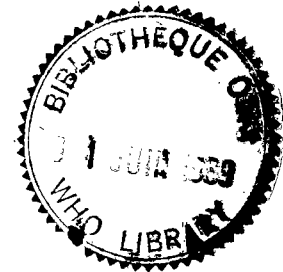


Water supply  
Health manpower  
planning techniques  
Delonnie

# Manpower planning in progress

How Indonesia's water supply  
sector forecasts its manpower  
needs using only one variable.



A Human  
Resources  
Development  
Case Study  
No: 6 in a series

# Foreword

The World Health Organization (WHO) and the Swedish International Development Authority (SIDA) are jointly producing a thematic series of case studies focussing on Human Resources Development.

Our intention is to both illustrate and document various methods, used in different parts of the world, which aim at improving human performance.

Activities and projects selected for this series are all of an innovative nature. They show that there are usually a variety of methods other than classical classroom training to help people do their jobs better.

While country reports and project descriptions are common, one seldom finds detailed descriptions of techniques used. "What was done?" is answered more often than "How was it done?" In this series of case studies we aim to provide the reader with a total perspective of what was done, how it was done, why it was done and an assessment of its effectiveness.

These collected experiences should give the reader ideas, which can be adapted to improve other activities and projects in his or her own environment. We believe this series will be a source of inspiration for action and deliberate change.

This specific case study was selected by the WHO's Regional Office for South East Asia which submitted a text written by Dr Wilfredo L. Reyes. Additional information was gathered during a field visit to Indonesia in March 1988. Interviews with government officials and consultants and other written material also form the basis of the text. We thank everyone for their assistance.

Alice Petrán, 3 April 1989

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Summary

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# Planning relies on simple method

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**Planning based on house  
connections**

Indonesia has witnessed a rapid growth of water supply schemes in the 1980's. It realized at an early stage that these newly constructed systems would not function effectively unless manpower and training needs were catered for. The country had already experienced many shortcomings in the water supply sector due to lack of skilled manpower and technical expertise. A way to tackle these problems would be to systematically plan for human resources development.

Contrary to what is done in many other countries, Indonesian planners started by asking themselves certain questions:

- How many people will Indonesia need to service the growing number of house connections?
- What will the staff need to know?
- When and where will staff be needed?
- What are the training needs and how shall these be met?
- What is all this going to cost?

The manpower planning strategy which was subsequently developed included a broad analysis of staffing requirements. It also dealt with what type of organization the cities would need to cope with a growing amount of clients. On a national level, the country designed a standard organizational structure and staffing pattern for each city's water enterprise.

The manpower planning method used by Indonesian cities today is based on one single variable — house connections. Earlier planning attempts included several different variables, but this had proved to be too demanding. Over the years, Indonesian planners have discovered that it is more important to have a practical and easy planning tool rather than something which demands tremendous efforts. For good planning it is essential that the procedure be easy enough to allow for continuous revision.

The Indonesian manpower plans have proved

to be useful in several ways. While they have not accurately projected future requirements, they have at least given indications about the overall direction of staff development. National plans have been based on provincial data and this has meant that provinces and local government have had to get involved and take responsibility for planning and implementation. This has stimulated communication between national and local government.

The manpower plans have also served as proposals for soliciting funds in order to realize the planned development. The World Bank, the Dutch government and private consultants have assisted the country in forecasting its needs, and have also assisted in financing training.

Every country faces the choice of making no plans at all, some simple plans or producing more sophisticated ones. Many countries choose the easiest way — that of not making any plans. Indonesia initially started off with devising complicated plans but has now got to the stage where it believes planning can be simple and ongoing.

Some would say why plan if you are not going to be particularly accurate? The question can also be turned around — why not start, get going and accept a process of trial and error which may end up as something better? ♦

## **Overall direction of staff development**

## **Proposals for funding**

Setting the scene

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# **Growth limited to urban areas**

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**Economic constraints**

The massive expansion of the water supply sector has been most remarkable in the urban areas. Indonesia has been working hard to reach the target it has set itself — by 1994, 75% of the urban population should have access to clean water supply, half of them via house connections, the other half by public hydrants.

Of the money allocated to developing the water sector, some 90% has been spent on urban projects. Rural areas have so far been quite neglected but have been given a higher priority in the current five-year plan.

The expanded water sector is a result of ambitious plans and a prosperous economy based on oil export incomes. But, just as high oil prices earlier allowed for rapid expansion, the fall of the oil price has slowed the speed in which the Indonesian water supply sector can now grow.

The flourishing past has been replaced by a more severe economic climate, and plans are therefore more modest as the oil price continues to be depressed. Nevertheless, Indonesia continues to plan for new construction and improved services.

Initially, during the five-year plan ending in March 1989, construction plans for urban areas proposed an increase in house connections from approximately one million to three million. Now, having come to the end of that five-year period, it is clear that all the plans have not materialized due to economic constraints. Diminishing incomes have not allowed for the projected 200% increase in house connections. However, house connections have doubled as have the number of public taps and production capacity.

In this atmosphere of change, it has been necessary to not only plan for construction but also consider other aspects of development such as human resources development. ♦



*Water tower in Sigli, North Sumatra. The early 1980's saw Indonesia's water supply sector grow rapidly — most notably in the urban areas. Planning for staff increases and training therefore became urgent.*



Part 1

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# Planners decide on single variable

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## Government survey

The method presently used to forecast manpower requirements in the Indonesian urban water supply sector is related to one factor — the number of house connections. The calculation method is not sophisticated, but for that reason may be all the better. It is something which almost anybody can use. The simplicity of the method has allowed planners to continuously revise forecasts.

Experience in Indonesia has shown that more advanced models tend to require time and skills which the country does not have. Earlier attempts to produce manpower plans involved many additional factors. One factor was, for example, pipe lengths. The number of people required to lay pipes, maintain them etc., had to be calculated. The use of several variables proved to be unwieldy. Besides being time-consuming and thus demanding, there were no adequate data on such things as pipe conditions.

The planners concluded that the number of house connections was the factor which most influenced the work load. A large part of a water enterprise's work relates to dealing with complaints, meter reading, billing and collection. The amount of work involved in carrying out these tasks is directly related to the number of house connections. Also, data on house connections are easily available, which was important for the planners.

Having decided that the number of house connections would form the basis for forecasting manpower requirements, the Indonesian government carried out a survey to get a picture of the situation in the field. Information submitted by local government structures included the following:

1. Existing number of house connections in each province
2. Type of system used by the water enterprise and its production capacity
3. Number of employees and their qualifications

By analyzing and discussing the data, it was possible to calculate what an individual water

enterprise would need in terms of staff. A staffing pattern was adopted indicating the number of employees needed in a water enterprise in relation to its house connections. It was assumed that if there were less than 2,000 house connections the water enterprise would need 15 employees per 1,000 house connections. In larger enterprises economies of scale would apply thus reducing the number of staff per 1,000 house connections.

<b>Number of house connections:</b>	<b>Employees per 1000 connections:</b>
<b>Less than 2, 000</b>	<b>15</b>
<b>2, 000 — 7, 500</b>	<b>12</b>
<b>7, 500 — 20, 000</b>	<b>10</b>
<b>More than 20, 000</b>	<b>10</b>

Assuming that there are five users to each house connection in Indonesia, there would be 60 employees for a population of 25,000 people or one employee to 416 people served. This can be compared to a study by the International Water Supply Association of some European cities in the early 1980's which showed the following staffing ratios:

**Employees to population served**

<b>Copenhagen, Denmark</b>	<b>1: 1,350</b>
<b>Wessex, England</b>	<b>1: 1,500</b>
<b>Hamburg, Germany</b>	<b>1: 1,550</b>
<b>Bordeaux, France</b>	<b>1: 1,750</b>
<b>Madrid, Spain</b>	<b>1: 2,200</b>

The standardized staffing pattern in Indonesia made it easy to forecast staffing needs. First it would give manpower needs on a province to province level in accordance with the expected increase in house connections. Once provincial demands were defined, it was easy to summarize

**Staffing pattern adopted**

**European cities**

and plan the staff requirements for the whole urban water supply sector. Provincial figures were simply added up to get the national projection.

The tables below give figures for the province of West Java.

**Manpower figures for the province of West Java**

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**Beginning 1985: Current situation**

House connections	Water enterprises	Number of employees
Under 2,000	5	126
2,000 — 7,500	11	630
7,500 — 20,000	5	626
Over 20,000	2	756

*Total house connections: 207,900*

*Total staff: 2,138*

*Staff/population ratio: 1: 486*

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**End 1989: Projected needs**

House connections	Water enterprises	Number of employees
Under 2,000	—	—
2,000 — 7,500	2	164
7,500 — 20,000	9	1,064
Over 20,000	13	4,014

*Total house connections: 532,300*

*Total staff: 5,242*

*Staff/population ratio: 1: 507*

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Thus, in West Java it was calculated that the staff would have to increase from 2,138 in 1985 to 5,242 in 1989, if house connections increased as projected. This meant a doubling of staff to keep water facilities operating and maintained in a proper way.

For Indonesia as a whole the figures were even more dramatic. According to the five year plan, house connections would go from a million in 1985 to three million in 1989. Thus, water enterprise staff would increase from 16,000 to 40,000 in five years .

Those who planned in 1985, during more prosperous days, were far too optimistic about the development of the Indonesian water supply sector in the latter part of the decade. For 1987/88, official figures show house connections were still only 1,350,000 and that 18,340 people were operating these. Efficiency has not been raised as staff numbers remain high — there is one employee to every 368 persons served. Changed economic conditions in the country slowed down the previously very rapid expansion. ♦

### Large staff increases



*The manpower plans developed in Indonesia highlighted the need for training. Water enterprise staff needed both more theory and practical guidance.*

## Part 2

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# Training needs examined

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### Cost of training

**H**aving arrived at a figure of how many people will be needed, additional questions arise. What sort of qualifications do the employees need? What sort of training should they undergo to be able to perform their tasks? What will training cost? How and where can training take place? How will it be funded?

On a national level, the Ministry of Public Works analyzed the different tasks for each job within the water enterprises and formulated fairly detailed job descriptions. Using this information, Indonesia set up a standardized organizational chart for the country's water enterprises.

The job descriptions were later elaborated on in connection with the design of a training programme in North Sumatra — the 11 Cities Organization-Management-Training project (see Case Study No: 2 in this series).

The examination of the organizational structure led to the identification of a number of key job holders who it would be appropriate to train. They were selected not only because they would need to have certain knowledge and skills, but also because they would be in a position to pass the training on to others in the work place.

Job titles were listed and multiplied by the number of water enterprises in Indonesia. The Indonesian government decided to apply the training programme designed for North Sumatra. It indicated the number of weeks of training required for each job title (see table opposite).

Based on experiences in North Sumatra the cost of the training could be estimated. Excluding travelling, one week's training was estimated in 1985 to cost about US \$ 122 (200,000 Rupiah). The training for those mentioned in the table opposite would amount to 1.4 million Rupiah and for all groups included in the human resources development plan 6.8 million Rupiah. Job holders like government officials, leakage controllers, treatment plant operators and pipelayers were also included in the manpower plan.

Indonesia has been able to profit economically from having made manpower forecasts. The plans as such have been used as proposals to obtain money for undertaking the manpower development. The manpower forecasts have thus both indicated the direction for future activities, and also paved the way for implementing the plans. ♦

<b>Job title</b>	<b>Total to be trained</b>	<b>Weeks per trainee</b>	<b>Total man weeks</b>
Director	285	4	1,140
Head of Techn. Dept.	285	4	1,140
Head of Finance/Adm.	285	2	570
Head of Production	285	2	570
Head of Planning	285	2	570
Head of Maintenance	285	2	570
Head of Cash	285	2	570
Head of Bookkeeping	285	2	570
Head of Consumer Contacts	285	2	570
Head of Adm./Personnel	285	2	570
<b>TOTAL</b>	<b>2,850</b>	<b>n/a</b>	<b>6,840</b>

Part 3

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# Plan of action for rural areas

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## Need for critical action

**M**ethods for planning manpower needs in rural areas are still at an early stage. Up until recently, not much money or effort has been invested in developing water sources for the rural population. Little effort has therefore gone into planning for rural staff. Manpower planning is still based on a range of variables and involves many calculations. It is most likely that these methods will be simplified as has been the case in urban planning.

The starting point for the rural planning procedure is a set of objectives and a list of activities to fulfill these. For each objective the most important and critical action is selected. The Indonesian example looks like this:

- Objective:** Provision of clean water for 100 % of rural population
- Critical action:** Construct water supply scheme

Based on experience and approximations, the time required for a sanitarian to perform certain tasks has been identified. To construct a shallow well with hand pump, a sanitarian would need 234.4 hours. For a deep well with hand pump he would need 181.8 hours.

Another factor involved in this estimation is the need for critical action. For example, how many shallow wells do we need? How many people will each serve? How many people do we have to serve? And so on.

Still another variable identified is the current work tempo and the desired one for the future. Through time-studies, the planners have calculated that in a normal working day 30% of the time is spent on the critical activity, 35% on performing other tasks necessary to running the water services and the remaining 35% on just waiting or arranging private affairs.

As the plans are based partly on approximations and include several variables, they



*Water supply to the rural areas has so far been quite neglected but has now been given a higher priority in the current five-year plan.*

are fairly uncertain. Planning is by definition uncertain and the approximations add to that in-built uncertainty. For this reason four different projections have been produced. In each projection the value of one of the variables was assumed to have changed. One of the two forecasts in the middle was selected as being the most realistic. The projection, made in 1984, shows a need for about 22,000 sanitarians before the year 2000. It is readily apparent that the rural manpower planning method is fairly impractical, while the urban one in all its simplicity shows an attempt to make some sort of diagnosis. ♦

**Plans fairly unclear**



For the future

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## Lessons learned

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➤ **Simple planning methods attract more users.**

The Indonesian lesson is that the simpler the method, the better. More sophisticated calculations tend to be once-off attempts at forecasting future needs and are rarely revised or repeated. For this reason they are not particularly useful. Indonesia like many other countries does not have the funds to set up a big planning apparatus, but has still found a way to get an idea about the future.

➤ **A simple plan is better than no plan at all.**

Even though the Indonesian calculations have not been entirely accurate, they have provided some indications about the future. With some idea about how the urban water sector staff would develop, the government continued its analysis by tackling the issue of preparing the staff. This way it could estimate the cost of future development.

➤ **Plans can be used for fundraising.** By having plans for an increase in house connections and a consequent increase in staff to install and operate these, Indonesia has been able to get financial assistance for developing the water supply sector. With a plan in hand, it is possible to demonstrate to potential funders a will for change and improvement.

➤ **Manpower planning allows for analysis of training needs.** After having forecast how many people will be needed, and what knowledge and skills they will require to perform their tasks, it is possible to determine actual training needs.

➤ **Decentralized planning activity increases responsibility.** In Indonesia each province must provide a forecast for the coming years. This forces them to analyze the present status and take some responsibility for future events.

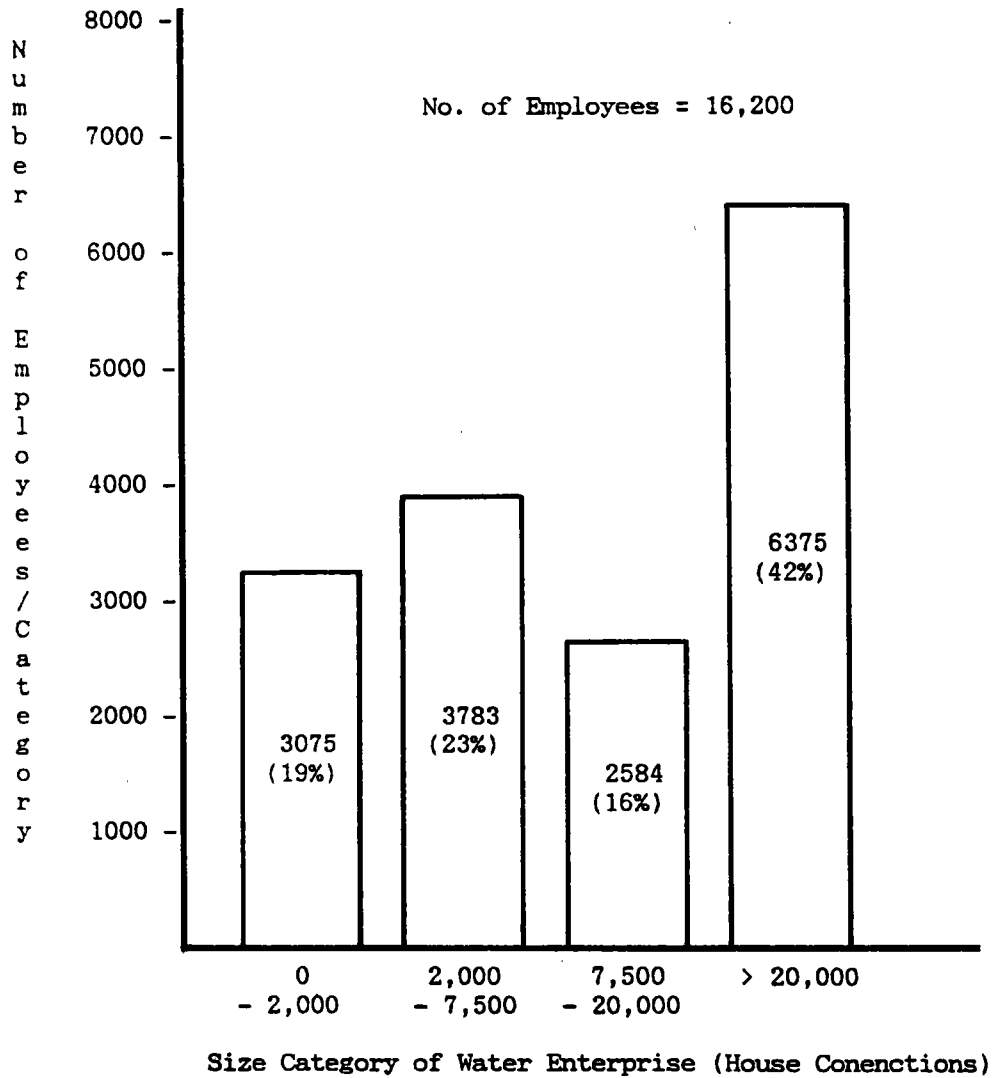
➤ **Communication is encouraged by decentralized planning.** In Indonesia, the provinces provide their estimates, which then form the basis of the national forecast. This supports and encourages dialogue between national and provincial levels of management.

➤ **Continuity is a key element.** The five-year plan for staffing in the water supply sector in Indonesia is continuously adjusted. This is easy as the method is simple to apply. In recent years, plans have been far too optimistic in projecting the number of trainees which would need to be prepared. ♦



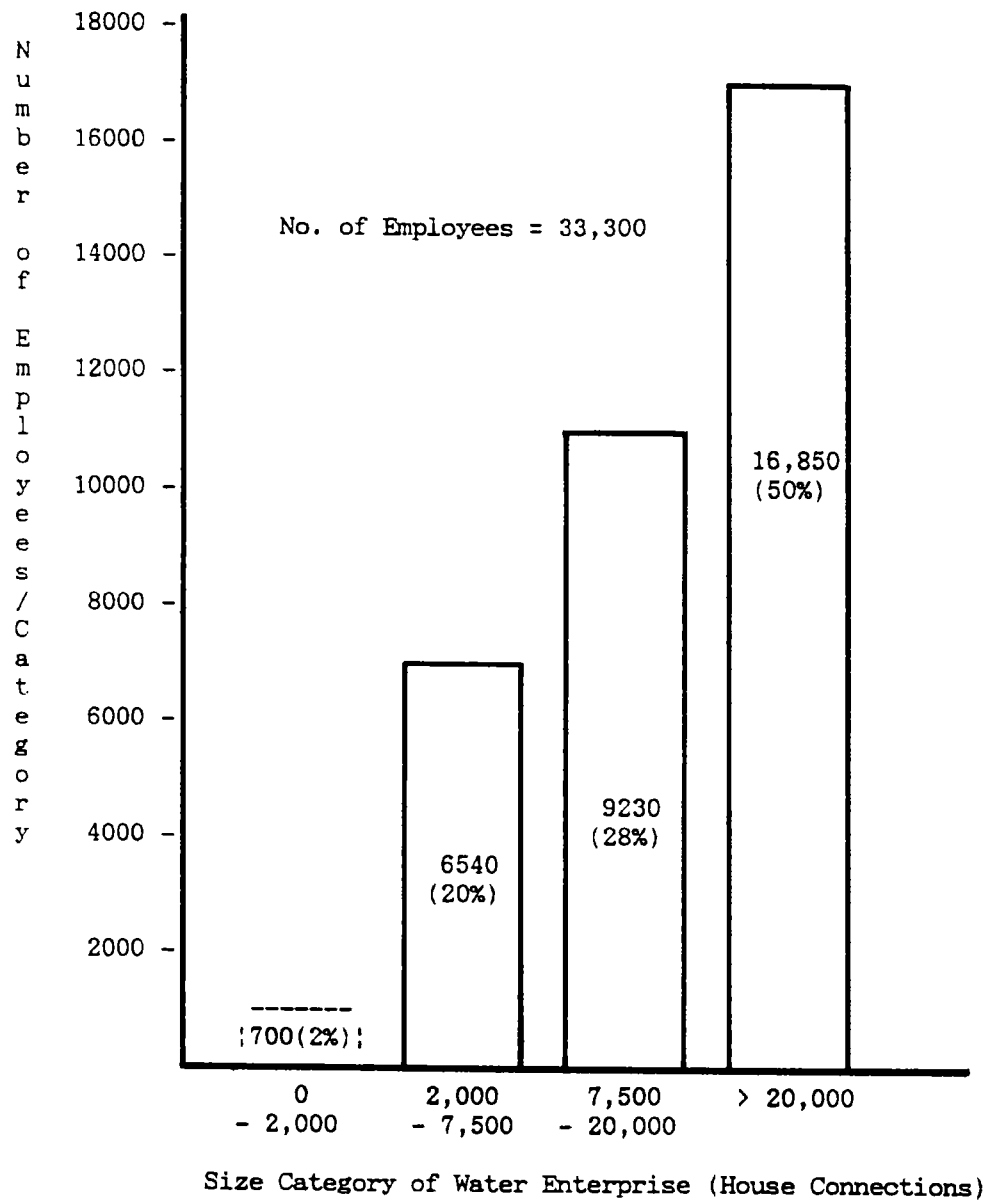
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Water enterprises in Indonesia  
Distribution of employees according to size of enterprise  
**Situation mid-1985**



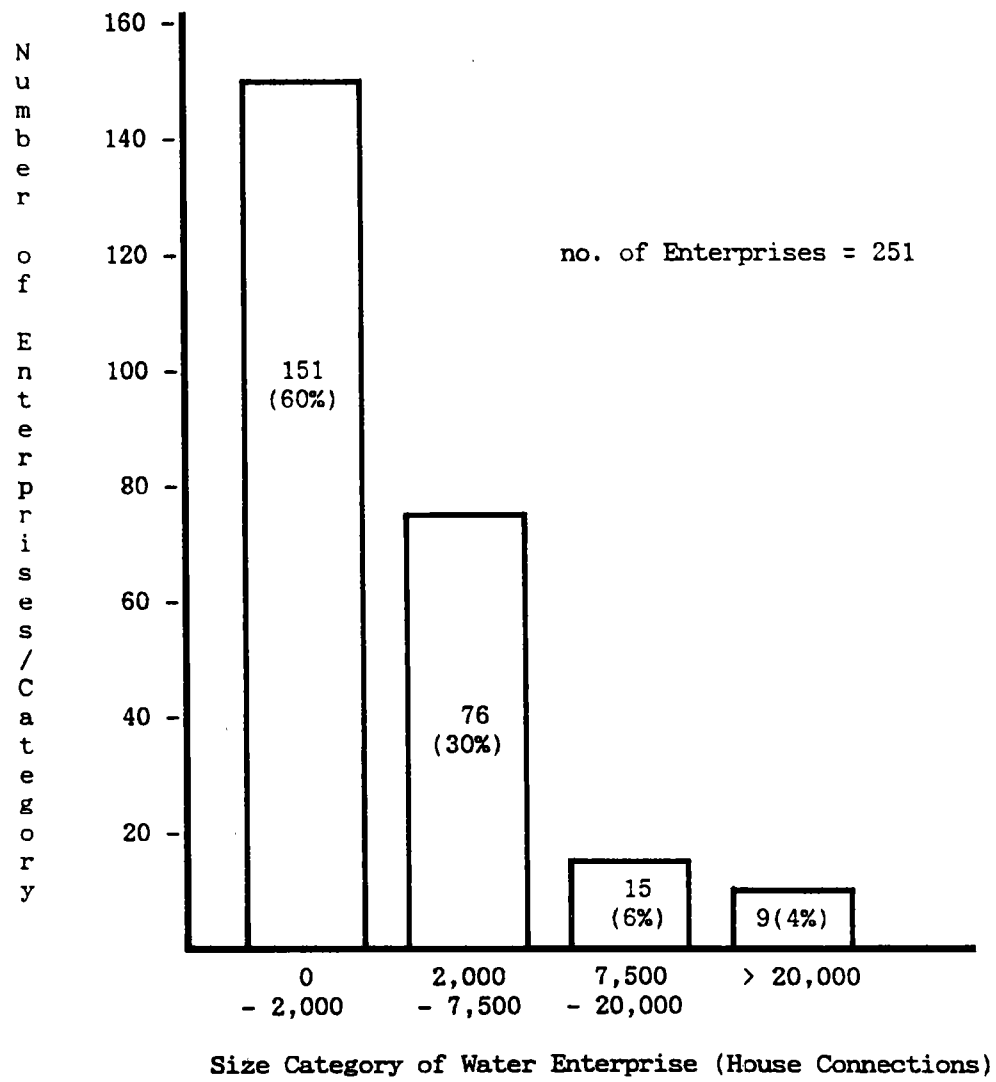
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Water enterprises in Indonesia  
Distribution of employees according to size of enterprise  
**Forecast situation mid-1989**



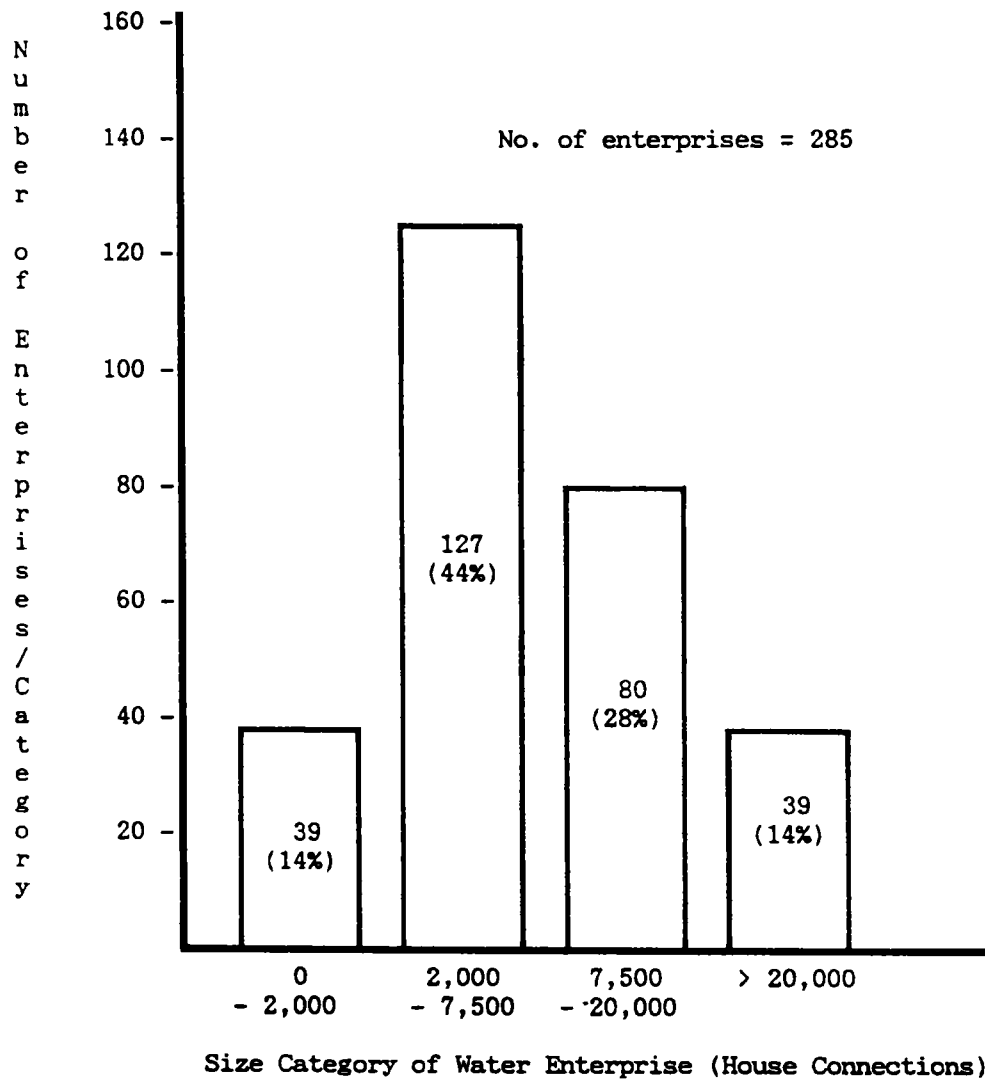
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Water enterprises in Indonesia  
Distribution of water enterprises according to size  
**Situation mid-1985**



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Water enterprises in Indonesia  
Distribution of water enterprises according to size  
Forecast situation mid-1989



Some titles  
in this series of  
Human Resources  
Development  
case studies

### **Managing the managers**

How the Philippines Local Water Utilities Administration monitors and supports General Managers of 350 Water Districts scattered all over the country.

### **Job descriptions prove their worth**

How a training package was developed during an Organization—Management—Training Project for 11 Indonesian cities and is now being applied nationwide.

### **Training programme gets a new profile**

How the Water Resources Institute in Tanzania reshaped its curricula to meet the country's need for skilled technicians.

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A copy of any of the above can be obtained by writing to the WHO. If you want more information about a specific case study, or the project, or maybe have ideas about HRD activities to be shared with others, please contact:

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