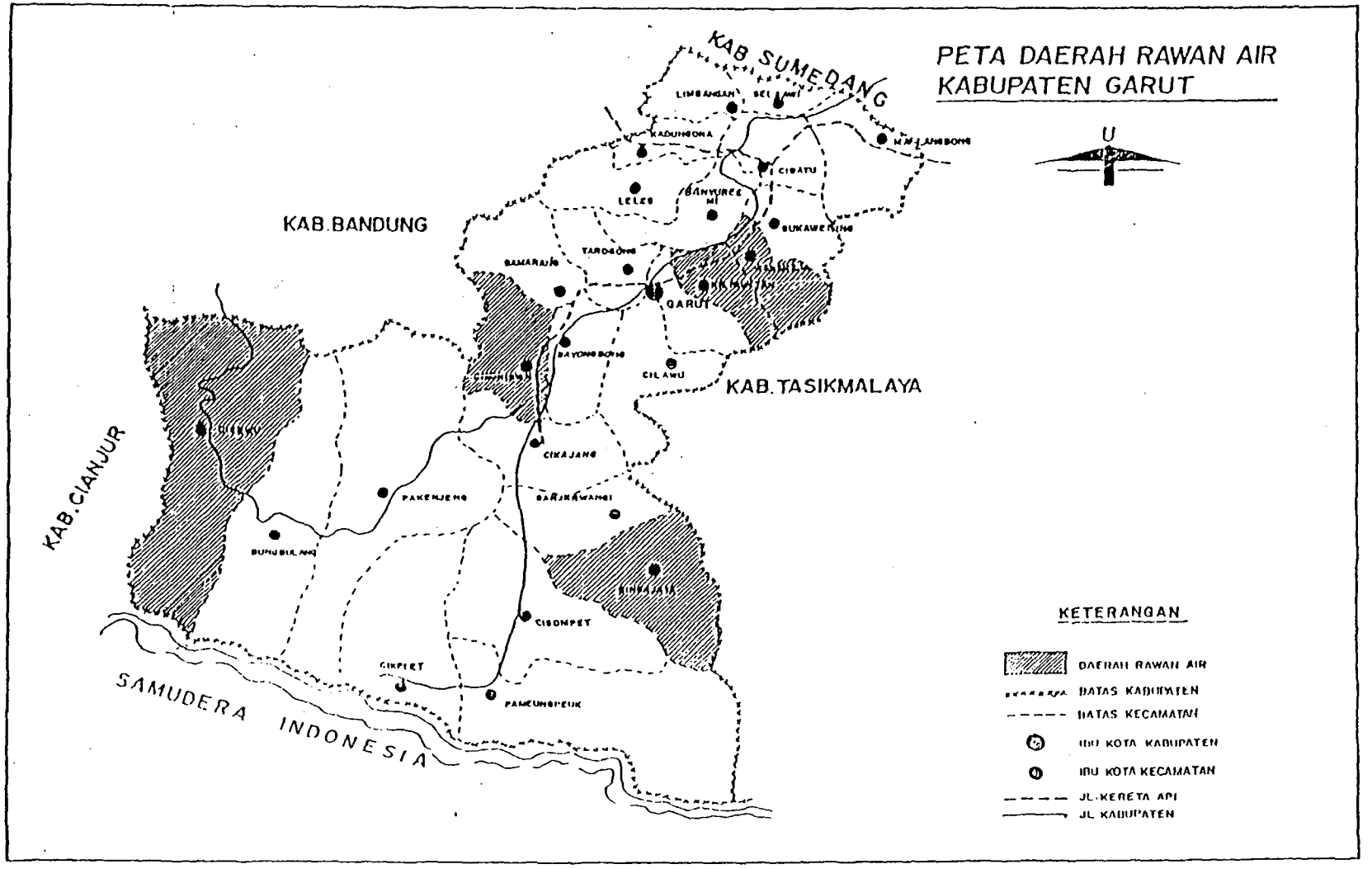
KABUPATEN SERANG
U
P. SANGIANG
BOJONEGARA
P. PANJANG
TELUK-BANTEN
SELAT-SUNDA
PULOMERAK
KR. WATU
TIRTAYASA
PONTANG
MANCAK
WR. KURUNG
CIRUAS
KAB. TANGGERANG
CARENANG
SERANG
CINANGKA
WALANTAKA
CIKANDE
PABUARAN
PADARINCANG
CIKESAL
BARUS
CIOMAS
PETIR
KAB. PANDEGELANG
KOPO
KETERANGAN
DAERAH RAWAN AIR
JALAN UTAMA
JALAN DESA
BATAS KABUPATEN
BATAS DESA

Gambar 3.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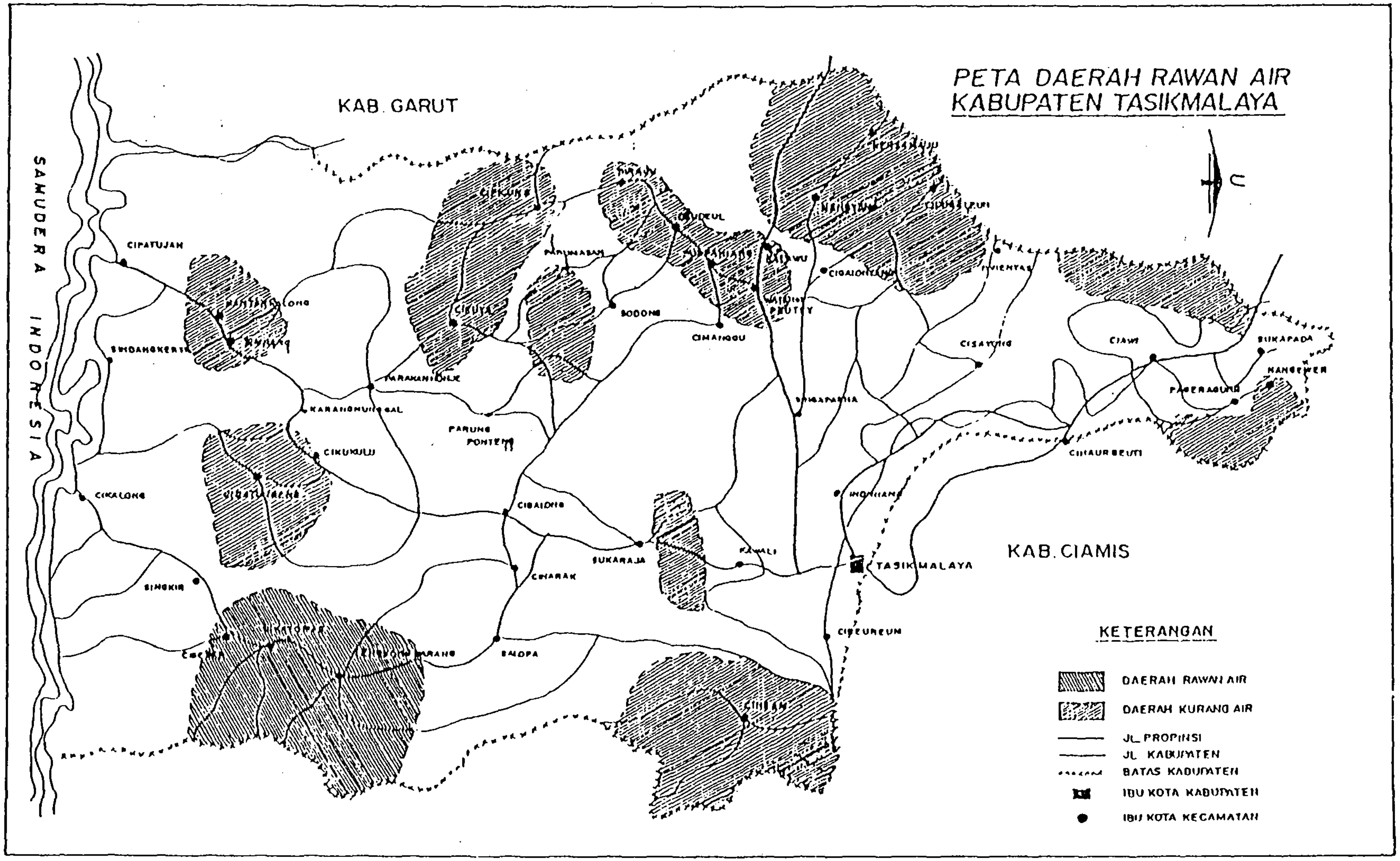
KABUPATEN GARUT
U
KAB SUMEDANG
KAB.BANDUNG
KAB.CIANJUR
KAB.TASIKMALAYA
GARUT
SAMUDERA INDONESIA
KETERANGAN
DAERAH RAWAN AIR
BATAS KABUPATEN
BATAS KECAMATAN
IBU KOTA KABUPATEN
IBU KOTA KECAMATAN
JL.KERETA API
JL KABUPATEN

Gambar 4.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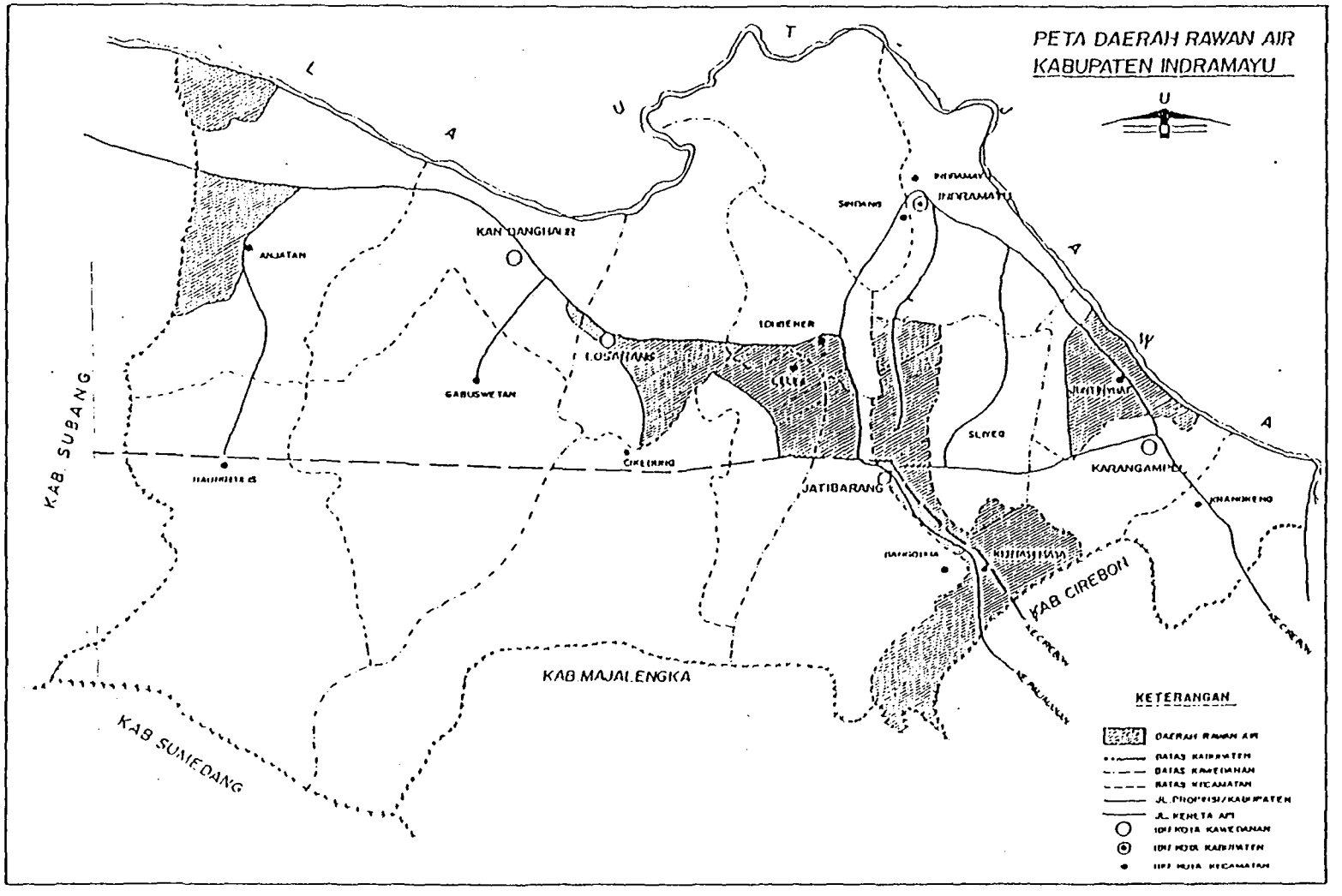
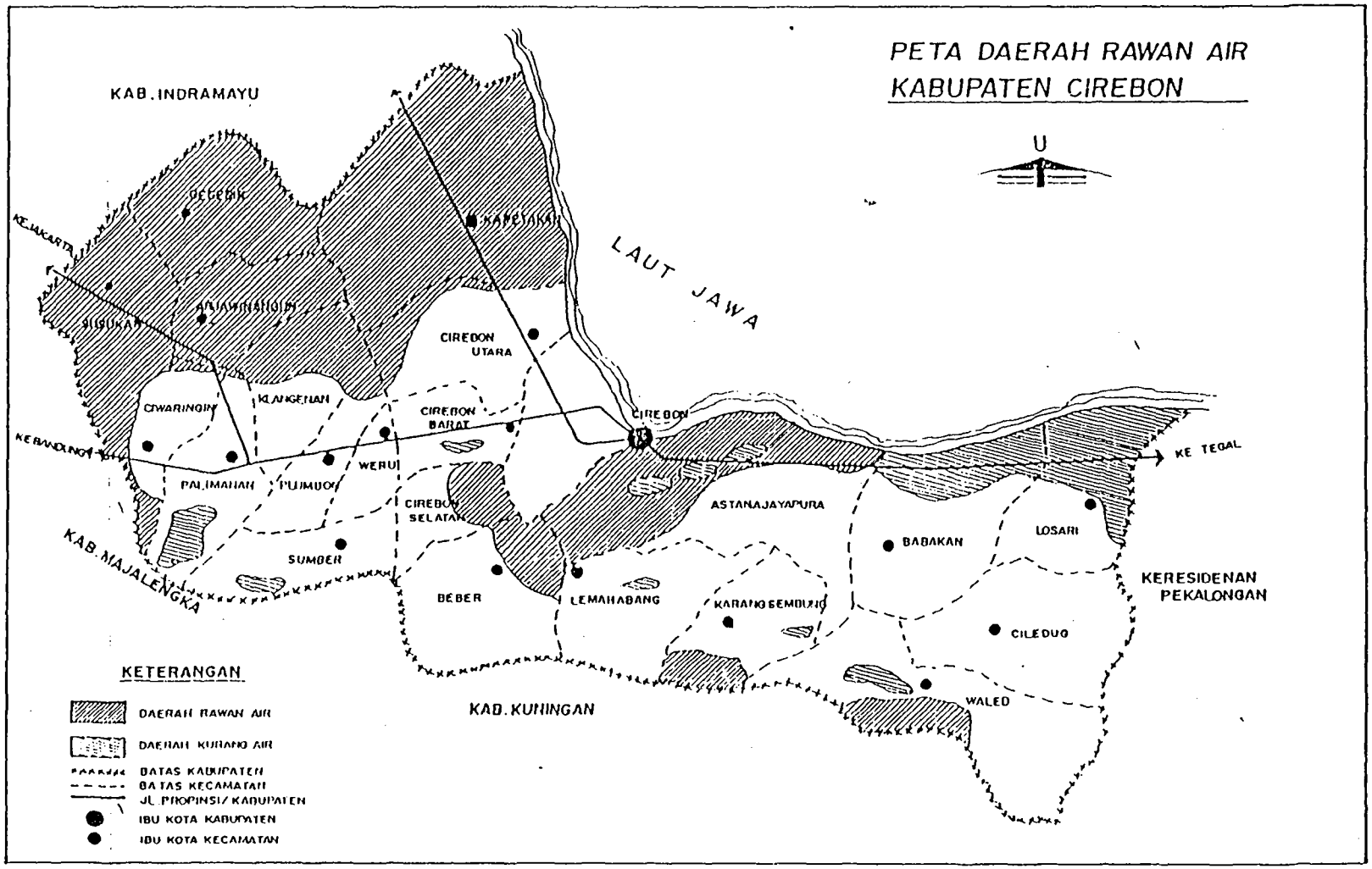
KAB. GARUT
KAB. CIAMIS
SAMUDERA INDONESIA
U
TASIKMALAYA
CIPATUJAH
CIKALONG
SUKARAJA
CIAWI
KETERANGAN
DAERAH RAWAN AIR
DAERAH KURANG AIR
JL. PROPINSI
JL. KABUPATEN
BATAS KABUPATEN
IBU KOTA KABUPATEN
IBU KOTA KECAMATAN

Gambar 5.


PETA DAERAH RAWAN AIR
KABUPATEN INDRAMAYU
U
KAB SUBANG
KAB CIREBON
KAB MAJALENGKA
KAB SUMEDANG
JATIBARANG
KARANGAMPEL
SLIYEG
KETERANGAN

Gambar 6.

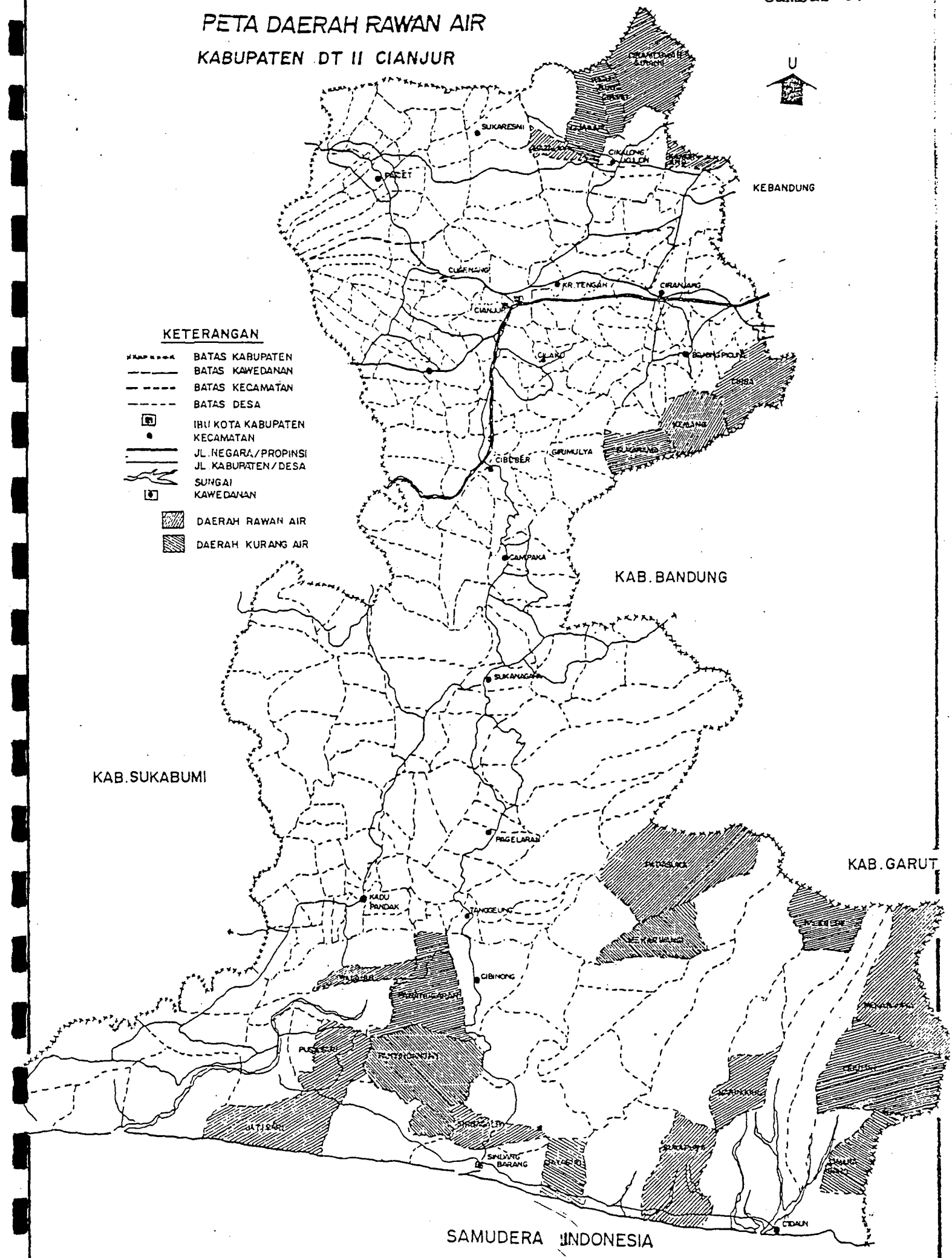

PETA DAERAH RAWAN AIR
KABUPATEN CIREBON
U
KAB. INDRAMAYU
LAUT JAWA
KE JAKARTA
KE BANDUNG
KE TEGAL
CIREBON UTARA
CIREBON BARAT
CIREBON SELATAN
CIREBON
CWARINGIN
KLANGENAN
PALIMANAN
PLUMBON
WERU
SUMBER
BEBER
LEMAHABANG
ASTANAJAYAPURA
BABAKAN
LOSARI
KARANGSEMBUNG
CILEDUG
WALED
KERESIDENAN PEKALONGAN
KAB. MAJALENGKA
KAB. KUNINGAN
KETERANGAN
DAERAH RAWAN AIR
DAERAH KURANG AIR
BATAS KABUPATEN
BATAS KECAMATAN
JL. PROPINSI/KABUPATEN
IBU KOTA KABUPATEN
IBU KOTA KECAMATAN

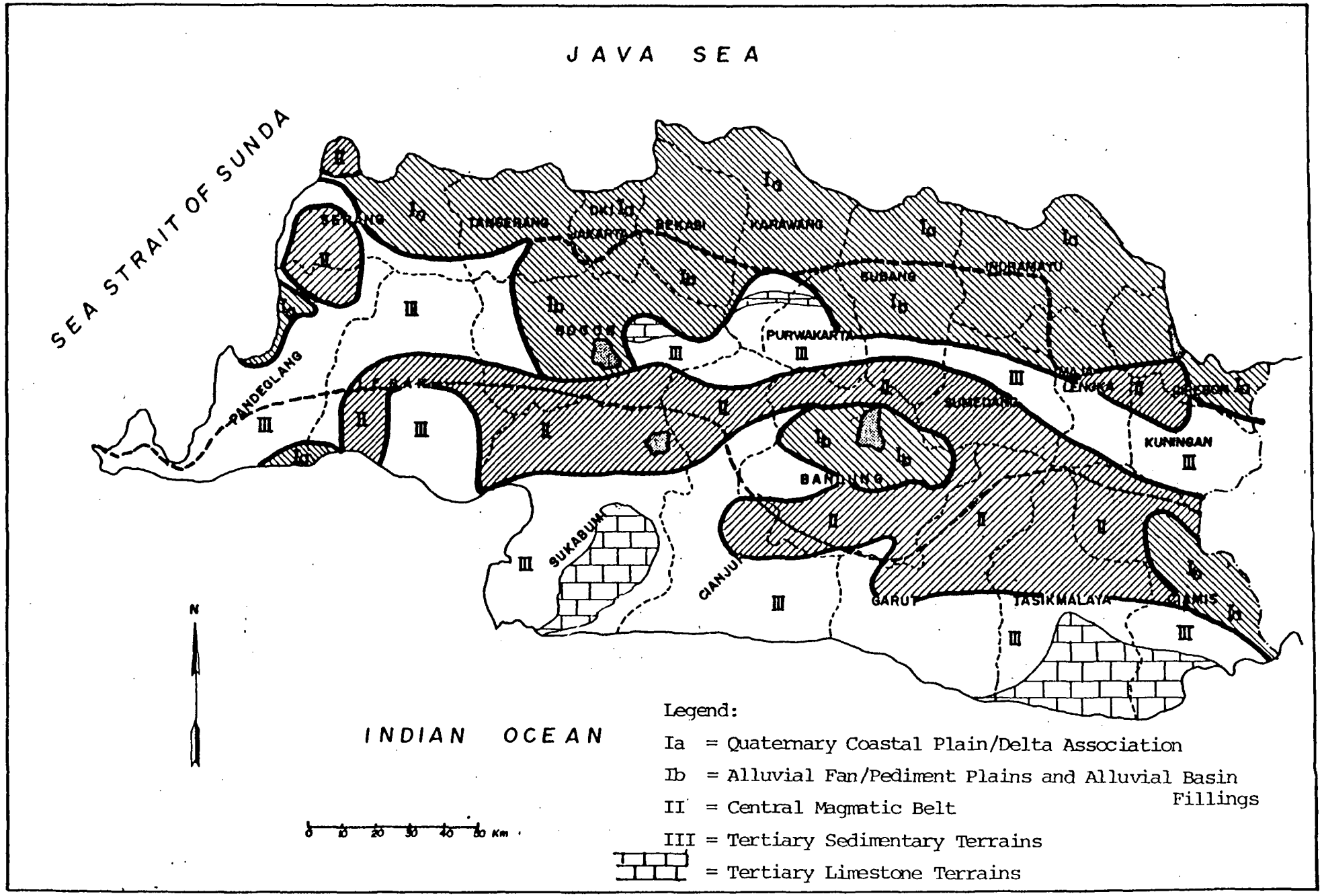
Gambar 7.

Gambar 8.

PETA DAERAH RAWAN AIR

KABUPATEN DT II CIANJUR





SKETCH MAP SHOWING THREE HYDROGEOLOGICAL UNITS

Figure 11.5: Sketch Map Showing Three Hydrogeological Units