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Promotion and Support for Women's Participation in the International Drinking Water Supply and Sanitation Decade

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UNDP INT/83/003 - PROWWESS

CASE STUDY ON WOMEN'S INVOLVEMENT IN COMMUNITY WATER SYSTEMS: THE PKK EXPERIENCE

NTT Province, Indonesia

World Health Organization
South-East Asia Regional Office
New Delhi, India
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By

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for

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CHAPTER I

INTRODUCTION : NTT, THE CASE STUDY AND THE PARTNERS

1. THE PROVINCE OF NUSA TENGGARA TIMUR

The Province of Nusa Tenggara Timur (NTT) is in the eastern half of Indonesia. It has a population of 3 million people spread across 111 islands. The total land area is 48,879.98 square kilometers.

NTT includes the western part of Timor Island, Alor, Flores, Sumba and 97 other islands. Kupang is the capital located on the south western end of Timor. Administratively NTT is divided into 12 districts (kabupaten) and 98 sub districts (kecamatan). It consists of 1723 villages (desa).

The province has a warm climate. Some areas are humid but others are not -- NTT records the lowest rainfall figures in Indonesia. The average rainfall is 1500 mm/year. However there is a pronounced rainy season from November to March followed by a long dry season, April to November. That said, one must also mention that there is considerable variation from one part of the province to another. There can also be dramatic differences from one year to the next with rains in Timor sometimes not starting until late December or even later.

The island of Timor which is of non volcanic origin is divided longitudinally by a ridge with steep slopes which results in rain water rapidly running into the sea. Although soil formations vary, it is largely rocky with rich coral and limestone deposits. This results in limited arable land.

Despite the limited arable land and poor soil conditions, subsistance agriculture is the primary means of livelihood for 85% of the population. In 1984, compared to the national per capita income of US$ 500, the NTT per capita income was US $200. While there have been improvements since, NTT still lags behind national levels.

Ninety percent of the population in NTT is rural. According to a number of studies and statistical data estimates, in 1981, the monthly family income of a typical small farmer was Rp.41,900. However, on the average, only 50% of the income is cash income.

The average village has a population of 1430 people. Overall, 36% of the villages have a population above 1500, 31% between 1001 - 1500, 30% between 501 - 1000 and less than 3% have a population of less than 500. (Kantor Statistik, 1982)

According to data of the provincial planning board (1985 inter censial survey) there is a slight preponderance of men over women (1,501,311 women, 1,527,750 men). Under fives constitute 14.4% of the population. Overall 41% of the population is below 15 years of age.

According to official estimates, 65% of the population in NTT is literate (National, 71%) with 57% of the women able to read and write. Until recently, NTT along with many other areas distant from the National capital felt little impact from national development efforts.

Because of its remoteness together with a pattern of scattered population, historically it has been difficult to reach the people or provide services. However Government programmes and extension services now have contact with even the most remote communities.

2. HEALTH STATUS IN NTT

The overall health picture in NTT is poorer than the national profile. This is also reflected in a lower life expectancy of 49 years compared to the national average of 55 years.

In 1980 the infant mortality rate (IMR) in the province was high 124 (urban 56, rural 129), as compared to the national of 87. By May 1985 it had dropped to 104 per thousand live births -- significant progress but still high.

Hygiene conditions in the district are poor with limited access to water and low use of latrines. Overall it is estimated that new cases of faecal - oral and water washed diseases account for 15 - 35% of reported diseases . The four major causes of death in infants are:

1. Perinatal causes (non tetanus), including trauma and infection
2. Neonatal tetanus
3. Malaria
4. Diarrhoea

3. WATER SUPPLY AND SANITATION

A majority, approximately 80% of the rural population in NTT, still uses traditional water sources, such as springs, rivers, streams, ponds, irrigation channels and shallow wells. Most of these sources are polluted (DHV, 1985).

In the area of sanitation, reliable data are not available. Through Government efforts, many villages now have pit latrines. However, many are not used and because of poor design factors may be more of a health hazard than help.

The Government of Indonesia (GOI) has accepted the primary health care approach and through the Directorate General of Communicable Disease Control of the Ministry of Health has undertaken the enormous task of improving health conditions in the rural areas. One of the goals of this program is to provide access to safe

drinking water to 60% of the rural population by 1990.

Since lack of clean water is such a problem in NTT it has been the focus of attention of Government efforts in collaboration with various international, local non-government and church agencies. Local self help efforts are also playing an increasingly important role. However much still remains to be done.

a) **Institutions involved in water supply and sanitation**

There are several Government Departments involved in implementation of rural water supply programmes:

1. Department of Home Affairs,
2. Department of Health,
3. Department of Public Works,
4. Department of Finance
5. The Planning Board (at each level)

At the central level, these departments are mostly concerned with the formulation of objectives, targets, policies and strategies. At the provincial level, the regional offices of the various departments in addition to planning, provide general assistance for preparation and implementation of programs.

The Department of Health plays a central role in implementation of rural water supply systems. Its Directorate General for Communicable Disease Control (CDC) has a Directorate of Hygiene and Sanitation which is responsible for rural water supply. The Regional Health Office has a division of Communicable Disease Control which through its section of sanitary engineering is responsible for supporting rural water supply development in the province.

The Provincial Health Office and particularly its Hygiene and Sanitation section is responsible for the technical approval, guidance, supervision of projects as well as community participation and training for rural water supply projects. The actual implementation of rural water supply projects is chiefly the responsibility of the Hygiene and Sanitation unit of the district.

More recently, it has been decided that, in principle, complicated piped water systems will be designed and implemented by the Department of Public Works. The organizational framework for water supply and sanitation is depicted in Figures 1 and 2.

FIG. 1 : DEPARTMENTS INVOLVED IN RURAL WATER SUPPLY/SANITATION

GOVERNMENT OF INDONESIA

Dept. of Home Affairs		Dept. of Health	Dept. of Public Works		Dept.of Finance
D.G. Province/ District Govern.	D.G. Village Govern.	D.G. Commun. Disease Control	D.G. Cipta Karya	D.G. Water Res'rces	D.G. Budget ------ BAPPENAS

PROVINCIAL / REGIONAL OFFICES

District Offices

Sub District Offices

Rural water supply and sanitation program

Figure 2 : Organizational Structure of Dept. of Health for Rural Water Supply and Sanitation

Department of Health

D.G. Communicable Disease Control

Dir. Hygiene and Sanitation

Dir.Sanitary Engineering

Regional Health Office

Division C.D.C.

Section Sanitary Engineering

Provincial Health Office

Division C.D.C.

Section Hygiene & Sanitation

District Health Office

Hygiene & Sanitation Unit

Rural Water Supply and Sanitation Projects

4. CASE STUDY : "WOMEN, WATER AND SANITATION"

One of the major efforts since 1980 in the area of water supply and sanitation has been a WHO/UNDP (INS/78/052) project which has been collaborating with the GOI to develop a province-wide implementation plan for rural water supply and sanitation. The project has also tested, developed and implemented water supply and sanitation plans in pilot villages emphasizing community participation. As with any project much has been learned from successes and problems.

In 1985, NTT became part of an inter-country project, "Women, Water and Sanitation", (INT/83/003) funded by UNDP in the context of the International Drinking Water Supply and Sanitation decade (IDWSS) and intended to promote and support women's participation in community activity related to household water management and supply systems.

The **overall programme, "Women, Water and Sanitation"** has three objectives :

1. To increase access to and utilization of water in four villages in two sub districts

2. To increase the participation of women -- specifically decision making -- related to supply and management of community water.

3. To monitor, record and analyse the process and impact of these activities in order to learn from this experience lessons to be shared more widely for implementation or adaptation in other locations

In order to learn from this action programme involving women, a case study was constructed.

As stated in the original NTT proposal, the case study had two main objectives :

1. To analyze and evaluate the process and impact of women's involvement in water supply and sanitation in four villages.

2. To analyze the impact on both the functioning and utilization of the improved facilities and the well being of women themselves.

Two secondary objectives which have been important in NTT are :

1. To provide base line information for the development of the design of intervention.

2. To strengthen the research capacity of the two universities in Kupang.

a) Project coordination and management by PKK

The two sides of this programme -- case study and action programme -- have been carried out under the overall leadership and coordination of Dr. Nafsiah Mboi, Chair of PKK (The Indonesian Village Family Welfare Movement) NTT.

PKK (Pembinaan Kesejahteraan Keluarga) is a national movement which was born among the village women of Java and has, over the years, spread through other villages and urban neighbourhoods in Indonesia, including NTT.

At the village level PKK is the main vehicle for stimulation, support, organization and management of development efforts by women. It is an integral part of the national social and development system (though not a government agency) and has a place in the formal management of village affairs as one of the working committees ("section 10") of the village development council (LKMD). As officially constituted, PKK is not a membership organization but rather an open, development movement in which all women may be active.

In practice, however, this is not always understood: for example, there is confusion about leadership and there are still many areas/villages in which women talk about "being a member" or "not being a member."

Although the managers and primary movers in PKK are women of the communities served, PKK is not a women's movement in the conventional sense: an organization of women concerned with "women's issues." Rather, it is a movement whose concern is promotion of family welfare/well being in the context of the overall development of the community.

Aside from the action of ordinary women and their families in community programmes initiated by PKK there are two special groups of PKK women :

1. Members of the action team (the management board) at each level

2. Kader, the village volunteers who have been trained, for example in health and nutrition and, on a volunteer basis, stimulate and lead activity.

PKK is relatively young as an active movement in NTT, having only begun intensive organizational development and village programming in 1979. Since that time, PKK NTT has given priority to work in three areas :

-- Health, including water and sanitation: nutrition: family planning.

-- Education, with particular emphasis on basic literacy training and skill training for economic activity.

-- Income generation.

To facilitate the village activities mentioned above and in addition to them, PKK NTT has had an on-going programme of institution building (leader training, regular consultation meetings etc.) intended to strengthen organizational aspects of the movement. There is also an on-going effort to promote and maintain dialogue with local government and NGOs.

PKK works very closely with government, both technical departments and local administrators : on the one hand getting technical advice and some financial support through a regular annual subsidy (village, sub district, district) and through programmes of some government departments and on the other hand providing information, experience, organization, wo/man power for training and overall management and implementation of village level government programmes related to or involving women.

However, PKK is, in no way, limited in its work to support/ participation/management of government programmes. It has a broader work programme and government and NGO support not withstanding, the emphasis in PKK NTT is on mutual self help activities initiated and carried out by women/families in the village with available resources.

b) Institutional cooperation for the execution of the case study

In view of the critical importance of water in most parts of NTT and the strategic situation of PKK in provincial development efforts -- community based but with close ties to government -- project design and structure for "Women, Water and Sanitation," (including the case study) emphasized inter agency collaboration:

- -- International organizations (UNDP, Ford Foundation, WHO)
- -- Government administrators (provincial, district and sub district)
- -- Government departments (Home Affairs, Health)
- -- Two local universities (one government and one private university)

The link between the case study and the intervention or action project was vital for both projects and was facilitated by the fact that PKK is the executive body for both projects. A workshop in Bangkok, May 1985 (WHO/UNDP) further facilitated this process by bringing together both "intervention" and "case study" participants. This clarified to both partners their basic needs and the limitations under which both projects would have to be implemented.

The case study in NTT was headed by a consultant, Chief investigator working with an Indonesian counterpart, a senior faculty member from Nusa Cendana University and a team of 9 men and women (senior students and junior faculty) from two Kupang universities, Nusa Cendana University (government) and Widya

Mandira Catholic University (private).

Close cooperation was also maintained with the Ministry of Health and with the WHO/UNDP Chief Technical Adviser in Kupang.

c) Funding

The case study in NTT has been funded/ supported by

-- Ford Foundation

-- WHO - SEARO
-- Provincial office of the Health Department

-- UNDP/ WHO Rural Water Supply Project

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5. Execution of the case study

The case study involved two main rounds of field data collection. The first period of data collection was from September to November 1985. Based on data from the field work, tentative action plans for improved water supply were developed and implemented in partnership with communities in the four selected villages.

Process of recruitment of field workers and creation of WSS (Women, Water and Sanitation) teams at all levels of PKK started in January 1985, followed by training of field workers, organizational work in the villages and construction in late 1986. Organizational and construction work in the villages still continues.

The chief investigator was kept informed about progress and problems in the process of implementation. The final round of field data collection was carried out from August to September 1987. Reasons beyond the control of the project made it necessary to collect data in August/September rather than a little later in the dry season.

Results from the first round of data collection have been reported in detail in "Case Study Report: Women, Water and Sanitation, An action study programme by PKK Propinsi, NTT, Indonesia (Narayan-Parker, September 1986). This report is based upon both rounds of data collection and incorporates some findings from the baseline study. However for indepth information about the setting prior to concerted organizational efforts by PKK in the four study villages, the reader is referred to the 1985 study.

In Bahasa Indonesia, the term "Women, Water and Sanitation"

translates into "Wanita, Air dan Sanitati." The water activities associated with PKK efforts in the four study villages came to be locally known as "WAS". Hence this abbreviated term will be used throughout the test.

CHAPTER 2

RESEARCH METHODOLOGY

1. SETTING

Any research project works within certain constraints the most important of which are time, finance, available human resources and the existing information base. A challenge of this case study was working under severe limitations of all of the above.

At the outset it became clear that field work would have to be limited to 4 - 5 weeks in the first round and be even more severly limited (20 days) in the second round. During this time four villages would have to be assessed. It was also clear that no single methodology would get to the complexity of interrelated factors affecting women, water and the community. The dual focus in the first round, i.e. gathering pre-intervention data, plus data that would help the action team develop their project further complicated the task.

The team consisted of the chief investigator, her interpreter, and 7 to 9 other members being trained in the research process. Various strategies for undertaking field work were considered.

Eventually it was decided to work in the village as a team for short, intensive periods rather than dividing the team up into smaller groups placed simultaneously in different villages for longer periods. Several factors pointed to the need for keeping the team together, especially during the first half of field work.

1. During pre-testing large inter-village differences were found which meant that on the spot decisions would have to be made to adapt, or to drop methodologies or sections thereof to suit village specific criteria.

2. Field workers were relatively inexperienced. Although individuals can be thoroughly trained in one or two specific techniques, it is impossible to train people in a short time to become anthropologists or sociologists. Hence there was need for some specialization within the team to assure quality data from all methodologies.

3. Most of the villages were scattered over a large geographic area. Within the project villages distance from one end to the other end was often 15 - 20 kilometers over hilly terrain. This meant that the team could be easily absorbed into different parts of the village without the community being overhelmed by the sudden descendance of a "team". It also meant that team workers would not usually need transport.

4. Although it is commonly believed that people from villages close to capital cities, usually can speak Bahasa Indonesia, the national language, this was far from true in the project villages.

   Three other languages were encountered which necessitated the use, selection and training of interpreters. Overall far fewer women compared to men were fluent in Indonesian.

5. Some methodologies such as observation of water collection necessitated finding and training of local people. This again called for some supervision by the chief investigator.

6. It was also obvious that team members would need constant support and guidance during field work and would function better under such conditions rather than in relative isolation.

7. The task of the chief investigator, supervision of team members plus data collection would have been impossible with a very scattered team.

For field work, the team was divided into pairs with a male and a female member. Each pair was placed in a different dusun in the village. If a dusun was particularly large the size of the residential team was increased. All team members lived with families scattered throughout the village. Special efforts were made to ensure that team members did not stay with local leaders.

By the time field work was completed in two villages, the team had gained experience and confidence. For the last two villages visited, the team was divided into two, with the chief investigator travelling and staying in both. However, team members had to do more moving around between dusuns in their villages.

2. COMPOSITION OF THE TEAM

In 1985 the team consisted of five male and five female workers plus the chief investigator. Except for the foreign chief investigator who worked through an older, male interpreter, the rest of the team spoke fluent Indonesian. One female member spoke Dhawan, the language of the Timorese people. An additional person was added on the team for field work in the northern villages to act as an interpreter for Tetun speaking people.

The 1987 round of data collection was done by 8 field workers, 6 of whom had participated in the 1985 case study. Fielding most of the old case study team was a great boon in rapport building and gaining acceptance in the villages. The team was headed by the same chief investigator as in 1985.

3. SELECTION OF THE VILLAGES

Villages were purposefully selected after extensive discussions with WHO/UNDP, officials of the Ministry of Health, and PKK at

the provincial and district level. Given financial contraints , it was decided to select two villages from Kupang district and two from Belu in the north central part of the island of Timor. Villages were selected to provide a wide range in terms of size, accessibility and the existing water supply and sanitation situation. Since PKK was to be the chief implementing body at the village level, an existing PKK structure was an additional consideration.

All the villages selected were relatively poor with low levels of development. In Kupang district, the two villages were Sillu and Naunu. Both are approximately 45 kms from Kupang. The two villages in Belu were Takirin and Sarabau, approximately 30 kms from Atambua, the district capital and 300 kms from Kupang.

4. RESEARCH TECHNIQUES

An attempt was made to obtain in depth, qualitative information on a variety of issues. However with 7 to 9 people interviewing, it was felt that it was important to establish some uniformity in approach.

Hence the methodologies were structured but questions themselves were open ended, allowing rich variation in answers, clarified by further probes. Altogether 15 different techniques were used, with some specialization within the team according to personal preferences, sex appropriateness and quality of work.

The team was extensively trained in the various techniques, especially in interviewing. The training was continued till the quality of work of all members was consistently high and some uniformity had been achieved in methodologies across team members.

Standard procedures of pretesting, translation, and back translation were followed in developing the research instruments.

Some interviews even by Indonesian team members were done through interpreters. Prior to field work it had been decided to bring in outsiders as interpreters. However, in the field it became apparent very quickly that local interpreters would be less threatening and their presence would help in establishing rapport. Interpreters were locally selected and trained. Again no one who was in any influential position or considered a leader served as an interpreter. Interpreters were always the same sex as the interviewer and respondent.

Data were collected at two points in time, prior to project implementation, in September-November 1985 and after a year and half of project implementation, in August-September 1987.

Data collection methods during the two phases shared some methodologies while some methodologies were unique to each phase. Hence the shared methodologies for the two phases will be reported together while methodologies unique to each phase will

be reported seperately.

5. DATA COLLECTION TECHNIQUES SHARED IN 1985 AND 1987

(a) Household interviews

Preliminary trials to develop a culturally appropriate, open-ended interview schedule were done in June 1985 followed by 6 pre-testings, in September 1985 in Kupang district. The number of pre-testings were unusually high because of the need to cut down on the number of issues addressed, their cultural relevance and the uniformity or lack thereof of information obtained.

Sharp intervillage differences in interviews necessitated further pre-testing in different villages.

Interviews in 1985 usually took an hour and a half with some interviews running as long as 2 hours. In 1987, interviews usually took an hour.

All interviews were carried out in privacy, often under a tree, in the back of the house or at night. Men interviewed men and women interviewed women.

Information gathered during interviews in 1985 included a brief demographic history, women's daily activities, emotional quality of life, sources of income, qualities of a good women, knowledge about PKK, leadership patterns, water sources, their advantages and disadvantages, desired quality of water, community participation, sanitation facilities and perceived differences between men and women.

In 1987, the household interview schedule used in 1985 was repeated with some changes. Questions addressing demographic, socio economic background issues were not asked. Since a majority of the questions asked in 1985 were repeated in the same form in 1987, they provide a sound basis for comparison of the group over time.

In 1987, a section consisting of 25 questions related to water user groups was added to the end of each interview. These questions related to the history, formation and functioning of water users' groups. Different questions were asked of people depending on whether they belonged to a group or not.

Besides being open ended, the interview formats had three other important features which played an important role in eliciting information that was reliable rather than information that was loaded with "socially desirable answers".

Although the primary purpose of the interviews was to understand the water supply, sanitation situation, functioning of PKK and lives of women, nonetheless, the purpose of the interview was stated in general terms to better understand

the lives of men and women in the villages.

In addition, direct questions especially about water and sanitation were avoided. Thus, at no point were people asked directly if water was a problem. Information about severity of water problems was obtained indirectly through other general questions such as daily activities considered difficult or problems affecting family life.

Lastly careful attention was paid to the sequence of questions so that, for example all questions about PKK were asked after general questions about women's abilities. However, the two were separated by questions focusing on water supply. Any information obtained during interviews that appeared unusual was cross checked further with independent sources.

Sample selection for household interviews

In order to understand women's lives and roles, it is essential to talk not only to women but to men as well. It was important to elicit not only women's self perceptions but also the perceptions of men about women's roles and abilities and perception of women about other women.

In each village, in 1985, a 20% sample was obtained. An equal number of interviews were done with men and women. The sample was selected using the village register.

The starting point was determined by randomly selecting a number from 1 to 5, the length of the interval. Male and female interviews alternated i.e.if household 1 was a male interview then, household 6 was a female interview.

A few criteria were further adopted to determine if an individual qualified for an interview. Interviews were conducted only with household heads or their spouses. An interview was done only if both members of a couple were alive and were currently living together. Further to qualify for an interview, a person had to be between 17 to 65 years of age.

All villages (desas) are divided into 'dusuns' or wards. Dusuns are often geographically isolated. Each dusun is further divided into Rukun Kampungs which are subdivided into RTs (Rukun Tetangga). Each of these has its own head or leader. Since it could not be determined beforehand, where improved water systems would become operational, all dusuns RKs and RTs were sampled proportionate to their population.

Altogether in 1985 252 interviews were conducted, of which 129 were done with women and 123 with men. The distribution by village was as follows : Sillu, 97; Naunu, 57; Takirin, 63 and Sarabau, 35.

The sample interviewed in 1987 was the same as in 1987. Some

new people (12) were added to the sample (nearest neighbor to the right of household sampled in 1985) when the person sampled in 1985 had moved, was ill, away from the vilage or had died.

The total sample size in 1987 was 240, with 122 men and 118 women. The distribution by village was as follows: Sillu, 81, Naunu, 158, Takirin, 64, and Sarabau, 37.

(b) Observation of household hygiene

Personal hygiene and hygiene related to water are impossible to assess reliably by direct questioning. This is especially true in areas where people, through health education, know what they 'should' do but may not practice advocated measures.

Hence at the end of each female interview, female interviewers would casually walk around and look at the house, especially at the kitchen and latrine.

Overall household sanitation was rated on a three or five point scale. Quality of water was assessed by visual inspection of water storage containers and dippers, and whether a young child could reach water containers unassisted by adults.

Men did not rate household hygiene because it would have been inappropriate for them to show interest in or enter the kitchen. Thus 112 households (all except three the same) were observed both years using the hygiene observation schedule.

(c) Key informant interviews

Key informant interviews were conducted by field workers and the chief investigator in 1985 and primarily by the chief investigator in 1987.

In 1985 the primary foci of these interviews were on history of the village, PKK, local institutions and leadership.

1) History of the village and PKK, 1985

An open ended format was used to guide interviews with older men and women about the history of the village and history of water sources. Each team member usually did two interviews on each of these topics.

In addition, female team members interviewed two or three women about PKK and its activities. These interviews were helpful in getting a historical perspective that would otherwise have been impossible during such short stays in the villages.

Interviews with women about PKK were extremely useful in judging outreach and impact of PKK.

2) Local institutions and leadership, 1985

Any project that envisions community participation must understand the strengths and weaknesses of the village level institutions and its leaders.

The chief investigator spent time conducting private interviews (often multiple interviews with the same person spread over a period of time) with all the village heads, dusun heads and other influential people including traditional(adat) leaders, ex-Kepala Desas (village heads), headmasters, priests, traditional healers.PKK leaders, PKK cadres and water diviners.

In depth information was also obtained on the functioning of the LKMD (the village planning and executing body), PKK and any other existing groups.

Information was also obtained on rituals, myths, beliefs surrounding water sources and local beliefs and understanding of why water dried up in certain places or why a particular hydraulic ram or piped system did not work. Any controversial information was cross checked with several sources and sites were visited.

3) WAS and PKK, 1987

The foci of key informant interviews in 1987 were slightly different. Open ended interviews were conducted by the chief investigator with formal, informal leaders, members and leaders of water users groups and of PKK. The focus of these interviews was on the history and functioning of "WAS" (wanita, air, sanitation, the Indonesian equivalent of women, water and sanitation) and water groups.

Interviews were also conducted with leaders of local institutions and with those in known opposition to formal leaders. As before these were invaluable in understanding the political and social context within which "WAS" activities had been undertaken.

(d) Group meetings without visual aids

Both years, in each village, a public meeting had been arranged at the village office, to introduce the team and their activities. In Sillu and in Naunu, both years, the meetings were poorly attended and consisted of village officials. Since the villages are scattered, team members were sometimes received with suspicion as people obviously did not know why the team was there.

Hence greater efforts to hold community meetings were made for the northern villages. In 1985 in Takirin the meeting was attended by more than 300 men, women and children and in Sarabau the team was greeted by dancers and had a great

following!

Attempts to hold group meetings with PKK women were not successful in 1985. In Sillu two women showed up. In Sarabau and Takirin an attempt was made to talk to women when they were informally gathered. These too were not very helpful in eliciting information. However they provided valuable insights in group dynamics! No attempts were made to have group meetings with PKK women in 1987.

(e) Water collection

Information about who collects water, how much water is collected, how many times is water collected, which sources are used, how long does a water journey take etc. was gathered by observation. Additionally some of the same information was obtained during household interviews.

The IRC (International Reference Centre) publication "Evaluation for village Water Supply and Planning" (1985) was used to guide the water collection and water use methodology. The major constraint was time.

Since houses in the villages are scattered over large distances and they usually use multiple sources, it was decided that observations would be done at homes rather than at sources. It was also decided that observations would be done for a minimum of three days and if possible for four to five days.

Water collection data were gathered by local women and girls (with an occasional man) who could read and write. These groups were trained in each dusun the day before data collection. Each person was given a three litre bucket and a measuring glass to help in estimation of quantities.

In 1985, in Sillu, and to some extent in Naunu, the work ran into trouble. Where problems were detected early, people were changed or retrained and the whole excercise was done over.

In Takirin (1985), as the water collection got underway, a series of large traditional pestas (celebrations) took place which lasted for three days. These involved most families in the village and hence water consumption patterns for those days were not typical. Hence water collection and water use observations had to be stopped early in two dususns in Takirin.

A simple, single page format was developed to record data for each household day observed. Information obtained included size and type of container, quantity of water, time taken, sex and age of person making the water journey and activities at the water source.

In each dusun, observation was started at one end of the dusun, usually near the major water source. In each dusun between 4 - 8 people collected data under the supervision of team members. One house was randomly selected and then 3 - 5 other houses nearest to it were included for observation. On the second day the teams moved to a mid point in the dusun on the third day to the other end of the dusun and repeated the same process.

The basic procedure was the same in all dusuns, but varied a little depending on the number of people observing and the number of days they were available.

Overall the 1985 results are based on 609 household days of observation and 1516 water journeys.

In 1987, the above described procedures were repeated. The water collection observations were conducted on the same households as in 1985.

The 1987 results are based on 612 household days of observation and 2,695 water journeys.

(f) Water use

Water use data were collected in conjunction with water collection data. Team members who supervised the water collection team, asked questions and measured quantities of water used for different purposes from 12 households over a period of two days.

Some alterations were made from the procedure recommended by Cairncross et.al. (1985). Cairncross et.al. recommend a minimum of two days for a water use study per household, It was felt that it would be more useful to observe 12 different households for water use rather than 6 households for two days.

For each household being observed for water use,observers made three visits, in the morning, late afternoon, and very early the following morning to obtain information about water use in the evening and night. Thus complete information was obtained for one full day from each household by adding an early morning visit on the day following the full day of observation.

Water use proved to be the most disliked activity among team members because of the precision demanded in measuring and estimating quantities of water used for different purposes. After experiencing difficulties in Sillu in 1985, all the men except one stopped doing water use data collection while only two of the women discontinued the task. Each person used a measuring glass and a three-litre bucket to estimate quantities.

Only those households which were being observed for water collection were selected for water use. The procedure of household selection was purposeful to try and get as much variety in households selected as possible vis-a-vis distance from water sources, observed prosperity of the household and number of household members.

The procedures and the households sampled were the same in 1985 and 1987. The 1985 data are based on a sample size of 117 households while the 1987 data are based on a sample of 119 households.

(g) Written records

All the villages have some statistics available relating to demography, number of toilets, occupation etc. In addition some offices have records of membership files for PKK. These were reviewed in the villages. Other documents related to water supply were also obtained from WHO, the Ministry of Health and from TP PKK Prop NTT (the provincial action team of PKK).

In 1987, files of the WAS action team at the provincial level, provided much information on planning, training, and organization implementation of WAS activities.

(h) Site visits

In both year site visits provided invaluable assistance in understanding people's description of water sources and related problems. All drinking water sources were visited in 1985 while all sources in which there had been any reported changes were visited in 1987.

6. Research techniques used exclusively in 1985

Some information collection techniques used in 1985 were not repeated in 1987. The main criteria to assess whether information would not be collected again in 1987 were: 1) degree of centrality to assessing impact of WAS or change in the villages; 2) degree of change that could be expected in the information; and, 3) relative to the importance of information the time it would take to collect information.

This resulted in some techniques being used exclusively in 1985. These include the following:

a) Mapping

Male members of the team mapped the dusuns together with the help of local residents, always men. The maps depicted the major features of each dusun and its water sources. In some dusuns, there are numerous little springs near the fields. Usually these are not used for drinking. Hence, these were not been included in the maps. In some dusuns, maps were made

by local residents and then discussed with team members.

These maps were extremely useful to the action team and to the technical departments in helping them assess possible physical improvements and implementation strategies.

(b) Semi projective techniques

Although the purpose of any water supply and sanitation intervention is an impact on health, it was decided that obtaining reliable health statistics would be extremely time consuming and not central to the project. On the other hand it was felt that information on health-related issues was extremely important to guide the development of any health education activities and to provide information on health-related practices.

In the area of health, direct questioning often elicits socially desirable answers depending upon the contact of the group with health educators and on the sensitivity of the particular issues addressed. Hence, it was felt that more indirect techniques would be appropriate and would also break the monotony of interviewing.

Pictures that are culturally appropriate can be used in a variety of ways as stimuli to start a discussion or to elicit perceptions.

Ideally this case study should have developed its own pictures but because of time constraints, it was decided to try to use already existing pictures.

PKK in NTT has been using a set of cards related to nutrition and health that were developed by UNICEF, Indonesia. However, it was felt that many of the pictures and concepts, appropriate for use in Java might be of doubtful relevance in NTT.

Through a series of pre-testing, it was decided to use 26 cards (mostly UNICEF cards) without any writing. Some additional cards were added to balance out positive and negative pictures. The pictures were re-drawn by a local artist to make them more appropriate in the NTT context.

The pictures were used to elicit people's concepts of good health, poor helath in children and practices associated with good and poor health. The game was introduced by showing the respondents four pictures, one of a healthy baby, one of a baby having diarrhoea, one of a healthy child playing ball and one of a sick child vomiting worms.

The respondents were asked to identify the sick and the healthy children and were then asked how they knew that the child was sick or healthy.

This was followed by giving the participants 22 other cards after mixing them up. The respondents then had to sort them out according to whether they thought the activity/condition pictured led to or was related to good health or poor health and illness. This procedure enabled the team to tap some of the health-related issues in a manner that was more interesting, involved people actively and discover their framework.

An additional important task was to test people's perceptions of the pictures and to see whether the pictures were perceived in the manner they was intended.

Sample selection

Ten percent of the population was sampled using the health pictures. It was decided to include more women than men. Hence two thirds of the sample consisted of women and one third of men. The sampling procedure was identical to the household interviews although no attempt was made to involve the people already interviewed.

The issues covered include use of toilets, washing of hands, nutrition, vegetable gardens, sickness, care of sick children, perception of doctors vs traditional healers, breast and bottle feeding, immunization, baby weighing, garbage disposal, ORT etc.

The pictures were administered by four of the female team members and two of the male members. Results are based on 119 interviews using pictures.

(c) Children's questionnaire

It is widely recognized that it is not only women but also children who are the primary carriers of water. It is also widely recognized that unless the entire population of a community benefits from a water supply project, health impacts are difficult to discern. For example, if water and sanitation facilities used by school children are not improved, it is doubtful if their health will improve.

However, few studies include children directly in their sample or try to gauge their awareness of water and health-related issues.

In studies working under severe time constraints, talking to children is a quick and reliable way of gaining insights into cultural complexities and in assessing a situation. Children are much less prone to give socially desirable answers.

In the present study, a simple questionnaire was developed which was administered to 11 - 15 year olds in their classrooms.

Questions were kept simple and generally did not require extensive writing. They related to water sources used, who brought water in the family, differences in sources in the rainy and dry seasons, care of younger siblings during diarrhoea, water and sanitation facilities used when the children were at school and their perceptions of differences between abilities of men and women.

Altogether 201 questionnaires were completed. However 169 were analyzed. The rest were dropped as they were completed by children belonging to villages other than those included in the study.

(d) **Water quality tests**

Water quality tests for total coliform count were carried out in all four villages in September 1985. The testing was carried out by the Ministry of Health in close cooperation with the research group. The membrane filtration method was used.

Samples were taken from 4-6 of the most frequently used water sources from each dusun. They included springs, wells, rivers and piped systems. For springs, samples were obtained from the source and from the bamboo outlet from which people took drinking water. For the piped systems, samples were obtained from the spring source and from the pipe outlet.

For each each sampled, samples were also obtained from four households using that source. Within each household, samples were collected from the water container in which water was brought from the source, the container in which water was stored at home and from the drinking water container. Notes were also made on the types of containers and whether the drinking water was supposedly boiled or not.

Unfortunately, for a variety of reasons, test results were not deemed reliable. Water quality tests for fecal coliform were repeated on a smaller scale in July 1986 and gave satisfactory results.

(e) **Technical assessment**

The Chief Technical Adviser from the WHO/UNDP NTT rural water supply project visited all four villages to assess the technical quality of existing systems and to provide guidance on possible technical options for the future.

In addition, in Takirin and Sarabau, he visited innumerable springs in the mountains to assess their potential for future gravity feed water systems.

7. **Research techniques used exclusively in 1987**

Water users groups did not exist in 1985. They were created

by WAS and were the main vehicle for community involvement in all phases of improving or creating a new water supply system. Hence in Phase II of data collection, in order to understand the implementation process, it was extremely important to understand in depth the functioning and dynamics of water groups.

However, several factors pointed to the need for creating some new methods/materials, other than those already used, for assessing these issues.

Three key issues in addition to trying to estimate numbers of people belonging to groups and understanding their perception about groups were identified as important. These were: 1) Who makes the decisions in the groups; 2) Do men and women feel that women have changed or gained in self confidence, participate more at meetings, etc; and, 3) How do members of a group evaluate themselves.

It was also felt that group meetings with water groups were important to reveal inter-personal group dynamics which often become clear very quickly when one is observing a group in action.

However several factors pointed to the limited utility of conventional discussion groups. Past experience had clearly shown that the strong tradition of spokespeople and deference to authority, result in group discussions really being a restrained dialogue with one or two people.

Given severe time constraints, the cultural context and desire to get members of a group to talk, participate and evaluate themselves, three participatory techniques were evolved, each focusing on one key issue.

Three games or activities were evolved which used pictures and photographs as the focus for group discussion. Brief descriptions of these games follow.

a) Decision making

The purpose of this activity was to find out user's perceptions of who made decisions in the group or for the group. WAS field workers had reportedly made a concerted effort to be facilitators and not leaders. A major part of this effort was to ensure that decisions which affected the group were made by group members themselves.

Field workers, in their monthly reports made frequent mention of the fact that groups were making their own decisions. Did group members feel the same?

In order to answer the above question, an activity was evolved which used a flannel pocket chart and six pictures which could be attached in the top row of the pocket chart.

The six pictures, 5 drawings and one photograph depicted different decision makers, ordinary women, ordinary men, female leader, male leader, group and the village WAS field worker.

Each person in the group was given six, small round paper discs to answer six different questions. Questions included who selected group leaders, who decided on location of standposts reservoirs or pipes, who was responsible for repair, etc.

Once each individual had cast their vote, the totals were tallied. The groups usually were made to face away from the pocket chart to encourage individual voting. If the groups were fairly large, more than 12, sub groups were formed, men and women were also separated into different groups.

The activity generated great interest, enthusiasm and allowed eveyone in the group to participate.

b) Women's self confidence

An important though difficult to measure indicator of change in women through their participation in development activities is a heightened sense of autonomy, efficacy, and self confidence and decreased shyness.

Once again, although women in the villages were reported by sub district and district PKK workers to be less shy it is important to gauge if village women themselves and village men perceive their women as being more self confident.

Once again, the activity was undertaken in groups and the procedure was similar to the decision making game. However, the pictures were different.

Duplicate sets of three pictures (drawings) of a woman were used. The first picture showed a woman too shy, unsure of herself to join a group, the second, a womam too shy to speak in a group and the third, a woman speaking in a group. The first set was shown with a photograph of an unimproved source while the second set was shown with an improved water source.

Women rated themselves personally while men rated women (in the group), prior to WAS activities and at present. The activity was a little more difficult than the previous game because of the introduction of time sequencing. However, it too generated wild enthusiasm especially among the men!

c) Self rating of group functioning

This activity not only resulted in self rating of individual functions or components of groups but also an overall self rating by a group of its functioning. This rating can be compared to those given by "external experts".

The activity consisted of seven pictures which were given to a group along with three stars varying in size representing very good, average and poor (rating of a group function or activity).

The group was asked to discuss each picture and then rate the activity or function or person under a star. Once all the pictures had been rated and some consensus reached, the group had to explain their ratings. This led to further discussion of ratings and brought to light factors which had not been talked about in more direct informal conversations.

At the end of these discussions which lasted from 20 minutes to two hours, the group gave themselves an overall rating, how effectively the group perceived itself to be functioning.

The pictures included collection of monthly dues, future plans, group cooperation, interpersonal relatons within the group, sanctions, support from leaders and PKK field workers.

All these activities were extremely useful in generating group discussion and involvement and in raising people's awareness of some of the strengths and weaknesses of the groups and future tasks.

In many groups, women were initially reluctant to participate in the meeting and would say "we cannot participate because we cannot read and write." In every group after the activity was explained people were given the option to not participate. Not a single person left. Some spontaneous comments from women were "we liked this method, because we don't have to read and write but we are forced to think and learn about how other people think." "This is a good method because everyone can give her opinion even those who are not brave enough to talk."

"This is a clever method because you can learn about how we think!"

d) Discussions with PKK implementators

Detailed meetings, individually and in groups, were held with PKK implementators of "WAS" activities at each level from the province to the village. These meetings were used to understand how the various phases of water supply activities were implemented, to discuss findings from village stays and to gauge individual efficacy, interest and commitment to "WAS goals.

8. ANALYSES OF RESULTS

Most of the data from household interviews, children's questionnaire pictures and observations of household hygiene were coded for computer analyses. Coders were trained till a high inter-coder reliability was established (98%). Some data

were tabulated by hand while some were qualitatively analyzed.

Statistical analyses for all sets of data consisted of frequencies, percentages, chi-square tests and analysis of variance where appropriate. All the data were tested at the .05 and .01 levels of statistical significance.

Data from observation of water collection, water use as well as data from participatory research techniques were tabulated by hand and checked for accuracy by independent tabulators.

CHAPTER 3

DESCRIPTION OF THE VILLAGES

Four villages in Timor were purposively selected to represent relatively poor villages that lacked improved water systems. The four villages were Sillu and Naunu in the district of Kupang in the South and Takirin and Sarabau both in Belu in the North.

Detailed descriptions of the villages including their facilities and the functioning of their local institutions can be found in the 1985 case study report. However, brief descriptions of the villages are included in this report to understand the setting in which the "WAS" activities were undertaken.

Each village is headed by an elected Kepala Desa or village head whose term runs for 8 years. Each dusun is headed by a Kepala Dusun or Dusun head. Each dusun has further subdivisions into Rukun Kampung which are further subdivided into Rukun Tetangga. Each of these subdivisions also has a leader or head.

The administration of each village is carried out by the Kepala Desa who is assisted by the LKMD, the elected village development council. The Kepala Desa is the chairman of this committee.

The LKMD consists of 10 sections each with specific duties and section leaders. Section 10 is PKK. LKMD includes the village officials, traditional (adult) leaders, clergy and usually school staff.

Each year LKMD has several meetings to plan village development activities. One of the important functions of the LKMD is to develop a plan for the use of the annual village subsidy of Rp 1,250,000 including RP 250,000 for PKK.

The majority of people in the villages are engaged in farming and raising of cattle. All villages have small shops which sell basic food commodities, kerosene, soap, etc. Major markets are outside the villages ranging from 3 to 15 kms away. A Puskesmas (health clinic) is also between 3 to 8 kms away from each of the four villages. All the villages have one or more churches and primary schools.

SILLU

The desa of Sillu is approximately 50 kms North of Kupang in the Fatuleu subdistrict. It is spread over an area of 160 square kms and it is approximately 30 kms from the first dusun to the last (Refer Map 1). Sillu is approximately 5 kms from the sub district capital of Camplong.

Within the village the terrain is hilly and the road is a mud and

boulder track. In the rainy season, Sillu is inaccessible except by truck and by foot. The total population of Sillu is 1889. Sillu is divided into four geographically separate dusuns (ward). The dusuns are Tunmuni (pop. 589: total number of households, 136), Oelhaususu (pop. 354: 81 households), Enokaka (pop. 427, households 84) and Tuamnanu (pop. 514: households 130) (Table 1).

TABLE 1 : DUSUNS OF SILLU

NO.	NAMES OF DUSUNS	POP.	TOTAL NO. OF HOUSEHOLDS
1.	Tunmuni	594	136
2.	Oelhaususu	354	81
3.	Enokaka	427	84
4.	Tuamnanu	514	130
	Total	1889	431

Water supply (prior to WAS)

Traditionally, people obtained water for all purposes through a variety of unimproved sources the primary of which are springs and hand dug wells. Some households also used rivers, small water falls, and small holes dug in the sides of rivers.

Through Government assistance three boreholes were drilled prior to 1985. One was completed in 1982 while the others remained incomplete in 1985. The one completed borehole broke down in November 1984 and remained unrepaired in 1985.

A hydram was also built in Sillu in 1982. However the project was unsuccessful as the water pressure was insufficient to reach the reservoirs built close to the roads. There were no water committees in Sillu in 1985 although some of the springs were occasionally cleaned by the users.

Sanitation

Almost every household and every public building had a toilet in 1985. These consisted of shallow pits in the ground with usually straw, palm leaves, hard cardboard or wood coverings for walls. Some of the toilets had doors of wood but more frequently consisted of a burlap or cloth hung across the portal. Most toilets were square while some were spiral shaped. Most had at least partial roofs. None of the toilet holes had covers or ventilation pipes.

In Sillu, it was estimated that not more than 20% of the population used the toilets regularly in 1985. Those who did use

toilets regularly tended to be village officials, clergy and school staff.

Toilets when used regularly tended to be smelly and attracted flies. Such toilets in addition had pits which were full of larvae.

NAUNU

The village of Naunu is also in Fatuleu district and is about 12 kilometers before the turn off to Sillu. It lies just off the main road going through Camplong.

Naunu is approximately 40 kms from Kupang and lies just before the main town of Camplong. Although Naunu consists of four dusuns, for the purpose of this project only three dusuns will be considered (Table 2).

TABLE 2 : DUSUNS OF NAUNU

NO.	NAMES OF DUSUNS	POP.	TOTAL NO. OF HOUSEHOLDS
1.	Oeltuni I	372	62
2.	Oeltuni II	408	68
3.	Oebola	1441	164
	Total	2221	294

The total population of Naunu including three dusuns is 2221. The three dusuns are Oeltuni I, Oeltuni II, and Oebola.

Oeltuni I and II are spread across approximately 3 kms down a steep, mud track on either side of it. Between Oeltuni I and II and Oebola there is a forest area. Oebola is approached by a road after going through Camplong. Hence it is geographically quite distinct from Oeltuni I and II. Because of this geographical separation, it was unfortunately impossible to do a composite map of Naunu. However maps of individual dusuns can be found on pages 32 and 33.

Parts of Oebola are very spread out (approximately 10 kms.) These areas are Oelsabloit which can be reached by road from Oebola. However to reach Oepura by road, one has to go back through Sillu, past Oelhaususu.

Local Institutions

At the time of the 1985 study, the village was under the leadership of a temporary or "caretaker" head who was resident in Oeltuni I. There were obvious conflicts and problems between him and dusun heads from the other dusuns. The situation of a

temporary caretaker was brought to the attention of relevant authorities and action was taken to elect a Kepala Desa. The new Kepala Desa was elected in early 1986.

Internal politics and rivalry have had a negative impact on village development plans. They have effected both the functioning of the LKMD and PKK in the past.

Water Supply (prior to WAS)

In Naunu, the primary sources of water were unprotected springs and to a much lesser extent hand dug wells. Although four of the larger springs were captured or improved by Government builders, these efforts left the source unprotected and resulted in decreased flow of water.

A good example of this is the spring called Oeltuni in dusun Oeltuni. Oeltuni has a spring capture which was built in 1978 by Department of Public Works. It consists of a square cement box on top of the source of the spring, with a large opening in the front at a height of 1.5 feet from the bottom.

In building the capture, an attempt was made to force the water to rise above the level of the spring. As a result, probably even before contruction was finished, the spring moved. Thus more water flows outside the spring than is caught within the spring.

The spring opening in the front also leaves the source unprotected and probably makes the spring water more prone to contamination than prior to the building of the capture. As a result of the reduced amount of water being captured, the water flows out of the opening at the top for a very short period during the rainy season. The original plan of the design was that people would use the water flowing out.

However, since the water does not flow out of the opening, the only way to get water is by dipping buckets inside the capture which in addition to contaminating the water also stirs up the mud at the bottom. The water level in Oeltuni at most times of the year was so low that women went at 3 and 4 a.m in order to get water that was clean, before the mud got stirred up.

Similar designs have also been used in other parts of Naunu. As a result of these experiences, people have come to believe that trying to cover a spring makes the water dissappear. Hence in 1985, people reported being afraid to build spring captures around the springs. Instead they built little cement boxes at a distance from the spring.

Sanitation

As in Sillu, almost every household had a toilet in 1985. However designs were poor and toilets if used smelled bad and attracted flies. Toilets were more used by people living in the center of the dusuns where houses were built close together and

in Oebola where there was little bush left.

TAKIRIN

The two villages of Takirin and Sarabau are in Belu district in the north central part of the island of Timor. They lie very close to the border between the provinces of NTT and East Timor. According to Government statistics, both villages are classified poor. They are both located in Tasifeto Timur sub district.

Takirin is located approximately 30 kms from Atambua, the district capital. At least four rivers have to be crossed to enter Takirin in 1985 which is situated in a hilly, mountainous area. Takirin is spread over 20 kms, along both sides of the main road, a mud track.

The total population of Takirin is 1328. It is divided into four dusuns (Map 4). The boundaries between dusuns are marked either by rivers or by forested areas. The four dusuns are Takirin (85 households; 386 people), Lianain (69 households; 337 people); Hasmetan (73 households; 33 people) and Fatubesi (61 households; 372 people) Table 3.

TABLE 3 : DUSUNS OF TAKIRIN

NO.	NAME OF DUSUNS	POPULATION	TOTAL NO. OF HOUSEHOLDS
1.	Takirin	386	85
2.	Lianain	337	69
3.	Hasmetan	333	73
4.	Fatubesi	372	61
	Total	1328	288

Water Supply (prior to WAS)

There are many large springs in the mountainous terrain of Takirin. Many of these are located at a height and above most of the houses in the village. The presence of large springs above most houses, is a situation which lends itself to gravity feed piped water systems.

In Takirin, by 1985 five piped water systems had been installed through community initiative and with primary dependence on the village subsidy. None of the springs had captured at the source and many of the pipes leaked.

However the entire population was not served by these pipes. Other sources used were unprotected springs, rivers and holes scrubbed in dry river beds. There was one shallow hand dug well in Takirin.

Sanitation

Contact with health authorities in 1985, was not as high as in the Kupang villages. Hence people had not experienced the same kind of pressure as they had in Kupang to build toilets. Since in many areas houses were spread out and there was still plenty of protective bush, people still used the out doors for defecation. It is probable that approximately 20% use toilets regularly.

SARABAU

The village of Sarabau lies very close to Takirin a kilometer away from one end of Takirin. However the two villages have very distinct identities and contact between people of the two villages is not frequent.

Like Takirin, Sarabau is very hilly and 30 kms from Atambua. Sarabau is the smallest village included in this study with a total population of 513 (104 households). It is divided into two geographically distinct dusuns (Table 4).

Sarabau I lies adjacent to the village of Bauho and has a population of 261 (53 households). Sarabau II in 1985 was more isolated (Map 5). It had to be approached by driving through a river bed and then up a steep mud road with inumerable gates that have to be dismantled to reach it. It has a total population of 252 (51 households).

TABLE 4 : DUSUNS OF SARABAU

NO.	NAME OF DUSUNS	POPULATION	TOTAL NO. OF HOUSEHOLDS
1.	Sarabau I	261	53
2.	Sarabau II	252	51
	Total	513	104

Sarabau appeared to be the poorest village in the survey in 1985, with Sarabau II poorer than Sarabau I. Both had only one permanent house each. Sarabau I had 11 semi permanent houses while Sarabau II had only 6 semi permanent houses.

The situation in terms of leadership was in some ways similar to Naunu because of the presence of a temporary caretaker. Unlike Naunu, the caretaker appared to be accepted in both dusuns.

Until July 1985, when a caretaker PKK head was appointed, for all practical purposes PKK was a defunct organization in 1985. Despite innumerable attempts, little information could be elicited about management of PKK subsidies. At the time of the 1985 survey, PKK had no cash of its own which further constrained development of PKK activities.

Water Supply (prior to WAS)

The water supply situation was particularly difficult in Sarabau. In Sarabau I, the problem was one of quality and distance while in Sarabau II although water sources were close, the problem was one of quality and sheer availability. During the rainy season, all sources in Sarabau II which is completely surrounded by rivers, got flooded.

One piped water system was built using the village subsidy in Sarabau I in 1984. The system was inoperational in 1985. The primary water sources were unprotected springs, open hand dug wells and rivers.

In Sarabau II the primary sources were springs, holes dug beside the river beds and hand dug wells. During the rainy season when these sources got flooded, people used rain water collected off thatch roofs. Water was then strained prior to use using the bark from coconut trees.

Sanitation

The sanitation situation in Sarabau in 1985 was similar to that in Takirin.

NOTE

A motorable road has since been completed to Takirin and Sarabau from Atambua. This appears to have completely changed the degree of isolation and prosperity of the two villages.

CHAPTER 4

The Setting: Designing and Implementing WAS

I. OVERVIEW OF RESULTS FROM THE 1985 STUDY

In order to understand why WAS activities were undertaken in certain ways and to appreciate the significance of change of different magnitudes, it is important to draw a profile of the communities in the four villages prior to WAS.

Hence this chapter summarizes some of the major findings and conclusions of the 1985 baseline study. This then sets the stage for understanding the design and process of implementation of WAS activities which enables one to better interpret the impact that the activities have had on the four study villages.

1. Background

The findings reported in this section are based on the methodologies described in chapter 2. These findings describe the situation as it was found in 1985, prior to any WAS activities in the villages.

Findings from the household interviews are based on a sample size of 252, which included 123 adult men and 129 women. The mean age of the sample was 32 years with ages ranging from 15 to 65 years.

2. Demographic and socio economic profile

(a) Length of residence

A majority of the families 73% (183) had lived in their respective villages for over 11 years. Overall 64% (163) had been born in the village or had been resident for over 20 years. Supporting the oral histories of settlement patterns there were relatively more long term residents in Sarabau and Takirin, than in Sillu and Naunu. Thus 78% in Takirin and Sarabau had been born in the village, or had been resident for over 20 years as compared to 52% (51) in Sillu and 61% (35) in Naunu.

Overall the Belu villages appeared to be more tightly knit than the Kupang villages which had a higher percentage of recent migrants.

(b) Tribes, language, religion

There were clear distinctions between the Kupang and Belu villages in tribes and languages. In Kupang the majority were Atoni and spoke Dhawan while in Belu, the majority not surprisingly, were Belunese and spoke Tetun.

In Sillu there were small percentages of people from the island

of Rote (8%), the district of TTU (1%), and the island of Flores (1%). In Naunu there were small groups from TTU (2%), Rote (2%), the islands of Sabu (2%), and Alor (4%). In Takirin only 2% were non Belunese while in Sarabau 3% were non Belunese.

In terms of religion, the majority in Kupang were Christian Protestant (Sillu 92%, Naunu 88%). The remainder were Roman Catholic. In Takirin, 98% were Roman Catholic with 2% Moslem. In Sarabau all the families were Roman Catholic.

(c) Education and literacy

Approximately 75% of the sample had been to school. However differences between villages were sharp, chi sq (d.f.3) = 11.9***). The distribution by village, of those who had never been to school was as follows:

-- Sillu 26% (25)
-- Naunu 19% (11)
-- Takirin 16% (10)
-- Sarabau 46% (16)

Thus in Sarabau, close to half the sample had no schooling. The average mean level of education in the four villages was 1.2 years.

There were no significant differences between villages in level of schooling among those who had been to school. Although some assumptions can be made based on level of schooling of a population, it is also important for a development project to gauge the level of functional literacy of a group. In an environment with few reading materials, people who were once literate often lose their literacy skills.

TABLE 5: LITERACY LEVELS BY VILLAGE

NO.	VILLAGE LITERACY	SILLU %	SILLU NO.	NAUNU %	NAUNU NO.	TAKIRIN %	TAKIRIN NO.	SARABAU %	SARABAU NO.	TOTAL %	TOTAL NO.
1	Reads well	43%	38	57%	32	52%	30	35%	12	47%	112
2	Reads with difficulty	17%	15	9%	5	21%	12	6%	2	14%	34
3	Cannot Read	40%	36	34%	19	27%	16	58%	20	39%	91
	Total	100%	89	100%	56	100%	50	100%	34	100%	237

In keeping with the statistics on school attendance, there were significant differences between villages in their functional literacy levels, Chi Sq (d.f.6) = 13.5*, Table 5.

Thus in Sarabau, 59% could not read while in Sillu 40% could not read. In Naunu 34% and in Takirin 27% could not read.
If to these figures, one adds those who read with difficulty (14%

overall), the proportion of non literates in all the villages was approximately 50%. The only exception was Sarabau in which the illiteracy level (including those who read with difficulty) was the highest, 65%.

These findings have important implications for any materials or strategies developed by WAS which assume literacy.

(d) Household size and composition

Defining the family, is an anthropological nightmare. For the purpose of the study, the issue was skirted and reference was made only to household. No attempts were made to delineate the cultural definition of a household.

For the study a household was defined as the number of people who usually lived and slept in the household. This could include kin and unrelatd others living together.

The average household size was 5.4 and ranged from a minimum of 2 to a maximum of 14 persons per household. (Table 6). The average household consisted of 3.0 adults (defined as persons above 14 years of age) and 2.4 children below 15 years of age.

The average household had an equal number of men and women, 1.5 each. On the average approximately 21% of the households had more than one adult man or more than one adult woman. This is an important finding when considering time demands placed by development activities on adults.

When households do not have multiple same sex adults, it is often more difficult for the adults to take additional major responsibilities outside the home.

TABLE 6: HOUSEHOLD SIZE AND COMPOSITION

Variable	NUMBER OF PEOPLE							
	0	1	2	3-4	5-6	7-8	8-14	Mean
Total Size								
Percent	-	-	5%	35%	35%	15%	10%	5.4
Frequency	-	-	13	88	87	39	25	
Total Adults								
Percent	-	-	56%	31%	8%	4%	1%	3.0
Frequency	-	-	140	78	20	10	4	
Total Adult Men								
Percent	-	68%	20%	10%	4%	1%	-	1.5
Frequency	-	171	51	27	1	2	-	
Total Adult Women								
Percent	-	67%	22%	10%	1%	-	-	1.5
Frequency	-	169	56	24	3	-	-	
Total Children								
Percent	12%	21%	24%	33%	8%	1%	-	2.4
Frequency	31	55	60	82	20	4	-	
Total Children 0-4 years								
Percent	37%	36%	22%	5%	-	-	-	1.0
Frequency	92	90	56	14	-	-	-	
Total Children 5-9 years								
Percent	46%	30%	20%	4%	-	-	-	.8
Frequency	117	75	51	9	-	-	-	
Total Children 10-14 years								
Percent	58%	25%	15%	2%	-	-	-	.6
Frequency	146	64	37	5	-	-	-	

>.05*
>.01**
>.001***

The distribution of children across households is also important, especially for a project focusing on women. Overall, 37% of the household had no preschool children (0-4 years). The average household had one child in this age category.

Overall there were fewer older children than younger children per household. Forty six percent of the households had no children between the age of 5-9 years while 58% had no children between the age of 10-14 years.

These findings should be kept in mind when considering the role of women and children in water supply and sanitation. There were no striking differences by village.

(e) Sources of income

Both men and women were asked about the man's main source of income. The primary source of income for 90% (230) of the group was farming. Most additionally mentioned corn as the major crop.

Other primary sources of income for a small percentage of the sample were Government salaries 4% (10), self employment or contract work for skilled labour including carpentry and masonry 2% (6), church preaching .8% (2) and teaching 2% (4).

There were slight differences between Kupang and Belu. Belu, expecially Sarabau, was primarily farming (97%) while in Naunu (18%) and to a lesser extent in Sillu (7%), there were some people engaged in non-agricultural work.

When respondents were asked for other sources of income, 13 different categories emerged (Table 7). Here it is important to note that in Sarabau, the poorest village, only 7 people mentioned a second source of income.

These figures from Sarabau have not been reported in Table 7 because the small number of responses, gives a distorted picture of their importance proportionate to the village as a whole. In Sarabau, these 7 people mentioned vegetables, a few mentioned cattle while one person mentioned a non agricultural occupation.

TABLE 7: OTHER SOURCES OF INCOME BY VILLAGE (except Sarabau)

NO.	VARIABLE	SILLU		NAUNU		TAKIRIN	
		%	NO.	%	NO.	%	NO.
1	Corn, Cassava etc.	15%	10	24%	17	35%	26
2	Rice, Peanuts	9%	6	7%	5	28%	21
3	Fruits, mamar	4%	3	14%	10	7%	5
4	Vegetables	6%	4	10%	7	5%	4
5	Cattle - paron	30%	20	23%	16	9%	7
6	Pigs	13%	9	10%	7	7%	5
7	Chicken	6%	4	1%	1	-	-
8	Kiosk, petty trading	4%	3	-	-	3%	2
9	Skilled-carpenter etc.	4%	3	7%	5	3%	2
10	Preacher	1%	1	1%	1	1%	1
11	Animals, horses	1%	1	1%	1	1%	1
12	Salaried-officials	1%	1	1%	1	3%	2
13	Other-goldsmith etc.	3%	2	-	-	-	-
	Total	100%	67	100%	71	100%	75

The relative prosperity of the two Kupang villages can be seen in the greater prevalence and variety of secondary sources of income including greater presence of animals.

Takirin was characterized by a much greater involvement in planting of rice made possible by the abundance of rivers with a good water flow most of the year.

All the villages had a very small pool of skilled labour. In general however, there were more people in the villages with construction related skills than was reflected by these statistics. This is because not everyone uses these skills as a source of income. However, men may use these skills in building their own homes, helping friends, relatives and when necessary community projects.

Individuals were also asked to rate their most and second most important sources of income. The results were very similar to the distribution of other sources of income and hence will not be repeated.

Only 15% (38) of the sample said that the men engaged in seasonal work. This was again more true of Sillu 21% (20) and Naunu 14% (8) than of Takirin 11% (7) and Sarabau 9% (3). With the exception of Sillu, this work meant planting of vegetables.

In Sillu it included planting of vegetables in the rainy season 38% (8) but it also included planting of fruit, production of lontar juice, raising chickens and contract work for skilled labourers such as carpenters and masons.

(f) Ownership of Land

Ownership of land in Timor is complex and an issue difficult to untangle. Timorese are slash and burn agriculturists. Hence a family may cultivate a plot for a few years and then let it lie fallow and move to another plot. Because of the complexity of the issue, no questions were asked about land ownership.

(g) Ownership of radios

Radio ownership together with information about listening habits is one quick indicator of contact with the outside world and exposure to information from the outside. Radio ownership by itself may or may not be an accurate indicator of wealth.

TABLE 8: OWNERSHIP OF RADIO BY VILLAGE

NO.	CATEGORY	SILLU		NAUNU		TAKIRIN		SARABAU	
	Ownership of radio	%	NO.	%	NO.	%	NO.	%	NO.
1.	Yes	23%	22	34%	18	8%	5	6%	2
2.	No	77%	75	66%	35	92%	58	94%	33
Total		100%	97	100%	53	100%	63	100%	35

Chi Sq (d.f.3)= 17.6***

All families were asked if their families owned radios. Only 19% (47) of the families owned radios with significant differences between villages (Table 8). Chi Sq (d.f.3) = 17.6***.
In Takirin only 8% (5) and in Sarabau only 6% (2) owned radios. In Sillu 23% (22) and Naunu 34% (18) owned radios. Radio is often an important source of new information especially as related to family welfare be it about health or about proper application of fertilizers.

(h) Radio Listening

Overall, 23% (54) said that they listened to the radio. Again differences between villages were statistically significant chi sq (d.f.3.) = 28.1***). The distribution of radio listeners by village was as follows:

-- Sillu 26%
-- Naunu 51%
-- Takirin 16%
-- Sarabau 3%

Naunu which is just off the main road near Camplong, the district capital, is atypical because of the high contact with a town. Women shop in Camplong, some men work in Camplong and people go to the Puskesmas in Camplong for treatment.

The higher percentage of radio ownership is also probably a result of direct and frequent contact with Camplong, its radios, music and urban way of life.

Frequency of radio listening (among those who listened to radios) by radio listeners is reported in Table 9. Unlike many cultures in these villages, the radio is not left on all day. A majority of the radio listeners, listened to the radio, once or twice a day or irregularly. Many of the families owned radios that were either broken or not operational because of lack of batteries. None of the villages had electricity.

There were interesting sex differences with a greater proportion of women 34% (31) radio listeners than men 20% (23) chi sq (d.f.3) = 5.0*. Thus women who spend more time in the house are

more likely to listen to the radio than men who are frequently away from the house.

TABLE 9: RADIO LISTENING HABITS BY VILLAGE

NO.	CATEGORY	SILLU		NAUNU		TAKIRIN		SARABAU	
		%	NO.	%	NO.	%	NO.	%	NO.
1.	Listen	22%	21	51%	25	16%	7	3%	1
2.	Don't Listen	74%	60	49%	24	84%	37	97%	34
	Frequency of radio listening								
1.	Once a day	28%	7	36%	9	33%	3	100%	1
2.	Twice a day	24%	6	48%	12	22%	2	--	--
3.	Three times a day	4%	1	--	--	--	--	--	--
4.	Irregular	32%	8	16%	4	44%	4	--	--
5.	Don't know	12%	3	--	--	--	--	--	--
	Total	100%	25	100%	25	100%	9	100%	1

(i) **Ownership of latrines**

The Government of Indonesia encourages rural households to build pit latrines. Most households had built pit latrines 91% (228). As mentioned in chapter III not all latrine owners used the latrines. The distribution of latrine ownership by village was as follows:

-- Sillu 94% (91)
-- Naunu 88% (49)
-- Takirin 89% (56)
-- Sarabau 91% (32)

(j) **Ownership of wells**

Overall only 4% (11) of the respondents said that they owned wells. Although in absolute terms the figure is low, it is important because of claimed ownership.

Initially, when village officials were asked if any of the wells were privately owned, with a few exceptions wells were perceived to be public property. In fact they were usually privately owned or at least controlled by a single or multiple influential families. The distribution of well owners by village was as follows:

-- Sillu 3% (3)
-- Naunu 7% (4)
-- Takirin 3% (2)
-- Sarabau 6% (2)

3. Profile of women

(a) Schooling of women

Since WAS aimed to make a special effort to involve women it is important to draw a profile of women in 1985. In terms of education, not surprisingly, significantly fewer women, 69% (89) had been to school than men, 82% (101) Chi Sq (d.f.1) = 5.2 *. Among those with some formal schooling, women had fewer years of schooling than men. However the differences were not statistically significant.
Thus while 15% of the men had more than primary school level education only 5% of the women had education beyond the level of primary school.

In terms of literacy, the differences between men and women were significantly in favour of men, Chi Sq (d.f.1) = 11.7 **. Overall only 38% of women compared to 56% of men could read well.

(b) Daily Activities of women

Women's daily activities in the four villages revolved in and around the house. However, women were also involved in agricultural activities in the field. In addition they had primary responsibility for fetching water, firewood and washing clothes. All these activities took women outside the home.

Men, in contrast, were primarily involved in agricultural work and care of livestock. Despite the fact that both men and women had to perform a variety of activities every day, there were certain activities they liked and considered easy and others that they disliked and considered difficult.

Among activities considered easy by women, collection of water received mention only 8 times out of 341 responses (4%). On the other hand, after weaving, the most frequently mentioned difficult activity by women was water collection (32/179; 18%). By contrast men mentioned water collection as a problem less frequently (10%).

(c) Leisure

When men and women were asked whether they felt they worked continuously or they had some time to rest as well, a majority of the men and women said that they did get sufficient time to rest. However, when the question was asked in general, cultural stereotypes came into play and both men and women said that women had more leisure than men!

(d) Value of women

In every society women are valued for their reproductive role. In most societies they are also valued as house minders and child raisers. In addition, women may be valued for their other

contributions to society.

In the study villages, there was general agreement among men and women about the value of women. The three activities most valued were weaving, household work and agricultural work.

In every culture, women's behaviour is guided by cultural expectations, norms and mores. In the study villages women were expected to work hard, manage the household well, help, respect and obey their husband, not quarrel, not gossip, be polite and stay at home.

When men and women were asked what activities should be avoided by respectable women, quarreling, insulting, gossip and laziness were mentioned the most frequently.

It is important to note that women getting together, unless the objective was clearly task specific, was viewed with suspicion by both men and women. Gatherings of women were seen as leading to gossip, an activity strongly disapproved.

(e) Perceived Differences in Abilities

Men and women rated women's abilities and skills such as intelligence, problem solving abilities, leadership potential, knowledge and information. Both men and women consistently rated men higher in all abilities. However, some women rated women as more skilled than men or rated both men and women equal.

Analyses of reasons revealed some strong cultural factors related to the fact that men were perceived to be the household heads and hence stronger and more powerful.

However, both men and women pointed out that usually men participated in village administration, village meetings, spoke Indonesian and went out more often. All these factors gave men a richer variety of experiences. In contrast, women were perceived as leading relatively isolated lives and involved in the same types of activities day after day.

Besides household duties and assisting their husbands in tending their plots, 62% of the women said that they produced items for sale. These included agricultural produce such as corn, vegetables, fruits, peanuts, coconut oil and also handicrafts and weaving.

Women spent their earnings buying food for the family, basic household supplies, clothes for children and supported children's school expenses.

A majority of the women, 77%, said their husband could ask them for their earnings.

The spending pattern of men was strikingly different from that of women. Although the amount of money involved was not known, men

spent their wive's earnings primarily on alcohol, cigarettes, snacks and clothes.

(f) Quality of Women's Lives

The quality of women's lives was explored by focusing on friendship and support networks, family problems and self rating on affect and satisfaction indices.

Most men and women, 70%, felt that they had someone to talk to when they experienced problems. Both men and women commonly turned to related kin. Only 5% of the women and none of the men confided in friends and neighbours.

Women were then specifically asked if they talked to other women about their problems. Approximately 60% of the women said that they did not confide in other women. Of those who talked to other women, the primary category was related kin.

Women were asked if they had opportunities to get together with other women. Overall, 57% of the women said that they did have opportunities to get together with other women. Most frequently this was at the village office and at village official's homes.

Spatially, women's contacts were limited primarily to their own dusuns. Only 53% of the women said that they had contact with people from other dusuns.

(g) Problems Affecting Family Life

Overall, 71% of the men and women said that they experienced some family problems.

The single most frequently mentioned problem by women was related to water collection, 30%. Men on the other hand, were more concerned about financial problems, 40%, while water ranked second, 13%.

(h) Emotional Quality of Life

An affect index and life satisfaction index were administered.

Although there was some evidence of "response bias", the results are useful as a rough gauge of the emotional quality of life.

Overall, women reported experiencing negative emotions such as loneliness, feeling upset, restleness, boredom and unhappiness more frequently than men. However, positive emotions were reported almost equally by both sexes.

4. Community Participation

In villages in Timor, there is a strong tradition of mutual help. This generally takes two forms. Gotong Royong is shared labour and Swadaya is self help which can include money and/or other

resources.

In all four villages, community development projects had been undertaken primarily through Gotong Royong and to a much lesser extent through Swadaya.

As far as water systems go, none of the systems initiated by government personnel from outside, involved the communities in any meaningful way. However community members had willingly helped in collection of materials, laying of pipes and digging of reservoirs.

In villages where new water construction projects had been undertaken, communities had been involved in contribution of labour but not in decision making. In addition, except for one instance in the early 70's in Takirin, communities had not been asked to make financial contributions.

Some people made it clear, that in the future they would not be willing to make cash contributions but were willing to contribute their labour. This situation has arisen because of a general lack of communication and trust between community people and village officials vis-a-vis management of finances, in some communities.

5. P.K.K.: The Indonesian Family Welfare Movement

In all four villages PKK was found to be functioning poorly. However despite problems in all villages, PKK had undertaken a variety of activities. These included nutrition gardens, assisting with "Posyandu", baby weighing, regreening, cooking, sewing, weaving and handicrafts. In addition, PKK had also taken responsibility for encouraging overall village cleanliness, especially as related to yards and toilets.

The functioning of PKK was found to be hampered by many factors, primary among which were: poor leadership, divisiveness within the villages, lack of coherent plan of action, little input from the outside and misperceptions of how PKK should function and who comprised its "membership."

Although Ibu Desas (wives of village heads) were the official heads of PKK, PKK in the four villages was in fact run by the Kepala Desas (Village heads). PKK decisions were made at the LKMD with little or no input from village women.

PKK membership was not seen as open to any interested person but limited to those women nominated, selected or ordered by the Kepala Desa.

Initiative for village activities came from the outside and was dependant on these orders. PKK leadership at the Dusun level was non-existant.

Despite the many problems and despite the fact that PKK NTT is

"young" (since 1979) it had already made an impact on village life. Some PKK women were already being perceived as leaders. In addition most village people viewed PKK as an important organization doing useful activities at the village level.

The most important reason why PKK at the village level continued to function despite its problems was because of the strengths, genuine interest and desire to learn among ordinary village women. The strength of PKK lay in the ordinary village woman.

6. Water Sources Used

A variety of unprotected sources were used in the four villages. In Sillu and Naunu primary sources were springs while in Takirin and Sarabau between 15-32% use springs. Other sources in Takirin and Sarabau were rivers and small holes scrubbed in river beds.

In Takirin there were 5 piped water systems that altogether benefit 21% of the population. Use of hand dug wells in all villages was low.

People, especially women, were concerned about water quality. In discussions about disadvantages of water sources, 61% of the women's concerns related to water quality while 33% of the men mentioned water quality. Men were more concerned about distance to source, 51%.

Only 37% of the sample used sources that were within 200 metres of their homes. There were clear differences between villages. In Sarabau, 79% of the sample had to walk over 1 km to the water source and in Sillu 56% had to walk over 1 km. This was true for only 9% in Naunu and 24% in Takirin.

None of the sources being used were perceived as being owned by the Government. Overall, 82% were viewed as public sources. Some sources were privately owned or at least controlled by certain families.

In addition, 91 people said that they used a second source as well, although less frequently.

Sources used varied significantly at different times of the year. Thus, during the rainy season and for a few months after, several small springs open up. In addition, hand dug wells also have water at this time.

During the rainy season people in addition used rain water. Thus the number of water journeys made in the rainy season were usually less than in the dry season.

The primary determinant in selection of source was proximity. Water quality was a concern only if the water was obviously dirty as determined by visual inspection.

7. Water Collection and Utilization

Women and children below 15 years of age were the most frequent water drawers and water carriers.

Men tended to be involved in water collection only if distances were great, if there were large animals around the house and if women were sick or there were no other family members to help with water collection.

The peak times for water collection were between 5-7 am and between 3-5 pm in the afternoons.

The average household made 2.5 water collection journeys per day.

A variety of water containers were used. These included buckets, jerry cans, bamboo and tins. Generally jerry cans and bamboos were dirtier than buckets and open tins because they are difficult to clean from the inside.

II. CONCLUSIONS AND RECOMMENDATIONS OF THE 1985 STUDY

1. Can villages be treated uniformly?

The study villages varied in population, proximity to city centers, degree of isolation, geography, spatial spread, language, tribe, wealth, education and severty of water problems.

In such an environment, plans for water supply have to be village specific although the underlying processes may be similar.

2. Are villages the relevant "units" for implementation?

Although villages may serve as the unit of analysis for government administrative purposes, for water activities, dusuns, which in most cases are geographically distinct entities are the more appropriate unit. However because of multiple water sources within dusuns and the geographic spread of dusuns themselves, not even everyone within a dusun is equally effected by water scarcities.

Thus even within dusuns, lower level groups/units, by water source used, may be more appropriate for WAS activities.

3. Is the focus on women justified?

Yes, but not to the exclusion of men. Why? Because in each indirect question asked more women than men were concerned about water problems including concern about quality of water.

4. How can women be involved?

In an environment in which men have little belief in women's abilities and women have little confidence in themselves; in

which men feel happier with women at home; in which men are exposed to a greater variety of experiences and receive more information; in which men are perceived as all powerful and the decision makers. getting women to make decisions without alienating the men or isolating women is a challenge!

Women's involvement can be encouraged by focusing on the importance of women in water and possibly by initial separate meetings of men and women providing women opportunities to state opinions and make decisions without appearing to contradict or challenge their husbands. The biggest boost to women's involvement will be given by the fact that WAS will be implemented by an organization that is often perceived to be concerned with women; i.e., PKK.

5. How should sites for new water sources be chosen?

Water collection problems do not affect the majority of the population. In addition there are strong inter village and inter dusun differences.

Priority should be given to those areas where water is perceived to be a major problem and the community is willing to do its share.

Water problems vary in kind and include those relating to distance, quantity, reliability, seasonality, quality and distribution.

Once again what this means, is that the community organizing and implementing strategies will have to be location specific and be undertaken at much lower levels than the level of villages.

Given resource constraints, choices will have to be made about which sources to improve. It is here that seaonality of sources becomes important.

As has been mentioned before, people tend to use sources closest to them. Thus in the rainy seasons, people use innumerable small springs, holes and hand dug wells which open up.

Given the two year life of the project and the impossibility of improving every water source, construction interventions should go hand in hand with increasing people's awareness about the importance of using protected sources.

Sites for new sources of necessity have to be based on land and ground water surveys. Different types of new sources should be opened up. These should include drilled wells, hand dug wells and piped water systems.

Final decisions should be made after discussing options with the communities involved and after considering data on location of people, areas where water problems are the most acute, technical assessment and indigenous knowledge systems.

Possible location of boreholes can be decided only after a survey for groundwater. New piped water systems are possibilities only in Takirin and possibly in Sarabau I. Once again ultimate decisions can only be made after considering costs involved. Hand dug wells may be possibilities in Oeltune II, Naunu.

6. Which existing water sources should be improved?

All sources are in need of improvement including piped systems! In Oebola, Naunu, not only should springs be improved but a sytem for equitable water distribution needs to be worked out together with the community. The same is true for some of the piped systems in Takirin.

Once again priorities will need to be set on the same considerations as those mentioned for site selection.

However, unless improvement in sources improves quantity or reliability or convenience it will be difficult to motivate the communities to get involved. Improvement in quality unless it is visually obvious will generate less interest than other improvements.

Community interest in building of spring captures can be stimulated by focusing on 1) increased flow of water through properly built captures, and 2) provisions for bathing and washing places.

Provisions of washing and bathing places can also be used to stimulate interest in improving piped water systems, hand dug wells and even boreholes.

7. Is water from piped systems uncontaminated?

Water coming out of piped systems and small bamboo pipes (a few feet long) was more polluted than water at the source. The highest Fecal Coliform Count was found in a community built pipe system in Takirin. None of the piped systems had spring captures at the sources.

Thus to improve the water quality at source not only is it important to redesign spring captures, but also bury pipes to prevent negative pressures from sucking in surface waste water.

8. Is drinking water in homes unpolluted?

Water quality tests indicated increasing pollution in a majority of cases from carrying to storage containers.

Boiled water samples tested, indicated that 70% of boiled water had fecal contamination.

Once again, improving the sources will be insufficient without teaching people how to handle water properly.

Thus the practice of advocating boiling of water by itself is not sufficient to ensure quality drinking water. In addition people need to be taught how long the water should be boiled and how to handle water after it is boiled.

This education should include the following factors:

-- cleanliness of carrying containers, storage containers, dippers, places where dippers are kept, and,

-- protecting water especially drinking water from the hands of young children.

If sources are adequately protected, the value of advocating boiling of water needs to be closely examined for its economic effectiveness and ecological impact. Perhaps the appropriateness of simple household filters should also be examined on a limited basis.

The most appropriate place for this is Sarabau II where people use the inside of coconut bark to filter rain water. Use of filters would also ensure that when people start using unimproved sources during the rainy season and soon after, they will still have access to clean drinking water.

9. What about community participation?

The guiding philosophy of the project is that for a water system to work in the long run, i.e., continued operation and maintenance, a community, especially its women, must be involved at all stages from problem identification, site selection, construction to evaluation and monitoring.

In order to mobilize a community, it is important to work through existing formal and informal leaders and through existing village level institutions. Hence it is important to consider local leadership and functioning of village level institutions.

10. Which village institutions and leaders should WAS work with?

All the villages had a LKMD and a Kepala Desa. In the study villages, the degree to which LKMD members were involved in decision making varied.

In some of the villages, LKMD decisions appeared to be made through "musywarah" but in others decisions were unilaterally made and put into action by the Kepala Desas.

In the latter case, LKMD decisions do not reflect community concensus or aspirations.

Two of the study villages were headed by temporary caretakers. Two additionally had experienced conflicts, dissension with existing caretakers or with Kepala Desas in the recent past.

All Government assisted projects should work through existing formal leadership and existing village level institutions.

However, to do so effectively, it is extremely important that participatory projects be aware of the weaknesses of the village level institutions.

Thus although it is extremely important to win the support of existing institutions and formal leaders, it is extremely important that decisions about project implementation be made at lower levels with smaller groups of men and women interested in improving their water supply situation rather than at the level of LKMD or village office.

Villages also varied in the degree of trust invested in the existing structure especially as related to financial matters. If financial or in kind contributions are expected from people, then it is extremely important, for people to be involved in selecting their own leaders at different levels for the implementation of the water project.

However this has to be done with the involvement, prior knowledge and approval of existing formal leaders. One common and acceptable mechanism is the appointment of formal leaders as nominal heads and community selected chairpersons, secretaries and treasurers as the operational heads.

11. What about PKK at the village level?

If "WAS" is to be a continuing process built into existing structures and mechanisms, rather than a "special project" that achieves much through short term, artificial structures created from the outside, then WAS, even at the village level, must work through PKK.

In fact, "WAS" because of its clear action oriented focus, can become a mechanism to strengthen PKK efforts at the village level. In addition the experience gained will result in a cadre of trained PKK personnel at all levels.

12. Should water user's groups be created?

Important as it is to work through existing institutions, for a water project it is important to create together with village people water users committees.

Such committees when formed at the initiative of users who understand and accept fully the responsibilities involved, will overcome problems linked with working exclusively at higher levels.

Users committees by definition are source specific and hence limited to people who already know each other and are living in close proximity to each other. Additionally, if people are

interested and r ance of maintaining sources to preserve quality of water, it will ensure long term maintenance of sources.

Once again, special attempts will have to be made, probably initially through separate meetings of men and women to ensure that women's perspectives and interests are reflected in decisions made by such committees.

Special care will also have to be taken to explore the group's needs for money collection, its handling, accounting and use. This is extremely important to ensure that the group understands and trusts its chosen leaders to handle group finances responsibly.

III. DESIGNING, PLANNING AND IMPLEMENTING WAS

The findings and conclusions of the 1985 case study provided PKK needed information for the overall design of WAS activities. However detailed plans and principles evolved further as implementation got underway.

Implementation of WAS activities at all levels was undertaken by P.K.K. Given the fact that PKK had chosen to undertake a new challenge, installation of water systems, an area in which it had no previous experience, and given the reported low levels of PKK activities in the villages, personnel and training became important issues from the beginning.

However, the key factor that influenced personnel and training decisions was PKK's desire not to be directive or authoritative but to create structures and operate in ways that would make PKK at each level and the village communities more autonomous and competent in the long run.

Thus WAS was used as a vehicle for learning and at the same for strengthening PKK at all levels from provincial to village. Thus no new entities were created to implement "WAS" rather "WAS" action teams were created within PKK, utilizing existing PKK cadres, trainers and leaders.

At the provincial level the PKK WAS team consisted of three people (2 women and 1 man), at each district level it consited of 3-4 people (including 1 or 2 men) and at the sub district (Kecematan) level it consisted of between 7 to 8 people (including 1 or 2 men). At each level the "WAS" team was headed by the chairperson of PKK (wife of the chief administrative official at each level).

Two young men with previous training in low cost water systems were seconded to PKK from other government departments for two years to serve as PKK field supervisors, one in each district. Their primary duty was organizing the communities in the villages and liasing with the PKK action teams at different levels.

As is usual within PKK, each level trained the next lower level. However, some of the trainings for the Kecematan (sub district) and village teams were conducted by the provincial WAS teams.

Several orientation sessions were held for each WAS team, the initial ones on participatory methods were carried out with the assistance of outside international consultants (UNDP/PROWESS). Subsequent training activities were carried out by PKK trainers.

Training at the provincial and district level consisted of training in participatory community management with special reference to water supply, and training in hardware - installation of handpumps, design of spring captures, piped systems, etc.

PKK action teams were also trained in formation of water user groups, which were to be the primary vehicle for community management of water systems.

Thus PKK's main focus was on preparation of communities to stimulate them to organize themselves to install, operate and maintain water systems. No attempt was made to design or stimulate the building of toilets or make additional efforts in the area of environmental sanitation and hygiene other than what PKK was already doing.

The two PKK field workers spent most of their time in the villages. They worked closely with village and PKK leaders as well as community people in all stages of WAS.

None of the PKK action teams were paid. However WAS team members received honorariums for travel and food while they were outside their homes. The salary of one of the field supervisor/worker was paid by PKK while the salary of the other was paid by his base ministry, Misistry of Home Affairs (Bangladesh).

We can now try and answer the key question, what happened.

C H A P T E R 5

THE EFFECTS OF WAS ON WATER SOURCES USED

Physical changes in water sources since 1985

Before trying to assess the degree of change in the water situation experienced by people, it is important to report the physical changes in water sources since the 1985 study.

Most of the changes were a direct result of WAS's partnership with people in communities. In addition there were spin off effects. A few individuals undertook to improve their private wells and springs without any direct involvement of WAS. This included a few families in Sillu and Naunu who lined their wells or cleaned springs.

Three shallow wells and a spring in Naunu and two wells and two small springs in Sillu were improved by nursing students during their field training, prior to WAS activities.

The following is a summary of the physical changes in water sources in the four villages as seen in August 1987. It should be pointed out that old groups and new groups are continuing to undertake new physical improvements. Hence the process of change started by WAS is ongoing.

Sillu

Dusun Tunmuni

1 borehole repaired
1 fitted with a pump
1 drilled - broken

Dusun Oelhaususu

1 borehole drilled - dry
1 spring capture

Enokaka

1 borehole drilled
1 private well cemented, 2 Enokaka wells cemented earlier by nursing school students

Tuamnanu

1 spring capture
2 springs improved by nursing school students

Naunu

Oeltuni I

2 private wells lined, 3 dug (privately) - one has plentiful water, two dry, 2 have enough for one family

Oeltuni II

2 private wells dug - dry
1 partial improvement for a spring by nursing students

Oebola

1 spring capture

Takirin

Takirin

3 pipe systems
3 spring captures, including 10 tank reservoirs and 7 taps

Lianain

2 pipe systems (one coming from dusun Takirin)
1 spring capture
5 tanks and taps

Hasmetan

1 pipe system, 1 spring capture, 6 tanks and taps
1 reservoir

Fatubesi

1 pipe system, shared reservoir and spring capture with Hasmetan

Sarabau

Sarabau I

1 pipe system, 1 spring capture, reservoir and 3 taps
1 shallow well dug and fitted with dragon handpumps (broken)

Sarabau II

1 borehole
1 shallow well fitted with dragon handpump (broken)

Total

New boreholes	5, 1 repaired	= 6
Spring captures		= 9
Shallow wells (2 handpumps)		= 5
Reservoirs		= 7
Water taps, stands and tanks		= 15

Broken at time of 1987 study

2 boreholes in Sillu (one has since been repaired by the community)
2 dragon pumps in Sarabau on shallow hand dug wells

1. Water sources used

Detailed location specific information on water sources has been reported in the 1985 study. This included a description of each water source in each dusun in all four villages together with maps detailing the water source. The history of the sources, rituals and ceremonies, ownership issues and community participation in the building of water systems were also discussed.

Hence the focus of this chapter will be primarily to assess the extent to which one of the primary goals of WAS, bringing about improvements in the water situation in the four study villages, has been achieved.

In both years there were four main sources of information on issues related to water sources. The first, as has already been mentioned, was innumerable key informant interviews. The second was site visits, and informal conversations with people living close to the sources. The third was observation of water collection and measurement to estimate water use patterns. The fourth method was questions included in the open-ended household interviews.

This triangulation was extremely important in cross checking information and in filling gaps in information on different aspects of water supply.

TABLE 10: A) CHANGE IN PRIMARY WATER SOURCE USED BY VILLAGE

NO.	TYPE OF SOURCE	SILLU		NAUNU		TAKIRIN		SARABAU	
		'85	'87	'85	'87	'85	'87	'85	'87
1	Spring	88%	59%	95%	86%	32%	3%	15%	16%
2	River	2%	7%	-	-	30%	3%	41%	3%
3	Hole scrubbed in river or beside river	2%	-	-	-	11%	3%	38%	11%
4	Piped water/tap	-	-	-	2%	21%	91%	3%	19%
5	Well	5%	10%	5%	12%	3%	-	-	24%
6	Waterfall	3%	-			3%		3%	-
7	Borehole	-	29%	-	-	-	-	-	27%
Total		100%	100%	100%	100%	100%	100%	100%	100%
Total No. of People		97	81	57	58	63	64	34	37

B) OVERALL CHANGES ACROSS YEARS

NO.	TYPE OF SOURCE	1985	1987
1	Spring	64%	43%
2	River	14%	2%
3	Hole scrubbed in river or besides river	9%	2%
4	Pipe water/tap	7%	29%
5	Well	4%	24%
6	Waterfall	2%	-
7	Borehole	-	14%
	Total	100%	100%
	Total No. of People	251	240

There were striking differences in 1987 compared with 1985 in types of sources used in the four villages. Overall there were significant differences in types of sources used in 1987 compared to 1985 (Table 10 a,b).

Thus in Sillu, in 1985 whereas 88% used springs and nobody used boreholes, in 1987, 59% used springs and 29% used boreholes. Dramatic changes can also be seen in Takirin and Sarabau.

In Takirin while 21% used piped systems (no spring captures) in 1985, 91% used piped system in 1987. The percentages using springs and rivers dropped from 62% in 1985 to 6% in 1987. Similarly in Sarabau there was a dramatic drop in people using rivers and holes in rivers from 79% in 1985 to 14% in 1987. Instead in 1987, 50% were using wells and boreholes.

Naunu, is the only exception to dramatic change. This is not surprising. As far as WAS initialed activities go, they were limited to building one spring capture in Naunu (Oebola) and improvement of two shallow wells which have become dry. However

more people living near a privately owned shallow well in Oeltuni I have received permission (after payment of money to the owner) to use a private shallow well. Hence the increase in use of wells from 5% in 1985, to 12% in 1987.

Overall, 65% of the sample in 1987 were using new of improved water sources. However there were significant village differences reflecting the varying degrees of physical changes in the villages. The distribution of those using improved/new water sources by village was: Sillu, 63%; Naunu, 36%, Takirin, 91% and Sarabau, 73%.

Thus not only has WAS succeeded in coordinating the working together of village people and technicians in other opening up of new sources or improving traditional sources, but the sources are also being utilized for domestic purposes by substantial numbers of people.

2. Advantages of primary water source

Advantages and disadvantages of sources were also discussed. People had no problems talking about the advantages of their chosen sources. In 1985, 411 advantages were mentioned. In 1987, 582 advantages were mentioned! The overall pattern of responses for the two years is reported in Table 11. Because of the dramatic increase in number of responses, percentage distribution represents people mentioning a particular advantage.

TABLE 11 : ADVANTAGES OF PRIMARY SOURCE BY YEAR *

NO.	ADVANTAGE	1985		1987	
		%	NO.	%	NO.
1	Only source that doesn't dry	45%	114	26%	64
2.	Close	38%	95	70%	168
3.	Water clean	34%	85	59%	141
4.	Water good, better, clean, cool	16%	40	17%	42
5.	Water can be used for drinking	13%	32	25%	60
6.	For cooking	6%	15	2%	6
7.	Can water vegetable, mamar, rice field	5%	13	18%	43
8.	Can bathe, wash clothes	-	1	1%	4
9.	For household needs	2%	5	3%	7
10.	For animals	-	1	4%	9
11.	New, clean source, group	-	-	10%	23
12.	Always used this source	-	-	6%	15
	Total No. of Responses		411		582
	Total No. of People		252		240

* Percent distribution of sample mentioning each category

In 1985, 45% of the sample used their primary source because it was the only perennial source. This percent dropped to 26% in

1987, indicating that more choices of sources were available in 1987 than in 1985. The changed percentages also indicate that primary sources are closer to a greater percent of the sample (70% in 1987, 38% in 1985) in 1987 than earlier.

In addition, many more people mentioned water quality. Thus 34% in 1985 said that the water was clean, while 59% in 1987 said that the water was clean. An additional 10% of the sample in 1987 specifically mentioned the fact that their primary source was a clean, new source. Vegetable watering was mentioned more frequently with 18% of the sample mentioning it in 1987 against 5% in 1985.

Thus overall, in 1987 more people mentioned proximity of source and cleanliness of water than in 1985. More people appeared to have chosen to use a particular source in 1987 than in 1985. In other words fewer people used a source in 1987 because it was the only available source.

3. Disadvantages of primary water source

Compared to advantages, people perceived few problems or disadvantages to their water source. Even though there is a general increase in number of responses to questions over the years, as far as the question on disadvantages is concerned, there is a decrease in numbers in 1987 (106) compared with 1985 (125)! Thus people perceived fewer disadvantages to their primary source in 1987 than in 1985 (Table 12).

TABLE 12 : DISADVANTAGES OF PRIMARY SOURCE *

NO.	DISADVANTAGE	1985		1987	
		%	NO.	%	NO.
1.	Far, tiring, takes time	21%	53	10%	25
2.	Floods in rainy season	10%	26	5%	13
3.	Dirty,leaves fall, not clear	6%	16	6%	14
4.	In dry season water less, black, white, muddy	4%	10	7%	16
5.	Other-somebody controls it, expensive	3%	8	3%	7
6.	Steep climb	2%	5	3%	8
7.	Water dries	2%	4	-	1
8.	Not managed properly, broken	1%	3	7%	18
9.	Too many people	-	-	2%	4
	Total No. of Responses		125		106
	Total No. of People		252		240

* Percent distribution of people

There was a decline in 1987 in the number of people who said that the source was far and hence it was tiring and time consuming to fetch water (21% in 1985, 10% in 1987), and that it flooded in

the rainy season (10% in 1985, 5% in 1987).

In 1987, there was increased mention of sources not being managed properly (1% in 1985, 7% in 1987). This reflects increased awareness of proper management probably acquired through involvement in water groups. It also reflects different standards of what a "proper water source" should be. Thus this category included broken taps, tanks, pumps and lack of cleanliness at source.

All four people who in 1987 mentioned crowding as a disadvantage belonged to Sarabau II and were using the borehole in which water flow was low. Hence people often had to wait for their turn to pump water.

a) Sex differences

Sex differences in disadvantages mentioned in 1987 paralleled those reported in 1985. Although women continue to be primarily involved in carrying water, men complained more about getting tired, the time and distance involved and about the steep climbs! The sex differences by year were as follows:

	1985	1987
Far, tiring	31% men, 12% women	15% men, 6% women
Steep climb	5% men, 2% women	5% men, 2% women

In 1985, overall 61% of women's responses related to poor quality water while 33% of the men's responses mentioned the problem of poor water quality.

In 1987, again while 66% of women's responses expressed concern with quality of water, 47% of men's responses related to water quality.

Hence although there is an overall increase in concern over water quality, women seem more concerned than men.

Thus WAS has been able to bring about positive changes in the water situation. This can be seen from the fact that people perceived fewer advantages and mentioned distance to and flooding at sources as a problem less frequently. At the same time WAS had raised people's awareness of the importance of water quality.

4. Usage of water from primary source

Respondents were asked for what purposes, the water from the source was used. There were no striking village differences. The percentages of the sample reporting varying uses are reported in Table 13.

TABLE 13 : USE OF WATER FROM PRIMARY SOURCE *

NO.	USE	1985 %	1985 NO.	1987 %	1987 NO.
1	Cooking	57%	143	46%	112
2	Drinking	52%	132	48%	116
3	Bathing	38%	97	61%	148
4	Other household use-washing plates, watering house ect.	36%	91	29%	69
5	Cooking, drinking, washing	32%	80	41%	98
6	Animals-drinking	31%	79	33%	80
7	Washing clothes	18%	45	31%	74
8	Watering vegetables/ plants	4%	11	50%	120
9	Mamar, fruit trees	-	1	2%	4
10	Other - toilet, fish pond	-	-	4%	9
	Total No. of Responses		679		830
	Total No. of People		252		240

* Percent distribution of people

It can be seen that the primary source is used for multiple purposes the most frequent of which are cooking, drinking, bathing, washing.

There are three interesting differences between 1985 and 1987 that fits the pattern of findings in various sections of this study.

Substantialy greater numbers mentioned bathing, washing clothes and watering vegetables in 1987 than in 1985. The distribution was as follows:

	1985	1987
Bathing	38%	61%
Washing Clothes	18%	31%
Watering Vegetables	4%	50%

Thus one could conclude that in 1987 more people were bathing, washing clothes and watering vegetabales from water at the primary source. This probably reflects an absolute increase in frequency of these activities rather than merely shift in source at which the activity is conducted, since in 1985, the water use for these activities was not mentioned either primary or secondary sources.

There were no sex differences except that in both years women mentioned washing of clothes more often than men. Men mentioned watering animals much more frequently than women.

5. Distance to source

Distances are difficult to judge for many rural people. For example, during our data collection, when people said a source was near or 100 meters or a 10 minute walk after three quarters of an hour we often still found ourselves walking!

Respondents were asked to estimate the distance to the source. Nobody had problems estimating distances, however whether their estimates would hold up against actual distances maybe questionable! It should be pointed out that although people may not be good at estimating distances accurately, like all people used to walking everywhere, they systematecally underestimate distances.

Changes in estimated distances to source are reported in Table 14.

There were significant reductions in distance to primary sources. While 16% of the sample used sources within a distance of 50 meters in 1985, this figure had almost doubled to 29% in 1987. Similarly while 40% of households had to walk between 1 to 2.5 kms to a water source in 1985, the figure had dropped to 14% in 1987.

Intervillage differences are reported in Table __.

TABLE 14 : CHANGES IN DISTANCE TO PRIMARY SOURCE

NO.	DISTANCE	SILLU		NAUNU		TAKIRIN		SARABAU		TOTAL	
		'85	'87	'85	'87	'85	'87	'85	'87	'85	'87
1	0 - 50 m	9%	11%	28%	24%	24%	61%	-	16%	16%	29%
2	51 -200 m	17%	34%	35%	50%	24%	30%	3%	43%	21%	38%
3	201 -800 m	18%	26%	28%	21%	28%	6%	18%	25%	23%	19%
4	1 -1.9 km	29%	20%	9%	5%	16%	2%	61%	16%	25%	11%
5	2 -2.5 km	27%	9%	-	-	8%	1%	18%	-	15%	3%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Consistent with other findings, it can be seen that the most dramatic reduction in distances was in Takirin where there is an extensive network of pipes.

6. Time taken for journey to and from source

Distance to source was also estimated by asking people how long it took them to walk to the source and to come back. Since return journeys often involved steep climbs with a heavy load of water, estimates reported are on round trip travel time. The distribution by village is reported in Table 15 and parallels estimated distances in meters to the source.

If one considers 20 minutes as a reasonable amount of time for a round trip water journey, in 1985, 30% of the sample fell in this category. In 1987, this percent had almost doubled to 57%. Another way to look at the overall reduction in time for round trip water journey in 1987 is to consider the percentage of households in which a single water journey takes one hour or more.

TABLE 15 : CHANGE IN TIME TAKEN FOR A ROUND TRIP TO PRIMARY SOURCE

NO.	TIME	SILLU		NAUNU		TAKIRIN		SARABAU		TOTAL	
		'85	'87	'85	'87	'85	'87	'85	'87	'85	'87
1	V.quick 1 - 10 min	11%	15%	43%	33%	33%	88%	-	14%	22%	38%
2	Quick 11 - 20 min	4%	23%	12%	25%	14%	8%	-	22%	8%	19%
3	Average 21 - 40 min	20%	30%	26%	31%	15%	2%	15%	27%	20%	22%
4	Somewhat long 41 - 60 min	21%	10%	12%	11%	18%	1%	27%	21%	19%	10%
5	Long 1 - 2 hours	21%	16%	7%	-	20%	1%	58%	16%	22%	9%
6	Very long 2+ hours	23%	6%	-	-	-	-	-	-	9%	2%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

In 1985, 31% of households took more than one hour for one round trip water journey. In 1987, only 11% of the households fell in this category.

Intervillage differences can be studied in Table 15. It can be seen that 22% of households in Sillu and 16% in Sarabau averaged more than one hour per water journey in 1987. None of the households in Naunu and one household in Takirin fell in the same category.

Thus it can be seen that there are significant reductions in time taken for water collection. However not every household in the vilages has been equally affected.

More accurate estimates of time taken for a water journey are reported later, based on observation of water collection.

7. Owners and builders of sources

Most sources are considered public, however all sources except those dug in recent years in people's yards have ancestral owners. While everyone may use a source considered public the decendants of ancestral owners really control the sources.

These ownership rights are exercised or become obvious in special circumstances such as when water becomes less, when there are proposals for construction on or around the source or for redistribution of water.

People are asked who owned the water sources. There were changes over time which are reported in Table 16, which once again reveal the direct and indirect effects of WAS activities.

In going back to the villages after two years asking questions about ownership of water sources, people were much clearer on ownership issues and much less likely to say everyone or the public owned it (Table 16).

TABLE 16 : PERCEIVED OWNERS OF PRIMARY WATER SOURCES

NO.	CATEGORY	1985		1987	
		%	NO.	%	NO.
1	Public	82%	185	61%	141
2	Private	10%	22	16%	37
3	Government	-	-	-	1
4	Desa	8%	17	18%	42
5	WAS group	-	-	5%	11
	Total	100%	224	100%	232

In addition, people appeared to be having a much greater sense of communal ownership or village ownership of sources in 1987 than in 1985 (Tables 16 and 17).

TABLE 17: WHO BUILT THE PRIMARY SOURCE

NO.	CATEGORY	1985		1987	
		%	NO.	%	NO.
1	Public	44%	73	9%	23
2	Natural, nobody built it	27%	46	7%	17
3	Private	14%	24	24%	59
4	Village	9%	13	20%	50
5	Government	6%	10	19%	47
6	Other - WAS groups	-	1	21%	53
	Total	100%	167	100%	249

These trends are more obvious in responses related to who built the source. It is interesting to note that while in 1985, 44% said the public built the source, in 1987, only 7% said public.

WAS activities are directly reflected in the 1987 responses. Thus in 1987, 21% said that a source was built by a group or by WAS. Mention of government increased from 6% in 1985 to 19% in 1987, primarily with reference to boreholes. People often said that although the community assisted by gathering local materials, the source was built and therefore owned by the government.

8. Secondary sources of water

Respondents were asked if they used any other sources of water. Overall in 1985, 91 people (36%) said that they had a secondary source of water. But in 1987, only 49 people (21%) said that they used additional sources of water.

This finding in itself reflects substantial change in the water situation. In 1987, many more people had access to convenient perennial sources and thus did not need to use additional sources (Table 18).

TABLE 18: CHANGE IN SECONDARY WATER SOURCE

NO.	SOURCE	1985		1987	
		%	NO.	%	NO.
1	Spring	20%	50	14%	34
2	River	6%	16	1%	2
3	Well	6%	15	2%	4
4	Pipe	2%	4	1%	2
5	Water fall	1%	2	1%	2
6	Hole scrubbed in the river	1%	4	2%	5
7	No source	64%	161	79%	191
	Total	100%	252	100%	240

In both years, springs were the most common secondary source used by 20% of the sample in 1985 and 14% in 1987. Fewer people used rivers and shallow wells as secondary sources in 1987 compared to 1985. Small percentages (1-2%) in both years continued to use pipes, waterfalls, and holes scrubbed in river beds as secondary sources.

The advantages and disadvantages of sources were similar to those mentioned in 1985 with two differences. Concern for quality of water was more frequently mentioned in 1987 as was the advantage of water available for watering plants.

Thus one could conclude that although not everyone is using new or improved water sources, there is a greater awareness of importance of clean water.

9. Water sources during the rainy season

Any study that is done at one point in time cannot capture seasonal variations. In an area with a pronounced dry and wet season, it is important to understand the differences in the water situation in the two seasons.

The water situation is at its worst at the end by the dry season in October and November just before the rains begin. The field work in 1985 was done during this season and hence the water situation was studied when it was at its worst. This was less true in 1987, when data collection were done in August/September. However, 1987 was a particularly dry, drought year, so that differences in months and rain between the two years probably balance out.

To gauge differences in water use, people were asked what sources of water they used in the rainy season. The overall distributions by year are reported in Table 19.

TABLE 19 : CHANGE IN SOURCE DURING RAINY SEASON

NO.	CATEGORY	SILLU		NAUNU		TAKIRIN		SARABAU		TOTAL	
		'85	'87	'85	'87	'85	'87	'85	'87	'85	'87
1	Same source	60%	69%	88%	82%	80%	42%	45%	47%	69%	60%
2	Different source	37%	7%	10%	5%	15%	22%	26%	7%	24%	11%
3	Same, different	-	8%	-	5%	2%	-	-	3%	-	4%
4	Source, rainwater	1%	14%	2%	8%	-	36%	-	27%	1%	22%
5	Use rain water	2%	2%	-	-	3%	-	29%	16%	6%	3%

Overall, as compared to 1985, fewer people reported using the same source during the rainy season (69% in 1985, 60% in 1987) in 1987. There was also a decrease in the number of people who used a different source during the rainy season from 24% in 1985 to 11% in 1987.

In 1987, there was a significant increase in use of rain water. Thus while only 1% reported using some rain water in 1985, 22% reported using some rain water in 1987. Use of rain water exclusively caused by flooding of sources (especially in Sarabau II) during the rainy season also dropped from 6% in 1985 to 3% in 1987.

Thus more people were using rain water in 1987 than in 1985. In addition, there was much less shifting of sources during the rainy season in 1987 than in 1985.

10. Frequency of water collection in the rainy season

Respondents were asked about the frequency of water collection during the dry and wet seasons. On the average in 1985, respondents reported making 3.0 water journeys daily in the dry

season while in the wet season. households on the average made 2.0 water journeys per day.

In 1987, respondents on the average reported 3.7 water journeys per day in the dry season and 1.9 water journeys per day in the wet season. These findings are quite similar to the findings from observation of data collection.

In both years, the reduction in water journeys in the rainy seasons was because of use of rain watre for several purposes. The extent to which rain water was used is reported in Table 20.

TABLE 20 : SEASONAL USE OF RAIN WATER

NO.	CATEGORY	1985		1987	
		%	NO.	%	NO.
1	Use rainwater for everything except drinking & cooking	60%	164	58%	139
2.	Use raiwater (use unspecified)	17%	29	9%	22
3.	Use rain water for animals/plants	9%	15	12%	28
4.	Other sources open up	5%	9	-	-
5.	Don't use rainwater	5%	8	6%	15
6.	Use rainwater for drinking when sources flood	1%	2	4%	11
7.	Use only rainwater	3%	5	1%	2
8.	Move to kebun	-	-	8%	18
	Total	100%	173	100%	240

It is interesting to note that with two exceptions, the distribution of responses remained almost identical. Thus in 1987, nobody mentioned other sources opening up while 8% mentioned the fact that their families moved to the fields during the rainy season and hence the water siruation was different.

It is important to point out that the usage of rain water was obtained indirectly by probing the reason for decreased number of water journeys during the rainy season. When direct questions were asked about use of rain, except in Sarabau, people generally laughed and denied using rain water for anything! Rain water is generally not considered clean.

Conclusion

The primary arguments for a community based approach including men and women is to ensure the building and improving of water sources that will be utilized and maintained in the long run. In the study villages, substantial numbers of households, 65%, were using new or improved water sources in 1987. In addition people perceived fewer disadvantages to their primary source in 1987. People appeared to be choosing to use particular sources rather than being forced to use a source because none other were available.

Compared to 1985, fewer people in 1987 perceived the need for secondary sources of water.

Sex differences in evaluation of advantage and disadvantages of sources were consistant across the two years. In both years, women were more concerned about the quality of water while men were more concerned about distance and physical efforts required to fetch water!

C H A P T E R 6

CHANGES IN WATER COLLECTION AND UTILIZATION

Information on who collects water, how much water is collected, etc. was obtained through direct observation and through household interviews. As mentioned under the section on methodology some problems were encountered during observation and later in analysis in 1985.

Hence, in areas where there were doubts about the reliability of data, data were dropped. As a result, the total frequencies on which data were subgrouped varies. All the tabulations were done by hand and double checked by independent coders.

To keep the data comparable, the households that were observed in 1985 were observed in 1987.

1. Who brings water?

The most frequent drawers of water in 1985 and in 1987 were women and children. 87% in 1985; 89% in 1987. Of all water journeys observed (1477 in 1985, 2695 in 1987) men were observed to make only 13% and 11% of water journeys respectively in the two years (Table 21).

TABLE 21: WHO BRINGS WATER

VARIABLE / YEAR	FEMALES 5-16+ Years	FEMALES 17+ Years	MALES 5-16+ Years	MALES 17+ Years	TOTAL
1985 %	20%	55%	12%	13%	100%
n	(296)	(812)	171	195	1477
1987 %	19%	59%	11%	11%	100%
n	(505)	(1577)	313	300	2695

There are interesting differences by village which were generally related to distance (Table 22). These differences were consistent across both years despite the fact that the number of water journeys made by households had doubled in all the villages except Naunu. In Naunu, no new water sources were being used during the period of data collection. In fact, no new perennial water sources have been found in Naunu.

Men's involvement in bringing water was found to be the highest in Sillu in 1985, when distances to water sources were the greatest. However, with the drilling of new boreholes which have eliminated long, steep distances for many households, men's and

boy's involvement has declined.

TABLE 22: WHO BRINGS WATER BY VILLAGE

VARIABLE	SILLU		NAUNU		TAKIRIN		SARABAU	
Age/Sex	1985	1987	1985	1987	1985	1987	1985	1987
Girls 5-16+ Yrs.	14%	23%	21%	26%	19%	13%	26%	22%
Women 17+ Yrs.	43%	45%	55%	50%	59%	66%	60%	62%
Boys 5-16+ Yrs.	18%	13%	12%	11%	11%	10%	8%	12%
Men 17+ Yrs	25%	19%	12%	13%	11%	11%	6%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%
n	322	570	296	275	490	1115	370	735

It was also found that men were more likely to be involved in carrying water if women were sick or if there were no children. Additionally, bringing water for large animals, especially horses and cattle, was considered "men's" work.

Keeping of horses and cattle in the backyard (paron) was the most common in Sillu followed by Naunu and was less common in the Belu villages in 1985. These differences were found to be less sharp in 1987.

Thus it appears that as the water situation improved, men's involvement in water collection decreased further. Overall, women and children were the primary water collectors both in 1985 (87%) and in 1987 (89%).

2. Water containers used

There were inter-village differences in the way water was carried and in water containers used. In Sillu, where the distance to water is greatest and the climbs the steepest, yolks were commonly used. The yolk consisted of a long piece of wood flattened in places, with buckets or jerry cans suspended from both ends. The size of the container varies with the size of the individual carrying water. Young girls and boys often carry a single jerry can either on their head or suspended from a pole.

In Naunu, yolks were occasionally seen but not as commonly as in Sillu. In both Sillu and Naunu, plastic buckets and jerry cans were commonly used. Buckets varied in size from 6 litres to 16

litres as did jerry cans.

In general, both years, buckets were observed to be much cleaner than jerry cans. Jerry cans were often green and black on the inside. At the source, women commonly clean buckets out with sand and water. However, the narrow neck of jerry cans prevents effective cleaning.

In the Belu villages buckets and jerry cans were the most common in 1985. However these were balanced on a cloth on the head. A women carrying two containers would carry one on the head and one usually in the right hand.

Unlike Kupang, in 1985, hollowed out bamboos were also seen to be used. Men usually carried one long bamboo 5 -6' long while women and children carried several shorter bamboos threaded together and supported from the head. A cloth was usually bound around the head.

In Belu, in 1985, a few women were observed using round clay jars to carry water. The use of both bamboo vessels and clay pots is an indication of poverty. As soon as people can afford plastic containers, bamboo is abandoned. Everywhere children used tin cans and plastic bottles in addition to buckets and jerry cans.

During field work in 1987, in the Belu villages, clay pots and bamboos were not seen as often as in 1985. The two villages apeared to be more outwardly prosperous in 1987 compared to 1985. This may be related to the multiple changes brought about by the building of new motorable roads connecting the villages to Atambua, the district capital. In addition to increasing ease of contact with the town and its markets, it has also increased the flow of traffic from town to the villages. Public buses now ply the roads regularly.

3. When is water brought?

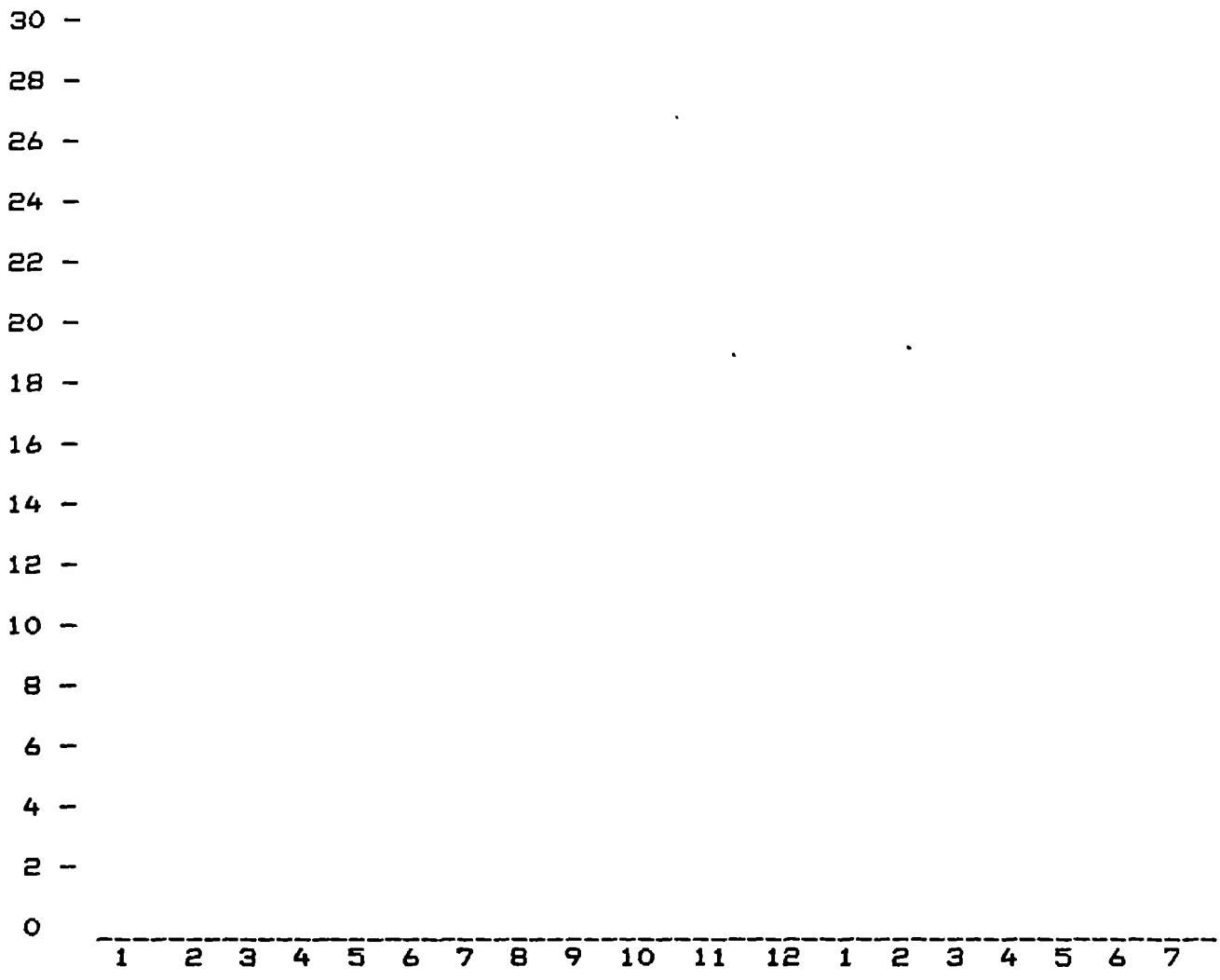
The work day begins early in most rural households. Most women start household work before dawn.

THe peak water collection time in 1985 was between 5 and 6 am (Figure _). By 7 am it slowed down but began to pick up again from 3 pm. The afternoon peak was at 4 pm. The pattern was the same for all villages. More water journeys were made in the mornings than in the afternoons.

The situation in 1987 was very similar to that in 1985 despite the fact that many of the boreholes are locked during the mid-afternoon hours.

When data were examined by dusun, Tuamnanu (Sillu) where people have to walk down to river Taiti from the main road, was the only dusun in which the peak water collection was mid-afternoon.

In Enokaka, as two years ago, a few households still collect


30
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Time of Water Collection

water at 2-3 am from the "lime" Enokaka wells which in the dry season have very little water.

4. Number of water journeys per household

The average number of water journeys made by a household per day was 2.5 in 1985 and 4.2 in 1987. Thus on the whole, the average number of water journeys had almost doubled in 1987 (an 83% increase, Table 23).

There were no differences between villages in 1985, although there were some differences by dusun. However in 1987 there were striking differences by village and by dusun. It is important to examine these differences in some detail because of the clear linkages to WAS activities.

The impact of distance on number of water journeys can be seen by comparing Naunu and Takirin. Naunu, with one exception in Oeltuni I, has no new sources. There are no significant differences in number of water journeys made before and after WAS related activities in Naunu. The overall average in 1985 was 2.7 journeys/household/day while in 1987 it was 2.9.

Takirin, on the other hand, presents the other extreme, where because of WAS activities, extensive pipe systems have brought water very close to people's houses. With the exception of Leanain and Hasmetan, where water is within a few meters of almost every house, there are some households in other dusuns that are still comparatively far from taps.

It is important to note that in Hasmetan the number of water journeys have almost tripled!

The same pattern can be seen in other dusuns of the other two villages. In Sillu for example, in Oelhaususu, where there are no new sources in working condition, the number of water journeys/day remain constant, whereas they have increased in Tunmuni and Enokaka, both of which have new boreholes in working condition.

Thus, overall households had almost doubled the number of water journeys they made per day in 1987. These changes were primarily concentrated in places where new water system have brought water closer to people's houses such as in Takirin. The fact that the increase in number of water journeys per day was not an across the board inrease, points to the fact that these changes are related to WAS activities.

TABLE 23: AVERAGE NUMBER OF WATER JOURNEYS PER DAY

	1985		1987	
	Total no. of Household days	Average no. of water journeys/hh/day	Total no. of Household days	Average no. of water journeys/hh/day
Sillu-				
Overall	158	2.5	159	3.56
Tunmuni	64	2.4	86	3.9
Oelhaususu	26	3.5	27	3.8
Enokaka	47	1.3	33	2.6
Tuamnanu	21	4.5	13	3.6
Naunu-				
Overall	106	2.7	97	2.9
Oeltuni I	24	2.3	30	3
Oeltuni II	29	3.3	26	2.9
Oebola	53	2.3	41	2.9
Takirin-				
Overall	177	2.5	190	5.7
Takirin	9	2.9	34	5.1
Lianain	37	3.8	38	6.7
Hasmetan	87	2.3	76	6.5
Fatubesi	44	1.8	42	3.6
Sarabau-				
Overall	167	2.4	166	4.1
Sarabau I	95	2.1	78	4.6
Sarabau II	71	2.7	88	3.8
Total HH days	608		612	
Overall Average:		2.5		4.18
Total water journeys observed		1516		2560

5) Quantity of water brought per journey

The average quantity of water brought per journey was 12.8 litres in 1985 and was 13.7 litres in 1987. The distribution by village is reported in the following Table 24.

TABLE 24: QUANTITY OF WATER BROUGHT PER JOURNEY

VARIABLE VILLAGES	YEAR 1985	1987
Sillu	15.3 litres	16.1 litres
Naunu	14.8 litres	15.1 litres
Takirin	12.8 litres	10.9 litres
Sarabau	8.7 litres	13.0 litres
Overall Average	12.8 litres	13.7 litres

It can be seen that on the average less water is brought in the Belu villages, especially in Takirin. These differences are related to four factors. They are:

1) age of water carrier,
2) proximity to water source,
3) presence of large storage vessels at home and to a lesser extent, to
4) type of source.

Takirin is a case in point. In Takirin the gravity feed pipe systems have brought water close to people's homes. Consequently very young children are more involved in bringing water in tin cans and small buckets. Additionally, people tend to fetch water as needed. This seems to be the result of two factors. The first, the proximity to water makes the chore of fetching water almost instantaneous. Secondly, few households appear to have extra buckets or large water storage containers such as drums in their houses. Hence water is brought as and when needed.

Who brings water is influenced to a limited extent by type of source. Thus, it is easier for children to turn on taps to collect water than pump a heavy handpump at a borehole. In Sillu, for instance, the handpumps at boreholes are too heavy for young children. In fact most cannot be easily pumped by one adult.

It is also important to note that although less water per journey is fetched in Takirin and Sarabau, the average household makes more water trips per day than in the Kupang villages. These two factors have implications for per capita water consumption.

6) Per capita water consumption

The per capita water consumption was calculated by dividing the total amount of water carried to households by the total number of people resident in households.

1985

There are very important differences in per capita water consumption by year (Table 25). In 1985, the per capita water consumption in Kupang villages was almost double that in the Belu villages. The per capita rates by dusun are reported in Table 26:

TABLE 25 : PER CAPITA CONSUMPTION OF WATER BY VILLAGE

VILLAGE	YEAR 1985 LITRES/CAPITA (PERSON - DAY)	1987
Sillu	9.2	10.5
Naunu	10.7	9.1
Takirin	5.6	10.2
Sarabau	4.0	10.2
Overall Average	7.8	9.0

TABLE 26 : PER CAPITA WATER CONSUMPTION BY DUSUN (LITRES/ PERSON/DAY)

VARIABLE DUSUN	LITRES/CAPITA 1985	LITRES/CAPITA 1987
Sillu		
Tunmuni	6.0	12.0
Oelhaususu	16.2	10.5
Enokaka	5.8	5.6
Tuamnanu	12.9	10.7
Naunu		
Oeltuni I	13.3	7.9
Oeltuni II	13.1	11.4
Oebola	6.1	8.6
Takirin		
Takirin	5.3	6.7
Lianain	5.2	12.3
Hasmetan	6.8	13.5
Fatubesi	5.3	5.7
Sarabau		
Sarabau I	4.3	9.4
Sarabau II	4.4	11.0

1987

The differences by village in per capita water consumption in 1987 appear to be related once again to the opening up of new sources closer to people's homes.

The most dramatic differences were once again in Belu where water consumption per capita had doubled since 1985. In Naunu, per capita water consumption had decreased, whereas in Sillu in which pockets of people are experiencing water available closer to their homes, per capita consumption increased slightly.

This interpretation of findings is further strengthened by examining per capita water consumption by dusun (Table 26). Once again the two dusuns in Takirin, Lianain and Hasmetan which lie alongside the main road, parallel to the new pipe system have the greatest increase in per capita consumption.

The situation is somewhat similar in Tunmuni although more households in Tunmuni remain unserviced by new water sources than in Takirin.

Thus, by 1987, per capita water consumption had doubled in the Belu villages. This dramatic increase did not occur in the Kupang villages which were more unevenly affected by new sources. Thus in 1987, the per capita water consumption in all villages ranged between 9 to 10.5 litres/day while in 1985 it was between 4.0 to 10.7 litres per day.

7) Patterns of water use

How is the water brought to the homes utilized? What are the differences in water use between families who consume more water per capita and families that consume less? These questions can only be answered by looking at patterns of water use.

In each village, a few households that were being observed for water collection were also studied to obtain an idea about different uses of water. Thus only a small percent of households observed for water collection were included in the study of water use.

TABLE 27 : WATER USE BY VILLAGE (LITRES/CAPITA/DAY)

NO	WATER USE	1985	1987
1	Cooking	2.5	2.4
2	Washing food	1.8	2.3
3	Animals	1.4	.9
4	Garden Watering	0.8	2.2
5	Personal Washing	0.5	0.8
6	Other	0.4	0.3
7	Drinking	0.3	0.3
8	Industry	0.1	0.03
9	Washing Clothes	0.0	0.2
	Total	7.8	9.4
	No. of Households	117	113

Water use patterns in 1985

The average water consumption from a study of 117 households was found to be 7.8 litres/capita/day in 1985 (Table 27).

Overall, it can be seen that the figure for drinking was low in 1985 (Table 27). However if people drank tea or coffee,it was included in the cooking category. What is interesting is that the figures support observations made earlier about washing of clothes and self at the source, presence of cattle and horses in compounds in Sillu and to a lesser extent in Naunu and lack of planted yards in Takirin and Sarabau in 1985.

There are also some differences related to food between the Kupang and Belu villages in 1985. In Belu, during the time of the survey (related to agricultural cycle) food such as sweet potatoes, yams, cassava and broken corn were eaten mostly. Washing of food prior to cooking was practically non existant. In the Kupang villages which were relatively more prosperous in 1985, unbroken corn was the staple.

In 1985, the Kupang villages also had more vegetation in the yards -- flowers and vegetables. In addition, especially in Sillu, having paron cattle in the backyard was common. Being more prosperous, people were also more likely to have other small animals such as pigs and chicken.

Examining of data by dusun is also instructive especially Oelhaususu where water consumption is high, water is relatively close to houses and larger percent of men are involved in bringing water. In Oelhaususu, the daily figure of water for

animals was 4.3 litres (per capita). More water was also used for cooking, washing of food and for gardens. Unfortunately a water use study was not done in Tuamnaunu.

In Oebola, the system of mud trenches dug to houses, makes water available at homes. Per capita consumption from water use (8.4) was found to be higher than from water observation (6.1). It is likely that observers who were posted near houses, missed the water that was being used from the mud trenches in people homes.

Water use patterns in 1987

Examining the water use for 1987 reveals how increased water brought to the house is used. There are four important categories in which inreased water use can be discerned.

Households were using more water in 1987 to wash food, for watering vegetable gardens, for washing themselves and for washing clothes (Table 28).

TABLE 28: WATER USE BY VILLAGE (LITRES/CAPITA/DAY

WATER USE	SILLU '85	SILLU '87	NAUNU '85	NAUNU '87	TAKIRIN '85	TAKIRIN '87	SARABAU '85	SARABAU '87
Cooking	3.1	3.1	3.1	1.8	2.3	1.7	1.4	3.0
Washing Food	2.6	3.4	2.4	2.2	1.0	1.2	1.0	2.7
Animals	2.7	1.0	1.2	.7	0.6	1.3	-	.6
Garden Watering	1.4	1.0	1.2	3.7	0.2	2.3	0.2	2.5
Personal Washing	1.1	.8	0.5	1.0	0.3	.9	-	1.0
Other	0.7	.1	0.8	.7	-	1.0	-	-
Drinking	0.4	.4	-	.7	0.4	.1	0.4	-
Industry	-	.04	0.1	-	0.2	.02	-	.1
Washing Clothes	-	.03	0.03	0.03	-	.07	-	.5
Total	12	9.9	9.4	10.8	5.0	8.6	4.0	10.4
No. of Households	39	32	26	19	28	41	24	20

Garden watering is an interesting case in point. In all villages except in Sillu, garden watering had increased in 1987, whereas in Sillu it had decreased. This does not mean that fewer people have gardens in Sillu.

One of the clear differences in the villages in 1987 was that the environment in the villages looked a lot greener and vegetables were more available in the villages. In Sillu as well, vegetable production had increased dramatically from earlier years. However in Sillu, vegetable plots have been made and planted at the

source. Hence there is a decreased need to carry water to the house. In other villages, in general planting at sources has not happened as much, either because sources are close to peoples's homes or because there has not been an organized group effort to grow vegetables to the same extent as in Sillu.

Similarly, amount of water used for personal washing has more than doubled in all three vilages except Sillu. Once again, in Sillu too, people are washing and bathing more often than two years ago. However two factors dictate that water is usually not brought to the house to bath except for those households which are close to the water source.

In Sillu, the water groups have rules which do not allow bathing or washing at the boreholes. These rules are implemented very strictly. Major washing of clothes is still done at the old spring sources. Women also bath at these times. Only small clothes may be occasionally washed at home. Personal bathing at home is also done occasionally.

It is also important to note that while in 1985 the Belu villages had no water use reported for animals, in 1987 Takirin had the highest water use for animals. It is possible that with plentiful water close to people's homes, more people have invested in fattening of animals for sale.

Overall, it can be concluded that increased water brought to the house is being used in ways that will lead towards improved health and possible wealth, through increased washing of food and self, vegetable production and increase presence of animals around the house.

8) Time spent in bringing water

The average amount of time spent in a single water journey was calculated separately for females and for males. In 1985, girls and women spent 39.7 minutes while men and boys spent 39.2 minutes per water journey.

The time spent on a water journey was significantly less for both sexes in 1987. On the average, women and girls spent 22 minutes while men and boys spent 22.7 minutes per water journey (Table 29). These averages mask strong intervillage differences.

TABLE 29 : TIME SPENT ON A WATER JOURNEY

VARIABLE VILLAGES	YEAR 1985 FEMALE MINUTES	1985 MALE MINUTES	1987 FEMALE MINUTES	1987 MALE MINUTES
Sillu	53.2	53.1	38.7	37.3
Naunu	22.6	21.6	12.9	11.3
Takirin	27.4	29.8	9.0	10.9
Sarabau	56.2	52.3	33.7	30.8
Overall Average	39.8	39.2	22.13	22.7

As can be seen from Table 29, there is a certain symmetry in reduction of times taken per journey across the years. Thus both in 1985 and in 1987 time taken for water journeys was the highest in Sillu and Sarabau.

Consistent with other findings, the shortest water journeys and the most significant decrease in time per water journey is in Takirin. The decrease in time per water journey in Naunu appears greater than one would expect.

This is primarily because one private source and one public source were being used by greater number of people living close to these sources than previously.

9) Time savings for women

It is often argued that if water was brought closer to homes, women would have more time to engage in production or have more free time.

In 1985, the average time per journey by adult women (17+ years) was found to be 41.2 minutes. The slightly higher average for adult women compared to men is related to the fact that adult women and older girls are responsible for washing of clothes.

Since women made 55% of all journeys in 1985, on the average women made 1.38 journeys per day or spent 56.9 minutes per day in water colection. On the average households spend 1 1/2 hours or 90 minutes per day in water collection (2.5 journeys per day).

In 1987, it was found that on the average adult women spent 21.1 minutes per water journey. Fifty-five percent of all water journeys were made by women. However, the average number of trips made per household per day had increased to 4.18. Hence, women made 2.5 water journeys per day, equivalent to 52.8 minutes per day.

Hence, the result of closer water sources has been, a decrease in time taken per water collection journey, an increase in total number of water collection trips per day, increased water consumption per capita and almost no time saved by women in water collection.

What do women do with time saved by reduction of time required to make a water collection journey?

The answer in the context of Timor is women choose to increase the number of water collection trips resulting in the same amount of time spent in collection water. However, it is important to emphasize that women choose to spend their time bringing more water to the family. This increased water is used for washing food, bathing and for watering animals and vegetables. All these uses of water promote better health and increase wealth.

The interpretation that women choose to spend their time bringing water can be concluded from the fact that fewer women in 1987 perceived water as a difficult problem compared to 1985, despite the fact that they were making double the number of water collection trips.

10) **Inter dusun differences**

Just as there were strong differences in water collection times by village, there were strong inter dusun differences. Once again, differences are apparent everywhere where new sources have been created. This is true of every dusun except Tuamnanu and Oebola. In Oeltuni I and II, although no new sources have been created, sources that are privately owned are being used by a number of neighboring houses (Table 30).

Sarabau II is an interesting case, where the time per water journey has increased quite substantially than decreased. This is related to the fact that the new source which is closer to people's home is a deep well borehole, whose handle is heavy, water flow is low and consequently people often have to wait for their turn.

The reported differences in water collection times are generally related to distance, steepness of terrain and to some extent, to crowding. Sillu is a case in point.

TABLE 30 : TIME SPENT ON A WATER JOURNEY BY DUSUN/YEAR

DUSUN		1985 (MINUTES)	1987 (MINUTES)
SILLU	Tunmuni	49	35
	Oelhaususu	37	28
	Enokaka	61	52
	Tuamnanu	62	61
NAUNU	Oeltuni I	20	13
	Oeltuni II	32	15
	Oebola	8	10
TAKIRIN	Takirin	66	19
	Lianain	19	5
	Hasmetan	33	4
	Fatubesi	30	25
SARABAN	Saraban I	68	27
	Saraban II	27	40

In Oelhaususu sources are relatively closer than in other parts of Sillu. In addition they do not involve steep slopes in Oelbaususu. People also reported that with the deepening of Enokaka wells, water in these wells lasts longer into the dry season. Hence compared to 1985, there was less use of more distant springs. Naunu, especially Oebola has sources close by. Only one section in Oletuni II, at the top of the hill, has a relatively longer walk.

In Takirin, only Dusun Takirin (certain sections) have long walks down hills to fetch water. In Sarabau II, although the sources are small, the approach to the source is flat and it is not far away. In Sarabau I in other hand, most houses have to go to the river or to springs in Bauho to collect water.

In addition to inter village and inter Dusun differences, there is great variation between households (Table 31). This variability can be seen by the distribution of households spending different amount of time on a water collection journey.

Whereas less than 30% of all water trips took 10 minutes or less in 1985, in 1987, 50% of all water journeys were less than 10 minutes.

Overall, 52% of all water trips in 1985 were of less than 30 minutes, whereas in 1987, 76% of all trips were under 30 minutes. Looking at the other extremes, while 18% of all water trips took more than one hour to complete, this percent fell to 7% in 1987. The percent distribution by village for 1987 is reported in Table 31.

TABLE 31 : DISTRIBUTION OF TIME SPENT BY ON WATER JOURNEYS

VARIABLE	TIME IN MINUTES						
VILLAGES	0-10	11-20	21-30	31-45	46-60	61-90	90+
SILLU	21%	17%	19%	10%	13%	13%	7%
NAUNU	55%	32%	8%	3%	-	1%	1%
TAKIRIN	79%	9%	5%	3%	2%	1%	1%
SARABAU	22%	18%	14%	16%	20%	8%	2%
OVERALL	50%	16%	10%	8%	9%	5%	2%

Conclusion

The impact of WAS should be assessed not only by analysing the changes in the physical situation but also the ramifications of the physical changes for water related practices.

When water is brought closer to people's homes, women (17+ years) continued to be the primary water collectors, 59%, together with children, 30%. The involvement of men in water collection decreases slightly from 17% to 11% when sources of water are brought closer to home.

Increase in proximity to water brings about dramatic inreases in number of water collection trips made per household per day, amount of water consumed per day, and decreases time taken for a trip. However, all these changes balance each other out, and the time spent by women on water collection per day remains constant.

Increased water brought to the house is used for washing of food, bathing, for vegetable production and for animals all of which have positive implications for health and income.

Thus in the WAS villages, women choose to spend time saved from long water journeys to make more frequent (shorter) water collection journeys.

CHAPTER 7

LIVES OF WOMEN

In order to be able to answer questions about impact of WAS on women in 1987, it was essential to ask more basic questions in 1985. What is it like to be a woman in Timor? What does a woman do? What decisions do women make? What problems do they face? What do men value in women? How do women perceive themselves? Are they satisfied with their lot? How does all this relate to water and sanitation?

It is difficult to answer all these questions in ways that are verifiable and reliable and can be repeated over time. Since the need to measure change was a priority, given time constraints, it was decided that the best that could be done was to try to understand those aspects of women's lives which were most likely to impact positively or negatively on their participation in development projects.

During the earliest visits to villages to establish preliminary guidelines, it was found that generally women were willing to talk openly about themselves, their relationship with their husbands and their problems.

However, some women found it difficult to articulate their emotions openly to outsiders. Some women seemed to react negatively to questions that to them appeared to be probing problems. Different indirect techniques were then tried which did elicit cooperation. However, the problem was lack of time.

Eventually, all questions and issues that were time consuming and that appeared not to be centrally related to water supply were omitted. Primary reliance was on open ended household interviews, key informant interviews with selected women, observation and participation during stays with village families.

Although the primary focus of WAS was on women, it was felt that to understand women's activities, roles and status correctly one had to understand the complementary roles of men within the context of the community settings in which both lived. Hence men were also interviewed about their lives and their perceptions of women.

1. Daily Activities of Women and Men

The daily activities of women and men are very different and complement each other. Of necessity there is some overlap, depending on labour needs at different times of the agricultural season and availability of other members of the family to help in different activities. It is important to understand women's daily activities and to understand which ones are perceived to be essential, problematic, liked or disliked.

There are various ways in which women's daily activities can be

studied. One way is a time budget study. However, with limited time for field work, it was decided that a time budget study of women was not a priority. Instead, an attempt was made to understand the daily cycle of activities of men and women.

This was done by asking both men and women to describe what they had done the previous day, from the time they woke up till they went to sleep at night. This question together with observations gives some idea of women's and men's daily activities.

The question was also used to lead into more detailed discussions about which activities were done every day, which ones were perceived to be easy, difficult, liked or disliked.

Before assessing change it is important to get a picture of women's and men's daily activities. One interview with a woman and one with a man are reported verbatim.

M.T. Oebola, Naunu, 23 years, woman

> "I woke up at about 5.00 when it was still dark. I cooked (made hot) water for coffee and boiled water for drinking (people appear to like to drink hot water as well as tea or coffee). I washed the plates in the kitchen from last night. I watered the floor (mud floors are generally watered to settle the dust, to clean the floor and probably also keep the house cool). I took the water from the ditch closeby to the house. I swept the floor.
>
> I then prepared broken corn for the midday meal and then did some weaving. I am weaving a selimut for my husband. I took a bath about 2 o'clock in the afternoon. In the evening, I prepared broken corn, we eat broken corn one day and once in a while "jagung bose" (corn, still whole but pounded to get the outer layer off, sometime cooked with red beans) I then went to bed."

N.B. Oeltuni, II, Naunu, 40 years, man

> "I woke up when the cock crowed, it was still dark. I went to defecate and then cleaned my tongue with a stick. I fed the pigs and then went to look after the cows. I then came home to drink hot water (air panas). I then went to the fields, carrying my meal with me. My field is a long way from the house. Earlier, when I worked in a field nearer the home I came home for my meal.
>
> I came home in the afternoon. I usually go out again to look after the cows. It was already dark when I came home. I took a bath at the spring and had a rest while waiting for the evening meal. Finally I went to bed."

Obviously, the cycle of daily activities in a farming community is dependent on the stage of the agricultural cycle.

Washing of clothes and bathing were two activities that were often undertaken only when time permitted. Handicrafts including sewing were also done when time permitted. Among both the Atoni and Belunese, defecation is considered an extremely private subject. Overall only a handful of men mentioned defecation in their conversations.

2. Rating of Daily Activities

After respondents had gone through a description of their activities, they were asked a series of questions related to ease and difficulty of activities and why they were considered easy or difficult.

This in turn was used to gauge how the fetching of water fitted into women's daily lives. This was a very important use of this set of questions because it provided information about water related problems without the use of questions directly focussing on water.

Questions were asked in general terms and were open ended. These questions were followed by probes where appropriate. Responses were then subject to content analyses from which categories were derived based on the answers given. This information was then fed into a computer and subject to statistical analysis.

Thus although tables with frequencies are presented, these are summaries of qualitative information obtained through semi-structured interviews and are not the end product of pre-coded yes or no questions.

Frequency distributions are primarily reported in five different ways, explained below:

1) Percent distribution of responses

Since the questions and answers were open ended, how much a person spoke varied. Thus one person often gave more than one answer or response to a question. This sometimes resulted in more responses than the number of people giving the answer. In comparing results across two years, results are presented using percent distribution of responses if: a) the total number of people giving responses are similar in both years; b) if the total number of responses are similar both years; and c) if the relative distribution of types of responses are important in themselves.

Thus percent distribution of responses, reflects the number of times a particular answer/response was given relative to total number of responses.

2) Percent distribution of people

Measuring change by studying changes in distribution of responses becomes misleading if there is a dramatic increase in: a) number of people responding to a question; and b) number of responses given per person.

In the above situation, if the questions were central to the issues concerned, the percentage distribution was calculated by calculating the percentage of people from the total sample that gave a particular response. Since each person may give more than one response, the total percentages do not add to hundred percent.

3) Overall differences in year

The overall differences in the samples reflect differences in results by year without any consideration of changes within subcategories such as village or sex.

4) Sex and village differences

Both years data were also examined for: a) sex differences - do men and women give similar or different answers; and b) for village differences - are there any differences in answers/situations between the four villages. These differences were measured for statistically significant differences using the Chi Square test.

5) Differences by source

Even if there are differences in results between 1985 and 1987, it is difficult to attribute results as related to one or another factor. It is a matter of subjective interpretation.

In order to see if differences could be shown to be more directly related to WAS, data from 1987 was analysed by water source used.
Type of water source being used was taken as a rough indicator of involvement in WAS. Three categories were used. They were,

a) People using the same unimproved sources in 1987 as they were using in 1985.

b) People using "new" sources opened up since 1985. This categorization tended to cluster the most active water user's groups created through WAS. It included those who were using boreholes that were not completely new but which were earlier dysfunctional,

c) People using improved sources. This group included those who were using improved springs, either those that had new spring captures or those that had been

cleaned. It is usually difficult to get people motivated for action, if the only difference the action will bring about is improved quality of water, unless quality of water is perceived to be a major problem. It is easier to motivate people if in addition to change in quality of water, there are positive changes in volume of water, ease of bathing, and washing.

2. (a) Change in activities considered easy

All the respondents were asked which activities they considered the easiest, which the second most easiest (Table 32). All the respondents mentioned one activity they considered the easiest while some mentioned a second activity. These responses were combined and resulted in 341 responses in 1985 and 414 responses in 1987.

There were significant sex differences in responses both years, 1985 and in 1987 (>.05 level). Both years, men's responses related primarily to their agricultural activities. Most of the agricultural activities mentioned spontaneously in 1985 were mentioned in 1987. However, all the activities dealing with feeding of animals and collection of firewood or fodder received mention more frequently in 1987 despite a severe drought.

This difference probably reflects the difference in agricultural season at the time of data collection. The 1985 data collection was done at the extreme end of the dry season while the 1987 data collection was done 2 months earlier.

Obviously, this has implications for data on findings related to ease and difficulty of water collection. However, if any differences emerge that are water related, they would have been more acutely reflected if data had been collected at the extreme end of the dry season. Hence, the slight differences in season are likely to mask true differences in water situation over the years rather than produce false positives. Additionally, the fact that a stressful drought was experienced in 1986/87 should also be kept in mind in interpreting the results.

TABLE 32: CHANGE IN ACTIVITIES CONSIDERED THE EASIEST

No.	ACTIVITY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Cooking	26%	32%	--	2%
2.	Housework	22%	23%	4%	10%
3.	Weaving	16%	11%	--	--
4.	Sewing, handicraft	11%	8%	--	--
5.	Nothing is easy/ all is easy	6%	4%	6%	1%
6.	Fetching water	4%	6%	9%	13%
7.	Kebun work	3%	1%	19%	6%
8.	Bringing firewood	2%	1%	6%	11%
9.	Planting fruit trees	2%	1%	6%	--
10.	Feeding pigs/ chickens	2%	5%	10%	18%
11.	Feeding cattle	1%	--	9%	14%
12.	Cutting fodder	1%	--	1%	10%
13.	Raising cassava sweet potatoes	1%	--	1%	--
14.	Weeding	1%	--	12%	4%
15.	Looking after children	1%	3%	--	1%
16.	Herding cattle horses	--	1%	1%	3%
17.	Watering plants, bathing	--	4%	--	3%
18.	Other-carpentry, office, making thread, etc.	1%	1%	10%	4%
Total		100%	100%	100%	100%
Total number of responses		178	193	163	221

Fetching water being an easy task, was mentioned much more frequently by men than by women, the primary water collectors! Compared to 1985, it was mentioned more frequently in 1987 by men and by women.

If one considers the number of people mentioning water carrying as an easy task, it was mentioned by 22 people in 1985 and by 40 people in 1987.

Another new water related category emerged which received no mention in 1985. Overall, 4% of women's and 3% of men's responses mentioned watering of plants and bathing as the easiest daily chores, whereas none mentioned these activities in 1985.

Over 60% of the responses referring to water collection as an easy task were made by people using new or improved sources. All

the responses related to ease of watering of plants and bathing were made by respondents using new or improved water sources.

Thus overall, the water situation in 1987 appears to have been easier than in 1985, despite experiencing a drought in 1986/87.

(b) Activities considered difficult

Respondents were also asked to name daily activities that they considered most difficult. Responses to this question are important because they reflect consistent sex differences, systematic differences in the water situation in the four villages in 1985 and the differing degrees of physical changes in water sources brought about in the village in 1987.

Ratings in 1985

In 1985, among women, weaving rated as the single most frequently mentioned, difficult activity (20%), followed closely by carrying of water (18%). Among men as well, 10% of the responses referred to carrying of water as a difficult activity (Table 33).

When data were examined for inter village differences, the differences were sharp. In Sillu 20% (28) rated carrying water as difficult while in Sarabau 23% (11) rated carrying water as difficult. In Naunu and Takirin the percentages were 6%)5) and 8% (6) respectively.

This reflects the realities of the water situation in the four villages. In Sillu, in 1985, distances involved were large for more groups of households than in Naunu or Takirin. In Sarabau, especially in Dusun I distances were large.

TABLE 33 : CHANGE IN ACTIVITIES CONSIDERED THE MOST DIFFICULT

No.	ACTIVITY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Weaving	20%	20%	--	--
2.	Carrying water	18%	12%	10%	4%
3.	Preparing the land	11%	11%	45%	26%
4.	Weeding	10%	15%	11%	3%
5.	Bringing firewood	9%	6%	--	6%
6.	Housework	8%	7%	1%	--
7.	Looking after children	8%	4%	--	--
8.	All is difficult	7%	--	7%	3%
9.	Feeding cows	4%	2%	4%	6%
10.	Other-carpentry, office work	4%	--	15%	8%
11.	Cutting trees	1%	--	4%	2%
12.	Trading/selling	--	--	1%	1%
13.	Feeding pigs	--	--	2%	--
14.	Planting vegetables	--	2%	--	2%
15.	Kebun work	--	18%	--	36%
16.	Taking care of animals watering plants	--	-- 3%	--	3% --
	TOTAL	100%	100%	100%	100%
	TOTAL NO. OF RESPONSES	(179)	(179)	(173)	(193)

Ratings in 1987

In 1985, overall 14% of all responses referred to water collection as the most difficult daily activity. In 1987, it had dropped to 7% with 12% of female responses and 4% of male responses referring to water collection as the most difficult activity.

The fact that these changes are not random can be seen by examining the pattern of differences by village and water source.

The percentage distribution of responses, referring to water collection as a difficult activity by village in 1987 was as follows:

Sillu:	14%	20% in 1985
Naunu:	9%	6% in 1985
Takirin:	1%	8% in 1985
Sarabau:	0%	23% in 1985

The inter village differences in 1987 reflect the differing degrees of change brought about in the water situation in the four villages. There were new water sources only in certain parts of certain dusun. In Sillu, in Naunu there were hardly any differences, whereas in Takirin and Sarabau, new water sources affecting most households have been opened up.

Similarly, in 1987 when data were examined by water sources being used, it was found that most of the responses focusing on difficulty in water collection, were made by those who were using the same source as in 1987 - both unimproved and improved.

By contrast, the group using new water resources hardly mentioned water collection as a difficult task. Thus clearly those who are using new sources (which are probably closer to their households than older sources) are less likely to focus on water collection as a difficulty than others.

3. Is There Time to Rest?

The concept of "leisure" is difficult to translate into Indonesian, and more importantly, at least for life in the villages, may be irrelevant. However, an attempt was made to find out if, in people's own perceptions, they felt that they were working continuously or whether they had time to rest (istirahat) from work.

The questions on leisure were important to try and gauge which of varying hypotheses on women's time savings because of increased proximity to water were true in the context of WAS activities.

1985

In 1985, overall only 6% (15) of the respondents felt that they worked continuously, while 94% (236) felt that they got some rest during the day. There were no significant sex or inter village differences.

Respondents were then asked if they felt that the rest they got from work was sufficient, a little or not sufficient.

Overall, 20% (49) felt that they did not get sufficient rest, 13% (31) felt that they got a little rest, while 67% (164) felt that they got sufficient rest during their daily activities. Once again, there were no significant sex or village differences.

1987

While the overall percentages (7%) reporting that they worked continuously in 1987, was not significantly different from 1985, there were significant sex differences in 1987! (Table 34)

While 12% of the women reported working without rest only 2% of the men did so (Chi .Sq. (d.f.1) = 8.2 **). When further questioned about how much rest they had in a day, once again there were significant sex differences (Table 35) (Chi. Sq. (d.f.2) = 22.7***). Almost a quarter of the women compared to 6% of the men, felt that they did not get sufficient rest in a day. There were no significant differences by village or by water source.

Why do some women feel that they have less time now than in 1985? This finding is difficult to explain in isolation but makes more sense when looked at in conjunction with findings on number of water journeys made per day and time taken for water journeys.

In 1987, it was found that despite decreased time per water journey, there were not time savings because women increased the total number of journeys made per day. However, there was an overall decline in rating of water collection as a difficult activity. Thus some women may have less leisure, and even though they may spend the same, or more time in water collection, what is important is that it is no longer considered difficult because they (women) are choosing to increase water consumption.

TABLE 34 : "DO YOU WORK CONTINUOUSLY?" BY SEX, 1987

NO.	CATEGORY	WOMEN		MEN	
		%	No.	%	No.
1	Work Continuously	12%	(14)	2%	(3)
2	Take Some Rest	88%	(103)	98%	(119)
	TOTAL	100%	(117)	100%	(122)

TABLE 35 : DEGREE OF REST BY SEX, 1987

NO.	CATEGORY	WOMEN		MEN	
		%	No.	%	No.
1	Not enough rest	23%	(27)	6%	(8)
2	A little rest	16%	(19)	6%	(7)
3	Sufficient rest	61%	(71)	88%	(106)
	TOTAL	100%	(117)	100%	(121)

(a) Leisure time activities

When people were asked what they did in their free time, most people mentioned more than one activity (Table 36). In both years, there were significant differences between the leisure time activities of men and women.

TABLE 36 : LEISURE TIME ACTIVITIES BY SEX AND YEAR

No.	ACTIVITY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Walk, visit friends, relatives, family	18%	6%	20%	13%
2.	Rest, sit, pick out lice, sleep	17%	22%	11%	20%
3.	Handicrafts	17%	14%	--	2%
4.	Weaving	15%	8%	--	--
5.	Sewing, embroidery	8%	10%	--	--
6.	Do little things around the house	8%	9%	7%	5%
7.	Talk, play, feed children	4%	1%	3%	4%
8.	Fetch water	4%	5%	4%	6%
9.	Dig yard, weed	2%	6%	16%	8%
10.	Trade, hawking	2%	--	9%	3%
11.	Fetch firewood	1%	3%	2%	6%
12.	Look after animals, big and small	1%	2	10%	7%
13.	Make pens for animals, repair fences	--	--	5%	8%
14.	Grow vegetables	--	--	4%	5%
15.	Talk to spouse	--	--	1%	1%
16.	Read bible, book	--	--	2%	2%
	water plants	--	3%	--	4%
	Other-community work, hunting, carpentry, pounding grain, etc.	3%	2%	6%	4%
	TOTAL	100%	100%	100%	100%
	TOTAL NO. OF RESPONSES	(155)	(155)	(155)	(155)

As is well known in NTT, women in their leisure time often sit, talk, and pick out lice in each other's hair. It is a social activity. In 1987, around 20% of men's and women's responses referred to resting, sitting, talking, or looking for lice. Both men and women also go out and visit friends and relatives.

Both men and women engage in variety of work or production related activities. Overall, approximately two thirds of leisure time activities referred to a variety of production activities. There were no major differences by year.

(b) Who has more leisure time, men or women?

In 1985, it was clearly established that despite the fact almost equal numbers of men and women felt that they, themselves, had sufficient time to rest in a day, the pervasive stereotype accepted by men and women was that women had more leisure time than men.

However in 1987, as already seen, significantly more women than men said that they did not get sufficient rest.

TABLE 37: WHO HAS MORE LEISURE

NO.	CATEGORY	WOMEN		MEN	
		1985	1987	1985	1987
1	Women	54%	48%	52%	63%
2	Men	31%	38%	26%	23%
3	Both	14%	12%	19%	13%
4	Don't Know	1%	1%	3%	--
	Total No. of People	127	118	119	122

(c) Have cultural stereotypes diminished?

In 1985, when respondents were asked in general, if they thought there were any differences in the amount of leisure time available tomen and women, there were no significant sex differences (Table 37).

However, when the same question was asked in 1987, there were significant sex differences, Chi. Sq. (d.f. 3) = 8.0*. Thus while a majority of the men, 63%, felt that women had more leisure, 48% of the women felt that women had more leisure than men.

This is a significant difference when one keeps in mind that in 1985 on all questions related to differences in abilities, women usually rated men more positively than themselves. What does this finding mean?

WAS implementors have made a very determined effort to involve women without alienating or ignoring men. This finding seems to indicate that there has been some spread effect WAS activities, especially on women. Women are more willing now to speak out for themselves rather than be dominated by cultural stereotypes.

It should be pointed out that if differences in reported leisure over the years were because of some new responsibilities, then these new responsibilities should be reflected in reasons for different ratings by women.

(d) Why are there differences in leisure time?

In 1985, women gave 138 reasons and men gave 125 reasons while in 1987, women gave 137 reasons while men gave 173 reasons for their judgements. What is amazing is the overall stability of responses to questions that are completely open ended. Hence, except for one new category, the category of responses were the same (Table 38).

Thus, in 1987, a greater percent of women's reasons, 35%, reflected their opinion that women had less leisure than men. On the other hand, more men had judged women as having more leisure in 1987. This is also reflected in their reasons. Overall 64% of the reasons given by men related to men working harder and longer while only 24% of the reasons reflected on women.

The new negative category (5%) that emerged was made by women. Statements made included the perception that because women did the same work everyday they got bored and hence lazy and stopped working and that women also went out more often. None of these statements were made by men!

TABLE 38 : REASONS FOR DIFFERENCES IN LEISURE

No.	REASON	WOMEN		MEN	
		1985	1987	1985	1987
1.	Women work only a little at home, then sit	28%	28%	19%	24%
2.	Men only farm, then rest	15%	28%	10%	13%
3.	Women stay at home, housework, don't have to go anywhere	13%	14%	20%	27%
4.	Women's work never finishes, work all the time	9%	3%	15%	5%
5.	Men have a lot of work	9%	1%	3%	6%
6.	Both have a lot of work and a lot of rest	8%	6%	10%	6%
7.	Men work hard all day in kebun, till night	5%	2%	6%	4%
8.	Women have to do housework and outside work, bring water, firewood	3%	3%	2%	3%
9.	Men have to go out as well	3%	2%	1%	--
10.	Both work hard with no rest	2%	4%	7%	2%
11.	Women have to obey and please husband also	2%	--	--	--
12.	Women's work is light easy, not heavy	1%	2%	5%	3%
13.	Women also have to weave, do handicrafts	1%	1%	1%	3%
14.	Men are heads of households and so have a lot of work	1%	1%	1%	--
15.	Women often lazy, go out, bored	--	5%	--	--
	TOTAL	100%	100%	100%	100%
	TOTAL NO. OF RESPONSES	(130)	(137)	(125)	(173)

4. Value of Women

In every society women are valued for their reproductive role. Additionally, in most societies women are valued as mothers for their role in raising children for the continuation of the family, clan and society. In most societies, in addition to their reproductive and nurturing role, women are also valued for a variety of other functions that they fulfill.

Roles are often minutely prescribed and form the norms against which the behaviour of individual women is gauged.

It is important to understand these spoken and unspoken rules, norms and values that delimit women's roles in a society. Once again the question on daily activities was used to lead into a discussion about value of women and perceived abilities of women compared to men.

(a) Activities done by women most valued by men

Both men and women were asked which activities that women did, in their perception, were most valued by men.

In general, both men and women were more articulate in 1987 than in 1985. This question is no exception. In 1985, women gave 146 responses, whereas in 1987, they gave 190 responses. The men's responses more than doubled from 181 in 1985 to 343 responses in 1987.

In 1985, there were no significant sex differences, i.e., the responses of men and women were similar. However, in 1987, there were significant differences in the responses of men and women, Table 39.

Before examining these differences it is important to stress two methodological points. Firstly, if a factor is shown to be positively valued through an indirect, open ended question, then that conclusion is much more likely to be true than if the same conclusion was drawn through a direct focus question.

A case in point, if men had been asked "Do you think collection of water is an important task performed by women?" and many had said yes, it would be less impressive, reliable, than if men said fetching water is an important task when they were asked "What activities that women do are valued the most?" We chose to word our questions in the second manner - the more indirect, open ended manner.

Secondly, if a conclusion is made based on responses to several related or apparently unrelated questions, then the conclusion is much more likely to be valid than if it is based only on one question. Example, if a decline in weaving, or increased evidence of bathing, watering of plants or growing of vegetables is apparent through several indirect questions, then conclusions about increased awareness, importance or frequency of these

activities are more likely to be valid than otherwise.

TABLE 39 : WHY ARE WOMEN VALUED? *

No.	ACTIVITY	WOMEN 1985	WOMEN 1987	MEN 1985	MEN 1987
1.	Weaving	38%	41%	54%	57%
2.	Managing household	36%	23%	55%	49%
3.	Farm work	16%	21%	8%	6%
4.	Carrying water	5%	4%	3%	43%
5.	Cooking food on time	3%	25%	2%	48%
6.	Making sleeping mats	4%	10%	3%	14%
7.	Sewing, embroidery	2%	5%	3%	9%
8.	Help, obey husband's orders	2%	10%	5%	7%
9.	Looking after animals	2%	4%	2%	4%
10.	Good relationship with husband	2%	2%	2%	1%
11.	Receive guests, develop village	1%	1%	3%	1%
12.	Petty trade	1%	1%	2%	2%
13.	Carry firewood	--	3%	2%	17%
14.	Grow vegetables	--	3%	2%	19%
15.	Watering toilets	--	2%	--	--
16.	Bathing children	--	2%	--	4%
17.	Don't know	6%	3%	--	--
	Total No. of Responses	146	190	108	343
	Total No. of People	(122)	(116)	(123)	(122)

* Percent distribution of people

(b) Effect of "WAS" on men

WAS activities appear to have affected men and women differently! When men were asked which activities that women did were valued the most, in 1985, water collection was mentioned by only 3% of the men. In 1987, water collection was mentioned by 43% of the men, a significant change. By contrast, women did not increase the value they played on water collection, 5% in 1985 and 4% in 1987.

Why is it that there has been such a change in men's responses to a question that presumably reflects core attitudes towards women?

It is probable that men's valuation of women reflect the primary activities that women have historically done. In this context although women have presumably always fetched water, the task was not dominant and taken for granted.

In the immediate past there have been three major changes which have focused men's attention on women's water fetching activities. Firstly, there has been talk about the importance of women's involvement in design and management of water systems. Secondly, the frequency with which women collect water has more than doubled, which makes the task of water collection more visible. Thirdly and perhaps most importantly the increased water availability, water collection and women's visibility in WAS have probably resulted in associating water collection with the dramatically increased vegetable production. Vegetable production both for home consumption and for sale may be highly priced especially in a drought year when crop yields have been low.

This interpretation of the finding is further strengthened when considering the sex differences in mention of vegetable production. Vegetable production by women as an activity valued by men was mentioned more frequently by men, than by women (men, 2% in 1985, 19% in 1987, and women, 0% in 1985, 3% in 1987).

Although the numbers are small, two new categories should not be disregarded as insignificant. Both are related to water use. For the first time a few women mentioned watering of latrines while a few men and women mentioned bathing of children as activities that women did that were valued by men.

For some reason, cooking food (Table 39) and serving food on time seems to be on people's mind, much more now than in the past!

Other tasks that women do that are valued by men and women were managing the household, working in the field, making sleeping mats, handicrafts, looking after animals, engaging in petty trade, maintaining a good relationship with the husband, receiving guests properly and carrying firewood.

Core values are difficult to change. However in the study villages, WAS experiences show that what might be presumed to be

deeply rooted attitudes may be influenced fairly quickly.

5. Perceived differences in abilities of men and women

The challenge faced by WAS was trying to give women a place of central importance in management of community water systems and give ordinary users a chance to make decisions and implement them. This had to be done in an environment in which decisions about community affairs were usually made by the formal leaders in which community members of both sexes, but especially women were ignored.

The baseline study findings had established that WAS activities would succeed in bringing women together only if the purposes were clearly task oriented. Even then difficulties could be expected in eliciting women's participation in mixed sex groups. In the villages, there were strong expectations for women to be obedient, polite and respectful of all, especially men. Women had low self esteem and self confidence. Men rated women lower on intelligence, problem solving, or leadership and knowledge than themselves. But more striking still, women in many cases rated themselves lower than men rated them.

In such a cultural milieu it is difficult to create an environment in which women will speak, think and act independently with confidence. Even if special activities succeed, it can not be assumed that this will be able to influence deeply rooted attitudes of men and women towards women.

Attitudes are difficult to change. If after a short intervention period (at the village level, after a year), questions not specifically project related, discern a change in attitudes towards women it is no minor achievement.

Thus it is worth examining the questions on perceived differences in abilities of men and women.

(a) Who is more intelligent

In 1985, there were significant sex differences, with more women than men , rating men as more intelligent (Table 40). In 1987, the differences between sexes were no longer statistically significant. There was a definite increase in the number of women, from 10% ('85) to 20% ('87) and men from 4% ('85) to 10% ('87), who rated women as more intelligent.

While fewer women rated men as more intelligent, more men rated themselves as more intelligent than in 1985! Among men there was a corresponding decrease in numbers rating men and women equal.

TABLE 40 : CHANGES IN RATING OF INTELLIGENCE BY SEX

No.	CATEGORIES	WOMEN		MEN	
		1985	1987	1985	1987
1.	Women	10%	20%	4%	10%
2.	Men	63%	56%	48%	62%
3.	Both	23%	24%	39%	26%
4.	Don't know	4%	--	9%	2%
	Total No. of People	128	117	117	122

Both men and women had no problem supporting their answers and as in other questions, there were more responses in 1987 than in 1985.

Among women's responses there was a decline in responses positive to men especially in stating that because men were household providers, powerful and rulers they were more intelligent (Table 41).

Surprisingly, there was a sharp decline in the statement that intelligence depended on education! More men and women credited both sexes with having brains in 1987 than in 1985.

In 1985 only 5% of statements were positive towards women. In 1987, 17% of women's responses and 9% of men's responses made positive statements about women's intelligence. This included a much more frequent mention of the statement that women were more intelligent than men because they engaged in a variety of tasks including cooking, weaving, working in the fields, managing the household and generally working a lot.

One can summarize that in 1987, women were more likely to rate themselves as more intelligent than men in 1985. Men on the other hand were less likely to rate both sexes as equal. Compared to 1985, more men in 1987 tended to rate themselves and to a lesser extent women, as more intelligent.

TABLE 41 : REASONS FOR RATINGS OF INTELLIGENCE

No.	REASON	WOMEN		MEN	
		1985	1987	1985	1987
1.	Men household provider powerful, ruler	30%	22%	16%	16%
2.	Men more clever, can solve any problems	9%	6%	13%	10%
3.	Men more educated	9%	10%	6%	19%
4.	Men responsible for everything, must manage everything	8%	12%	5%	12%
5.	Men go out more, so more experiences	3%	1%	5%	6%
6.	Men's right, duty to make decisions, adat	2%	1%	1%	1%
7.	Men talk more, so know more	-	3%	1%	--
8.	Women weak, not able, only receive, follow orders	5%	1%	1%	--
9.	Depends on education	11%	2%	21%	1%
10.	Both have brains	3%	17%	9%	18%
11.	Depends on individual	2%	2%	2%	5%
12.	Women clever at some things, men clever at some things	1%	1%	10%	2%
13.	Both share decisions	9%	3%	5%	--
14.	Both are stupid	2%	--	--	1%
15.	Women more clever, work cook, weave, kebun	6%	15%	5%	8%
16.	Women manage the house, work a lot	--	2%	--	1%
	Total	100%	100%	100%	100%
	Total No. of Responses	(101)	(122)	(102)	(134)

(b) Who has more knowledge and information?

The pattern of differences seen in response to the question on intelligence can also be seen in the question on information/ knowledge (Table 42). While there were significant differences in 1985, (Chi Sq (d.f 3)= 9.6 *) there were no significant differences in 1987.

TABLE 42: WHO HAS MORE INFORMATION AND KNOWLEDGE

NO.	CATEGORY	WOMEN		MEN	
		1985	1987	1985	1987
1	Women	10%	16%	6%	9%
2	Men	70%	69%	60%	76%
3	Both	12%	11%	28%	10%
4	Don't know	8%	4%	6%	5%
	Total No. of People	124	117	116	121

Once again, compared to 1985 more women and men in 1987, rated women as more knowledgable than men. Men's ratings of themselves as more knowledgable increased, women's rating of themselves stayed the same, with some decrease in both sexes being rated equal.

Like in 1985, the most frequently mentioned reason in 1987 by men and women was the fact that men went out more often than women and hence were exposed to a variety of different experiences (29% to 33% Table 43). Both men and women also said that men knew more because they attended village meetings and participated in village administration. Men, more than women, also felt that men received more information or were targetted for information more than women.

Once again, there seems to be a realization that the amount of knowledge and information one has is not determined by formal education (men in 1985, 20%, 1987, 3%).

In 1985, not a single positive statement was made about women except for ones related to more formal education. In 1987, 12% of women's responses and 9% of men's responses made direct positive statements about women. These statements included perceptions that women had opportunities to get together occasionally and exchange information, women worked a lot, and that women were responsible for the household and so gained much information and knowledge.

TABLE 43: WHY DO MEN OR WOMEN HAVE MORE INFORMATION?

NO.	REASON	WOMEN		MEN	
		1985	1987	1985	1987
1.	Men go out a lot, many experiences	32%	29%	34%	33%
2.	Involved in village meetings, administration	14%	16%	3%	14%
3.	Men get more information	9%	7%	4%	14%
4.	Women stay at home	9%	7%	7%	3%
5.	Men more clever, can think, solve problems	6%	9%	1%	7%
6.	Women more educated	6%	--	1%	1%
7.	Men have responsibility to solve women's problems	5%	3%	9%	1%
8.	Both help each other	5%	6%	5%	3%
9.	Men more educated	4%	3%	1%	6%
10.	Depends on education	4%	--	20%	3%
11.	Men powerful, ruler	3%	3%	--	4%
12.	Men are stronger	1%	2%	6%	--
13.	Men read a lot	1%	--	--	--
14.	Neither has much education	1%	--	2%	1%
15.	Men are used to thinking and asking a lot of questions	--	3%	3%	1%
16.	Women get together, they are responsible for household	--	3%	--	1%
17.	Women work a lot, gain much information	--	9%	--	8%
	TOTAL	100%	100%	100%	100%
	TOTAL NO. OF RESPONSES	(95)	(123)	(90)	(154)

(c) Who makes better leaders and why?

There were no striking differences in respondent's perceptions of leadership abilities of men and women across the years (Table 44). There were no significant sex differences either year.

TABLE 44: WHO MAKES BETTER LEADERS

NO.	CATEGORY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Women	7%	11%	1%	7%
2.	Men	79%	81%	79%	82%
3.	Both	11%	8%	17%	9%
4.	Don't know	3%	1%	3%	2%
	Total No. of People	126	118	119	122

Eighty percent of men and women generally agreed that men made better leaders than women. Following the pattern of other results, there is a slight increase in the numbers of men and women rating women as better leaders than men.

This finding may seem negataive to readers in light of the fact that the leaders of all the water users groups were female. However it is important to point out that despite the fact that the official leaders were females, the decisions were still often made by the male advisors, village leaders and other male village facilitators.

In an environment in which cultural traditions put men in positions of authority, any attempt to aggressively promote women as authority figures could provoke a back lash. This has not happened in the villages. Rather, there has been a very small but consistent increase in viewing women more positively than before WAS.

Reasons for people's judgements of leadership abilities are reported in Table 45. It can be seen that there is a decline, especially among women in reasons favoring men and an increase in reasons for rating both sexes equal or women better than men. It is important to note that among men, whereas not a single positive statement was made about female leadership abilities in 1985, in 1987, 8% of the responses were positive towards women.

TABLE 45: WHY DO MEN/WOMEN MAKE BETTER LEADRS *

NO.	CATEGORY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Men are household heads, powerful, ruler	50%	46%	34%	51%
2.	Men more clever, can think solve problems	9%	12%	14%	19%
3.	Women only stay at home, lack experience	9%	1%	6%	1%
4.	Men used to talking in public, know Indonesia	5%	3%	5%	--
5.	Other - tributes to men	5%	1%	2%	--
6.	Men are responsible for solving women's problems	4%	2%	8%	1%
7.	Men involved in village administration, meetings	4%	1%	3%	1%
8.	Women only obey, receive, follow orders	3%	8%	5%	1%
9.	Men are stronger, can do heavy work	2%	9%	2%	2%
10.	It is a man's right, adat	1%	2%	--	1%
11.	Men are brave, not afraid	--	--	7%	1%
12.	Depends on education, experience	4%	2%	13%	6%
13.	Both have brains	1%	6%	1%	7%
14.	Women can lead	3%	5%	--	5%
15.	Women have more variety of experiences, work at home and outside	--	2%	--	3%
	TOTAL	100%	100%	100%	100%
	TOTAL NO. OF RESPONSES	(104)	(119)	(116)	(130)

(Percent distribution of responses)

(d) Who is better at solving problems?

In 1985, there were statistically significant sex differences with more women rating themselves on par with men. In 1987, these differences disappeared. All the men who weren't sure in 1985, and some of the men who rated both sexes equal, in the meantime became convinced that men were superior problem solvers than women! More women rated men as better problem solvers in 1987 than in 1985 (Table 46).

TABLE 46: WHO IS BETTER AT PROBLEM SOLVING

CATEGORY	WOMEN		MEN	
	1985	1987	1985	1987
Women	6%	5%	3%	3%
Men	60%	78%	68%	87%
Both	32%	17%	18%	9%
Don't know	2%	--	11%	1%
Total no. of people	126	118	120	122

However before drawing definitive conclusions, it is important to study the rationale underlying the responses.

Overall, in 1985, only one directly positive statement about women was made by men. Two men said that women had more education. Women had not made one positive statement about themselves (Table 47).

In 1987, however, 8% of women's responses and 3% of men's responses were positive statements about women's problem solving abilities.

Women (6%) pointed out that women were better problem solvers because they had to manage the household even when resources were strained or nonexistant (6%). Some men also said that when men made mistakes, it was women who corrected them and that women were able to think more clearly and that their thinking was more sharply focused than men.

TABLE 47: REASONS FOR JUDGEMENT OF PROBLEM SOLVING ABILITY

NO.	CATEGORY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Men household head, provider, powerful, ruler	35%	47%	26%	49%
2.	Men and women must help each other	29%	16%	14%	8%
3.	Men more intelligent	8%	2%	6%	9%
4.	Men responsible for everything, must manage everything	6%	13%	19%	15%
5.	Women always busy, so not so clever	5%	--	--	--
6.	Men more free to go out, so more experiences	5%	1%	5%	5%
7.	Depends on individual	3%	1%	7%	1%
8.	Women weak, not able, can only receive	3%	--	5%	--
9.	Men are stronger	2%	1%	3%	1%
10.	Men more educated	2%	1%	2%	1%
11.	Men more patient	1%	--	--	--
12.	Men's right, duty to make decisions, adat	1%	4%	8%	4%
13.	Men talk more	--	4%	3%	4%
14.	Women more educated	--	1%	2%	1%
15.	Women must manage even under difficulties	--	6%	--	1%
16.	Women think more clearly	--	1%	--	1%
	TOTAL	100%	100%	100%	100%
	TOTAL NO. OF RESPONSES	(152)	(127)	(106)	(139)

(e) Ability to work in groups

Finally, people were also asked if they thought there were differences in the functioning of groups comprised of women only and those of men. This question was misunderstood in 1985 and hence comparative data across time is lacking.

However, it was the only question, in which there were significant sex differences (Chi Sq d.f 3=22.7***) in 1987 (Table 48).

Approximately 37% of both men and women rated men's groups better than women's groups. However, 35% of women and 43% of men rated both types of groups as equal while 27% of women and 9% of men rated women's groups as functioning better than men's groups.

TABLE 48: WHO WORKS BETTER IN GROUPS, 1987

NO.	CATEGORY	WOMEN	MEN
1	Women	27%	9%
2	Men	37%	36%
3	Both	35%	43%
4	Don't know	1%	12%
	Total No. of People	118	121

TABLE 49: REASONS FOR RATINGS ON ABILITY TO WORK IN GROUPS (1987)

NO.	CATEGORY	WOMEN %	MEN %
1.	Men work hard, non stop	16%	22%
2.	Men are stronger, women only receive help	19%	10%
3.	Men are leaders, responsible, clever, heads, faster	8%	6%
4.	Women's work is easier	2%	6%
5.	Women just talk, give headaches, are lazy	2%	2%
6.	Women work hard, know a lot	8%	3%
7.	Women are the heads, have duties	9%	5%
8.	Both must work together	33%	27%
9.	Both have their own work	3%	19%
	TOTAL	100%	100%
	TOTAL NO. OF RESPONSES	(129)	(125)

There were corresponding differences between men's and women's responses in support of their answers. These are presented in Table 49 and are interesting because the question obviously made some people think about the water groups in which women were perceived to be active.

Although once again, the list is primarily a tribute to men, it is interesting that more positive statements about women or about equality and sharing between the sexes have been made in response to this factor than to any other. It is also important to note that it is the only place, where both men and women stressed the need for men and women to work together each making his/her own unique contribution.

(f) Have women gained in self confidence?

During group meetings with water user's groups, women and men rated retrospectively, women's confidence in themselves before

groups had been formed and after participation in groups. Women rated themselves individually.

Both men and women took great delight in this activity. They had to choose between ratings, very shy, somewhat shy and brave/not shy).

Men usually rated the women prior to WAS as very shy, and with great flourish would rate women as brave after their involvement in groups!

Women mostly rated themselves as very shy or somewhat shy prior to WAS. A few women rated themselves brave. However the majority of women rated themselves somewhat shy or brave after involvement in water groups. Some of the younger women rated themselves shy before and after WAS.

What is important about these ratings is that 1) people perceive women as more self confident in 1987 than in 1985, and 2) both women, but especially men take great pride in this increased "bravery" of women.

6. Qualities of Women's Lives

What is the quality of women's social and emotional or psychological lives? Do they have friends, support networks, family problems? What are the differences between men and women.

These questions have been answered to some extent in the earlier report. However, it is often stated that establishing of women's groups often provides women opportunities to socialize and creates important support networks. This however would normally depend, not only on:

1) the cultural context;
2) the type of women's group, its function; and,
3) length of existance.

One year by any standard is too short a time period to measure change in emotional quality of life associated with participation in groups.

(a) Intimacy between people

Small, face to face communities are usually characterized by mutual sharing and help. However, at the same time, often because of their size and face to face contact, they are also marked by gossip and a reluctance to confide intimate problems to others because of the fear that soon every one will be privy to them.

What is it like in the study villages? When people, especially women have personal or family problems, who do they talk to, what are their support networks? Have there been any changes since WAS?

All respondents were asked if there was anyone they could talk to, when they had problems and who was it that they usually confided in. Women were asked additional questions to assess if women felt closer to other women.

In 1985, approximately 70% of men and women said that they had someone to talk to when they had problems. In 1987, this had increased to 84% for men and 74% for women.

Whom do people turn to when they have problems? The primary category for both sexes in both years were related kin, parents, uncles, aunts and spouses.

In 1987, there was a dramatic increase in the number of men and women reporting turning to their spouses. Thus 71% of women and 34% of men said that they talked to their spouses in 1987 against 18% in 1985.

Thus it appears that participation in water user groups do not bring women closer together but brings couples closer together. This interpretation makes sense when one considers the experience of most people in groups.

While most of the groups have undertaken collective action, they are at this stage of growth not conducive to intimacy among women. Rather the fairly large, mixed sex groups are constantly forced with making new decisions and taking on new roles.

Many husbands attend group meetings with their wives. Faced with much new information about activities, in which formal and informal leaders also have only limited experience, it is probable that some couples turn to one another.

(b) Women's networks

Women in addition were asked if they talked to other women about their problems. In 1985, only 40% (50) of the women said that they could talk to other women about their problems. These were primarily:

- relatives 65%
- friends 21%

and - neighbors 14%

In 1987, slightly more women, 47% (56) said that they could talk to other women about their problems.

The distribution in 1987 was as follows:

- relatives 74%
- friends 6%
- neighbors 5%
- wives of village staff 9%
- PKK 2%

and - wives of clergy 2%

Thus in 1987, women seem to be turning more to the family and more frequently to wives of village officials including members of PKK and the clergy. This is important because wives of village officials have played important roles in village water activities. Thus wives of many village officials instead of being leaders/resource people in name only have begun actualizing their leadership potential.

(c) Women's groups

Women were asked if they had opportunities to get together with other women, to do things, talk or undertake activities. The question was deliberately made somewhat task oriented, because pre-testing indicated that women getting together in groups without a specific task was viewed with suspicion. It was assumed by both men and women, that women would get together and gossip, which was viewed extremely negatively.

Overall, in 1985, 57% of women said that they had opportunities to get together with other women. In 1987, this percent increased dramatically to 80%.

Women were also asked where they got together. The distribution of responses by year are reported below:

	1985	1987
Village office	45%	26%
Village official's home	21%	34%
Home of neighbors for sewing, crocheting, talking	14%	9%
Home of relatives	10%	4%
Church	4%	1%
Teacher's home	1%	--
Water collection place	5%	9%
During building of water source	--	16%

Although basically the same categories are mentioned in 1985 and 1987, the changed distribution reflects the activities of the water groups and the more active roles played by previously passive wives of dusun level officials. This is reflected in decreased mention of village office and increased mention of village officials' homes in 1987 compared to 1985.

It is also important to note that an increased number of women mentioned water sources and group activities undertaken to build new or improve old water sources, as "meeting places".

7. Problems Affecting Family Life

During pre-testing individuals were asked about problems affecting their villages and those affecting the family. In general people found it difficult to respond to the question about the village as a whole. Hence the question was dropped and

respondents were asked if they perceived any problems that affected their family life.

Once again keeping to the methodological philosophy of no direct questions on water to gauge perceived seriousness of water problems, the questions on family problems become important in gauging water problems. If water is mentioned in such a non directive context it clearly is important to the respondent.

In general, in 1987 it was found that more people were willing to answer the question than in the first round. Like before, there were striking differences between the sexes (Table 50).

While the problem of water collection was the single most frequently mentioned problem by women in 1985 (30%) it had declined to 15% in 1987. Interestingly, men mentioned it more frequently, 18%. All the water activities have obviously made men more aware of the water problems!

Women also rated health as an important problem more frequently in 1987, 10%, than in 1985, 1%. This probably reflects increased awareness and hence greater concern about health rather than poorer health in absolute terms in 1987 compared to 1985.

It is important to examine inter village differences in mention of water problems. The distribution by village was as follows:

	1985	1987
- Sillu	28%	35%
- Naunu	3%	7%
- Takirin	17%	6%
- Sarabau	36%	14%

The inter village differences in 1987 relative to 1985 reflect the uneven coverage of WAS activities in the four villages. Naunu, is interesting because no new perennial sources of water have been found and one major spring has been improved. Change has been difficult because of complacency of people compounded by political problems. Yet the presence of WAS has led to an increased awareness of water problems! Takirin served by quite extensive pipe systems, has a definite decline in the frequency with which water problems are mentioned.

In Sarabau, all the references to water problems were from people in Sarabau I where political problems with a neighboring village have centered on water rights and water distribution.

TABLE 50 : MOST IMPORTANT PROBLEM BY SEX

No.	CATEGORY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Water	30%	15%	13%	18%
2.	Money	26%	34%	40%	48%
3.	Lack of harmony between spouses	14%	10%	2%	3%
4.	Food	12%	8%	10%	22%
5.	Other-outside influences, late salaries etc.	6%	--	5%	1%
6.	House work not smooth	5%	10%	9%	2%
7.	Clothes	3%	2%	4%	--
8.	Looking after children, lazy children	2%	6%	--	1%
9.	Enemy	1%	--	--	--
10.	Children's health	1%	5%	1%	2%
11.	Adat demands	--	1%	6%	2%
12.	House repairs	--	3%	8%	1%
13.	Gossip	--	--	2%	--
14.	Health/sickness	--	5%	--	--
15.	Animals destroying plants	--	1%	--	--
	TOTAL	100%	100%	100%	100%
	TOTAL NO. OF PEOPLE	(74)	(89)	(94)	(105)

In Sillu, the majority of responses were from Tunmuni and Taumnanu both extremely spread out dusuns in which only certain segments have been served with new/improved water sources. The fact that certain sections are served and others not, makes those who are not served even more dissatisfied with their situation than previously.

The results were also analyzed by type of source being used. There were strong differences in frequency of mention of water as a problem in the three groups, those using unimproved sources, those using new sources and those using unimproved water sources (sprags). The distribution was as follows:

users of unimproved sources	24%
users of new sources	8%
users of improved sources	21%

8. Economic impact

(a) Has the project had any economic impact on women?

Besides managing all household activities and helping their

husbands in agricultural production, women also produce a variety of items they sell or trade in the village or outside.

Reports of field workers and informal conversations with women all indicated increased vegetable growing in the villages because of easier access to water sources.

Baseline data on women's production activities for trade or barter were gathered in 1985. Hence if there have been changes in women's production activities for sale they should be reflected in comparative data gathered in 1987.

(b) Women's production activities

In 1985, 62% of the women said that they produced items for sale. By 1987, 85% of the women said that they produced items for sale. This was more true for Belu villages (94-100% of women), and least true for Sillu (70%), and Naunu (81%). Production activities mentioned are reported in Table 51.

Some women mentioned more than one activity. It can be seen that there is a definite increase in number of women involved in growing vegetables, onions and fruits. By contrast the number of women involved in sewing, making of handicrafts and weaving either declined or did not increase.

TABLE 51: WHAT WOMEN SELL *

NO.	CATEGORY	1985	1987
1.	Fruits, coconut	35%	78%
2.	Vegetables, onion	21%	60%
3.	Corn	12%	25%
4.	Handicrafts, sewing	10%	2%
5.	Casava, sweet potatoes	9%	22%
6.	Peanuts, mung beans	7%	18%
7.	Weaving	4%	4%
8.	Other -- coconut oil	2%	2%
	Total No. of Responses	77	211
	Total No. of Women	(77)	(101)

* Percent distribution of women

(c) How important are these activities to women?

It is extremely difficult for women to make statements on monthly income from these productive activities for two reasons. Firstly, production is usually fairly seasonal, and secondly, women obviously tend to feel that accounting systems (as we know it) are not so important!

However, women were able to make very definite statements about how important they felt these sources of income were for them (Table 52). These small sources of income not only affect more women, but have also increased in importance for women.

While in 1985 only 18% of the women engaged in production of items for sale felt that the activity was extremely important to them in 1987, 67% of the women stated these activities as being

TABLE 52: IMPORTANCE OF WOMEN'S MARKETABLE ACTIVITIES

NO.	CATEGORY	WOMEN 1985	WOMEN 1987
1	Extremely important	18%	67%
2	Important	72%	30%
3	Not very important	6%	--
4	Not important	4%	3%

extremely important for them. All the women in the sample in Sarabau (100% of those incuded in the study) rated their income sources as extremely important. The distribution in other villages was as follows:

- Takirin 67%
- Sillu 55%
- Naunu 58%

How do women spend their earnings? These findings have been discussed in detail in the earlier report. In general, there was a clear difference in the spending pattern of these earnings by men and women. While men tended to spend their wives earnings primarily on tobacco and alcohol, women tended to spend money on household expenditures or their children (Table 53).

TABLE 53 : HOW WOMEN SPEND THEIR EARNINGS

No.	CATEGORY	WOMEN 1985	WOMEN 1987
1.	Food, vegetable, meat, salt, oil	26%	34%
2.	Household supplies, soap	23%	26%
3.	Kerosene	21%	16%
4.	Clothes	12%	9%
5.	School expenses	6%	6%
6.	Thread for weaving	5%	1%
7.	Adat, church	3%	1%
8.	Transport	4%	--
9.	Pay water group fees	--	7%
	Total	100%	100%
	Total No. of Responses	187	206

It is important to note that women's cash earnings may have become particularly important in 1987 because of pervasive drought leading to low crop yields. In fact women's earning appear to have been used to a greater extent for purchase of food in 1987 than in 1985.

From the expenditure patterns over two years, it can be seen that women don't spend money frivolously. It is important to note that expenditures on food increased while expenditures on kerosene, children's clothes, adat, transport and thread for weaving decreased.

An important, new category emerged. For 14 women (7% of the responses), their earnings enabled them to pay their basic and monthly contributions to their water user's groups.

Hence WAS activities provided increased opportunities for women to grow vegetables and to market them. In addition, some of the money raised through increased access to water is also being used to ensure long term maintenance of water facilities.

Conclusion

Despite the extremely short period of organizing at the village level, there have been profound, discernible changes in women and in men in the four village communities.

Compared to 1985, fewer women perceived water collection to be a difficult task. In addition, water collection was no longer the most common family problem mentioned by woemn. While 30% of the women mentioned water collection as a problem in 1985, only 15% mentioned it in 1987.

More women were rating themselves on par with or better than men in intelligence, knowledge and information and especially in ability to work in groups. Even though the numbers were small more men rated women positively in 1987 in the various abilities than in 1985.

Despite the fact that more men perceived water collection as an easy task in 1987 than in 1985, when asked what activities women did that were valued by men, 43% of the men in 1987 mentioned water collection. By contrast in 1985, only 3% of men mentioned water collection.

Thus men who took the task of water collection as a given in 1985, were more appreciative of the fact that women performed the daily task of water collection for the family. This was probably related to the fact that women were collecting water more frequently and hence were more visible and also the fact that increased water collection resulted in highly prized additions to family diet and income.

In terms of relationships with other women, involvement of women in water groups appears to have increased intimacy between

couples more than it has brought women together.

Additionally, in terms of economics, many more women were growing vegetables for sale in 1987 than in 1985. Women perceived these earnings as extremely important to them.

C H A P T E R 8

HAS PKK CHANGED ITSELF: WAS AND PKK

PKK has been responsible for implementing WAS at all levels. Hence it is important to consider PKK from two perspectives. Firstly, how has PKK been affected by taking on the responsibility for implementing WAS? In other words, in the process of implementing WAS, has PKK itself changed?

Secondly, was PKK effective in bringing about 1) improvements in the water situation, 2) changes in women and, 3) in men and communities in the directions desired. The second question is answered throughout the report in considering the issue of change at all levels in women, water, communities, technicians...

Hence this chapter will consider changes that can be discerned in PKK at the village level. However, before trying to discern change it is important to emphasize some key principles of the PKK movement. It is equally important to understand how PKK was functioning in the four village in 1985, so that change perceived can be viewed in a historical perspective.

1. Organizational aspects of the PKK movement

a) Leadership

According to the ministerial decree (Decree number 28, 1984) describing the organization of PKK, the chair of the action team (the PKK management board) at each level -- provincial, district, sub district and village -- is the wife of the respective chief administrator (which is to say wife of the Governor; wife of the district, sub district or village head.) All other positions are left to local choice.

b) Membership

As legally constituted, PKK is not a "membership organization" with membership requirements, procedures for accepting or rejecting members, membership rights and responsibilities. Rather, PKK is a development movement the main concern of which is family welfare in the broadest sense, a movement in which any one may be active. Nonetheless, in carrying out this field research the terms "membership and "member" were used in data collection and discussion with men and women around "membership" questions was found to be revealing in terms of gaining insight into organizational practice in the study villages and how PKK is perceived .

c) Different roles in the PKK movement and PKK activities

With regard to the roles a woman might play in PKK, there are three, distinct and identifiable roles in the movement :

** Participant in activity organized or promoted by PKK (for example, participating in a food preservation class, participating in baby weighing, maintaining a home garden, practicing family planning). Both women and men can be participants but, in general, the vast majority are women.

** Cadre, or trained volunteer (woman or man) working without financial compensation in activity promoting family welfare. As previously stated, the three priority concerns of PKK in NTT since the early 80s have been:

-- Health (for example, nutrition, water, environmental sanitation, issues of child survival etc. and family planning)

-- basic education

-- income generation

As with participants, cader can be either women or men. The vast majority are women.

** Member of the action team (Tim Penggerak) which in the movement serves as the management board of PKK at each level -- provincial, district, sub district, village. Again, action team members may be men or women and the vast majority are women. However, the WAS teams as mentioned before, at provincial, district and sub district level have both women and men.

2. PKK in 1985

In 1985, relatively little was known about the levels of functioning of PKK in the four study villages. Hence the 1985 study explored the functioning, problems and successes of PKK at the village level from different perspectives.

The findings about PKK from the baseline study are reproduced here in full because PKK has been the key implementing and coordinating institution for WAS, despite the disheartening findings about the functioning of PKK at the village level and how it was perceived in 1985.

Secondly as mentioned before, WAS was perceived as a vehicle to strengthen PKK as an institution. This approach has resulted in the creation of mechanisms that can be sustained within PKK in the long run rather than creation of artifical structures outside the PKK system. It is because of this strategy utilizing existing personnel, volunteers, cadres and leaders that it is important to understand the village situation vis-a-vis PKK in 1985. Only then can the challenger and problems faced by PKK and its achievements be seen in perspective.

3. Findings from the 1985 baseline study

In 1985, PKK at the village level was perceived to be experiencing many problems. Problems that were the most pervasive and being experienced by all four study villages are reported here.

a) Leadership, 1985

In all the villages leadership of PKK was weak. There were three main problems with the Ibu Desas, (wife of the village head who automatically serves as Chair of PKK at the village level)

** The most common problem was lack of interest. For example, three of the four Ibu Desas did not know how the PKK subsidies had been spent in the past, what training activities had taken place, nor could they say approximately how many women had been trained in the different activities being undertaken by PKK.

** The second problem was inability of the Ibu Desas to set aside divisiveness and rivalries between themselves and past PKK leaders in the larger interest of a functioning PKK. Ibu Desas had almost no contact with women outside their own dusuns either because of lack of interest or because of internal rivalries.

** The third major problem was lack of trust between PKK women and their leaders. This problem arose in 3 of the 4 study villages and had major negative repercussions on their ability to mobilize women to undertake activities for PKK.

A common complaint among PKK members was "we work hard for PKK and we never get any rewards. What is worse is that we never know how much money is obtained from selling our products and what is done with the money. So why should we work for PKK?"

The last major reason for erratic functioning of PKK was the lack of leadership at the level of dusuns. It is here that the geography of the villages plays a crucial role.

In the study villages except for two dusuns in Naunu, dusuns are distinct geographic entities often spread over a distance of 30 kms. It is impossible for women to trek over a distance of 5-10 kms every day to participate in PKK activities in the village office. It is equally impossible for the Ibu Desa to go to every dusun even during the period when a project is being implemented. In such an environment, leadership functions have to be decentralized.

As explained above, although nowhere is there an official policy (written or otherwise) designating the wife of the dusun head (ward leader) as compulsory leader of PKK in her own dusun,

nonetheless, in the study villages this was said to be the policy regardless of her interest or skill. To complicate matters still further, while on the one hand none of the women in question had been trained either about PKK or leadership, on the otherhand they were often ignored by the chair of the village PKK.

None of the Ibu Dusuns in 1985 were able to discuss any of the PKK activities except for handicrafts production. Even then it was true only if they had personally been involved in production. In most instances they had never had a meeting with the Ibu Desa. Additionally, many of the Ibu Dusuns had young infants and stated plainly that they had neither interest nor time to get involved with PKK.

We went on to suggest in 1985 that since most of the direction for PKK activities comes from outside, the Kecamatan, Kabupaten, those responsible for PKK at these levels should be cognizant of this problem and seek solutions. It should be pointed out, that in almost every dusun there was at least one dynamic woman involved and interested in PKK.

Despite the weak leadership and apparent low level of interest of the Ibu Desa, PKK was still functioning in all the villages. Why was this so? There appeared to be 3 reasons:

** Interest/ action of Kepala Desa (village head)

Despite the fact that the Ibu Desas are the official heads of PKK, in all four villages the real heads were the Kepala Desas.

The Kepala Desas, together with the LKMD, not only made the decisions about use of PKK subsidies but they made the decisions about the day to day operation of PKK, selection of women for training and organisation of PKK work groups. In all the villages, the Kepala Desas knew more about all aspects of PKK than the Ibu Desas. In one village, the Ibu Desa refused to meet with the author to talk about PKK without first getting permission from her husband.

** Traditional respect given to leaders.

Unless people are extremely upset with their leaders, they still follow tradition and do what their leaders ask of them.

Thus when the Kepala Desa 'orders' women to come to the village office for PKK activities they do show up. This is especially true when it is clear that the activity is ordered from the outside, by the Government. In the words of one Ibu Desa "It is extremely difficult to get women to come to the meetings and participate. But if we get orders from the Government and order the women to come, they come because they are our children, we are their mother and father".

** Women want to learn and PKK has interesting activity

Individual women in the villages are genuinely interested in learning from participating in the various PKK activities. Thus PKK at the village level seems to function not because of its leaders but in spite of its leaders.

b) Meetings, 1985

Upto the time of the 1985 study, in all villages, except once in Sarabau, PKK had never held its own meetings. In none of the villages had PKK ever held a 'musyawarah' of its own at the village level. PKK at the village level seemed to operate only as a part of LKMD. Often PKK representatives other than the Ibu Desas did not attend the LKMD and even if they did, given the cultural context they did not speak. One Ibu Desa said "we only hold PKK meetings when important visitors come from outside".

In one village, attempts had been made to overcome some of these problems by the appointment of four dynamic women as vice chairpersons. The intention was that once the women were informed about a plan, they would meet to discuss how it should be implemented. The problem that still curtailed their activities was that they were often not informed about projects till it was too late. The problem they said "is that when information comes to the village office, it stops there. Either we are not informed or informed too late".

Only in one village was an attempt made by the author to hold a group meeting with PKK women. The Kepala Desa informed women through the Kepala Dusuns and their wives. After three days notice two women showed up for the meeting. Further inquiry revealed that most women including the Ibu Desa's neighbours did not know about the meeting.

On the rare occasions that smaller PKK project related meetings were held, few decisions were ever made in discussion with members. Many members said "even when a meeting is held we are never asked what we want to do but are just ordered to do this and that".

c) Plan of Action, 1985

In 1985, PKK activities in the villages seemed to lack a coherent plan of action. Ibu Desas perceived themselves as having little autonomy in initiating projects on their own. All the Ibu Desas in one way or another, said "we never do anything on our own, but only when ordered from the outside".

We suggested in 1985, that if the intention of PKK leadership at higher levels was to encourage PKK leaders at the village level to initiate activities, then this should not only be clarified to Ibu Desas, but to other PKK leaders in the villages as well.

It would be difficult for anyone to be a good leader in the absence of any activities.

d) P.K.K. Membership, 1985

The entire issue of membership was probed in every village because after a brief stay in Sillu, it was obvious that not every woman was considered or considered herself a member of PKK.

Once again the Kepala Desa plays a pivotal role in PKK. In the study villages every woman was not automatically considered as belonging to PKK. Women could only participate in PKK activities if ordered, nominated or selected by the Kepala Desa. A woman who was interested but not yet nominated, did not feel free to express her interest either to the Ibu Desa or Kepala Desa. It would be considered inappropriate for her to do so.

During interviews with PKK volunteers and members, women frequently said that they had not participated in a particular training because at that time their name was not on the register, or because at that time they did not belong to PKK.

Most of the village heads said they maintained a register of PKK members. (In this connection it should be pointed out that there may well be confusion in some villages between what they refer to as "members" and women trained as cadres/ volunteers. In the PKK administration system the village action team is expected to maintain 10 notebooks about various administrative matters -- for example, meeting minutes, lists of activites carried out, a guest book, an account book and, among others, a list of trained cader. This may possibly be the register referred to as the "register of PKK members.")

A system in which membership and participation depends on being noticed by the Kepala Desa is bound to have severe limitations. Kepala Desas for one may not be the best judges of women's competencies. In addition they may select only those women from those dusuns with whom they get along irrespective of their ability or need. Finally, in spread out desas, the Kepala Desa simply may not know all the women personally.

e) Input from the Outside, 1985

By 1985 some women in all four villages had received some training in a range of activities from PKK at the higher levels. Thus some women in each village had been trained in sewing with sewing machines, cooking of nutritious foods, weighing of babies and use of growth charts, nutrition, health and proposal writing.

In general, however, impact of training appeared to be limited by two factors, selection of women and lack of direction from Ibu Desas. Women were often selected by nomination by the Ibu Desas. As is obvious, Ibu Desas had limited contact outside their dusuns. Thus women who had received training often tended to be concentrated in one geographic area and were often isolated from

others because of rivalries and dissensions within the village.

Some women said that when they came back, especially from cooking training, they were very excited and keen to teach other women. However they felt that they could not do a cooking demonstration without the consent of, or invitation from, the Ibu Desa. That consent never came.

Ibu Desas in some villages had participated in training courses. When courses were based on practical involvement, women seemed to have benefited from the course, but when courses had been more abstract women had come back after 3-5 days unable to even state the purpose of the course.

f) P.K.K. Activities, 1985

In all the villages, sewing, making of handicrafts, weaving, cooking and baby weighing activities had been on-going. In addition PKK women in 1985 were also involved in encouraging villagers to keep their yards, toilets and the village clean. In the past, every village also had vegetable gardens. In 1985 however, because of water and motivational problems, only one nutritional garden in one dusun in Takirin had been planted.

In Takirin, nutrition cadres were also involved in a supplementary feeding program for malnourished children. PKK in Takirin and in Sarabau was also playing important roles in 'regreening' projects.

g) Conclusion : Was PKK active in 1985?

Despite erratic leadership, lack of direction in the overall plan of action and limited input from outside, PKK in all four villages was, with varying degrees of success, carrying out a range of activities. The credit for PKK's continued functioning in 1985 has to go to the women of the villages who continued to be interested in PKK. It would be apt to end with a quote from a PKK member.

> "We are interested in PKK but we are not interested in just sitting and listening but we want to learn. We want to learn new things and practice new things. We want to develop our village so we can be proud of it".

4. Assessing Impact

Against this background, let us now attempt to assess the impact of WAS on emergence of women as leaders and on PKK as a village institution.

5. Have women emerged as leaders

Despite the relatively low level of PKK functioning reported in the study villages in 1985, PKK is having an impact on the villages. One important indirect indicator is the issue of women

tremendous difference is dicernible in such a short time during a process in which not everything was done well or right, the potential of vitalizing female leaders from within the villages to undertake development activities remains largely and untapped.

The distribution of the two most frequently mentioned leaders by village is reported in Table 57. As can be seen, the Ibu Desa and Ibu Dusun are mentioned by a much greater percent of the sample in 1987 than earlier. Naunu and Sarabau are particularly interesting because of the change in leadership since the baseline study.

Naunu and Sarabau provide interesting contrasts. Naunu is still caught up in divisive politics, and the wife of the village head is young and in the words of the older PKK cadres "lacks experience."

TABLE 57 : CHANGE IN FEMALE LEADERSHIP BY VILLAGE *

No.	CATEGORY	SILLU	NAUNU	TAKIRIN	SARABAU
1.	Ibu Desa				
	1985	11%	14%	11%	3%
	1987	49%	36%	46%	64%
2.	Ibu Dusun				
	1985	2%	-	2%	6%
	1987	16%	17%	39%	22%

* Percent distribution of sample

In Sarabau, the wife of the village leader is also young but dynamic, forceful and has exerted her leadership. She has contact with both dusuns. Hence the dramatic increase from 3% to 64% in perception of Ibu Desa as a leader.

7. Relationship to WAS

Even more direct relationship of emergence of female leaders to WAS activities can be seen from analysis of female leaders by type of water source (Table 58).

TABLE 58: ARE THERE ANY FEMALE LEADERS BY WATER SOURCE

NO.	CATEGORY	USERS OF OLD SOURCES	USERS OF NEW SOURCES	USERS OF IMPROVED SOURCES
1	YES	82%	93%	80%
2	NO	18%	7%	20%

Obviously even though people may not have actively participated in water user groups, there is some spread effect due to proximity with these activities. This spread effect is evident

in the overall increase in mention of female leaders. However, there are still significant differences between those who were part of the most active groups (new sources), less active groups (improved springs) and those who did not participate in groups.

8. Qualitative differences in leaders

The differences in PKK leaders were obvious within a few minutes after arrival in the villages. Women who, in 1985, were too shy to talk, talked without hesitation in 1987. Not only were they not as shy but women were also more knowledgable about PKK activities. At some of the meetings with Kepala Dusuns, the men turned to their wives for information about PKK and 'water groups'! This was a real departure from the pattern established in 1985, when women turned to husbands for information!

9. Why such a difference

The intriguing question is why is there such a dramatic difference in women in such a short time?

A combination of factors appear to have contributed to this dramatic change.

1) PKK provided women with opportunities to exert leadership in a supportive, non threatening environment

2) The agenda addressed a felt need that was concrete, action and goal oriented, ie. building and managing of water systems,

3) The provision of opportunities for leadership were followed up by relevant training,

4) Provision of information, materials and technical expertise from the outside was timely, so that the context within which leadership was to be exercised became a reality rather than remaining an ellusive, distant promise, and

5) Focus on female leaders was with the approval and support of existing official and unofficial male leaders.

In other words, once encouraged, women perceived themselves as having a role to play in achieving goals perceived to be important by others in the community as well.

10. Impact on Community development activities

WAS has had multiple impacts at different levels. It is difficult to constantly try and differentiate between the effect of WAS on women, on institutions, on men and the community. Changes in attitudes, involvement of men are changes in the community. These have already been discussed in the previous chapter.

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leaders.

In addition to a general question on women's potential as leaders, all respondents were specifically asked if, in their perception, there were any women in their village that they would consider leaders. It is important to point out that this question was asked early on in the interview before any specific questions were asked about PKK.

In 1985, there were significant sex differences with fewer men perceiving any female leaders, 29%, than women, 49%, Chi Sq (d.f 1) = 8.0***.

In 1987, there were still significant sex differences but there was a dramatic increase in the number of both women and men who perceived some female leaders in their village Chi Sq (d.f 1) = 7.2**) (Table 54).

Thus in 1987, 80% of the men and 92% of the women said that there was a female leader in their village.

TABLE 54: ARE THERE ANY WOMEN LEADERS BY SEX

CATEGORY	WOMEN		MEN		TOTAL	
	1985	1987	1985	1987	1985	1987
YES	49%	92%	29%	80%	39%	86%
NO	51%	8%	71%	20%	61%	14%

TABLE 55: ARE THERE ANY WOMEN LEADERS BY VILLAGE

CATEGORY	SILLU		NAUNU		TAKIRIN		SARABAU	
	1985	1987	1985	1987	1985	1987	1985	1987
Yes	36%	80%	41%	88%	50%	92%	25%	87%
No	64%	20%	59%	12%	50%	8%	75%	13%

In 1985, there were significant differences between villages with 25% in Sarabau and 50% in Takirin saying that there were female leaders in their villages. The dramatic increase in female leadership swept away these differences between villages in 1987 (Table 55).

Thus between 80% to 92% of the people from all four villages said that there were female leaders in their villages in 1987 as contrasted to between 25% to 50% who perceived female leaders in 1985.

6. Who are the female leaders?

A follow up question was asked about who were the leaders. An

important indicator of change is the fact that while in 1985 there were only 72 responses, in 1987, there were 287 responses about who were the female leaders. Since the number of people responding to the question has more than tripled, the answer will be reported as a percent of the total sample rather than percent of total responses elicited. This reflects more clearly the differences in the number of people perceiving female leaders in 1985 vs. 1987.

Significantly more men and women, 56%, mentioned the Ibu Desa as a leader in 1987 than in 1985. Earlier the Ibu Desa was mentioned by only 7% of the men and 15% of the women in the total sample. There was also an impressive increase in the number of people who mentioned wives of lower level officials as leaders, particularly Ibu Dusuns and Ibu RT/RW (Table 56).

TABLE 56 : WHO ARE THE WOMEN LEADERS BY SEX *

No.	CATEGORY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Ibu Desa,(wife of village head)	15%	56%	7%	56%
2.	Ibu dusun	5%	27%	5%	33%
3.	PKK	3%	5%	13%	11%
4.	Ibu urusan, administrator	3%	2%	-	3%
5.	Ibu RT/RW	2%	16%	-	7%
6.	Important people	2%	6%	1%	5%
7.	Ibu clergy	1%	1%	-	3%
8.	Elders in the family	1%	2%	-	-
9.	WAS leaders	-	2%	-	2%
	Total no. of responses	41	139	31	148
	Total no. of people	(129)	(118)	(123)	(122)

* Percent distribution of sample

Direct mention of PKK did not increase greatly. This however, does not mean that leadership of PKK women has declined. As mentioned before, there is an overlap between PKK leaders and wives of village administrators. Hence when these administrators start exercising their leadership roles, PKK cadres who are not also wives of officials appear less prominent.

The question about female leaders was asked prior to any questions related to WAS or to water groups. Hence these answers are an extremely important indicator of impact of WAS on women and PKK in a very short time.

The results also indicate that PKK's attempts to activate its village level leaders and also decentralize leadership to the lower adminsitrative levels has worked. Indeed, if such a

Besides the specific changes already discussed, WAS has also had a discernible impact on people's involvement in village development activities. Once again, it is important to point out that the question about organization was asked prior to specific question about PKK or about water user groups.

11. Membership in groups

In 1985, 44% of men and women said that they belonged to at least one village level group. In 1987, this number had increased to 79% with significantly more women, 84%, reporting membership in groups than men, 74%, (Chi Sq (d.f 1) = 3.6*).

The dramatic increase in participation in groups affected all villages almost equally, wiping out significant differences reported in 1985. Thus participation in groups ranged in the seventies in all villages and was 86% in Takirin.

Once again, because of the dramatic increase in number of people involved in groups, the comparison across years is reported as percentage of people from the total sample (Table 59).

TABLE 59: CHANGES IN GROUP MEMBERSHIP BY SEX *

NO.	GROUP	WOMEN		MEN	
		1985	1987	1985	1987
1.	PKK	32%	60%	1%	25%
2.	Church	5%	6%	2%	10%
3.	Women's group - sewing, weaving	2%	3%	-	-
4.	Women's group - feasts	2%	-	-	-
5.	Faith, prayer group	2%	2%	-	5%
6.	Farming	2%	14%	10%	9%
7.	Family planning	1%	1%	-	-
8.	Informal groups - talking, looking for lice	1%	-	-	2%
9.	Other - Golkar, civil, military	1%	1%	4%	5%
10.	Village officials	-	-	10%	8%
11.	Village working group	-	12%	15%	20%
12.	Greenery project	-	-	2%	12%
13.	Burial group	-	3%	1%	-
14.	Water group	-	35%	-	23%
	Total no. of responses	62	158	57	145
	Total no. of people	129	118	123	122

* Percent distribution of sample

In 1985, 32% of all women and only 1% of the men in the sample reported being members of PKK. This percent increased to 60% for women and 25% for men in 1985. Mention of "feast" groups

disappeared in 1987. While more women reported membership in farming groups and village working groups than in 1985.

Water groups which naturally received no mention in 1985 since there wre no water groups were mentioned by 35% of women and 23% of all men in 1987.

Thus, there has been a marked increase in claims to membership in PKK. The change in PKK membership and mention of water groups by village is reported in Table 60.

TABLE 60: CHANGE IN PKK, WATER GROUPS MEMBERSHIP BY VILLAGE

NO.	CATEGORY	SILLU		NAUNU		TAKIRIN		SARABAU	
		1985	1987	1985	1987	1985	1987	1985	1987
1	PKK	16%	47%	11%	48%	21%	27%	26%	49%
2	Water Groups	-	32%	-	9%	-	53%	-	11%

It is important here to point out that although some people perceived WAS as a PKK activity, many people did not associate WAS with PKK. This appeared to be related to two facts. Firstly, PKK field workers have kept a low profile and did not appear to blow the PKK bugle each time they did something. Secondly, the WAS activity involved the entire community, leaders, non-leaders as well as men and women. Hence it did not fit into the typical pattern of PKK activities that has been practiced in the villages.

The findings about increased membership in groups such as farming and village working groups also establish that all other group activities in the villages did not come to a stop so that all energies could be directed to WAS. This, of course, was a deliberate policy which makes WAS not only sustainable but also replicable.

12. People's Perceptions About PKK

(a) Is there a PKK here?

A series of questions were asked specifically about PKK. The first specific question about PKK was whether PKK existed in the village.

People were definitely more aware about PKK's presence in 1987. In 1985, 98% of the men and 88% of the women knew that there was a PKK in their village. In 1987, eveyone except for one women knew about the existance of PKK.

(b) What is PKK?

People were asked if they knew what PKK stood for, most described PKK. In both years there were significant sex differences. Table

61. In both years more women than men could not describe PKK even though PKK deals mostly with women.

However there was an overall decline in numbers of people who said that they could not describe PKK. Distribution of descriptions can be seen in Table 61.

TABLE 61: CHANGES IN DESCRIPTION OF PKK BY SEX

No.	DESCRIPTION	WOMEN		MEN	
		1985	1987	1985	1987
1.	Family welfare	12%	11%	16%	17%
2.	Women's development group	9%	4%	9%	6%
3.	Sewing, basketry group	5%	14%	3%	3%
4.	Household affairs	4%	1%	6%	3%
5.	Women working for men	3%	-	5%	-
6.	Household cleanliness	1%	5%	5%	6%
7.	Serving guests & cooking group	1%	8%	8%	6%
8.	Planting vegetables	-	13%	4%	22%
9.	Nutrition group	-	1%	5%	6%
10.	Weaving	-	12%	1%	9%
11.	Planting lamtoro	-	-	1%	-
12.	Trainers from Kecamatan	-	-	1%	-
13.	Don't know	65%	29%	36%	21%
14.	Water groups	-	2%	-	1%
	Total	100%	100%	100%	100%
	Total no. of responses	77	152	94	163

Three trends are obvious. More people could describe PKK in 1987 than in 1985. In 1987, no one said that PKK was women working for men and there was large increases in mention of PKK's vegetable planting activity.

The results also clearly indicate that PKK did not stop its other regular activities in the four villages and create a 'special project' atmosphere around WAS. Hence WAS activities which were provided needed support were implemented by PKK while it continued its regular programme.

(c) What does PKK do?

The descriptions of PKK activities are quite similar across both years (Table 62) with the exception of a significant increase in frequency of mention of growing of vegetables. 17% by women and 25% by men in 1987 as compared to 6% and 10% respectively in 1985.

TABLE 62 : PKK ACTIVITIES BY SEX

No.	ACTIVITIES	WOMEN		MEN	
		1985	1987	1985	1987
1.	Sewing, crochet embroidery	26%	20%	12%	12%
2.	Cooking	19%	13%	21%	16%
3.	Weaving	17%	21%	28%	21%
4.	Basketry, handicrafts	8%	8%	7%	4%
5.	Growing vegetables, cassava	6%	17%	10%	25%
6.	Housecleaning, cleaning of yard	3%	4%	5%	4%
7.	Growing flowers, flower arrangements	2%	8%	7%	9%
8.	Nutrition, baby weighing	1%	1%	1%	1%
9.	Family development	1%	5%	1%	3%
10.	Look after guests	-	-	1%	-
11.	Other: make coffee etc, clean village, clean toilets, etc.	2%	3%	4%	5%
12.	Don't know	15%	-	3%	-
	Total	100%	100%	100%	100%
	Total no. of responses	186	226	214	294

In terms of numbers of people involved, vegetable growing was mentioned by 8% of women and 18% of men in 1985. In 1987, it was mentioned by 33% of all women and 59% of men. Obviously, all the increased vegetable growing that has been encouraged in conjunction with proper use of water has been noticed and associated with PKK.

Another indicator of greater knowledge about PKK activities in 1987 is the fact that not only were there more descriptions of activities in 1987 (520) compared to 1985 (400), but there were no "don't know" responses.

(d) PKK Membership

PKK is not a membership organization or movement. However at the village level it appears to be still perceived as a membership organization. When individuals were asked who were PKK members, a variety of responses emerged (Table 63).

In general it can be seen that there was a decline in the frequency of the most inappropriate categories in 1987, such as certain women, young girls, literate or married women. As compared to 16% of men and 34% of women in 1985 who said that they did not know who were PKK members, in 1987, only 2% of men

and 13% of women said that they did not know who PKK members were.

TABLE 63 : WHO ARE PKK MEMBERS?

No.	MEMBERS	WOMEN		MEN	
		1985	1987	1985	1987
1.	Women	27%	38%	31%	27%
2.	Certain women	14%	4%	39%	15%
3.	Wives of senior officials	13%	26%	9%	37%
4.	All women	6%	14%	2%	6%
5.	Young girls	3%	3%	1%	8%
6.	Married women	2%	-	-	3%
7.	Literate women	1%	1%	-	-
8.	Those ordered by officials	-	1%	2%	2%
9.	Don't know	34%	11%	16%	2%
10.	Men	-	2%	-	-
	Total	120	140	120	157

In 1987, there was also an increase in mention of "all women" as members.

(e) **Do you belong to PKK?**

There were significant differences by year and sex in numbers of people claiming to belong to PKK (Table 64). Thus in both years signficantly more women than men said that they belonged to PKK.

TABLE 64: DO YOU BELONG TO PKK

NO.	CATEGORY	WOMEN		MEN	
		1985	1987	1985	1987
1	Yes	27%	52%	2%	9%
2	No	73%	48%	98%	91%

In 1987, there was more than a doubling of people claiming membership in PKK. Thus while 27% of women in 1985 said that they belonged to PKK, the numbers inreased to 52% in 1987. Among men the numbers increased from 2% to 9% in 1987.

Thus increased awareness of PKK and increased involvement in PKK in 1987 is consistent with findings reported earlier on group membership in village organizations.

(f) Reasons for belonging or not belonging to PKK

People were asked why they belonged or did not belong to PKK. A majority of the responses were made by those who did not belong

to PKK (Table 65). The responses of men and women were quite different with two thirds of the male responses stating that PKK was only for women. Thus even though more men said that they belonged to PKK in 1987 among those who did not, misperceptions about PKK abound.

The responses of women were not very different in the two years except that in 1987 more women said that they were too busy or that they were not chosen to belong to PKK.

Overall, it can be concluded that despite increased participation in PKK, some basic misconceptions about who can belong to PKK still abound.

TABLE 65 : REASONS FOR BELONGING/NOT BELONGING TO PKK

No.	REASON	WOMEN		MEN	
		1985	1987	1985	1987
1.	Too busy	19%	28%	9%	6%
2.	Not invited, no opportunity,name not on list, not ordered	13%	9%	18%	1%
3.	Only for educated, not illiterate	12%	13%	-	2%
4.	Only for wives of officials	11%	1%	-	-
5.	Don't know anything about PKK	10%	6%	7%	5%
6.	Only for young girls, not for older women	9%	10%	1%	2%
7.	Other-still new, husband doesn't want	5%	1%	10%	1%
8.	Only for women	3%	2%	51%	70%
9.	Live too far	1%	-	-	-
10.	No PKK here	1%	-	-	-
11.	Not interested	1%	1%	4%	11%
12.	Chosen to belong to PKK	15%	20%	-	2%
13.	Want to learn, help others	-	9%	-	-
	Total no. of responses	99	91	77	119

(g) Is PKK useful?

If people in a community perceive a certain organization or movement as being useful to them, it is more likely to continue to grow but if it is not perceived useful it has no inherent dynamism to fuel its growth.

Respondents were asked if they thought PKK was doing anything useful in their community and were asked to describe PKK activities in the community. There were no significant differences by village.

Overall, in 1985, 74% of all respondents said that PKK was doing something that was useful in the community. There were significant sex differences with more men rating PKK as useful than women.

In 1987, there were no significant sex differences. Overall, 97% of men and women rated PKK as useful. The distribution of responses is reported in Table 66. It should be noted that men's responses exceeded those of women both years.

The five most frequently mentioned useful activities in 1985 and 1987 by women were:

1985	1987
- weaving - 22%	- nutritional gardens - 23%
- sewing - 18%	- weaving - 19%
- cooking - 12%	- sewing - 11%
- handicrafts - 11%	- family, community, development - 11%
- nutritional gardens - 8%	- cooking - 10%

Thus it can be seen that once again growing of vegetables (kebun gizi, nutritional gardens) stand out by their dramatically increased frequency of mention.

TABLE 66 : PKK ACTIVITIES RATED USEFUL

No.	ACTIVITY	WOMEN		MEN	
		1985	1987	1985	1987
1.	Weaving	22%	19%	19%	14%
2.	Sewing, embroidery, crochet	18%	11%	8%	7%
3.	Cooking	12%	10%	19%	15%
4.	Handicrafts	11%	7%	6%	2%
5.	Nutrition garden, and growing of vegtables	8%	23%	12%	21%
6.	Other - improve culture, beautify yards, plant hedges, weaving to present to Government officials	4%	3%	8%	1%
7.	Greening, lamtoro	4%	-	6%	-
8.	Family nutrition, baby weighing	3%	1%	-	10%
9.	Family, community development	2%	11%	3%	16%
10.	Teaching women	2%	1%	-	1%
11.	Income generating activities, weaving, vegetables etc.	1%	2%	10%	5%
12.	Cleanliness	-	7%	5%	10%
13.	Don't know	13%	5%	4%	1%
	TOTAL NO. OF RESPONSES	129	203	156	271

In terms of number of people in 1985, growing vegetables was mentioned by 8% of all women and 12% of all men. In 1987, it was mentioned by 40% of all women and 46% of men.

Both sexes, especially men, focussed more on family and community development activities including baby weighing in 1987 than earlier. PKK focus on environmental and personal cleanliness is also reflected in its increased frequency of mention in 1987.

(h) Change in PKK implementation

Anyone involved in the implementation of a community development activity in partnership with people in the community, cannot remain unchanged. PKK implementors are no exception.

The most frequently mentioned change by many of the WAS implementators was reflected in the sentiment expressed by one WAS team member "The most exciting part is to see that the participatory approach works. I was willing to try it but I did not know if people would be able to work and make decisions on their own. Change takes long but we know more about how to communicate with village people."

(1) Conclusions

In taking on the task of designing, implementing and monitoring WAS in partnership with village communities, PKK has achieved a great measure of success in reaching its goals and of using WAS as a means to strengthen itself as an institution.

The success experienced by PKK in implementing WAS was not at the cost of other activities normally implemented in the villages. Even though using and strengthening existing structures was at times problematic and difficult, it ensures the long term viability of WAS concepts.

CHAPTER 9

COMMUNITY INVOLVEMENT IN WAS: WATER USER'S GROUPS

The key mechanism utilized by PKK to ensure that users, women and men had opportunities to get involved in WAS related decision making was creation of water user's groups. Water user's groups played a central role in putting the concept of community management of water systems into practice.

Hence, it is important to understand how the groups were formed, how many groups were formed, what were their functions and how effectively groups were able to carry out their functions.

Several methods were used to understand the dynamics of groups, and to assess their effectiveness and outreach. Once again the triangulation of methods was crucial in validating information from different sources and in assessing the evaluation of different "experts".

A series of 24 open ended questions about groups were asked towards the end of all household interviews. The chief investigator also conducted key informant interviews with office bearers of all groups and two or three members of each group. In addition, interviews were also conducted with key people who were in the process of forming new groups at the time of field work. The third method of getting information about groups was through group meetings using the participatory methods described earlier. Lastly, PKK field workers and members of action teams were asked their opinions about different aspects of groups.

1. Intended structure and function of water user's groups

The structure of water user's groups was modeled after water user's groups that had been functioning well in village Bolok, near Kupang.

The purpose of the water groups is to organize user's of an existing source or potential user's of a new source to take responsibility to design, implement, operate and maintain a water source with some support from the government.

Each water user group as its name implies should be source specific. It should have a number of elected officials including a chairperson, secretary, treasurer, two caders (people responsible for repairs) and it can have assistants to the various officials, plus executing officials and advisors.

Group officials should be elected by the group and not by outsiders. Each group should maintain separate notebooks on accounts, meetings, attendance and decisions at meetings, etc.

Each group should agree on a basic cash contribution and a monthly cash contribution. This money should be used for repairs and maintenance of water sources. Money should be spent after consensus has been reached within a group. All groups should use water wisely and plant vegetables near the source.

Once a group, in consultation with WAS field workers, has agreed upon the source to be improved. they should collect all needed local materials. Technical assistance will be arranged after the group has collected materials and is willing to organize labor during construction.

After completion of construction, the group will be responsible for long term operation and maintenance of water sources.

2. Creation of water user's groups

Perspectives differed in detail, about how it all happened. However the key steps explained by all were the same. After orientation meetings at all levels of PKK including the village level, and at relevant government departments at the provincial, district and subdistrict levels, community meetings were held at the village office in each village. These were usually followed up by community meetings at the dusun level.

The purpose of these community meetings was to explain the function and basic approach emphasizing the role of women and communities in management of water systems. This was followed by an explanation about the need for water groups. The basic structure and functions of water groups were explained. Elections for leaders of water groups were then held. WAS field supervisors (who lived in the nearby towns) then worked individually with the different water groups.

After community meetings, water user's groups in a village had little contact with each other unless they were in close physical proximity to each other.

3. Number of groups

Twenty five water groups evolved. Altogether there were ten in Sillu, four in Naunu, seven in Takirin, and three in Sarabau. Each group was unique, had its own problems and successes and had different degrees of outreach. Table 67 provides some basic information about the groups.

4. Awareness of presence of groups in the village

During household interviews, individuals were first asked in general if there were any water user's groups in the village. Overall 77% (185) of the sample said that there were water groups in their village while 23% (54) said that there were none.

TABLE 67: LIST OF GROUPS

GROUP NAME	TOTAL NO. OF HOUSEHOLDS	PHYSICAL IMPROVEMENT
Sillu		
Cahang	15	None
Kakaana	24	Borehole
Nafoniko	37	Repair borehole
Tunmuni	26	Borehole
Oelhaususu	18	Spring capture
Oelbina	38	Borehole, broken
Enokaka	22	Borehole
Enokaka	14	None
Tuamnanu	10	Plan rain water tanks
Sublele	51	Spring capture
Naunu		
Oebola	7	Spring capture
Group I Oeltuni	9	Improving
Group II Oeltuni	7	Hand
Group III Oeltuni	10	Dug Wells
Takirin		
Wekaen		Piped system,
Launina	18	spring capture
Aitua	13	reservoir, taps
Salulan	68	"
Wemedan	19	"
Hasmeltan	73	"
Fatubesi	61	"
Sarabau		
Weao	22	Piped system
Titikrai	24	Shallow well, handpump
Sarabau II	56	Borehole, broken
Sarabau II	7	Handpump for shallow well (broken)

There were significant village difference (Chi Sq (d.f. 3) = 44.9***). The distribution by village of those who knew about the presence of water groups was as follows:

Sillu	78%
Naunu	48%
Takirin	97%
Sarabau	77%

Thus not surprisingly, Naunu in which the most difficulties were experienced by WAS team members and in which groups were not functioning effectively, only 48% of people were aware of the presence of water groups.

There were no significant sex differences although more women, 81%. than men, 74%, were aware of the presence of water groups. The stability of these responses can be seen from answers obtained to similar questions later on in the interview.

People were later asked if there were water groups in their dusun. Once again 77% of the sample said that water groups were present in their dusun. Thus despite the fact that water groups were unequally distributed in the villages, overall 77% of the sample knew about their presence.

5. Membership in groups

Respondents were also asked if they themselves belonged to water groups. Overall 69% (166) of the sample said that they belonged to groups.

Parallel to differences reported in awareness of existance of groups, there were significant differences between villages (Chi Sq (d.f 3) = 38.8***). The distribution by village of those who claimed water group membership was as follows:

Sillu	63%
Naunu	45%
Takirin	95%
Sarabau	76%

Because of the importance of the question and the fact that water groups were not equally distributed or functional across dusuns it is worthwhile reporting membership in water groups by dusun:

Sillu		Naunu		Takirin		Sarabau	
Tunmuni	75%	Oeltuni I	62%	Takirin	95%	Sarabau I	74%
Oelhaususu	73%	Oeltuni II	85%	Lianain	100%	Sarabau II	78%
Enokaka	67%	Oebola	22%	Hasmetan	93%		
Tuamnanu	38%			Fatubesi	100%		

The findings reflect the geographical distribution of groups. Thus in Sillu, in dusun Tuamnanu, in one part of the dusun near Taiti, the group had never met. Hence most people said that they did not belong to groups.

Naunu is interesting because despite the fact that activities in Oebola have been more visible and tend to be talked about, only 22% of the sample in Oebola said they belonged to the water groups. Dusun Oebola is very spread out. Since people who live away from the spring Oebola use other springs closer to them, they naturally don't perceive themselves as belonging to the Oebola spring group.

In Oeltuni I and II although groups have met rarely if at all and WAS activities have had problems, between 62% and 85% said that they belonged to groups.

Takirin with its extensive piped systems had obviously reached most people. In Sarabau, in both dusuns parts of the two dusuns have not been affected by physical improvements and do not belong to groups, the primary reason being geographical distance.

There were significant sex differences in perceived membership in water groups (Chi Sq (d.f 1) = 5.5**). Thus while 62% of the men said that they belonged to water groups, 76% of the women said that they belonged to water groups (Table 68).

TABLE 68: MEMBERSHIP IN WATER GROUPS BY SEX

NO.	BELONG TO GROUPS	WOMEN %	WOMEN NO.	MEN %	MEN NO.
1	YES	76%	(90)	62%	(76)
2	NO	24%	(28)	38%	(46)
	TOTAL	100%	118	100%	122

This sex distribution in self claimed membership reflects well the basic philosophical approach to WAS activities.

All users of a water source are naturally considered to be part of group. However in every type of group some people are active and some not. WAS has made a concerted effort to encourage women to take the lead and get involved in the water groups by stressing women's knowledge and interest in water issues since they are the primary managers of domestic water in households.

However, men have never been discouraged from participating and getting involved in groups. Thus although there may be more women who feel an identity with the groups, substantial numbers of men do so as well.

6. Indicator of population coverage

It is important to note that another independent indicator of WAS coverage also hovers at 65% (157). Change in water sources used in 1987 as compared to 1985 were noted for the total sample. It was found that 35% (83) of the sample used the same unprotected sources in 1987 as they did in 1985.

Overall, 44% (106) were using different, new sources of water that had been opened up through WAS activities. Another 21% (51) of the sample in 1987, was using improved or protected sources such as springs or shallow wells with hand pumps.

Thus from all indicators it appears that around two thirds of the sample and probably village population have been directly involved in and affected by WAS activities.

Not surprisingly there were very significant differences between villages (Table 69). Only in Naunu were a majority, 64%, still using the same unprotected sources as in 1985. In Takirin 91% reported using new or improved protected sources while in Sarabau, the percentage was 73%. In Sillu, 63% were using new or

TABLE 69: USE OF NEW/IMPROVED WATER SOURCES BY VILLAGE

NO.	CATEGORY	SILLU	NAUNU	TAKIRIN	SARABAU	TOTAL
1	Same source as before	37%	64%	9%	27%	35%
2	Using new source/WAS	25%	5%	88%	73%	44%
3	Using improved water source	38%	31%	3%	-	21%
	TOTAL	100%	100%	100%	100%	100%
	TOTAL NO. OF PEOPLE	81	58	64	37	240

improved water sources while the Naunu percentage dropped to 36%.

7. How were groups formed

As mentioned before, WAS teams emphasized the need to get community people involved in all aspects of WAS activities including the process of group formation and selection of leaders.

In the perception of the villages, how were the groups formed or who formed the groups? The question was answered by 81% (149/185) of the sample who were aware of the presence of water groups. Nineteen percent (36) said that they did not know who formed the groups.

Altogether 217 different responses were elicited. Fifty seven people gave more than one response each. There were strong differences between the perceptions of men and women (Table 70).

Overall 27% of women's responses and 26% of men's responses referred to the village head as forming the groups. .

Women, overall perceived the groups as being formed by officials including PKK women from the kecematan level, 56%. Only 11% of the women mentioned community discussions that led to group formation.

Men on the other hand, perceived group discussions "musyawarah" as leading to group formation much more frequently than women, 30%. Men mentioned officials slightly less frequently than women, 43%. None of the men mentioned PKK women from outside the village.

TABLE 70: WHO FORMED THE WATER GROUPS BY SEX

NO.	CATEGORY	WOMEN		MEN	
		%	NO.	%	NO.
1	All people in the community agreed after deliberation	11%	12	30%	33
2	Village head	27%	29	26%	28
3	Other village officials	17%	18	10%	11
4	Outside village officials	5%	5	7%	8
5	PKK officials from outside of the village	7%	8	--	--
6	PKK women from village	18%	19	3%	3
	Women officials from water groups	2%	2	8%	9
7	WAS (male) field workers	9%	10	5%	5
8	Other	5%	5	11%	12
	TOTAL	100%	(108)	100%	(109)

Women mentioned PKK women from within the village, 20%, much more frequently than men, 11%. This probably reflects women's greater contact with PKK women.

The male WAS field workers received relatively low mention, 9% of responses among women and 5% among men. Obviously WAS field workers were not perceived as dominating the process of group formation.

Once again, given the historical cultural context of all decisions being made by one of two people, the fact that community discussions and PKK women received some mention are significant moves in community involvement in development activities.

8. Perceived purpose of water groups

The advantage of open ended questions is that answers given reflect people's perceptions and understanding of a situation to a greater extent than when answers are in response to a structured questions because the structure of the question may bias the answers in certain directions.

The purpose of water groups was clarified at the village level through various activities. How people perceive the purpose of water groups is central to their understanding of the function and importance of groups and their participation in the groups.

People were asked about the purpose of the water user's groups. A majority, 87% (161) of those who said they were aware of water groups gave one or more perceived purposes of water groups. Altogether 225 responses were made by 161 people.

The most frequently stated purpose of water groups related to long term maintenance and repair, 30%. This included, 15% (34) who mentioned collection of money from group members to ensure long term maintenance of sources. Additionally 12% (27) of the above responses specifically mentioned the task of undertaking repairs while 3% (7) referred to preventive maintenance to ensure that reservoirs, pipes and pumps did not get broken (Table 71).

Certainly, it appears that the most difficult message, ie, responsibility for long term maintenance and repairs has gotten through too many in the water user's groups!

Altogether, 44% of men's responses whereas 15% of women's responses, referred to responsibility for repairs. It is important here to point out that despite the fact that in a couple of groups in Sillu, women have been trained in lifting out the pumps and diagnosing problems in the boreholes, taking care of repairs seemed to be primarily viewed as a male activity.

The need to maintain cleanliness especially at the source and the point from which water is collected, was emphasized in 18% of men's and women's responses.

Overall 11% said that one of the purposes of water groups was to look for new water sources to ensure that water was found closer to people's homes. It is interesting to note that nobody in

TABLE 71: PERCEIVED PURPOSE OF USER GROUPS

NO.	CATEGORY	WOMEN	MEN	TOTAL
1	To ensure that pump, pipe, etc. do not break	2%	4%	3%
2	To collect money contribution	8%	22%	15%
3	To do repairs	5%	18%	12%
4	To ensure cleanliness	18%	18%	18%
5	To properly manage water, distribute equally	11%	7%	9%
6	To do construction, pipe, reservoir, drilling, bathrooms	21%	7%	14%
7	To work together	8%	2%	4%
8	To plant vegetables	13%	10%	12%
9	To look for new sources, to bring water closer	11%	11%	11%
10	To clean village	3%	1%	2%
	TOTAL	100%	100%	100%
	TOTAL NO. OF RESPONSES	(104)	(121)	(225)

Takirin mentioned this as a purpose! However, it was mentioned in places where lack of a good source continues to be a problem, such as in parts of Sillu, dusuns I and II in Naunu, and in Sarabau II.

Proper management of water including its proper utilization and distribution was more prominent in women's responses, 11%, than in men's responses, 7%.

Interestingly, women focused on physical construction of sources, 21%, much more frequently than men, 7%. Women also focused on working together through mutual cooperation to achieve ends, 8%, more than men, 2%.

Not surprisingly, planting of vegetables which has been a prominent activity in most groups also drew mention, 13% among women and 10% among men.

Overall only 2% of the responses such as to clean the village, did not apply to the original reasons for forming water groups. From the list of reasons for water group formation given by

village men and women, it is obvious that they understand why groups have been created.

9. Perceived activities of a group

Respondents were asked to describe the activities of water groups. The activities described reflected the purposes mentioned earlier. Altogether 201 activities were described by 153 people. Some people, 46, described more than one group activity. The four activities of water groups that were mentioned the most frequently were:

Growing vegetables, watering plants and trees	35% (men, 44%, women, 26%)
Construction of pipes, tanks, boreholes, etc.	31% (men, 18%, women, 44%)
Provision of clean drinking water, ensuring cleanliness	17% (men, 22%, women, 12%)
Collection of monthly money contributions	10% (men, 8%, women, 11%)

Other activities mentioned less frequently were:

Washing, watering of flowers and houses	2%
Managing water	2%
Keeping yard, village clean	2%
Bringing water closer	1%
Undertaking repairs	1%
Building bathrooms and fish ponds	1%

It should be pointed out that the fact that repairs have not been mentioned frequently in no way contradicts perceived purpose of group. Since all construction work is relatively new, the number of repairs that have been necessary have been few. Hence repairs fortunately do not feature centrally in activities of water groups!

In terms of village differences, there was one striking difference. Whereas around 40% of the responses from each village referred to growing of vegetables, in Naunu, growing of vegetables received almost no mention (4%, 1 person). This reflects realities in Naunu. Another indication of relative lack of activities in Naunu was that only 20 people were able to describe 24 activities. In contrast the number of activities described in Sillu and Takirin (with similar sample sizes) were

more than 70.

10. Achievements of water groups

People were asked if in their perception the water groups had been able to accomplish any of their goals. Overall 88% (147) said that water groups had achieved some results.

There were no sex differences, however there were significant village differences (Chi Sq (d.f 3) = 18.2***). In Takirin and Sarabau, 97% of the sample said that water groups had achieved some results. In contrast this was true for 82% in Sillu and only 67% in Naunu.

Sillu, as mentioned before is very spread out and not every part of every dusun has been covered by water groups. Naunu as mentioned before, caught in village politics and limited water in the ground has not been as successful as the other villages.

a) Description of results

Overall, 153 people mentioned 171 achievements of water groups. Once again, over half of the achievements mentioned focused on growing of vegetables for household consumption and for trade, 51%. It was mentioned slightly more frequently by men, 56%, than by women, 48%. An additiional 4% of responses referred to growing of fruits.

The other perceived primary achievement of groups was the physical construction involved in the building of water resources, 27% (31% women, and 22% men).

Provision of clean water was mentioned in 7% of all responses. Other achievements mentioned were:

building of fish tanks and bathrooms, 2%;
getting a new source of water, 2%;
bringing water closer to homes, 4%; and
managing water well, 1%

For a group of people for whom the water situation has not been easy, it is remarkable that the most prominent achievement to most men and women was not increased proximity of water or the building of new sources, but growing of vegetables and fruits.

11. Ratings of water groups

Individuals were asked to rate the working of water groups on a three point scale ranging from very good to not good. Overall 74% (119) of the respondents rated water groups as working very well, 15% (25) rated them average and 11% (18) rated the working of water groups as not good or poor.

While there were no significant sex differences in rating, the differences between villages were significant at the .01 level.

By now it should be easy to guess which villages scored the lowest overall!

The Kupang villages scored the lowest, with 60% in Sillu and 67% in Naunu, rating water groups as working very well. The percentages in Takirin and Sarabau were much higher, 80% and 89% respectively.

In Sillu, there are three groups which have been formed which still do not have a new water source and there are two groups in which the boreholes stopped working soon after they were drilled. Most of the people who rated groups at low, belonged to these groups.

a) Justification of ratings

People were asked to justify their ratings. Examination of these justifications is important as it reveals what is important to people in the villages. The question was answered by 139 people who gave 150 reasons. The distribution of reasons provide a fascinating insight to people's thinking.

What is striking is that except for one category, explanations were scattered over 15 different categories, none of which were dominant.

It is fascinating to note that the most prominent criterion was not a measure of physical achievements in terms of building new sources or growing vegetables or cleaning sources, but was the fact that people were able to cooperate and work together , 49% (73). Fifty-one percent of men's responses and 47% of women's responses focused on this justification.

Perhaps this is a reflection of an important cultural ideal which in practice is often not achieved. As described in the 1985 study, while examples of gotong royong were found in all the villages, they were usually based on a thinly disguised commando system. At the same time, it should be pointed out that examples of people coming together freely on a cooperative basis were also seen in building of houses, in burial societies and in one instance, in construction of a water source. A few instances of successful agricultural groups were also observed in one village.

Other justifications for ratings are listed below:

Water is being used/ managed water properly	8%
Money contributions collected	4%
Water is already closeby	4%
Growing vegetables	3%

Water sources are clean	3%
Collected local construction materials	2%
Water can be used for bathing/ washing	2%
Water runs on - nothing has broken	2%
Know how to run a group	2%
All don't help, join or understand function of group	6%
All don't give contribution, or give it late	5%
There is not enough water	4%
Pump/reservoir has broken	2%
Vegetables spoiled by chicken	1%
No fish in fish tank	1%
Lack of local materials	1%

As it can be seen overall 49% of justifications focused on people working together, 31% were other positive justifications while 20% related to poor or average ratings given to water groups.

b) Ratings from group meetings

While people rated groups individually during household interviews, groups rated themselves, ie. their overall functioning as a group towards the end of group meetings.

This question was asked after groups had already discussed how various activities or aspects of their functions were working. It is important to note that in every case a group's self rating was exactly the same as the chief investigator's rating of them.

There were two groups in Tunmuni, Sillu who were so exuberant and self confident that when the question was asked, they laughed and shouted "We are the best!" Other groups that rated themselves average or poor were able to justify their ratings explaining their strengths and weaknesses. In a few instances, groups were split with half the people rating themselves as average and half rating themselves either poor or good.

Unfortunately, despite repeated attempts group meetings could not be arranged with the groups that were rated by outsiders as working poorly. The fact that meetings could not be arranged is

perhaps evidence enough of their ineffective functioning. However, meetings were held with leaders and a few members of these groups to obtain some understanding of why these groups functioned poorly.

Groups that were functioning poorly or not at all included: three in Sillu, two with broken boreholes and one in Tuamnanu which never really got off the ground because no technical solutions had been found; all the old groups in Naunu; two groups in Takirin (piped system facing water distribution problems and problems of poor leadership).

A few reasons emerged consistantly to explain patterns of poor group functioning. Primary among these were:

1) lack of meaningful contact with WAS field workers and action teams;

2) poor leadership within the group;

3) lack of appropriate water source including lack of waterwater at source; and,

4) presence of senior level formal leaders in the group.

The presence of wives of village heads in water groups appeared to have a negative effect on groups. This does not necessarily mean that the chairpersons of PKK are not effective leaders but that their presence prevented the emergence of effective leaders from among members of the group. This is not surprising given the cultural context of deference to authority. In fact, one of the primary reasons for forming groups at the level of water users was to avoid the above problems and ensure the selection of effective leaders.

Obviously, wives of village heads cannot be asked to leave groups, but perhaps WAS action temas need to work more closely with groups in which village leaders are members, to help groups overcome some of the problems associated with traditional patterns of interactions with leaders, in culturally appropriate ways.

There were two patterns of leadership that emerged in the four groups, one in each village. The end results were the same, poor functioning of groups. The first pattern was one in which the wife of the village head was not nominated/elected as the leader of the water group. However just her presence in the group, intimidated the water group leader who in most circumstances (outside the water group) was in a position of less authority and more deference to the wife of the village head. Hence this resulted in nobody taking any initiative.

The second pattern, was that the wife of the village leaded asserted such tremendous directive authority, that there was no horizontal diffusion of leadership. This resulted in most women

having little self confidence in their opinion. For example, even at the group meeting with us, women in one group were afraid to say anything without the approval of the wife of the village head. Group members were afraid they would say the "wrong thing". The situation was salvaged by asking the wife of the village head with whom we had already had extended meetings to leave the group.

Overall, 40% of the groups were rated as functioning very well, 40% rated functioning well (average), while 20% were rated as functioning poorly.

12. Decision making within groups

One of the key issues in planning and implementing of a community development activity is how are decisions made and who makes decisions. It is extremely difficult to understand the dynamics of decisions mad retrospectively. The answers depends not only on who one talks with but also the types of decisions concerned.

In order to understand the perspectives of members of water groups, the participatory activity with pocket charts and six pictures described earlier was played. The game was played with 18 water groups. People enjoyed the activity, played with enthusiasm and made their decisions individually.

Seven specific questions were asked and individuals had to choose between six possible decision makers, the group, ordinary women, women leaders, ordinary men, male leaders and PKK male field workers.

a) Who makes the decisions

In interpreting or assigning value to the results two facators are worth repeating, firstly the goals of WAS activities and secondly the situation found in the villages prior to WAS in 1985.

Ever though the focus of WAS activities was on women, the approach was not isolationist. The aim was to get users or people who are most affected by decisions to make the decisions, the reasoning being that,

1) well informed users would make the most appropriate decisions,
2) if decisions were not appropriate they alone would be responsible for them,
3) they would be more willing to carry through with decisions requiring relatively unpalatable actions, and
4) groups that learned to be effective through their own decisions would continue to function even after PKK field workers stopped guiding the group.

Since the issues of women's involvement were not crystallized as women vs. men, what is important in interpreting results is studying percentage of decisions made by people other than a) the formal male leaders and by, b) PKK field workers.

Secondly, in interpreting results, it is important to keep in mind the starting point or situaton found in 1985. As far as water groups go, there are no comparison points in time because there were no water groups in 1985.

However, a decision making scale that had been developed in 1985 to assess PKK and LKMD, was not used because all major decisions were stated to have been made by the formal, male village leaders. Hence any diversification of decision makers away from village heads should be viewed as positive.

TABLE 72 : DECISION MAKING WITHIN WATER GROUPS

NO.	CATEGORY	GROUP	ORDINARY WOMEN	WOMEN LEADERS	ORDINARY MEN	MEN LEADERS	PKK FIELD WORKERS
1	Who makes the decisions within the group	28%	7%	19%	5%	12%	29%
2	Who chose the leaders	10%	3%	30%	11%	20%	26%
3	Who makes the decisions about the activities of the group	27%	9%	16%	13%	23%	12%
4	Who decided what the monthly contribution should be	17%	8%	32%	13%	10%	20%
5	Who decided if there was a need for sanctions	13%	5%	22%	6%	39%	15%
6	Who decided about location of pumps, taps, tanks, etc.	14%	1%	16%	13%	16%	40%
7	Who decides about repairs of pumps, pipes, etc.	21%	4%	9%	5%	18%	43%
	Overall scores	19%	6%	21%	9%	21%	24%

The scores from all 17 groups (8 from Sillu, two from Naunu, five from Tal'rin and three from Sarabau) were pooled together.

The percentage distribution of perceived decision makers for various issues are reported in Table 72.

Overall, 19% of all decisions were perceived to be made by the group, 6% by ordinary women, 21% by women leaders and 9% by ordinary men. Altogether 21% of all decisions were perceived to be made by male leaders and 24% by PKK field workers.

Thus overall 46% of all decisions were perceived to be made by the group or women, 9% by ordinary men and 45% by traditional male leaders and PKK field workers.

The percent distributions varied by question. For example, PKK field workers were perceived to make 40% of the decisions on location of handpumps, pipes, taps, etc, while male leaders were reported to make only 16% of these decisions.

These figures are low given the fact that in most cases decisions have to be made by technicians (depending on results of ground water surveys). In the past, especially in the case of piped systems, decisions about location of standposts were determined by village heads. Given the above two factors, rather than being perceived low, the figures of 31% of locational decisions being made by the group or women is quite high.

Sanctions, are clearly something that are viewed as the responsibility of leaders both male (39%) and female (22%).

Leaders were perceived to be chosen by groups, 27%, by male leaders, 23%, and by outsiders, 12%. This is quite different from PKK's intention of having group leaders chosen by members themselves. However, there was great variation by groups, members of groups being quite clearly involved in some groups while not at all in other groups.

Other results also varied by group. In groups that were obviously not functioning effectively, in which contributions had stopped, over 75% of decisions were perceived to be made by the PKK workers and the formal leaders. This was most true for groups with non functional water systems.

When results were discussed with PKK field workers and implementors, they were surprised that they figured in 10%-60% of decisions. PKK implementors felt that in most cases they had not pushed groups to make certain decisions but only made suggestions.

What is important is not so much whether the decisions were actually made by the PKK implementors or not but how they were perceived by the people.

b) Women's involvement in groups

In Timor the usual decision makers in public forums are village officials especially the village heads, government officials and less frequently male community members. In an effort to summarize the ratings on decision makers a scale measuring participation was developed (Table 73).

A six point scale was developed to measure involvement of users in decision making. The six point scale ranged from 1 to 6 with one representing no participation and six representing high levels of participation or group decision making. The six levels of participation in order of increasing participation were decisions made by: 1) PPK field workers; 2) male leaders; 3) ordinary men; 4) female leaders; 5) ordinary women; and 6) group. Female leaders were rated as more participatory than ordinary men, because traditionally husband's of women are more likely to speak up and voice an opinion in a group than female leaders.

Each group was rated on the six point weighted scale. Meetings could not be held with two groups in Sillu, 3 groups in Naunu and two groups in Takririn. In Sarabau, although separate meetings were scheduled for different groups in each dusun, people from both groups showed up at the first meeting and refused to leave!

It is interesting to note that the groups which formed almost spontaneously or which have received only partial help (had to contribute cement or cash in addition to local materials) or delayed help have emerged the most participatory and have the greatest involvement of women.

These include the groups in Sillu that were still expecting to receive boreholes and the group in Oelhaususu which took about a year to get organized and collect materials to finally improve a spring capture. In Takirin, it includes the group in Fatubesi which has put temporary pipes across a dry river bed to bring pipes to the dusun. The pipes will be removed just before the rains begin because the river floods every season. Government departments had been unable to provide a more permanent solution because of high costs in building structures to suspend the pipes across the river.

Although there seemed to be some association between degree of involvement in decision making in the past and continued strength of a group, the association wasn't always perfect.

Sublele, the group in Sillu that built a spring capture is a good example. Decisions were made primarily by the male leaders and to a lesser extent by the group. Once construction was completed, although the group has continued keeping the spring clean, it has neither undertaken any new activities nor does it perceive a need to do so in the future.

TABLE 73: RATINGS OF PARTICIPATION IN GROUPS

	GROUP	TYPE OF WATER SYSTEM	
	Sillu		
1	Tunmuni, Cabang	No improvement	3.6
2	Kalaana	Borehole	2.9
3	Nefonilo	Borehole	3.3
4	Oelhaususu	Spring capture	3.4
5	Oelbima	Borehole, broken	2.1
6	Enokala	Borehole	3.1
7	Enokaka	No improvement	3.6
8	Sublele, Tuamnanu	Spring Capture	3.5
	Naunu		
1	Oeltuni, Group III	Lining shallow well, dry in summer	2.7
2	Puamnasi	New group, wants to extend pipes, build reservoir	2.9
	Takirin		
1	Wekaen, Takirin	Piped system	3.0
2	Salulan, Lianain	Piped system	3.1
3	Wehedan, Lianain	Piped system	2.1
4	Hasmetan	Piped system	3.1
5	Fatubesi	Piped system (temporary connection)	3.3
	Sarabau		
1	Sarabau I	Piped system, shallow well	3.2
2	Sarabau II	Borehole, shallow well	2.5

The distribution of summary scores by village was as follows:

Sillu	3.3
Naunu	2.8
Takirin	3.0
Sarabau	2.8

Thus overall, 46% to 55% of all decisions were made by women and by group members. In other words 50% of decisions were being made by men, husband's of female members, male leaders and male PKK field workers. Thus women have been at least equally involved as men in decision making.

While it may be desirable to further reduce the perceived role of

PHP field workers as decision makers, this may involve a change in how PHP workers present alternatives and suggestions rather than a basic reorientation in relationship with groups.

The involvement of male leaders in some degree is also appropriate given the cultural context. Once the groups have gained more experience and the formal leaders perceive even more clearly how they stand to gain by decentralizing leadership, decision making by formal leaders may further decrease. With experience formal leaders may start soliciting community involvement (decision making) in village development activities.

c) Group decisions

It is natural for groups to be at different stages of growth. However within most of the groups that were still functioning, there were several examples of group problem solving.

In one group in Takirin, the community first decided to form three seperate users groups all using different standposts from one piped system. Each group had its own leaders and collected money. At one group meeting, it was realized that if each group was responsible just for the standposts that it was using, how would water distribution problems be resolved and who would be responsible for repairs to the spring capture or water reservoir half way up the hill?

After much deliberation, it was decided that the three small groups would merge to form one large group, but that for administrative purposes the original small groups would remain as sub-groups within the larger group.

In another group in Sillu an elaborate system has been developed by which the land near a borehole has been divided into vegetable plots and assigned for vegetable cultivation to individual families. In addition, to avoid overuse of pumps, at particular time, families have been divided into "morning" and "afternoon" families. Morning and afternoon refers to the time when women water their vegetable plots.

Other contributions

Too often in the past, water projects have equated contribution of labour and local materials to community involvement. Contributions, labour and material,in themselves may or may not be indicative of community involvement in decision making. However this does not imply that community contributions are not important but that compared to community control over designing, implementing and maintaining a system they may not be as important.

In the study villages, not only were communities involved significantly in decision making, but they also contributed their time, labor and cash. Thus all local materials such as sand, stones, and lime were contributed by the groups. Some groups

collected money to buy and/or transport truck loads of sand, while still other hired village masons for construction. In addition some groups contributed lengths of pipes, cement and taps. Three groups in Talirin have built addition standposts and reservoirs by themselves. In addition some groups in all villages have dug wastewater ponds, fish tanks and bathing cubicles.

The bulk of imported materials were supplied by the Ministry of Health, Government of Indonesia.

13. Who is more active within groups

In order to see if members of a group perceived one sex to be more involved in water groups than the other, respondents were asked if either sex was more active within the group.

Overall, 26% (43) perceived men to be more active in water users groups, 47% (79) perceived women to be more active while 27% (45) perceived both sexes to be equally active.

There were strong sex differences in perception (Chi Sq (d.f 2) = 10.5**, Table 74).

TABLE 74: WHO IS MORE ACTIVE WITHIN GROUPS

NO.	CATEGORY	WOMEN	MEN
1	Men	15%	37%
2	Women	55%	40%
3	Both	30%	23%
	TOTAL	100%	100%
	NUMBER OF PEOPLE	(86)	(81)

Women rated themselves, 55%, more active than men, 40%. Compared to women, more men judged themselves to be more active, 37%. Only 15% of the women rated men as more active than women.

People were then asked to justify their ratings and there were sex differences in justification which paralleled the sex differences in rating (Table 75).

Fifty-seven percent of the women felt that women were more active because the water groups were perceived to be "women's groups" and also because women were felt to be more concerned with improving a water situation since women were the ones who were engaged in the daily task of water collection. Similar responses were made by fewer men, 39%.

On the other hand, 38% of men stated that men were more active because they were more caring about the group, they had more experience and had more duties and responsibilities within the group. Some men also stated that men worked harder than women and cared more about water and that women helped only a little. Similar responses were made by 15% of the women.

TABLE 75: WHY ARE WO/MEN RATED ACTIVE

NO.	CATEGORY	WOMEN	MEN	TOTAL
1	It is a women's group	38%	31%	35%
2	Women bring water	19%	8%	14%
3	Men care more, experienced, have more duties	8%	27%	17%
4	Men care more about water	2%	2%	2%
5	Men do more work	4%	8%	6%
6	Women help only a little	1%	1%	1%
7	Both women/men work, do different work	2%	7%	4%
8	Both are same	26%	16%	21%
	TOTAL	100%	100%	100%
	TOTAL NO. OF PEOPLE	(80)	(77)	(157)

Overall 28% of the women and 23% of the men stated that both men and women were equally active.

These results clearly show that, despite the emphasis on importance of women, WAS has in no way neglected or alienated the men, many of who perceive themselves as having more duties and responsibilities within water groups than men.

14. Perceived problems and solutions

Unless a group is able to self diagnose it is unlikely to continue functioning effectively in the long run in this instance after WAS field workers withdraw.

The ability to self diagnose is evident if people can evaluate themselves and justify rationally their evaluations. In water groups, self diagnosis was evidenced in the ability of groups to

rate themselves as a group and assign themselves realistic ratings. It was further evidenced in people's responses when they were asked about problems being experienced by groups and possible solutions to the question.

Overall, 71 people, 39% of those who belonged to groups felt that their groups were experiencing problems. They were able to furnish 79 examples of problems.

The list of problems, like the list of justification of ratings consisted of 21 different problems most of which were mentioned just by a few people. Hence, the data have been reorganized and will be considered in four main categories:

1) those which the group can solve by itself;
2) those which reflect poor leadership at levels higher than the water group;
3) technical problems including politics beyond the control of the group; and,
4) other.

The first category included problems which presumably were within a groups ability to overcome. Overall 31% of responses related to problems dealing with money, lack of contributions, insufficient group funds or people contributing money late. It is important to note that one person mentioned the problem of groups funds being used for personal purposes.

Lack of cooperation, group infighting, people not attending or going late to meetings and not every user joining a group were problems referred to in 26% of the responses.

Eleven percent of the responses could be categorized as reflecting lack of leadership within the village offices or misdirection by PKK leadership from the subdistrict (Kecematan) level. This included: lack of support from or cancelling of activities by the village head and village officials; misunderstandings between WAS teams from its subdistrict level and water groups; example, people awaiting government transportation to transfer collected local materials. Most of these responses were from village Naunu.

It is important to note that 29% of people's responses could be categorized as being beyond the ability of water groups to solve under normal circumstances. These dealt primariy with technical aspects and core funds for water supply.

These included:

Not enough water at source, so people must wait	14%
Broken, nonfunctional boreholes	9%
Heavy, deep set pump, difficult tiring to fill more than one bucket	2%
No government funds to build a new water source	1%

The classic problem created by an outside-the-village government team was in relation to a piped system. After a piped system had been installed through WAS activities, the technical department of the district, installed bigger pipes in the same source and directed the pipes to a neighboring village below the village! The spring source is acknowledged to belong to the study village.

Even though problems such as lack of water in the groud can generally be considered to be outside the capacity of water groups there are always exceptions!

Sillu has three new boreholes of which only one functioned beyond a month. Both boreholes were installed by a private contractor and paid for by the Ministry of Health. At the time of field work, both boreholes had already remained broken for over 6 months. Despite contact with the Department of Health and the contractor, technicians were able to fix the pump. The technical explanation given was that there was not sufficient water in the ground and so the pumps were dry.

When the dry pumps were discussed with a village man, Mr. Kake, known to be able to repair mechanical equipment, he said,

> "I think I know the problem. We are afraid to do anything because we are waiting for the technicians from Kupang to come. The well (near the village office) was drilled to a depth of 52 meters, and the water, only arose to 8 meters. The 'dempster' (cylinder) and pipe were at 45 meters. So the dempster is hanging above the level of the water and only one meter of the pipe got in the water. When the level of water fell, water stopped coming out of the pump."

Later, after the departure of the case study team together with the WAS field worker, Mr. Kake of Tunmuni removed the pump, carried out measurements with a rope and concluded once again that the cylinder was above the level of water. By attaching an additional length of pipe, the cylinder reached the water and water started flowing out of the pump!

The incident is reported to show that even though people may not have formal training, they may be more interested and hence more successful in solving a problem than more qualified but distant technicians.

The excitement, pride and feeling of confidence that the successful repair of the pump can be imagined! Mr. Kake has already trained three young men and one women in pump repairs in his own water group and two people in a neighboring group. It has been recommended that village skills be used more extensively in training water group cadres, not only in the Kupang villages but also in the Belu villages.

a) Perceived solutions

Possible solutions were suggested by 48 people. The solutions

suggested should be viewed keeping in mind the problems mentioned.

Overall, 31% of respondents said that the problems could be solved if the female chairpersons of the water groups became more active, took initiative, provided the lead and interacted more with people in the group. This was also seen as a means of increasing people's enthusiasm, 4%. Thirteen percent of the group felt that many of the problems could be solved through group discussion or musywarah.

Nineteen percent of the people felt that the problems that the groups were experiencing could only be solved by action taken by higher authorities.

Other suggestions were practical in nature such as deepening wells, 2%, making coops for chicken, 2%, and collecting more local materials such as lime, stone and sand.

Six percent suggested the instituting of sanctions or punishments for those who broke rules or did not cooperate and participate in group activities.

Any grouping of people that depends on contributions from its members must have ways of ensuring that everyone contributes in the amounts agreed and at the time agreed. Groups may ensure contributions by subtle or not so group pressure and by a system of rewards and punishments. The issue os sanction has confronted each water groups and hence needs to be discussed.

15. Issue of sanctions

The issue of sanctions was specifically addressed during group meetings. It was found that overall there were very strong feelings against the imposition of sanctions in the context of water use. A typical argument went as follows: "We try to win everyone's heart by gentle persuasion. If somebody does not pay we try and persuade them to pay. We don't impose sanctions because everyone must have water because water is given by God and Government. So everybody can get water."

However, through the use of picture sorting in group meetings and private interviews with different individuals about the same issues two factors became clear.

Firstly, because of cultural norms against the imposition of sanctions, if asked directly people usually denied the existance of sanctions. Secondly, the use of the word sanction or Sanksi (Bahasa Indonesia) in the context of water was taken to mean denial of access to water because of nonpayment of dues. Hence different forms of sanctions imposed for other reasons were not easily elicited.

It was established that although every group except one initially denied the use of sanctions, approximately 50% of the groups had

used sanctions in one form or another.

Thus the group which in one situation said "no sanctions" in another context said that two older, poor widows were not allowed to use the pump because they did not pay dues. When it was suggested that an exception be made because of poverty, the group quickly vetoed the idea!

Four groups do not allow consistent nonpayers to use their improved water source. Many of the groups were concerned that if they did not impose sanctions on nonpayers, gradually the number of nonpayers would increase and the group would die. Asked why they did not impose sanctions the group said "we are not sure if we have the right to do so. We know that we are responsible for taking care of the water but the water is on public land and was paid for by the Government. So it is the government that owns the water. Do we then have the right to prevent some people from using government water?"

Other forms of sanctions were imposed in a few instances in all villages when particular families did not participate in construction of sources. These sanctions usually consisted of increased amount of labour or in kind contribution. In one case, the local hansip (the civil security representative) was called to reprimand people who did not participate in construction. However, this was imposed not by external authorities but by the water group leader.

16. Money collection within a group

When the groups were first formed and soon after construction was completed, WAS field workers explained the purpose and need for each group to have its own financial resources so that groups would be able to take care of repairs when the need arose.

Most groups did accept the basic structure suggested by WAS field workers, of a one time basic contribution and a smaller monthly contribution. Since a groups own resources are central to a groups ability to function independently, the issue of contributions was incuded in the household interviews and group meetings.

Like the issue of sanctions, questions dealing with contributions were likely to elicit "correct" answers. Hence the findings from household interviews are in all probability inflated in the positive direction.

Respondents were asked if their groups had instituted basic and monthly contributions. There were statistically significant differences by village. Thus 99% of people from Belu said that their groups had basic payments while 79% from Sillu and only 35% from Naunu said the same. In Naunu, none of the groups except Oebola had to make basic contributions.

The most commonly charged basic payments were Rp 1000 or Rp 1500

(Rp 1600 = US $1.00). A few groups charged Rp 500 or Rp 2500.

People were then asked about the size of monthly contributions and whether these were a financial burden on them. Monthly contributions ranged from Rp 50/month to Rp 750/month. Monthly contributions levied by groups most usually ranged from Rp 100 to Rp 500/month.

In Belu, a few people said that they had been allowed to pay their contribution in kind. This is a policy that WAS field workers have recently encouraged groups to implement. Cash flow in villages is quite seasonal and hence group treasurers have often been told by members that they would pay after the harvest.

When responsents were asked directly if they paid their monthly contributions, 60% (84) said yes, 32% (45) said yes, but usually late and only 7% (10) said no. There were significant sex differences which in this case probably reflect differences in proneness to give socially desirable answers!

Women appeared to be less susceptible to giving polite answers. Thus while 13% of women said that they did not pay none of the men said the same. Overall, 64% of the men said that they paid their monthly dues in contrast to 57% of the women.

a) Are contributions a burden?

While 10 or 30 cents a month may not seem very much to outsiders, it may or may not be perceived to be a burden to those who have to make that payment. Overall, 85% (117) of the respondents said that their monthly dues were not a financial burden, 8% (11) said that the dues were a slight burden while 7% (9) said that the dues were a heavy burden.

Once again, there were significant sex differences (Chi Sq (d.f 2) = 9.3**). While none of the men said that the monthly dues were a heavy burden, 12% of the women said that the dues were a heavy burden for them.

In some households, women use the money raised from selling vegetables planted near water sources to pay their monthly dues.

During group discussions, it was evident that people generally felt that the monthly dues were not a burden. However a certain reluctance to pay dues emerged among substantial numbers of people. This was related to two reasons.

People were more willing to pay dues while the pumps or pipes etc. were in working order. However if there was a breakdown, people stopped paying their dues, the argument being "if we don't receive water, why should we pay."

This attitude has been created probably by a long history of broken promises leading to deep seated suspicions when contributions are solicited.

Another example of this mistrust which will take time to convert to trust is the case of handpumps in Naunu. WAS field workers offered to liase with the provincial government to obtain a hand pump for a shallow well for a group as soon as the group had collected local materials for its installation. The group insisted that they would collect materials after they had seen the pump arriving on site.
The second reason related to the first, is a lingering suspicion about whether the money will be used properly. Here it is important that WAS workers encouraged groups to make frequent public statements about group finances. This will reduce chances of wrong doings. The groups should also be helped to understand the functioning of banks, the concept of interest and how to deposit and access money from a bank account.

At the time of study most members including chairpersons of groups did not know anything about accumulated group finances. Even though some groups had accumulated up to Rp 100,000, all groups were keeping money at home. None of them had any trust or experience with banks.

17. Does a group have future plans?

It is easier to mobilize a group of people when the goals are concrete, action oriented. However, once concrete goals are achieved it is sometimes difficult to sustain a group for what are perceived to be purely maintenance tasks.

In the context of WAS this is probably true for both WAS implementors and for water user's groups. As long as groups of people have goals that they want to achieve, they will probably try to continue their existance.

Within WAS, there have been quite pronounced spurts of activity starting with group formation, getting ready for construction, undertaking construction of activities and reiteration of importance of group funds. After construction is completed, if people feel there is not much left to do and the groups no longer have a function, then gradually water user's groups will become defunct.

Hence a series of questions were asked during household interviews and group meetings related to future plans and whether resondents and groups perceived a need for the continuation of the groups.

The results from the household interviews and the group meetings were similar. Overall, 70% (105) of the respondents said that their group had plans for the future while 30% (45) said that their group did not have future plans.

There were strong sex differences (Chi Sq (d.f 1) = 11.0***) with fewer women aware of future plans than men. Overall 58% (46) of the women while 83% (59) of the men said that their group had

plans for the future.

Above 70% of respondents from all villages except Sarabau (56%) said that their group had future plans.

When respondents were aksed what the future plans were, 106 people responded with 139 ideas. The fewest number of future plans were from Naunu, 20, and Sarabau, 19. In Sillu and Takirin the numbers were 41 and 59 respectively.

Overall 16 different categories of plans emerged with three categories receiving mention more frequently than others. These were growing vegetables and beans 32%, and undertaking new construction activities such as building water tanks, installing pipes to draw water closer to homes or installing pumps, 34%. Continued money collection also received mention far more frequently than other responses, 10%.

Other plans mentioned included the following:

Keeping source clean	7%
Undertaking repair work	5%
Building fish tanks	3%
Building rainwater tank	1%
Building a church	1%
Building bathrooms	1%
Building wastewater ponds	1%
Constructing a path (to borehole)	1%
Collecting materials	1%
Working together	1%

Even though responses are scattered they are extremely important in gauging the cohesiveness of a group and their sense of efficacy.

Thus responses like desire to build a small church (Takirin) are extremely important in indicating that a group believes in its strength and having achieved success in one difficult activity wants to branch off to trying to achieve other self defined goals.

During group meetings, it was also obvious that women were much less aware of future plans than men. As far as future activities, men seem to be more centrally involved than women. Two of the groups in Silu planned to save money and install

electric pumps at the borehole to overcome the problem of heaviness of pumps.

Both groups knew that pumps were very expensive. One group said that it would take them several years to raise the money necessary to purchase a pump. The other group has decided to double their monthly contribution at a group meeting because they did not want to wait for years before they bought a pump. Thus from the fact that at least 70% of group members were aware of future plans, it appears that with some continued support from WAS field workers, most of the groups will continue to function and probably diversify their goals.

18. Will water groups continue to be needed?

Any doubts that members of water groups did not have a future orientation can be dispelled. Respondents were asked whether they perceived a need for water groups in the future.

Surprisingly almost all 97% (156) of respondents unhesitatingly said that groups were still needed despite the fact that construction activities had been mostly completed. There were no sex or village differences.

People had no difficulty articulating reasons for continued need for water user's groups. Altogether 150 people gave 262 reasons!

Reasons are similar to responses given to earlier questions and help further to establish the reliability of responses and validity of conclusions drawn.

Preventive maintenance is a difficult concept to communicate in any environment but especially in a cultural environment in which the concept has not been applied in the context of water resources. Once again it is impressive that reference was made to preventive maintenance the most frequently, 28%. Thus people said that water must be managed well and distributed well to ensure that water systems do not break down. This they felt was an important need that could be fulfilled by the water groups.

Others said that groups would ensure that there were no break downs by taking care of pipes, pumps and reservoirs. People said that if there were no groups sooner or later the water would stop running.

Continued cleanliness was also an issue referred to in 20% of responses. Collection of contributions, 14%, and need to carry out repairs in cases of break downs also received mention, 10%.

Other people felt that the groups would ensure that water was used well, this included growing of vegetables, 8%, and using water from improved sources for drinking, cooking, and other household uses.

Only 3% of responses referred to the need for new construction

activities including hanging of pipes (Fatubesi) and construction of proper paths to pumps (Sarabau II).

Seven percent said that groups would ensure tht people continued to work together in the future. Overall only 1% said that groups were no longer needed and another 1% said that they did not know why groups were needed in the future.

It is obvious from the above discussion that WAS teams have been very successful in convincing those who are involved in groups about long term purposes of groups once construction of sources is complete.

During group meetings, groups were asked if they thought they would continue to function if support from WAS field workers were withdrawn.

All the groups pondered the question seriously and most expressed doubts. Most groups said that eventually they would be able to exist without any guidance from the outside but that there were certain areas in which they still needed assistance.

Areas in which groups felt they needed further assistance were the following: How to communicate with poeple, the art of persuasion; how to clarify roles of different water user officials so that they would function more effectively; how to restructure roles of group leaders so they would have more direct contact with a few households in the group rather than trying to cover everyone in the groups; and training in repairs.

It is interesting here to point out that groups which were not strong, ie. functioning in effectively, were less critical of themselves and felt that they needed no further assistance!

Opinion among WAS implementors about whether the groups could functio without external support was also divided. Many of implementors felt that WAS action tems were needed to remind people about their duties and also to carry out skills, training especially in repairs.

19. Why have the groups been successful?

It is important for us as outsiders to draw out lessons learnt from WAS activities. But it is equally important to learnmore directly from village people involved in WAS activities why they think they have been successful or not successful or what factors in their perception played important roles in their successes and failures.

Everyone, including WAS implementors, found these questions difficult to answer. However, at the village level the question on factors related to success were answered by 122 (out of 165) people who belonged to groups of whom 16 did not perceive any successful groups.

Overall, 67% (68) of respondents who perceived some successes said that the most important reason for success was that the people in the communities had cooperated and worked together.

Another 10% (11) said that success had been achieved because ordinary community people had worked together with village officials.

Only 2 people mentioned WAS in any form.

This is a remarkable tribute to WAS field workers and action teams at all levels.

The interpretation of the finding that WAS was mentioned by village people as a factor in success by only 2 people is a tribute, of course depends on one's development philosophy.

The fact that people feel that they themselves rather than some external body, like WAS, were central to success is a strong indicator that PKK workers have indeed played a low key facilitating role rather than a leadership role. It is this facilitating role that has also resulted in emergence of new leaders within the community.

It would be apt to quote one comment made by a women who in 1985 appeared not to be able to talk "We made it (water activities) successful. We are already clever. We have learned so many new things and have had so many new experiences so we made us successful."

a) People/institutions important in success

Just in case there are doubts about reliability of responses based on one question, two more direct questions were asked about people and institutions important to success.

When people were asked what factors/people/institutions played a role in achieving success not everyone was able to answer the question. Overall 98 people gave 133 answers presented in Table 76.

TABLE 76: FACTORS IN ACHIEVING SUCCESS

NO.	CATEGORY	WOMEN	MEN	TOTAL
1	Help from dusun, village office and us	20%	28%	24%
2	Help from WAS and us	14%	19%	17%
3	Help from Government and us	7%	18%	13%
4	We, working together in groups	15%	14%	15%
5	PKK, women	12%	7%	9%
6	PKK field workers	21%	12%	16%
7	Technicians	6%	--	3%
8	Certain women, men	5%	2%	3%

From Table 76, it can be seen that when specifically asked for institutions and people, respondents were more likely to mention institutions but not in isolation. They also included themselves! Thus overall 69% of responses mentioned people working together and being assisted by the village office, WAS or the government.

PKK field workers received more mention, 16%, as did PKK women, 16%. However, overall people's power still is overwhelmingly dominant!

People were than asked to rate the most important factor in success. This question was answered by 107 people who gave 130 responses. The answers reconfirm earlier interpretation of change brought about by a grassroots movement. The distribution of factors considered important was as follows:

We, working together, groups	30%
Village officians including heads of dusuns and RTs	14%
WAS	16%
WAS field workers	11%
Female heads of water groups	6%
Technicians from Kupang	10%
PKK	5%
Informal, traditional leaders	6%
Irrelevant response	2%

Once again the most frequently mentioned important factor was people working together, 36%, if one includes elected leaders of water user groups. Other factors mentioned less frequently were WAS, WAS field workers, village leaders incuding those at the dusun and RT level, and informal traditional leaders, technicians from Kupang and PKK.

20. Why have there been some failures?

In order not to unfairly load findings in favour of success, respondents were also asked about factors/reasons for failures.

Perhaps failure is too strong a word. The reader is reminded that perceived problems have already been reported.

Most people said that there had been no failures. However, 38 people did give reasons for failures (23% of those who belonged to groups). If a group of individuals take credit for success than they should also take responsibility for failure.
Of 38 people, 53% said that failures had been experienced

because they had been unable to work well together. Some respondents said laziness and lack of enthusiasm among them had led to failure. Five percent (2 women) said "we are experiencing failures because we are still new at this. We are still in the learning stages."

Sixteen percent (6), all from village Naunu, blamed failure on external factors such as lack of materials and owners refusing to allow people to carry out construction at water sources, 5%.

Another 8% (3) primarily from Naunu, said that groups had been unsuccessful because of lack of cooperation between the dusun and village heads.

Altogether 11% (4) said that failure was experienced because of broken down pumps at boreholes that were beyond the ability of the community to repair. All these responses were from Sillu.

Thus it can be seen that while the majority felt that no "failures" had been experienced, those who did perceive failures felt that the primary reason was lack of cooperation between village people.

21. Has WAS affected your life?

Throughout the report, whether dealing with water, women, PKK or household hygiene there is plenty of evidence of change since 1985. The last question in household interviews was the only direct question dealing with change.

All respondents were asked whether formation of water user's groups and its activities had affected their lives in any way. Overall 84% (150) of those who were aware of water groups said that the groups had affected their lives, 16% (29) said that the groups had not touched their lives.

However, if one includes the sample of those who did not know anything about water groups, 63% (150) of the total sample felt that their lives had been affected while 37% (90) felt that there had been no change in their lives.

There were no sex differences, however there were statistically significant village differences. The percent distribution of the total sample (240) who felt that their lives had been affected was as follows:

Sillu	49% (40)
Naunu'	48% (23)
Takirin	92% (59)
Sarabau	76% (28)

However, if one considers only those with some familiarity or involvement with water groups, the percent distribution of those who felt that their lives had been affected was as follows:

Sillu	68% (40/59)
Naunu	79% (23/29)
Tahirin	97% (59/61)
Sarabau	93% (28/30)

The obvious follow up to the question is "how have the water activities affected your lives?" Overall 134 people were able to articulate 239 examples of multiple changes. Although the answers were scattered, there were pronounced sex differences which are worth examining (Table 77).

TABLE 77: PERCEIVED CHANGES BROUGHT ABOUT BY WAS

NO.	CATEGORY	WOMEN	MEN	TOTAL
1	Can grow vegetables, fruits, beans	21%	14%	17%
2	Water is now close/not far	21%	18%	19%
3	Clean house, yard	16%	4%	9%
4	Easy to bathe children, we are clean	12%	2%	6%
5	Easy to wash, water plants/ house, drink, etc.	9%	3%	6%
6	Water no longer a problem, much water	8%	22%	16%
7	Now get clean water	5%	10%	8%
8	Before we were tired, now we can rest	3%	4%	4%
9	More healthy	2%	2%	2%
10	Work is light if people together	2%	6%	4%
11	Through our contributions built pipe/tap/reservoir, etc.	1%	14%	8%
12	Gained much experience	1%	1%	1%
	TOTAL	100%	100%	100%
	TOTAL NO. OF RESPONSES	112	127	239

Overall, women's responses were more specific while men's responses were more general. For example among men, 22% of responses referred generally to the fact that water was no longer

a problem. 18% referred to the increased proximity of water.

Among women. 8% referred to water no longer being a problem. while 21% referred to the increased proximity of water. However. many more of women's responses than men's responses referred to the following specific changes directly related to water:

Can grow vegetables, fruits	21% women	14% men
Can bathe	12% women	2% men
Easy to wash. etc	9% women	3% men
Water is now clean	5% women	10% men

Thus it can be seen that except for change in cleanliness of water, women's respones were more specifically related to increased ease with which water that was plentiful and closeby, could be used for different purposes.

Women much more frequently, 12%. than men, 2%, referred to having cleaner yards and houses. PKK volunteers especialy from the subdistrict (Kecamatan) have encouraged total environmental sanitation as part of the overall PKK work at the village level.

Men. 20%. much. more then women, 3%, referred to the physical construction achievements attained through mutual cooperation.

Frequency listings of responses sometimes don't capture how much some of the changes brought about through WAS have meant to village people. Perhaps the importance attached to the changes can be better conveyed through a woman's own words.

> "Earlier, we felt ashamed, inferior. We were not clean and our children were dirty. Now we are no longer dirty, our children are no longer dirty. We no longer need to feel inferior when people from the cities come to visit us."

22. Spreading the experience

An issue that faces every development activity that is successfully completed is how can the success be replicated or how can the learning/experiences be transferred to other locations.

While there are several answers to the question, one way of lessening dependence on exteral"experts" and strengthening people's self confidence. is to use village people who have gone through one learning cycle as resources in other places/dusuns/villages about to undertake similar activities. The same approach can also be implemented within the same village with exchange visits between groups functioning more effectively and those functioning less effectively.

When respondents were asked if they would be willing to go to other villages to share their experiences. a majority. 64% (93/146) said yes. The question should also be used as a rough

indicator of most people's willingness to go to other villages to help.

The question baffled many people. Being too general and lacking a context, it was difficult for many people to answer. Some people said that they would like to go to other villages because they wanted to help other people and gain new experiences. A few people said that they were too busy to go.

Surprisingly a few modest people said that they would be willing to go after they had gained a little more experience in group management and taking care of water systems.

Three women said that it would not be good for women to go (overall there were no sex differences), while one person said that visiting other villages was the government's business.

When the same questions were asked during group meetings there were interesting group differences. The groups that were strong were funny in their reaction! When the question was explained, people became very excited and started laughing and said yes. Later they became coy, more modest and said that they would go if higher authorities felt they (a group) would be able to help in other villages.

The groups that were less strong said yes or no but without any enthusiasm.

23. What will you say?

People were also asked what they would tell someone else in a village wanting to improve their water situation. The question was answered by 83 people (95 responses), 56 women and 39 men. There were some interesting sex differencs (Table 78).

If men were to tell the story of their experiences and distill lessons learned for others, they would primarily focus on the process involved in forming groups and collecting money (42%). They wuld also talk about the opportunities to grow vegetables for home consumption and for sale.

In addition, more than women (2%), they would tell people about WAS and how it helped them to organize themselves and liased with the provincial government, 10%. Men would also emphasize the importance of people cooperating to work together and taking the initiative to request govenment assistance.

Men would also tell communities to dig wells and explain to them how people in their villages came to receive water.

Compared to men, women would focus on ways and means of ensuring that drinking water was clean, 38%. None of the men mentioned achieving clean water! Women would also make frequent reference to growing vegetables, 20%, as well as processes involved in forming water groups, 11%, and managing water well, 10%.

TABLE 78: WHAT PEOPLE WOULD SAY IN OTHER VILLAGES

NO.	CATEGORY	WOMEN	MEN	TOTAL
1	Form water groups	11%	42%	23%
2	Grow vegetables/ consume or sell	20%	18%	19%
3	Clean source, get clean water	38%	--	22%
4	Work hard together/ make proposals to Govt.	9%	8%	9%
5	Manage, distribute, use water well	10%	2%	8%
6	Not experienced enough to give advise	1%	8%	4%
7	Tell about WAS	2%	10%	5%
8	Other - dig.well, how we got water	9%	12%	10%

Compared to men only 1% of women's responses referred to lack of experience and hence readiness to talk to other groups.

What do these results mean? No two people involved in the same activity have exactly the same experience or learn exactly the same thing. More often than not perspectives differ. That is the essence of being human.

In the context of WAS, it means that mixed sex teams may give a more balanced picture of processes involved than same sex teams visiting other villages. Such teams would be better equipped to address the different interests of men and women than teams comprised only of men or only of women.

24. Why some people do not belong to groups

Answers about why people belong or do not belong to groups can only be answered if people are aware of the existance of groups. Altogether 36 people answered questions related to why they did not join or belong to groups.

The primary reason for not belonging to groups was that no groups existed in the vicinity of some of the people. (64%) 23. Overall, 22% (8/36) said that they had no desire to belong to a group. Another 8% (3, all men) said that the groups were too far from where they lived. One man thought that the groups were only for women while one women said that she was far too busy to get involved in water user's groups.

On further probing, it was found, that about 25% of those who did not belong to groups said that since they lived close to perennial water sources, they did not need water groups. Small numbers, 2 or 1 person each) gave the following reasons: objected to having to pay monthly contributions: felt that only women could belong; said it was difficult for them to join either because they were too old or because they had small children or because their name was not on the list.

People who said that they did not belong to groups because there were no water groups near them were asked why no groups had been formed. Three categories of reasons emerged. The most common response (11/24) was that although plans had been made they had yet to be implemented. Approximately 21% (5/24) blamed lack of government interest or lack of caring by the village officials primarily the village chief. The rest of the reasons (8/24) had to do with technical factors, lack of suitable water source including distance to existing water sources.

In informal conversations, many of these people expressed frustration. These were people living in areas where the water situation was difficult but where either no water groups had been formed or were not functioning effectively.

This was found to be true in parts of all dusuns in Sillu, in Naunu and in parts of Sarabau II. In Sillu, there are two groups, one each in dusun I and III that have formed groups and have collected local materials and finances. At the time of the 1987 study they were still expecting to receive a borehole. Two groups, one each in dusun I and II in Sillu have broken down boreholes, which until recently, had not been repaired and appeared to have run dry.

In dusun IV, Tuamnanu, Sillu, during the ground water survey, no ground water was found within a reasonable distance of home. Hence grups formed have turned cynical although a few are now willing to experiment with rainwater tanks.

Similar problems with lack of ground water have hampered enthusiasm of water groups in Oeltuni I and II, especially households living near the village office.

The message from men and women in Naunu that came through repeatedly was "We desperately need water. We have already tried by ourselves to dig wells. We used a local man from Savu. But we have not found water. Show us a way of knowing where the water is in the ground and we will dig our own wells and pay on our own for these wells. We will do anything to find water."

In Sarabau II, one subward is located too far from the drilled boreholes and continues to use a spring that is relatively closer to them. When women in the unserved area heard about a water user's group meeting, a delegation of 8 women from the unserved area came down to lodge their protest at being overlooked!

It is important to point out again that although the case study was done in August/September 1987, WAS activities were being continued. Existing problems are being addressed by WAS action teams and field workers while new and old groups are developing further.

25. Spread effects of WAS activities

Spread effects of WAS can be measured in different ways at different levels. Let us start with the village level.

1. Within village spread effects

Not everybody in every village participated directly in WAS activities. However, in general, discernible increases in women's self confidence and in men's ratings of women's abilities were noted. While there were some differences between those who participated in WAS activities to a great extent, to a lesser extent and not at all, often these differences were a matter of degree. Overall, compared to 1985, more positive attitudes towards women could be discerned in 1987.

Thus one can conclude that the presence of WAS activities in villages is probably influencing even those who are not directly involved in such activities.

2. Strong groups serve as models

Although WAS has not made a systematic effort to share experiences between groups, this is happening spontaneously to some extent.

There are several examples of groups having spontaneous positive influences on each other. Two interesting examples are the way in which two groups in Sillu came to be formed.

An interview with an informal leader in one of the groups is presented verbatim. This was his response to questions on history of the group.

> "First, soon after you (chief investigator) left in 1985 men from Kupang came to do a survey. They put little yellow markers near our house. Later we found that people were going to come and drill where there were yellow markers. When the drilers came we thought that maybe we would also get a borehole if we formed a group, collected local materials and money. So we did."

Another dramatic instance of within village spread effect was related to borehole repairs. When old Bapa Kale in Tunmuni figured out why the borehole in front of the village office in Sillu was dry and corrected the situation so that water started flowing, people from Oelbima (broken borehole) literally came running to find out how it had happened. They then promptly went

back and carried out similar measurements at their borehole. Unfortunately, the borehole in Oelbima was found to be dry.

Some groups are also thinking about diversifying activities or using the structure of groups to initiate other community development activities, such as building of a small church.

3. Formation of new groups

Some new groups have been formed within villages at the intiative of villagers themselves. In Naunu, despite the problems relative to other villages, the idea of forming groups in the context of trying to improve water sources has caught on. In Oebola, three new groups are at different stages of growth.

Even though the Oebola (spring capture) group does not appear to perceive much reason for continued high levels of activity, the experience has inspired people using other sources such as Oelpua, Anoebaki and Puamnasi to start the process of group formation.

Group meetings were held with some women from Oelpua and Anoebaki. The women were very knowledgable and were even able to give estimates of number of bags of cement they would need.

4. Influence on leaders

WAS activities were initiated through existing village institutons irrespective of whether they had a poor track record. Even though not every decision in groups was made through a participatory democratic process, many decisions were made through membership involvement.

The achievements of groups have gradually influenced at least some leaders used to carrying out 'people's wishes' in authoritarian ways.

One small but important example follows.

In 1985, it was reported that in villages which had built piped systems through community participation, every tap or standpost ended at or near the home of the village head, irrespective of whether the majority of houses had access to the water or not.

In 1987, during a private, informal late night discussion a village leader said "one of the things that I have learned is that in deciding where to put the pipes we should not think only of ourselves."

5. Influence on other villages

Three examples come to mind right away. One is an incident reported from a meeting of heads of villages. The focus of the meeting was on development activities. During discussion time the village heads described development activities in their

villages. The head from one of the study villages described WAS activities emphasizing the success achieved through formation of groups and community based initiatives.

In a similar meeting in a different location at the subdistrict level, when some village heads began describing the severity of water problems, a PKK members of WAS at the subdistrict level explained the WAS approach and asked the village head to try it out.

In another location, a village neighboring a WAS village wanted to improve its water situation. Tired of a difficult water situation, the village heard about "WAS" and decided to help itself. It formed a water group, people collected local materials and contributed cash (Rp 100/household). The group built a spring capture and a reservoir at one of the springs which they eventually want to use for a piped system.

6. Changes in implementors

As mentioned before WAS has been implemented by PKK at all levels. Special WAS action teams were created at each level who in addition to their normal PKK duties also undertook special responsibility for WAS.

If PKK implementors have learned any new skills through the training received and the experiences they have gained, then that experience remains a rich resource to be applied to other development activities. Almost all PKK implementors were interviewed in groups in private. Extracts from interviews are presented below.

Female PKK WAS team member, subdistrict Belu

> "Many of us are just housewives. For us it is not usual to go to people's houses, meet people and talk to them on a one-to-one basis. With WAS we had to go house to house and now we feel confident. We didn't have that experience before because we had never counselled people on a one-to-one basis before. Before we just had general meetings and repeated the same thing in every situation."
>
> "We have received a red book about women working together. We have already started using it in our other PKK work."

Male PKK subdistrict team member

> "As men we don't think about water because it is women's business. Now we have learned how water can be used and how to manage water systems. We have even applied it to our own houses and I have started a vegetable garden."

Head of a subdistrict WAS team

> "We are not educated enough. We need training (said very happily). We will take any training that will help us. We have realized through WAS how difficult it is to change people's attitudes. We want somebody to train us so we can change people's attitudes quickly - so we don't have to wait for years. What are the ways to motivate people, how can we make them more active?"

Member Kabupaten team, female

> "There are two things that I have learned. I have learned about fixing pumps and I have learned how to approach people. Before WAS I knew nothing about participatory methods and how to get close to people."

PKK Field Worker

> "I knew a lot about community development before. But only in theory. Now I know that if people are given a change they will help themselves."

Each and every PKK WAS implementor from the highest to the lowest said that WAS work would continue even after WAS activities were stopped (special funding end in March of 1988). Every person said that since other PKK work would continue WAS activities would become part of their normal routine.

All these people trained in new skills will probably continue to work for PKK. Many of them are already including lessons learnt from the WAS experience to their other activities. For example, participatory methods are being applied to other PKK training activities. Lessons learned will thus continue to spread.

7. Linkages with technical departments

One of the key factors in the success achieved by WAS has been the determined effort made by PKK at the provincial level to involve the technical experts right from the beginning. Even though the technical ministries cooperated, the cooperation in the beginning, was not based on total conviction in the abilities or willingness of communities to get involved.

Seeing was believing in this case. Skepticism has gradually turned to believing that rural people are not lazy, that they will work hard and contribute not only local materials, but also cash if the government on its part keeps its promises.

No first experience with something new is implemented without problems. However what is important is that the department heads of the relevant ministries at the provincial level are eager to ensure that the WAS experience does not get lost.

Special interest has been aroused in the possibility of incorporating WAS experience in the teaching curriculum at the School for Sanitarians in Kupang. In addition heads of planning departments and chief administrators of districts have invited PKK to share its experiences with them.

8. Linkages with planners and administrators

Just as linkages were developed and maintained with the Ministry of Health, so also links were established with the Ministries of Planning, Home Affairs and the district administrative authorities. Meetings were held with heads of departments not only when help was needed, or a problem needed to be addressed but for information sharing. After discussion of findings of the second round of case study data collection, senior administrators invited PKK to share its WAS experiences with them.

Conclusion

Water User's Groups have played a central role in getting users involved in decision making in water activities without alienating the established formal and informal leadership in the villages.

Both women and men have been involved in water groups. Decisions within groups have involved the group and women in at least 50% of major decisions. However men, including leaders and PKK workers have mad 50% of the major decisions. Thus women have become involved in water groups without the exclusion of men.

Groups vary in their strength and effectiveness. However most have a strong future orientation. Most groups perceive long term maintenance and repairs of water systems as the primary purpose of water user's groups in the future. Groups are also in the process of diversifying and taking on new roles.

WAS field workers and action teams have played central coordinating and supportive functions. They appear to have struck the right balance between doing too much or too little for groups. They emerge not as dominating leaders bur as key resources that provided the stimulus to people to organize themselves to receive government assistance to improve drinking water systems within the villages.

The most important tribute to WAS planners and implementors is that people view themselves rather than WAS as the most important factors in bringing about changes in the drinking water situation.

CHAPTER 10

WATER QUALITY

1. Water In The House

Water quality is affected by many factors including quality at source. However, even though water at the source may be clean, it can become polluted during its journey from the source to the house and within the house before it reaches the consumer. In order to interpret results from water quality testing properly, it is important first to understand handling of water within the house and people's beliefs about sources of contamination or pollution of water.

Water is usually stored in the kitchen and may be kept in the bathroom (a small seperate thatch cubicle usually without a roof to provide some privacy, for bathing and urinating) or in some room in the house. It is occasionally found in the toilet and sometimes left sitting outside between the house and the kitchen. Nobody mentioned storing water in the toilet in 1985. However in 1987 it was mentioned by 15 families, not a great number but a significant beginning!

(a) Water storage containers

Within the household water is stored in a variety of containers. As noted in 1985, the use of bamboos was frequent in the Belu villages.

Use of bamboo and earthen pots generally decreases as prosperity increases. From Table 79 it can be seen that many households store water in more than one type of container.

There was an overall decline in use of earthen pots. In 1985, 49% of households reported storing water in earthen pots while in 1987, this was down to 43%. There is a dramatic increase in use of plastic buckets and to a lesser extent of jerry cans. In general buckets were found to be cleaner than jerry cans. The narrow necks of jerry cans makes it difficult to clean them from the inside.

TABLE 79 : WATER STORAGE CONTAINERS BY YEAR *

TYPE OF CONTAINER	1985		1987	
	%	NO.	%	NO.
Earthen	49%	121	43%	102
Big plastic bucket	39%	96	68%	162
Jerry can	19%	48	31%	74
Bamboo	11%	28	1%	3
Drum	4%	9	8%	16
Chinese jar, glass jar	3%	7	12%	29
Iron/tin jar	2%	6	3%	6
Jar/pot (material unspecified)	1%	2	-	-
Total No. of Responses		317		392

* Percent distribution of sample mentioning different categories

By 1987, use of bamboos had almost disappeared. It was 11% in 1985 and 1% in 1987. Thus it can be seen that the results from two different sources of information household interviews and direct observation were the same.

Increase use was also reported of Chinese jars and drums. Drums are sometimes found in the bathrooms and kitchen. They were more frequently observed in 1987 than in 1985.

Some striking differences between villages are reported in Table 80. The differences are dramatic in the Belu villages. Thus

TABLE 80: DIFFERENCES IN WATER STORAGE CONTAINERS BY VILLAGE*

NO.	TYPE OF CONTAINER		SILLU	NAUNU	TAKIRIN	SARABAU
1.	Earthen pots	1985	52%	57%	52%	21%
		1987	50%	57%	36%	19%
2.	Plastic buckets	1985	41%	34%	31%	56%
		1987	60%	59%	77%	86%
3.	Jerry can	1985	11%	12%	32%	29%
		1987	18%	21%	38%	65%
4.	Bamboo	1985	1%	-	29%	26%
		1987	1%	-	2%	2%
5.	Drum	1985	3%	9%	2%	3%
		1987	8%	4%	3%	16%

* % distribution of sample

while use of plastic buckets increased in each village in 1987, between 77% to 86% of all households in Takirin and Sarabau were using plastic buckets compared to 31% and 56% respectively in 1985.

Similary, more households in the Belu villages had jerry cans in 1987 than the Kupang villages which in 1985 had higher proportion of households using jerry cans.

In 1985, while a quarter of all households in Takinin and Sarabau used bamboos, these had all disappeared by 1987.

These are two possible explanations for the above findings. Either there has been a dramatic increase in prosperity in the Belu villages or the villages have decided to spend some of their savings in consumer goods. It is probable that with the opening of new roads, increased access has not only led to greater access and exposure to consumer goods but has also provided new markets for sale of goods produced by village households.

(b) Ladels/Dippers

Before water can be used for drinking or for any other purpose, it has to be drawn out from the storage container. Most people use some smaller container or "moks," (short handle ladel) to draw the water from the larger container. This can be another point of pollution.

Overall, 8% (23) in 1985 and 12% (33) in 1987 said that they poured directly from the storage container into the next container without using any dippers. Compared to 1985, the use of "moks" (short handle ladel) went down in 1987 (from 54% to 40%) and the use of gayung (long handles) went up (from 20% to 30%).

While gayungs were used almost exclusively in the Kupang villages in 1985 (30%) they were used almost as much in Belu villages in 1987 (22% to 26%).

Miscellaneous other containers were used for dipping water. These included: glass, 6%, basins, plates, milk tins, 80%, and buckets and jerry cans, 1%.

(c) Other uses of dippers

To judge if the water dipper was used exclusively for dipping water, respondents were asked if the water dipper was used for anything else.

In 1985, 47% (106) of the sample said that they used the dipper for other purposes as well. In 1987, this percent had increased to 61% (131). There were significant differences between villages with distribution remaining almost identical across time. The distribution of households having a dipper which was used for other purposes as well by village in 1985 and 1987 was

as follows:

Sillu	:	25% (1985); 49% (1987)
Naunu	:	44% (1985); 55% (1987)
Takirin	:	76%, same both years
Sarabau	:	68%, same both years

Respondents who reported multiple usage were asked about the other uses of water. In both years, the dipper was most commonly used for drinking (83%). It was less commonly used for bathing, eating and cooking. In 1987, it was also used for watering plants (3%).

Needless to say, all these other uses of dippers are potential means of contaminating stored drinking water.

(d) Drinking water

Through contact with the Puskesmas and health workers, many people in the villages are aware of the fact that it is desirable to boil water before drinking. In the study villages, in 1985 this was more true for Kupang district than for Belu district and the least true for Sarabau, the most isolated village (Belu).

In order to avoid eliciting "socially desirable" responses, no questions were directly asked about boiled water. Instead people were asked if they had any special water for drinking and what was special about it.

There were no significant differences by sex or by village both years. However, there was an increase in number of people saying that they had special water to drink (Table 81). Sarabau which had the lowest percent, 72%, in 1985, saying that they had special water for drinking, had the highest number in 1987, 100%. In 1987 maybe Sarabau is not longer the most isolated village!

TABLE 81: IS THERE SPECIAL DRINKING WATER

NO.	CATEGORY	YES		NO	
		1985	1987	1985	1987
1.	Sillu	86%	96%	14%	4%
2.	Naunu	83%	90%	17%	10%
3.	Takirin	80%	92%	20%	8%
4.	Sarabau	72%	100%	28%	-

However, since there has been much talk in the villages about the importance of clean water, the question may have elicited socially desirable responses to some extent.

When respondents were asked what made the drinking water special a variety of responses emerged (Table 82). The distribution of

TABLE 82 : QUALITIES OF SPECIAL DRINKING WATER

NO.	QUALITIES	1985 %	1987 %
1.	Boiled	41%	48%
2.	Kept in a special, clean container, jerrycan, bamboo, pot, unboiled.	18%	14%
3.	Kept in a thermos flask, kettle-probably boiled	9%	10%
4.	Drinking water - not boiled	9%	3%
5.	Hot water (air panas)	8%	13%
6.	Special because also used for cooling	3%	2%
7.	Kept covered, protected unboiled	3%	5%
8.	Bring water from a special place	3%	-
9.	Unboiled water	2%	2%
10.	If unclear, let it settle	1%	1%
11.	Other	1%	1%
12.	Don't know	2%	1%

responses were very similar in both years with a slight increase in numbers mentioning boiled water (from 41% to 48%).

There was a decline from 9% in 1985 to 3% in 1987 in people specifically stating that drinking water was not boiled. Other responses mentioned are reported in Table 82.

Sex differences were more pronounced in 1987 than in 1985 but in the same direction. In both years, many more of the women's responses than the men's responses made reference to boiled water. The distribution by year was as follows:

	1985	1987
Women mentioning boiled water	48%	56%
Men mentioning boiled water	34%	41%

Additionally in 1987, while 21% of women's responses made reference to hot water (air panas) only 6% of the men's responses did so.

As before, the findings are difficult to interpret. There are two possibilities. It is possible that women felt more pressured to give socially desirable answers since the question related to their domain. Alternatively, it is possible that men are less aware of what women are doing than women themselves. The odds are that the first intepretation is correct.

(e) Qualities of good drinking water

During the course of the interview, respondents were asked what the water should be like to be considered good for drinking. The responses were in some ways similar to responses about special drinking water.

There were no significant differences between sexes or between villages or between years. The responses are reported in Table 83. The two most frequently mentioned qualities were that water should be boiled and clean. Other less frequently mentioned qualities were that water should be from a clean source, cool, unboiled, clear, hot, from a special container, kept covered, from an earthen pot and from a tap.

Thus among a small percentage there is a feeling that boiling water changes the flavour of water, some prefer to drink cool water while others prefer to drink hot water.

Although there are not many taps in the villages, a few people believe that water from a tap is automatically safe. This has implications for pipe water systems. If taps are provided at standposts without protecting the source completely, it may be difficult to convince people that water may still be polluted.

TABLE 83 : QUALITIES OF GOOD DRINKING WATER

NO.	QUALITIES	1985	1987
1.	Boiled	64%	54%
2.	Clean	19%	22%
3.	From clean source	4%	4%
4.	Cool, unboiled	3%	1%
5.	Clear, not dirty	3%	2%
6.	Covered, well kept	2%	4%
7.	Kept in a special container	2%	6%
8.	Hot (air panas)	2%	5%
9.	From a tap	1%	1%
10.	Kept in an earthen pot	-	-
11.	Other, flowing water	-	1%

As can be seen from Table 83, there are no great differences in responses across time. Once again this reflects the fact that PKK activities have primarily focussed on organizational structures for physical improvement of sources and not as much on water handling or quality of water beyond general statements about importance of water quality.

(f) Beliefs about water contamination

If people believe strongly that water can never be polluted, then efforts to make people change sources or ways of handling water would be extremely difficult. People were asked if they thought

whether water could become polluted or sickness causing.

In 1985 there were no sex or village differences and 94% of the sample believed that the water could get polluted. However in 1987 there were significant village and sex differences.

Sarabau which in 1985 had the largest number of unaware people, who said that water could never get polluted, in 1987 had 97% of people who said that water could get polluted. By contrast, in Naunu, the percent in 1987 fell to 72%.

In 1987 there were significant sex differences Chi Sq d.f. 1 = 6.8**. More women, 91%, than men, 79%, said that water could get polluted. Thus, 21% of the men and 9% of the women felt that water could not get polluted.

Why is there a decline in numbers of people who state that water can become polluted? The primary mechanisms of pollution are perceived to be at the source. As people see more and more water being completely covered (spring captures) or coming out of pipes, taps or pumps, they believe that water cannot become polluted since the source is protected/covered.

Thus overall, there has been no increase in awareness of paths of contamination of water especially through improper handling of water. This interpretation is further strengthened when one examines people's responses to a question asking how water becomes polluted (Table 84).

TABLE 84 : CAUSES OF WATER POLLUTION

No.	QUALITIES	1985	1987
1.	Leaves falling	33%	21%
2.	Dust, dirt, mud, landslide from rain	15%	30%
3.	Source not cleaned	9%	8%
4.	Water kept uncovered	7%	9%
5.	Flood, rain	7%	8%
6.	Filth, rubbish	6%	-
7.	Animals	4%	2%
8.	Water germs, fungus	3%	7%
9.	Roots of trees	3%	2%
10.	Container not cleaned	2%	5%
11.	Washing in water source	2%	-
12.	Too many people using source	2%	1%
13.	Water level reduced/milky/ stagnant	2%	3%
14.	Other, bamboo dirty, snails don't know	2%	2%
15.	Contaminated in house		2%
	Total No. of Responses	100% (364)	100% (436)

As can be seen from Table 84, the primary reasons are still related to highly visible sources of contamination at source.

These include
- leaves falling
- dust and dirt
- source not being cleaned
- flood, rain, animals
- reduced water level
- dirty bamboos, roots of trees.

In 1985, 9% of the responses related to water containers and 3% referred to fingers and germs at the source.

In 1987, these numbers had increased slightly. Thus 14% of the responses referred to water containers and 7% referred to germs and fingers. In addition, 2% made direct reference to water contamination within the household.

Thus although there is a slightly higher awareness of possibility of pollution after water is drawn from the source, the primary focus is still on how water can get contaminated at source.

It is also ironic that as water at sources became safer, the process of making the sources safer has made more people aware of possible ways of contamination at source. However, as people have also seen increasing number of sources being protected, more people tend to believe that water can no longer be polluted.

(g) Methods of stopping water contamination

If people know how water gets polluted, the next logical question is do people know of methods of preventing contamination. In 1985, 21% said that they did not know of a way to stop contamination. In 1987, only 5% said that they did not know of a method of preventing contamination.

In 1985 there were significant differences between villages with 93% in Naunu and only 57% in Sarabau claiming to know how to prevent pollution. In 1987, there were no longer any significant differences between villages. In every village between 89% to 100% of the sample said that they knew of a method of stopping pollution.

In 1985, there were no significant sex differences. However in 1987 there were significant sex differences Chi Sq (d.f. 1)=4.4*. More women, 98%, than men, 92%, said that they knew of a method of preventing water contamination. Given the fact that more women than men have been intimately involved with WAS activities, the finding is not surprising.

The primary methods of stopping pollution mentioned related directly to WAS activities. Thus primarily people talked about cleaning sources and protecting or covering of sources.

2. Water quality tests prior to WAS activities

Water quality can really only be assessed through bacteriological examination. Water is generally tested for bacteria which are excreted in large numbers by animals and humans and whose presence is indicative of fecal pollution. Water was tested for faecal coliform (F.C.) using the membrane filtration method. Ideally drinking water samples should contain no fecal coliform. Howeve, in most developing countries, governments are aiming to achieve lower F.C. counts, rather than trying to achieve the deal of no F.C. in the immediate future.

The results presented are based on water quality testing conducted in July 1986. Water quality testing was deemed important because of lack of information on quality of water in general. Thus the results provide information on certain patterns of pollution.

Since no special effort was made during intervention to focus on quality of water, water quality testing was not repeated in 1987. Hence the results presented are based on tests conducted at one point in time, prior to implementation of WAS activities in the villages. Despire the fact that the testing was carried out in 1986, to remind the reader that the results describe the situation prior to WAS, the results are labeled 1985 to indicate that they were a part of the first round of case study data collection.

Altogether 265 water tests were done in the four villages. Because of limited supply of chemicals, only major sources in each dusun were tested. Sources tested included springs, wells, rivers, holes scrubbed in rivers and pipe systems.

The distribution of numbers of water samples from sources in the four villages was as follows:

-- Sillu : 27
-- Naunu : 13
-- Takirin : 24
-- Sarabau : 10

In addition, in each dusun, a few households using the particular sources sampled were also included to study quality of water en route from the source till it was consumed.

Thus samples were obtained from the water containers in which people brought water from the source, water storage containers within the house and samples from drinking water containers. Individuals were also asked if drinking water was boiled or unboiled.

It was easy to judge whether drinking water was actually boiled or not. In households using boiled water, drinking water was usually stored in plastic jugs, kettles or metal pots in which it was boiled.

Fecal coliform (F.C.) counts ranged from 0 to 13,000! Hence results are indicated in geometric means which are less affected by a few extreme results than arithmetic means.

The results are based on 265 water samples. However if water from the container used to carry water from the source was not transferred to another container, the sample was counted for both categories of carrying and storage. Similarly if water from storage containers was used directly for drinking, it was counted twice, both for storage and for drinking.

(a) Water quality at source, 1985

It is well established that water quality at sources varies not only from day to day but also at different times of the day.

Although some sources were sampled more than once, this was not true for every source. Hence results indicate the state of the sources at one point in time.

Although the information is limited, it is extremely useful since no information was available at all about quality of water at sources on within households.

(b) Geometric means

Geometric means (G.M.) and ranges of fecal coliform counts at sources are presented in Table 85.

Overall, springs were the least polluted, G.M. 9.5 followed by holes dug in or beside river beds, G.M. 14.8. Water from piped systems had a G.M. of 24.7 while rivers had a G.M. of 117.5.

Hand dug wells were on the average, the most polluted with a G.M. of 147.9. The range of the F.C. counts is reported in Table 85.

The most polluted sample was from a piped system (Wehedan), in Takirin, near the school.

The fact that most sources including springs are polluted is not surprising given the fact that none of the sources is adequately protected.

In general, water from the springs was purer than the water from the bamboo pipes.

TABLE 85 : WATER QUALITY AT SOURCE, 1985

TYPE	SILLU	NAUNU	TAKIRIN	SARABAU	TOTAL
	Geometric Mean Colonies/100 ml				
Spring	3.6	11.7	24.7	10.6	9.5
(range)	(0-274)	(0-278)	(0-514)	(2-254)	(0-514)
Well	197.2	300.9	-	30.5	147.9
(range)	(32-592)	(104-880)	-	(12-78)	(12-880)
River	-	-	33.5	1445.4	117.5
(range)	-	-	(8-140)	-	(8-140)
Hole in River	55.9	-	10.7	2.0	14.8
(range)	(10-380)	-	(4-52)	(0-4)	(0-380)
Pipe System	-	-	20.03	87.1	24.7
(range)	-	-	(0-5344)	-	(0-5344)
Total	13.1	19.4	21.0	23.7	17.7
	(0-592)	(0-880)	(0-5344)	(0-254)	(0-5344)

The overall quality of sources by village was as follows:

-- Sillu : 13.1 (least polluted)
-- Naunu : 19.4
-- Takirin : 21.0
-- Sarabau : 23.7 (most polluted)

Thus the overall quality of water at sources was the least polluted in Sillu while water was the most polluted in Sarabau.

(c) Frequency distribution of F.C. counts from sources, 1985

It is useful to look at the distribution of actual fecal coliform counts for all sources from all four villages (Table 86).

Overall, 19 % (14) of the sources had no fecal coliform. Although the number is small, it should be considered high given the exposed conditions of most sources.

TABLE 86: FREQUENCY DISTRIBUTION OF F.C./100 ml OF WATER AT SOURCE, 1985

No.	F.C./100 ml	PERCENT	FREQUENCY
1.	0	19%	14
2.	1-10	30%	22
3.	11-25	11%	8
4.	26-50	4%	3
5.	51-100	10%	7
6.	101-250	11%	8
7.	251-500	8%	6
8.	501-1000	5%	4
9.	1001-6000	2%	2
	Total	100%	74

Altogether 45 % (33) of the sources had F.C. counts ranging between 1-50. 21 % (15) had counts ranging between 51-250 while 8 % (6) had counts ranging between 251-500.

In addition, 5 % (4) of the sources had counts between 501-1000, while 2 % (2) had F.C. counts between 101-6000.

Overall, 26 % of the sources had fecal coliform counts greater than 100/100 ml of water.

(d) Progression Of Water Pollution, 1985

In all villages on the average, water in carrying containers was found to have higher F.C. counts than water at the source. Thus although the overall G.M. for all sources was 17.7, the G.M. for water from carrying containers was 140.6 (Table 87).

The deterioration in quality was the worst in Sarabau where the G.M. for water from containers was 140.6.

If one keeps in mind, the information reported on nature of water containers, the results are not surprising. It is helpful here to look at the frequency distribution of actual F.C. counts from water containers (Table 88).

Overall, only 4 % (3) of the samples from carrying containers had no fecal coliform. Altogether 38 % (30) had F.C. counts ranging between 1-100.

Another 27 % (22) of the containers had F.C. counts ranging between 101-500.

It is important to note that 31 % (24) had F.C. counts ranging between 501-13,000/100 ml.

Thus a majority of the water samples from carrying containers, 58 % (45) had F.C. counts over 100/100 ml.

TABLE 87 : WATER QUALITY FROM SOURCE TO HOUSE, 1985

nking Village	Source	Range	Carrying Container	Range	Storage Container	Range	D W
ber	Range						
Sillu	13.0	0-	127.8	4-	160.8	0-	
3.66	0-	529		2940		2940	
	2940						
Naunu	19.4	0-	78.9	0-	52.2	0-	
3.0	0-	880		4288		3920	
	3920						
Takirin	20.9	0-	86.6	4-	94.0	4-	
8.1	0-	5344		12,008		12,008	
	6800						
Sarabau	23.7	0-	309.0	0-	330.9	0-	
3.4	0-	254		8600		8600	
	10,400						
Total	17.7	0-	140.6	0-	128.1	0-	
8.1	0-	5344		12,008		12,008	
	10,400						

TABLE 88 : F.C./100 ml FROM WATER IN CARRYING/ STORAGE CONTAINERS, 1985

No.	CATEGORIES	CARRYING CONTAINER %	CARRYING CONTAINER No.	STORAGE CONTAINER %	STORAGE CONTAINER No.
1.	0	4%	3	8%	8
2.	1 - 10	10%	8	8%	8
3.	11 - 25	10%	8	7%	7
4.	26 - 50	5%	8	7%	7
5.	51 - 100	13%	10	12%	11
6.	101 - 250	14%	11	16%	15
7.	251 - 500	13%	10	14%	13
8.	501 - 1000	9%	7	8%	8
9.	1001 - 5000	15%	12	12%	12
10.	5001 - 13000	7%	5	7%	7
	Total	100%	78	100%	97

(e) Storage containers, 1985

When water is stored in containers, over a period of time, there may be a slight improvement in water quality because of the steady dying-off of bacteria. On the other hand depending on how water is handled, water quality may deteriorate.

Compared to the G.M. of water from all carrying containers, water from storage containers was slightly lower, G.M. 128.1.

The distribution by village is reported in Table 87.

However in three of the four villages, Sillu, Takirin and Sarabau, the G.M. of water samples from storage containers was higher than water from carrying containers. Thus water quality in stored containers was worse than the water quality in the containers used to bring water from the source.

It is easy to relate these findings to information related to handling of water within households and the reported water hygiene in the household hygiene index (Chapter 12).

In terms of distribution of F.C. counts across water storage samples, overall 8 % (8) of the samples had no fecal coliform (Table 88).

Twenty-three percent (23) had F.C. counts ranging from 1-50, 42 % (39) ranged between 51-500 while 27 % (27) had F.C. counts ranging between 51-13,000.

Overall, 57 % (57) of the samples had F.C. counts greater than 100/100 ml of water. The distribution of results of water from carrying and storage containers are quite similar.

(f) Drinking Water, 1985

Altogether 105 drinking water samples from households were obtained. These included water that was boiled and water that was unboiled.

The G.M. of all drinking water samples was 48.1 (Table 87). Once again Sarabau claimed the distinction for having the poorest water quality, G.M. 73.4.

The distribution by village is reported in Table 87.

(g) Boiled vs unboiled water, 1985

Since the drinking water samples, included samples that were boiled and samples that were unboiled, it was decided to do further analyses distinguishing between these two categories.

The Geometric Mean for all boiled water was 24/100 ml while the G.M. for unboiled drinking water was 85/100ml. The range for boiled drinking water was from 0 to 10,400 while the range from unboiled drinking water was 0-6800 (Table 89).

TABLE 89 : QUALITY OF DRINKING WATER, 1985

No.	VILLAGE	BOILED WATER G.M.	BOILED WATER RANGE	UNBOILED WATER G.M.	UNBOILED WATER RANGE
1.	Sillu	12	0-1200	68	84-2940
2.	Naunu	20	0-624	36	0-3920
3.	Takirin	21	0-720	52	4-6800
4.	Sarabau	62	0-10,400	127	0-4240
	Total	24	0-10,400	85	0-6800

Once again, Sarabau had the poorest quality of both boiled and unboiled drinking water.

It is important to look at the distribution of F.C. counts across the two samples (Table 90).

Overall, 30% (16) of the boiled water samples had no F.C. while 10% (5) of the unboiled water had no F.C.

Forty-three percent of the unboiled samples had F.C. ranging between 1-100 while 37 % of the boiled water had the same range.

While 28 % of the unboiled water had F.C. counts ranging between 500-13,000, 23 % of the boiled water samples fell in the same category.

These findings have extremely important implications when considered together with what is already known about handling practices.

TABLE 90 : FREQUENCY DISTRIBUTION OF FECAL COLIFORM COUNTS FROM DRINKING WATER, 1985

No.	CATEGORIES	UNBOILED		BOILED WATER	
		%	No.	%	No.
1.	0	10%	5	30%	16
2.	1- 10	6%	3	17%	9
3.	11- 25	13%	7	0%	4
4.	26- 50	11%	6	4%	2
5.	51- 100	13%	7	8%	4
6.	101- 250	6%	3	2%	1
7.	251- 500	13%	7	8%	4
8.	501- 1000	11%	6	8%	4
9.	1001- 5000	13%	7	13%	7
10.	5001-13000	4%	2	2%	1
	Total	100%	53	100%	52

From the above findings, it can be concluded that boiling of water does not ensure that the water will be free from contamination. The practice of asking people to boil water to ensure quality of drinking water alone is not sufficient. In fact in a fuel scarce area, the value of such a practice should be carefully examined.

Based on the results, it can be concluded that the two most important interventions to improve quality of water are:

1. improvement of quality of water at source,
2. improvements in handling of water.

Results indicate that some unboiled water in addition to boiled water had F.C. counts of 0. This means that even under village conditions, if water at the source is pure and water is properly handled, drinking water can be safe for drinking without resorting to boiling.

On the other hand, while boiling of water for a sufficient length of time makes the water safe soon after it is boiled, the safe quality is often lost because of improper storage and handling of water.

Summary data of geometric means and ranges of F.C. counts from all major categories of water samples is reported in Figure 5.

Conclusion:

WAS action teams have directed most of their energies organizing communities for undertaking physical improvements. In water sources and in ensuring that users will take responsibilities for long term operation and maintenance of water sources. Hence there has been little emphasis on "health education" including a focus on water quality.

This lack of focus on water quality is evidenced from the fact that there have been no dramatic changes in people's awareness of importance of maintaining quality of water after it leaves the source. On the other hand, there is evidence of greater awareness of water quality issues at source.

Overall only 19 % of water sources were free from fecal contamination. Water quality from springs and holes in rivers was better than quality of water from pipe systems, wells and rivers.

Pipe systems may improve convenience but the quality of water is worse than at the source.

Although, the overall G.M. of boiled water samples was lower than the G.M.'s of unboiled drinking water samples, between 70-90 % of both samples had fecal coliform.

Between 23-28 % of the boiled and unboiled drinking water had F.C. counts of over 500/100 ml of water.

In examining pollution levels at different points in the water journey, it was found that although water in containers was more contaminated than sources, on the whole, the level of contamination in water carriers reflected the level of contamination at sources.

These findings have three important implications for intervention:

1. It is important to protect sources to improve the quality of water at source.

2. Boiling of water does not ensure safe water either because water is not boiled long enough or because it is improperly handled after it is boiled.

3. It is extremely important to educate people, especially women and children about proper water handling.

C H A P T E R 11

SANITATION, HYGIENE AND HEALTH

The area of sanitation and hygiene is vast, complex and extremely difficult to assess reliably in a short period of time.

Toilets are an extremely important part of household sanitation. Yet in an environment where people have been told to build toilets, it is difficult to assess whether people are really using toilets. In fact, it is difficult to get beyond "socially desirable" answers.

At the outset, these problems were obvious. This meant that techniques other than direct questioning would have to be employed to understand the issues surrounding toilet use. These techniques, if properly employed, are time consuming. It was finally decided not to attempt to explore extensively the area of defecation practices.

The intervention team had decided that, at least during the first two year life span of WAS, interventions would be limited primarily to water, without any toilet building or redesigning of toilets.

Since toilets were not a priority for intervention, they were naturally not a priority during the first round of information collection. At the same time, it was felt that some information related to defecation practices would be useful.

In the second round of data collection no questions were asked about toilets since intervention activities did not focus on toilets. Hence data related to toilets are from 1985. The situation has not changed except for the fact that in the Kupang villages officials now have cemented squatting plates. The toilets were built by nursing trainees.

1. Use of Toilets, 1985

As has already been mentioned, almost every household has a toilet. These consist of shallow pits covered by wood planks or logs. Most do not have roofs, but some have a raised thatch roof. Some are spiral shaped while others have a door of sorts, either wood or a piece of cloth or sacking. It is common for toilets to flood in the rainy season and collapse. In 1985, none of the toilets had vent pipes or seat covers.

Reliable indicators of toilet use are the presence of fly larvae in the pit, flies and a strong odour! During family stays, it was established that toilets were not usually used by women and children. In general, men tended to use toilets more than women. It was estimated that not more than 15-25% of the families with

toilets used them regularly.

However, in areas where houses are built close together, and where there is little bush left for privacy, toilet use is higher. People have no choice but to use toilets.

It is important to state strongly that the presence of toilets, often poorly designed, which people have often been forced to build, is not an indicator of improved sanitation. Such toilets have probably led to a worsening of the sanitation and health situation.

These conclusions are based upon observation, participation and informal conversations, especially during the latter part of village stays.

Two examples from the field are provided to illustrate the point. (* Author's field notes)

Family A - The toilet was built in the back of the house not far from the kitchen.

"The toilet consisted of a shallow pit, full of buzzing flies and crawling larvae and with a horrendous smell. Using the toilet every morning was a nauseating affair. One morning I said to my hostess, 'I don't know how you can bear to use the toilet'. She quickly said 'I can't and I don't. I just go in the bush in the back and you should do the same. The only person who uses the toilet is Bapak (her husband)."

Family B -

"The household toilet had walls made of pieces of tin, with logs sort of covering the pit and no roof. A four foot high fence has to be climbed to reach the toilet. The family including four children claimed to be regular users.

At first the toilet was extremely clean with no odour, no flies and no larvae. After the first two days of use a few flies were noticed. By the third day, to improve the toilet a roof had been built, a temporary shelter consisting of large Lontar (a variety of palm, "Borassus Flabilifer") leaves. In the meantime another team member also started using the same toilet.

By the fourth day, flies in the pit and the toilet were a definite nuisance and by the end flies were not only buzzing in the house but also in the kitchen located in the back of the house, closest to the toilet. Children were seen going trekking to the corn fields early morning".

2. Reported Toilet Use, Household Survey

The results from the household interviews are unreliable but important from a methodological point of view. As suspected, they clearly establish that certain types of information cannot

be obtained after very brief acquaintance through direct questioning by outsiders associated with the Government.

3. Reported Toilet Use in Sillu, 1985

All respondents were asked where all the members of the household generally went to defecate and urinate.

TABLE 91 : USUAL DEFECATION PLACE, SILLU, 1985

No.	Category	0-4 yrs		5-9 yrs		10-14 yrs		Women		Men	
		%	No.	%	No.	%	No.	%	No.	%	No.
1	Outside	11%	6	9%	4	--	--	--	--	--	--
2	In the yard	23%	13	5%	2	--	--	--	--	--	--
3	Behind house	7%	4	2%	1	--	--	--	--	--	--
4	Anywhere	43%	24	7%	3	--	--	1%	1	1%	1
5	Near house	5%	3	5%	2	--	--	--	--	--	--
6	In the bush/ forest	--	--	2%	1	3%	1	3%	3	3%	2
7	River	--	--	--	--	--	--	--	--	--	--
8	WC/toilet	11%	6	70%	30	97%	32	96%	93	96%	93
	Total	100%	56	100%	43	100%	33	100%	97	100%	96

The distribution of responses and places commonly used for defecation, by age were very similar for all villages. Hence only results from Sillu are reported as an example, Table 91. It is instructive to note the reported change in toilet use with age.

Thus parents, often reported little toilet use among children 0 - 4 years of age. However between 5 - 9 years approximately half the children reportedly use the toilets. By the teenage years, 90 % were reportedly using toilets. Among adults, both men and women, between 86 % to 96 % reportedly used toilets for defecation!

It is obvious from these results, that adults, when asked directly, rarely say that they do not use toilets. However they are more willing to say that their younger children do not use them.

Fortunately, only a few toilet related questions were asked during household interviews. In NTT at least, direct questioning about toilet use does not reflect reality.

4. Cleaning materials, 1985

All interviewees were asked, "after defecation what do you clean yourself with?" The question was left open ended and respondents described the cleaning process!

In general, water is considered the desired cleaning material. First hand experiences indicated that even when there was direct evidence that people were using corn cobs to clean themselves, if asked, they would say water.

There were no significant sex differences although there were inter-village differences (Table 92).

TABLE 92 : MATERIAL USED FOR CLEANING AFTER DEFECATION, 1985

No.	MATERIAL	SILLU		NAUNU		TAKIRIN		SARABAU	
		%	No.	%	No.	%	No.	%	No.
1.	Water	59%	61	66%	43	82%	54	2%	1
2.	Corn cobs	17%	18	11%	7	4%	3	27%	15
3.	Leaves	1%	1	--	--	3%	2	16%	9
4.	Paper	--	--	--	--	1%	1	25%	14
5.	Wood	1%	1	3%	2	2%	1	13%	7
6.	Stones,rocks	4%	4	9%	6	5%	3	15%	8
7.	Cloth	5%	5	--	--	1%	1	--	--
8.	Cloth,water + soap	7%	7	--	--	--	--	--	--
9.	Water + soap	5%	5	9%	6	2%	1	--	--
10.	Anything	1%	1	2%	1	--	--	2%	1
	TOTAL	100%	103	100%	65	100%	66	100%	55

The statistics on water use like the statistics on toilet use should be viewed with caution. Even if the numbers are unreliable what is clear from the statistics is that people clearly use many other materials besides water for cleaning themselves after defecation.

Other materials used besides water were corn cobs, leaves, paper, wood, stones, rocks, cloth and cloth in combination with water and soap. Toilet designers should take note!

No direct questions were asked about washing of hands after defecation. Observations indicated that this practice was not widespread. Some people probably do wash hands, usually without soap.

Naturally, hands are washed where water is kept. This is either in the kitchen or in the kamar mandi (bathroom). However, soap was rarely found in either of these two places. In addition, some people who do use water for cleaning themselves, wash hands with the left-over water in the can, in or near the toilet.

Here, it would be useful to point out that during the water use study for households, water used for toilets received no mention!

5. Defecation place during diarrhoea

In terms of health, usual defecation place of a population is important. What is perhaps even more important, is where people defecate when they have diarrhoea, when the likelihood of spreading infections is the greatest. There were no significant differences by vilage but there were some sex differences. (Table 93).

TABLE 93 : PLACE OF DEFECATION DURING DIARRHOEA BY SEX

No.	PLACE	WOMEN		MEN	
		%	No.	%	No.
1.	Toilet	81%	104	89%	109
2.	Outside	11%	14	2%	3
3.	Forest	5%	6	6%	8
4.	Anywhere	2%	3	1%	1
5.	Behind the house	1%	1	--	--
6.	House yard	--	--	2%	2
	Total	100%	128	100%	123

It is important to note that women were less likely to use the toilet when they had diarrhoea than under normal circumstances. Although, like the statistics on regular toilet use, the statistics are unreliable, they are important because they indicate a trend towards even lower toilet use during diarrhoea.

6. Pigs and toilets

What can pigs have to do with toilets? The answer is, a lot. As has been previously mentioned, despite the fact that use of toilets in most dusuns of the villages studied was low, human waste was never seen lying around on the ground or, in the fields.

Why? The answer lies partially with pigs.

Most families own pigs, and in areas where pigs are not penned, they eat up human waste. In fact, the presence of eager pigs often makes it difficult for people to finish defecating in the bush in comfort!
According to animal husbandry experts, human waste is important nutritionally in the diet of pigs in Timor as many areas are food scarce especially for livestock.

Thus, penning of pigs and building of toilets share a link. If pigs are penned they can no longer devour human waste. The same is true if people build and use toilets.

However, if pigs are penned and toilets are still not used, the sanitation situation, will probably deteriorate.

7. Conclusion

In places where people are more educated, and where people have come under greater contact with Government health officials, people are more likely to report toilet use irrespective of whether they actually use toilets.

Having a toilet in the backyard is obviously no guarantee that it will be used. Those concerned with health, should spend more time asking themselves why people do not like to use toilets, rather than merely pressuring people to build and use toilets.

The present designs of toilets are such that if they are used regularly, one needs a stout heart and a blocked nose to continue!!

In terms of health education, perhaps it is important to focus on

1) The infectious nature of faeces, especially during diarrhoea

2) Infectious nature of children's faeces

3) Importance of washing of hands after defecation

4) Health, risks associated with washing hands in kitchen or kamar mandi after defecation.

5) Proper disposal of cleaning materials

8. Household hygiene index

Improvement in the overall availability of water and/or in the quality of water, should result in improvement in overall health, especially relating to the incidence of diarrhoea in a population.

However, often the effects of improved water supplies are negated because of continued poor household hygiene practices, especially relating to handling of food and water.

Thus, although women may get pure water from the source, by the time the water is used for drinking, it may be polluted because of unhygienic handling of water and/or dirty water containers.

The only reliable way in which information can be obtained on household hygiene is by systematic observation by sensitive and trained observers.

To measure household hygiene, especially as related to the kitchen and handling of water, a simple observation schedule was developed. This schedule was pre-tested in villages around Kupang and underwent several changes. It was used only by female observers and casually done at the end of household interviews.

The schedule consisted of 13 items each of which was rated on a two, three or five point scale. The index consisted of three sub-indices dealing with hygiene relating to food, water and the yard. The first four items related to kitchen hygiene. The five items were:

1. food storage - dry food,
2. food storage - cooked food,
3. kitchen ventilation,
4. presence of flies and insects in the kitchen
5. cleanliness of kitchen floor.

A few problems were encountered during observation. Not every item in every household could be rated. Thus the number of observations on which the results of each item is based varies because of the inability to rate each item in every household. For example, in a household, if the food had not been cooked or had already been eaten, there was no cooked food in the kitchen to be rated.

Similarly, not every household has surplus dry food stored in a manner common in urban households. This is especially true for storage of corn, the staple food. Dry corn may be stored, still in the cob in a room, on a raised platform, or suspended from the roof in the kitchen. In other cases, it was sometimes difficult to rate dry food coverage without appearing inappropriately nosey and offensive.

Kitchen ventilation during pre-testing was rated on a three point scale. However, many families cook outside in the open! If this was so, ventilation was rated high! However, this item was not included in the overall hygiene index.

The section dealing with water hygiene was less problematic and easier to rate, although as with food, sometimes there was no water to rate!

It was hypothesized that one important source of pollution of drinking water was young children dipping dirty containers and their unwashed hands inside the stored water. During pre-testing, an attempt was made to judge whether young children helped themselves to water or not, through direct questions. This proved inconclusive.

Hence, an item was included in the observation schedule to note the placement of the water container and whether it was within the reach of children, 3 to 5 years of age.

Thus, if water containers were placed on the floor or on a slightly raised platform they were rated as within the reach of young children. However, if the water jugs were kept on a table, they were rated as out of reach of young children.

Water related items were:

1. whether or not water container covered
2. whether or not water container within reach of young children
3. cleanliness of drinking water
4. cleanliness of water container
5. cleanliness of water dipper
6. cleanliness of place where water dipper was kept.

The last two items of the hygiene observation schedule were cleanliness of the yard and presence of animals in the house. Data on the index were collected from 112 households in 1985 and from 117 households in 1987.

(a) Construction of the Household Hygiene Index

Overall, 12 items were combined to make up the composite hygiene index. This index was treated as being composed of three sub-indices:

1. kitchen hygiene
2. water hygiene
3. general hygiene

Correlation between subindices, individual items and the overall index were tested. Correlations between subindices are reported in Table 94.

TABLE 94 : CORRELATION MATRIX OF SUBINDICES OF HOUSEHOLD HYGIENE.

VARIABLE	SUBINDEX KITCHEN	SUBINDEX WATER	SUBINDEX GENERAL HYGIENE	SUBINDEX HYGIENE INDEX
Subindex kitchen	1.00	.55***	.34**	.92***
Subindex water	.55***	1.00	.33**	.81***
Subindex general hygiene	.34**	.33**	1.00	.50***
Household hygiene index	.92***	.81***	.50***	1.00

** .01 *** .001

As can be seen from Table 94, the subindices are highly correlated to each other and to the overall household hygiene index. However, the subindices on kitchen and water hygiene correlate less well with the two item index on general household hygiene. This subindex also correlates less well with the total household hygiene index.

(b) Dry Food Storage

This item was rated on a five point scale from covered to uncovered. The positive end of the continuum in terms of hygiene was always rated 1 and the negative end always rated the highest number. In neither year, were there significant differences by village (Table 95).

TABLE 95 : STORAGE OF DRY FOOD

No.	Category	1985 %	1985 No.	1987 %	1987 No.
1	Covered	9%	9	3%	3
2	Mostly covered	13%	12	28%	31
3	Half & Half	41%	39	51%	57
4	Mostly uncovered	32%	30	12%	14
5	Uncovered	5%	5	6%	7
	Total	100%	95	100%	112

There was a trend towards more food being partially or mostly covered in 1987 than in 1985.

(b) Cooked food storage

Like dry food storage this item was also rated on a five point scale ranging from covered to uncovered.

Once again there were no significant differences by village in either year. The distribution of covered food by year is reported in Table 96.

TABLE 96 : STORAGE OF COOKED FOOD

No.	CATEGORY	1985 %	1985 NO.	1987 %	1987 NO.
1	All covered	21%	21	8%	9
2	Mostly covered	22%	22	45%	50
3	Half covered	23%	23	33%	37
4	Most uncovered	31%	31	12%	13
5	All covered	3%	3	2%	3
	Total	100%	100	100%	112

Like with uncooked food, in 1987 a greater percent of food was at least half covered, 86%, than in 1985, 66%.

(d) Kitchen ventilation

In 1985, 3 % of the households cooked outside. In 1987, none of the households were observed to be cooking outside.

While there was some reduction in the number of kitchens rated dark and stuffy in 1987, the majority 57% still fell in this category (Table 97).

TABLE 97 : KITCHEN VENTILATION

NO.	CATEGORY	1985		1987	
		%	NO.	%	NO.
1	Good	5%	6	4%	5
2	A little	22%	25	39%	44
3	Dark & Stuffy	70%	78	57%	64
4	Outside	3%	3	--	--
	Total	100%	112	100%	112

Overall, both in 1985 and in 1987, only between 4% to 5% of kitchens were rated well lit and well ventilated.

(e) Flies in the kitchen

The presence of flies and other insects in the kitchen was rated on a three point scale. Altogether in 1985, 26% of kitchens had many flies while in 1987, only 4% of kitchens were rated as having many flies.

TABLE 98 : FLIES AND INSECTS IN THE KITCHEN

NO.	FLIES AND INSECTS	1985		1987	
		%	NO.	%	NO.
1	None	12%	13	10%	11
2	A few	62%	70	86%	96
3	Many	26%	29	4%	5
	Total	100%	112	100%	112

Once again the trend in 1987 was towards greater cleanliness or fewer flies (Table 98).

(f) Kitchen Floors

The condition of kitchen floors was rated on a three point scale (Table 99). Overall, while 29% of kitchens were rated as having very dirty floors in 1985 (including animal droppings, usually chicken), only 4% of kitchens were rated as having very dirty

floors in 1987.

Thus, there appears to have been a definite improvement in the hygenic condition of kitchen floors by 1987.

TABLE 99 : CONDITION OF KITCHEN FLOORS

NO.	CONDITION OF FLOOR	1985 %	1985 NO.	1987 %	1987 NO.
1	Clean	11%	13	14%	15
2	A little dirty	59%	66	81%	91
3	Very dirty	29%	33	5%	6
	Total No.	100%	112	100%	112

(g) **Water storage**

All drinking water containers were observed and rated on two criteria. The first one was whether the container was covered or not. While there were significant village differences in 1985, these differences were no longer statistically significant in 1987 (Table 100).

TABLE 100: CONDITION OF WATER STORED

CATEGORY	SILLU	NAUNU	TAKIRIN	SARABAU	TOTAL
Covered					
1985	83%	79%	54%	88%	76% (83)
1987	82%	88%	63%	76%	77% (86)
Uncovered					
1985	17%	21%	46%	12%	24% (27)
1987	18%	12%	37%	24%	23% (26)
TOTAL NO.					
1985	46	19	28	17	110
1987	39	24	32	17	112

Thus although the overall ratings do not change, approximately 76% covered each year, there was a decrease in the number of households with covered water containers in Sarabau. Overall, in the Kupang villages, between 82% to 88% of households had covered water containers in 1987 while this was true for 63% to 76% of households in the Belu villages.

(h) Can a young child reach the water?

There was a dramatic decline in the number of water containers that were kept out of reach of children in 1987. Thus while 22% of water containers were out of reach in 1985, only 7% were placed out of reach of young children in 1987 (Table 101).

PHC in their follow up work should stress the important of keeping drinking water containers out of reach of young children in order to preserve the quality of water.

TABLE 101: IS DRINKING WATER WITHIN CHILDREN'S REACH?

NO.	CATEGORY	1985 %	1985 NO.	1987 %	1987 NO.
1	Yes	78%	87	93%	104
2	No	22%	25	7%	8
	Total	100%	112	100%	112

(i) Cleanliness of drinking water

The cleanliness of drinking water was rated only by visual inspection for obvious impurities. Cleanliness was rated on a three point scale.

Significant inter village differences of 1985 disappeared in 1987 (Table 102). It is interesting to note the dramataic decline in rating in Naunu. Thus while 63% of drinking water samples were rated clean in Naunu in 1985, only 37% were rated clean in 1987.

TABLE 102: CLEANLINESS OF DRINKING WATER

No.	CATEGORY		SILLU	NAUNU	TAKIRIN	SARABAU	TOTAL	
1.	Clean	1985	33%	63%	38%	18%	37%	41
		1987	20%	37%	34%	12%	27%	(30)
2.	A little dirty	1985	60%	37%	62%	82%	60%	66
		1987	77%	63%	63%	88%	71%	(80)
3.	Very dirty	1985	7%	--	--	--	--	3
		1987	3%	--	3%	--	2%	(2)
	Total No.	1985	45	19	29	17		110
		1987	39	24	32	17		112

Sarabau, also remains consistent with the least number of samples rated clean, 18% in 1985 and only 12% in 1987. Thus overall there appears to be a decline in water quality in households as rated by visual inspection.

(j) Cleanliness of water container

The condition of the water container itself from within was rated on a three point scale. The pattern of decline in overall cleanliness of water containers was similar to the finding on cleanliness of water itself (Table 103).

TABLE 103: CONDITION OF WATER CONTAINERS

NO.	CATEGORY		Sillu	Naunu	Takirin	Sarabau	Total
1	Clean	1985	28%	47%	35%	29%	33% (35)
		1987	28%	29%	19%	6%	22% (25)
2	A little dirty	1985	64%	53%	65%	71%	64% (68)
		1987	69%	71%	75%	82%	73% (82)
3	Very dirty	1985	8%	--	--	--	3% (4)
		1987	3%	--	6%	12%	5% (5)
	Total No.	1985	47	17	26	17	107
		1987	39	24	32	17	112

Thus overall while 33% of water containers were rated clean in 1985, 22% were rated clean in 1987. Except for Sillu, there were dramatic drops in ratings in all the other villages with Sarabau ranking the lowest. While 29% of water containers were rated clean in 1985, only 6% were rated clean in Sarabau in 1987.

PKK has not yet systematically approached hygiene education. In order to reap the full health benefits of improved and more accessible sources of water, it is essential to make people aware of the importance of proper handling of water.

(k) Cleanliness of Water Dipper

Most people use some sort of container to get the water from the container to drink. However, in some cases, people pour directly from the container into the utensil used for drinking water. In cases where people use some sort of dippers to draw the water, the dipper itself is another potential source of contamination. In some instances the dipper is also used for drinking.

Once again there was an overall decline in rating of cleanliness of water dipper in 1987 compared with 1985 (Table 104). While 32% of water dippers were rated clean and 1% rated very dirty in 1985, 19% were rated clean and 4% were rated very dirty in 1987.

TABLE 104 : CONDITION OF WATER DIPPERS

NO.	CATEGORY		Sillu	Naunu	Takirin	Sarabau	Total
1	Clean	1985	30%	57%	30%	18%	32% (30)
		1987	13%	21%	28%	12%	19% (21)
2	A little dirty	1985	65%	43%	70%	82%	67% (63)
		1987	71%	75%	69%	88%	77% (86)
3	Very dirty	1985	2%	--	--	--	1% (1)
		1987	8%	4%	3%	--	4% (5)
	Total No.	1985	43	14	20	17	94
		1987	39	24	32	17	112

The distribution by village is reported in Table 104.

(1) Cleanliness of the place where the dipper is kept

Although the dipper itself may be clean, if it is improperly stored or left on the floor, it would be yet another source of water contamination. If it was not obvious, people were casually asked where the dipper was kept.

In 1985, there were significant inter village differences which disappeared in 1987. There was an across the board increase in overall cleanliness of places where the dippers were kept. Thus while in 1985, only 2% of the places were rated clean, in 1987 29% of the places where dippers were kept were clean. Additionally while 41% of the placed were rated very dirty in 1985, only 1% were rated very dirty in 1987 (Table 105).

It appears that the general messages of PKK on importance of sweeping and cleaning have made a difference. This is evident in the overall higher ratings in cleanliness of places, indoors and outdoors.

However, it appears that handling of water needs special awareness raising efforts without which water handling habits are unlikely to change.

TABLE 105: CLEANLINESS RATING OF PLACE WHERE WATER DIPPER IS STORED

NO.	RATING		SILLU	NAUNU	TAI IRIN	SARABAU	TOTAL
1.	Clean	1985	2%	7%	--	--	2% (2)
		1987	31%	42%	22%	24%	29% (33)
2.	Little dirty	1985	55%	57%	30%	94%	57% (53)
		1987	69%	58%	75%	76%	69% (78)
3.	Very dirty	1985	43%	36%	70%	6%	41% (38)
		1987	--	--	3%	--	1% (1)
Total No.		1985	42	14	20	17	93
		1987	39	24	32	17	112

(m) Cleanliness of the yard

All the household yards were also rated for overall cleanliness on a three point scale ranging from clean to very dirty (rubbish and faecal waste). The faecal waste was animal droppings and was occasionally children's faeces.

In keeping with the trend of greater cleanliness in 1987, no yards were rated very dirty filled with rubbish and with some faecal matter (Table 106). There were no significant differences by village.

TABLE 106 : CLEANLINESS OF THE YARD

No.	CATEGORY	1985		1987	
		%	NO.	%	NO.
1	Clean	24%	26	26%	29
2	A little rubbish	69%	73	74%	83
3	Rubbish, faeces	7%	7	--	
	Total	100%	106	100%	112

(n) Presence of animals in homes

Many households have chickens, dogs and cats in the house and occasionally pigs. In 1985, overall 8% of households were observed to have animals wandering through the house. In 1987, 26% of households were observed to have animals inside the house. Once again there were no significant differences by village.

This finding does not necessarily mean that people who earlier had animals outdoors now let the animals wander through the house. The finding needs to be interpreted together with the

finding of greater presence of animals around the house especially in the Belu villages.

9. Analyses of relationships between hygiene indices and other variables

The relationship between certain key variables such as schooling, village, etc. and the hygiene indices were examined in 1985. These relationships were not reexamined in 1987 since the socioeconomic and demographic questions were not reasked. However five key findings from the baseline study will be repeated for ease of reference.

(a) Schooling

The relationships between the hygiene indices and whether the women interviewed had been to school or not, were examined in 1985. There were no statistically significant relationships between any of the hygiene indices and school attendance except with the water hygiene index F (d.f.8,50) = 1.9* which was significant i.e. those households in which women had been to school had better water hygiene than those households with women who had no schooling.

When the relationship between the indices and number of years of schooling was examined, only the water hygiene index approached signifcance at the .06 level F (d.f.8,50) = 1.97.

There were no relationships between any of the hygiene indices and literacy.

Thus, it appears that women who have some formal schooling have better water hygiene practices than women with no schooling. However, the number of years of schooling seems to be less important than the fact of having been to school or not.

(b) Total number of young children

It is an uncontestable fact, that a home is more difficult to keep clean if there are many young children in the house. For the purpose of this study very young children were defined as those below 5 years of age.

Young children are not only good mess makers but they may also be water polluters! Hence, an exploratory analysis was done examining the effect of demographic composition of the household with the hygiene indices.

Very strong, significant relationships were found between the number of very young children in the household and the household hygiene indices.

(1) Kitchen hygiene

F (d.f.3,83) = 3.72**. Group means scores on kitchen hygiene index were as follows:

-- 0 children 9.94
-- 1 child 9.75
-- 2 children 12.14
-- 3 children 12.33

There is an inverse relationship between cleanliness in the kitchen and number of young children in the house i.e. the kitchen is cleaner when there are no children or only one very young child, rather than when there are two or more very young children. Any parent knows this to be true!

(2) Water hygiene

The specific hypothesis that very young children are likely to cause water contamination, if the water is kept within their reach was also borne out by the data.

There was a significant relationship between the presence of very young children and water cleanliness F (d.f.3,85) = 2.86*. The water hygiene mean scores by number of children was as follows :

0 children 9.35
1 child 9.38
2 children 10.53
3 children 11.00

Thus, once again there is an inverse relationship between number of very young children in the house and water cleanliness/ hygiene. In other words, households which have no children or one child below 5 years of age have better water hygiene than households in which there are 2 or 3 children below 5 years of age.

What this means is, that to preserve the quality of water within the household, families have to protect their drinking water from the grubby little hands of very young children!!

Although the "general hygiene" did not correlate well with either of the other sub indices or the overall household hygiene index, as far as very young children were concerned, however, the relationship was significant F (d.f.3,95) = 3.34*.

(3) Overall Household Hygiene

There was a highly significant relationship between the presence of very young children in the household and overall household hygiene F (d.f.3,72) = 4.74**. The overall mean scores by number of very young children was as follows:

0 children	21.9
1 child	22.1
2 children	26.3
3 children	26.0

Once again, a family is likely to score significantly better on overall household hygiene if there are no children or only 1 very young child present in the house than when there are two or three children below 5 years of age.

(c) Children, between 5 and 9 years of age

The relationship between presence of children in the house and hygiene, especially as related to the kitchen and water is logical. While the relationship between the presence of very young children and hygiene was significantly negative, the relationship between older childen (5-9 years) was negative, though not statistically significant.

Thus, the trend of the relationship established with very young children, was apparent, but not strong. The F values between the sub indices and presence of children between the ages of 5 and 9 years were as follows:

Kitchen hygiene,	children 5 -9 years	F 3.83 = 1.81, sig 0.15
Water hygiene,	children 5 - 9 years	F 3.83 = 1.92, sig 0.13
General hygiene,	children 5 - 9 years	F 3.93 = 3.20, sig 0.02
Household hygiene,	children 5 - 9 years	F 3.72 = 2.09, sig 0.11

(d) Children, between 10 and 14 years of age

As children get older, at least in terms of household work, they become an asset rather than a liability. Instead of creating a mess, they are helpers in cleaning up messes and often ease the mother's household burden. This is especially true if the children are female.

One would expect, then, that with the presence of older children, the relationship reverses i.e. with no older children to help, the household is more difficult to keep clean than if there are one or two older children. The relationship would, of course, be conditioned by the presence of younger children and other variables at the same time.

If older children are treated in the same way as adults, then the relationship between household hygiene and their presence should disappear. The F value's for the various indices are presented below:

(1) Kitchen hygiene

Older children 10-14 year F (d.f.3,83) = 23.49*. Kitchen hygiene

was worse when there were no older children or 3 older children than when there were one or two older children.

(2) Water hygiene

Older children, F (d.f.3,85) = .27, sig., .84

(3) General hygiene

Older children, F (d.f.3,95) = .46, sig., .71

(4) Household hygiene

Older children F (d.f.3,72) = 1.83 sig., .14

Thus, in most cases, with the exception of kitchen hygiene, the relationship between presence of children and household hygiene disappears.

When the data were examined for the relationships between presence of adult women and men and hygiene, there were no significant relationships between the two.

(e) Other Variables

(1) PKK Membership

Certain women in the villages considered themselves as belonging to PKK, while others did not. Since PKK members are more active and often take the leadership role in implementing PKK activities, it is likely that they are more knowledgable than those women who are not PKK members. If they are involved in health-related activities, eventually their homes should reflect better health-related practices.

This was not found to be true for the various hygiene measures. There were no significant differences in any of the hygiene related indices between the households of women belonging to PKK (membership self defined) and those not belonging to PKK in 1985.

(2) Radio Ownership

There was a significant relationship between radio ownership and the total household hygiene index F (d.f.1,74) = 4.15*. The relationship between radio ownership and kitchen hygiene was also significant F (d.f.1,85) = 7.2**.

Radio ownership is not a perfect indicator of exposure to radio messages. However, radio owners tended to have better household hygiene, especially as related to the kitchen, than non radio owners.

10. Health

(a) Parent's Perception of Children's Health

During the household interviews, parents were asked to rate their children's health in comparison to the health of other children in the community. Since there was only one question on health, responses should be considered an indication of trends rather precise indications.

TABLE 107: PARENT'S RATINGS OF CHILDREN'S HEALTH

No.	Rating of Health	1985 %	1985 NO.	1987 %	1987 NO.
1	More healthy	11%	26	20%	45
2	Same	53%	122	42%	94
3	Less healthy	27%	63	35%	79
4	Other	9%	20	3%	7
	Total	100%	231	100%	225

In 1987, respondents were more likely to rate their children as more healthy or less healthy rather than the same as other children (Table 107). In both years there were significant differences by village (Table 108).

TABLE 108: CHILDREN'S HEALTH BY VILLAGE

NO.	CATEGORY	SILLU 1985	SILLU 1987	NAUNU 1985	NAUNU 1987	TAKIRIN 1985	TAKIRIN 1987	SARABAU 1985	SARABAU 1987
1	More healthy	10%	30%	15%	17%	14%	15%	3%	11%
2	Same	64%	38%	60%	52%	53%	50%	9%	42%
3	Less healthy	18%	30%	13%	31%	23%	33%	85%	35%
4	Other	8%	2%	12%	--	10%	2%	3%	3%
Total		100%	100%	100%	100%	100%	100%	100%	100%
Total No.		89	77	53	52	57	60	32	36

The most dramatic differences were in Sarabau, which in 1985 was the most isolated village and had the least contact with the Puskesmas. In 1985, 85% of parents in Sarabau rated their children as less healthy than other children. In 1987, only 35% rated their children less healthy than other children. This finding is difficult to interpret in isolation.

Some indications may be found in reasons for ratings given by parents. Hence the sheer difference in numbers of parents being able to articulate reasons for their ratings may be more important than the distribution of reasons themselves.

(1) Why are some children more healthy?

In 1985, 23 parents were able to give reasons for their children's better health. In 1987, this number had increased to 137 parents and 183 reasons. The distribution of responses is reported in Table 109. In 1987, some parents gave more than one reason for their rating.

TABLE 109: REASONS FOR RATING CHILDREN MORE HEALTHY *

NO.	CATEGORY	1985 %	1985 NO.	1987 %	1987 NO.
1	Give good, nutritious food	26%	6	53%	72
2	Mother guarantees health care	26%	5	33%	45
3	Cleanliness is guaranteed	17%	4	26%	36
4	Give enough food regularly	13%	3	15%	21
5	Child is more resistant	9%	2	1%	1
6	Child is fatter	9%	2	4%	5
7	Other	--	-	2%	3
	Total No. of Responses		23		183
	Total No. of People		23		187

* Percent distribution of people

Among those who rated their children as more healthy (23 in 1985 and 137 in 1987) a quarter in 1985 and more than half in 1987 said that their children received good, nutritious food. Increased proportion of parents also gave credit to mothers saying that mothers through their care and efforts guaranteed care and cleanliness which led to better health.

Given the increased level of PKK activity in the villages, it is possible that parents are not only more aware of their children's health but the health of some children actually improved. However, with limited data it is difficult to draw any conclusions with confidence. What is clear is that people have greater ability to articulate their ratings of their children's health.

(2) Why Are Some Children Less Healthy?

In 1985, 49 parents explained their perception of their children's poorer health. In 1987, 75 people gave 100 reasons for their ratings. Once again, this dramatic increase probably reflects people's greater knowledge about children's health rather than an actual decline in the health of some children.

It is important to note that despite the increase in absolute numbers, while 33% of parents mentioned lack of sufficient food as a reason in 1985, only 24% did so in 1987 (Table 110).

TABLE 110: REASONS FOR RATING CHILDREN LESS HEALTHY

No.	Reason	1985		1987	
		%	NO.	%	NO.
1	Lacks nutritious food	49%	24	28%	20
2	Not enough food	33%	16	24%	17
3	Bodies not clean	8%	4	26%	19
4	Does not eat	4%	2	3%	2
5	Change in weather	2%	1	11%	8
6	Food given not appropriate for children	2%	1	6%	4
7	Water not clean	2%	1	3%	2
8	Sickness/fever/cough/cold	-	-	39%	28
	Total No. of Responses	100%	49		100
	Total No. of People		49		75

Two changes were obvious in 1987. While no parent mentioned frequent presence of sickness, disease, fever as a reason for poor health in 1985, 39% of the parents did so in 1987. In addition while 8% mentioned the personal cleanliness (bodies not clean) as a factor, 26% mentioned it in 1987. Other reasons mentioned by larger proportion of parents in 1987 were: changes in weather and food given not appropriate for children.

Change in weather, especially change brought about by winds is commonly heard as a explanation for sickenss in Timor, even in the towns (Masuk Angin).

Thus it appears that despite a drought the health of children in the study villages may not have deteriorated and that if it has deteroriated it is not because of food scarcities. It appears that parents were more aware of children's health in 1987 than in 1985. This increased awareness may be treated to continuation and strengthening of PKK health related activities, some of which were carried out in conjunction with personnel from the health clinics.

Conclusion

The household hygiene index used in 1985 was repeated in 1987. Despite the fact that health education has not been systematically implemented as part of WAS, there were consistent increases in cleanliness ratings. These included cleanliness of yards, kitchen floors and places where water dippers were stored.

In addition, although there was an overall improvement in storage of food, the condition of stored water was either the same or sorse. Similarly, more drinking water containers were within reach of young children in 1987 than in 1985 which is probably also indicative of worsening quality of water within homes.

Thus unless PHP specifically addresses the issue of proper handling of water, water within the households will probably continue to be contaminated.

CHAPTER 12

SUMMARY AND CONCLUSIONS

At the time of the second round of field data collection in August/September 1987, WAS activities in NTT had been in operation for a little over one and a half years. WAS activities still continue.

Despite the fact that one and a half years (one year at the village level) is an extremely short period of time to bring about change, WAS activities have clearly achieved their objectives and thus have important lessons for those desiring to bring about change in water situations in scattered rural communities in Timor.

The three major objectives of the overall "Women, Water and Sanitation" (Indonesian equivalent WAS, Wanita, Air dan Sanitasi) programme implemented by PMK were:

1) To increase access to and utilization of water in four villages in two subdistricts.

2) To increase the participation of women - specifically decision making-related to supply and management of community water.

3) To monitor, record and analyze the process and impact of these activities, in order to learn from this experience.

Let us now turn to three major sets of questions posed by the WAS programme: what is the impact of women on water, what is the impact of water on women, and the "how" question, how can it be done?

Let us first determine if the basic assumptions justifying women's involvement in low cost communal water systems were valid in the four study villages.

1. Was the focus on women justified

The 1985 study clearly established that while women were the primary water collectors and perceived water problems more frequently than men, men were also involved in water collection and concerned about water problems, although to a lesser extent.

Given the cultural context of women's low self esteem, men's low evaluations of women's abilities and the agreement among both sexes that men were household heads and therefore responsible for decision making, WAS focussed on women in its activities, not to the exclusion of men but to ensure that women were not bypassed.

The findings from the 1987 study support the 1985 baseline findings and the basic assumptions that make it imperative to

involve women (and men) in management of low cost water systems in certain cultural contexts.

Thus the study found that:

- women were the primary water carriers.

  55% in 1985, 59% in 1987

- men were less involved than women in water collection, and less involved in 1987 than in 1985

  13% in 1985, 11% in 1987

- women worked in the households and in agricultural and horticultural activities.

- women made more frequent reference to water related problems than men in 1985.

- women expressed greater concern than men about the quality of water: men were more concerned about the distance to water sources both in 1985 and 1987.

Thus the basic assumptions that make it important to include women in design and management of water systems were valid.

2. Impact on water systems

Before examining in detail the extent to which women were involved and the way in which they were involved in WAS activities, let us first examine the issues that are of primary interest to planners and technicians. The three key issues are:

a) were there any positive changes in the water situation:

b) were new or improved water sources being utilized appropriately; and,

c) can the water systems be maintained over the long run?

a) Changes in the water sources

The drinking water situation in the four study villages has changed to differing degrees. The following construction activities have been undertaken and completed directly through WAS in cooperation with water user's groups in the four villages:

6 boreholes
9 spring captures
5 shallow wells, lined, deepened, 2 fitted with handpumps
7 water reservoirs
15 water taps/standposts

Other construction activities have also been undertaken, probably

inspired by the perceived success of WAS both within the same villages by individuals and new groups and in neighboring villages. These include lining of wells, deepening of shallow wells, cleaning of springs and building of spring captures.

b) Utilization of protected sources

In 1985 not a single source that was being utilized was completely protected at the source. The new and protected sources built since 1985 are not within easy access of all the people in the villages. However every household within easy access of new or improved water sources was utilizing these sources. Some households walk past closer traditional sources to utilize water from new sources.

Overall, in 1987, 75% of the sample was using improved water sources some of which were completely protected. Overall, 65% of water sources being used in 1987 were a result of WAS initiated activities while 10% were a result of other activities.

Thus not only had a variety of new water sources been constructed or old sources improved since 1985, but they were also being utilized by 75% of the sample.

c) Was water being appropriately utilized?

In 1987 per capita water consumption had increased from 7.8 litres/day to 9.0 litres/day. The increased water brought to homes was being used in ways that promoted better health and increased income. The most prominant use of increased water brought to the households was for watering of vegetables and plants. However, most vegetable plots were planted near sources and hence were watered directly from source. This increased use of water not carried to the house first did not get reflected in the above figures.

The differences in appearance of the villages in 1987 (a drought year) was dramatic compared to 1985. Villages had more plant life, including vegetables in 1987 despite experiencing drought. In 1987 more water was also being used for bathing, for washing of food and for watering animals around the house.

The importance of vegetable production for home consumption and for sale was evidenced through several other study findings.

However there appeared to be no change in handling of water after water was collected from the source. Water within houses appeared to be handled in ways that would probably contaminate water. PHH has not specifically mounted a "health education" effort or addressed behaviours that affected the quality of water negatively within the house.

d) Can the water systems be maintained?

In brief the answer is yes, water systems can be maintained by

water user's groups with some government assistance in provision of tools, imported spare parts and by further training of community people in undertaking repairs.

However to answer the question satisfactorily, it is important to turn to the mechanisms and processes that brought about the changes in the water situation.

3. How was the change brought about?

WAS activities have been designed and implemented by PKK in close cooperation with people from the four study villages. Despite the drawbacks associated with utilizing a poorly functioning village institution, PKK, WAS has been implemented using PKK volunteers and trainers at all levels and by the placement of two field workers one each in the two study subdistricts.

At the village level, water user's groups which were source specific were formed after soliciting the cooperation, approval and involvement of all village and PKK leaders. WAS's community based approach stressing the importance of women's involvement was explained not only at the village level, but at inter department meetings at the provincial and district levels. This created the environment needed for cooperation with planners and technicians at all administrative levels.

Ultimately, though the change was brought about by PKK through the mechanism of water user's groups which ranged in size from those consisting of 10 households to those consisting of over 70 households.

a) Water User's Groups

Twenty five water user's groups have evolved in the four villages with three more at varying stages of formation. Each group has a female chairperson usually elected by members and a set of officials with varying functions. The groups include men and women. Most groups collect a monthly fee ranging from Rp 100 to Rp 500 per month.

All groups participated actively in construction. In addition, they contributed all local materials and sometimes cement, pipes and taps. Groups have also undertaken repairs and bought spare parts from group funds.

For a community implemented activity, the community's self evaluations are more important than those evaluations conducted by outsiders. If a community initiative is to be sustained over a period of time, a group's perceptions of its own functions, roles, activities and its ability to evaluate itself become very important.

1. Ability to self diagnose

At the time of the fieldwork, August 1987, the functioning of

groups was rated on a three point scale by the groups themselves, by PKK field workers and action teams and by the chief investigator. There was a high degree of agreement between the ratings of all groups.

Forty percent of the groups rated themselves as functioning very effectively. 40% rated themselves average while 20% rated themselves as functioning poorly. All the groups were able to justify their ratings.

2. Perceived reasons for success

When asked why the group had been successful, 67% of the men and women said that the most important reason for success was that people in the communities had cooperated and worked together. Another 10% said that success had been achieved because ordinary community people had worked together with village officials.

Only two people mentioned WAS in any form.

The fact that people felt that they themselves rather than some external body were central to success strongly indicates that

1) PKK workers had indeed played a low profile facilitating role rather than a highly visible and dominating leadership role.

2) Groups do not feel completely dependent on outsiders, and hence given a little more time and experience will continue to function and probably diversify to achieve other goals.

3. Factors, people, institutions in success

When people were asked more pointedly for factors, people, institutions, that were important in the group's success, WAS, PKK and technicians received more credit! However, 79% of the responses still mentioned the "users" or the "people" together with some other factor such as cooperatin with village officials, government or WAS.

This is strong evidence of people's involvement and more importantly efficacy, their belief that they can and did bring about change.

In an environment characterized by goverment initiated activities done for the people, through the village heads, this is a dramatic change.

4. Factors in failure

"Failure" in the context of groups is a strong word. Overall, 23% of those who belonged to groups felt that groups had experienced some failures. Over 50% of the reasons given related to people's inaibility or unwillingness to work together.

However, the rest related to lack of suitable water resources, lack of cooperation from village leaders and broken down water resources, boreholes, that were beyond the capacity of the community to repair.

It is interesting here to point out that one of the boreholes that government technicians had given up on was eventually repaired by the community.

5. Long term maintenance and repairs

Evidence of the water user group's ability and willingness to take responsibility for long term maintenance and repairs comes from several questions, none of which directly addressed the issue of maintenance and repairs.

a) Perceived purpose of water groups

When people were asked what was the purpose of water groups, the most frequently stated purpose of groups related to long term maintenance and repairs, 30%. Altogether 44% of men's responses and 15% of women's responses referred to the group's responsibility for repairs.

b) Who decides about repairs

During group meetings, when members of water groups were asked who decided about repairs, 39% said it was the group, women, members and leaders and ordinary men; 18% said male leaders and 43% said that it was the PKK male field workers. This finding does not contradict other findings because it reflects the pattern in the past, which in turn is related to two factors.

The first is that upto August, 1987 very few village people had been trained in repair work and secondly was the relative absence of tools. PH is currently addressing both these issues.

c) Will water groups be needed in the future?

When individuals were asked if water groups would be needed in the future, surprisingly 97% said yes. Even more impressive was that preventive maintenance was the single most frequently mentioned reason for the continued need for groups, 28%. Additionally, another 24% referred to the continued need for money collection and need to carry out repairs in case of breakdowns.

Thus all evidence indicates that the WAS approach emphasizing group decision making and responsibility for water systems starting with design of systems has resulted in the groups willingness to take responsibility of system maintenance and repairs.

6. Will the groups survive?

More important than past accomplishments of a group, and related to the issue of long term maintenance is the issue of overall survival of groups. Will the groups continue to exist and function in the future?

The indications are that in all probability a majority of the groups will continue to exist and function in the future if they are provided guidance in the immediate future in resolving specific issues currently facing the groups.

There are several reasons why many of the groups will probably continue to function in the long run.

1. Groups have already experienced some success and hence believe in their own efficacy.

2. Groups themselves want to survive because they perceive a need, purpose and function for themselves.

3. Groups have some basic organizational skills for group management.

4. Groups are moving on to stating new goals.

5. The majority of the decisions were made by the group, by individuals men or women, and by female leaders.

6. The groups have the ability to increasingly self diagnose, perceive problems and seek solutions.

7. The formation and functioning of groups was accomplished without alienating or threatening any groups of people or leaders within the communities.

A group of people with the above characteristics are indeed more likely to succeed than fail.

7. Some problems

A few weaknesses and potential problems related to water groups were also discerned. These need to be corrected quickly to ensure that the groups continue to function effectively.

a) Financial Management - Some groups have collected and/or spent upto Rp100,000. However most group leaders and members did not know anything about the group's finances. Money was being kept in homes of treasurers. Nobody understood or trusted banks. The situation is ripe for possible financial mismanagement which was reported in one instance. If the pattern of mistrusting leaders with finances becomes evident in even one group, the groups will fall apart very quickly.

b) Group Management - People love titles, official designations, secretary, vice chairperson I or II, advisor, implementor, etc. However job descriptions or specific functions were forgotten in most cases, resulting in almost everyone perceiving themselves as having essentially the same function although different ranks in the hierarchy.

More effective use needs to be made of people's willingness to take on specific responsibilities within the group. Since groups are fairly large and homes often scattered over large areas, one option may be to divide up the group into clusters of households with different people responsible for collecting money and keeping informed, households within a cluster. Leaders of these clusters would be responsible to the higher group leaders.

c) Ownership and Sanctions - Although groups understand and appreciate the role of the government in making possible the building of "expensive" new sources, people also feel that once construction is complete, they are the managers or owners. Most groups feel the need for sanctions, penalizing non paying users in some way to keep the system of monthly contributions functioning. However some groups are hesitant to impose sanctions because of lack of agreement among them about whether the group has the right to impose sanctions or regulate the use of a government provided asset. The situation needs to be clarified to groups.

d) Repairs - Issues of lack of spare tools and few trained people in repairs needs to be corrected. Once again the role of the government needs to be clarified further so that users do not feel that they have to receive "permission" before they can undertake repairs by themselves. This was especially true for the repair of boreholes. More than one or two people from each group should be trained so that in the long run groups are not dependant on the continued residence and interest of one or two people.

4. The role of women in WAS

The role of women in WAS is difficult to seperate from the role of men. Both men and women were members of PHI action teams although there were more women than men. Both men and women were members of water user's groups. Both men and women contributed uniquely to the achievement of group goals.

However, on the other hand, it is extremely important to stress that without making a strong case for importance of women in decision making, it is unlikely that women would have experienced the opportunities to become meaningfully involved in the management of water systems.

Let us first consider women's involvement in water user groups.

1. Overall, women, 81%, were more aware of the presence of

water groups in their villages than men, 74%.

2. More women, 76%, than men, 62%, perceived themselves as members of groups. More women than men were thus knowledgable about groups.

3. Both women and men perceived women, 47%, to be more active in groups than men, 26%. Overall 27% said that both men and women were equally active.

   Not surprisingly there were strong sex differences in perception. Thus while 55% of women perceived themselves as more active than men, 40% of the men did so. Fifteen percent of the women perceived men as more active while 37% of men rated themselves as more active than women.

4. When asked to justify ratings on which sex was more active in water groups, 57% of the women and 39% of the men stated that women were more active because the group was a women's group and because women were more involved and concerned with the daily task of water collection.

5. In participation in decision making within groups measured on a six point scale, with 1 indicating low involvement and 6 indicating high women's and group involvement, the overall score (for 7 major decisions for all groups) was 2.8. Thus overall 46% of all decisions within groups were made by the group, ordinary female members of the groups and by female leaders.

   Given the cultural context of very little involvement of women in decision making related to village activities, any involvement in decision making is a remarkable achievement.

5. The importance of men in WAS

Women's inclusion in WAS was not achieved at the cost of exclusion or alienation of men. In fact if either women or men had not been involved, the groups would not have functioned effectively.

The inclusion of women and men resulted in the pooling of different perspectives, skills and abilities which made it possible for user's to function effectively as a group. Some examples of these differences in perspectives of men and women are given below all of which are needed to sustain the functioning of groups and take full advantage of new opportunities provided by greater access to water.

a. Purpose of Groups

When asked about the purpose of water groups, men

primarily focused on the responsibility of preventive maintenance and repairs, 44% (women, 15%). Women focused primarily on construction at sources, 21% and need to maintain cleanliness, 18%.

b. Perceived activities of groups

Among men the most frequently mentioned activities were growing of vegetables, 44%, and ensuring cleanliness at source, 22%. Among women, construction activities at sources once again received the most mention, 44%, followed by growing of vegetables, 26%.

c. Awareness of future plans

Significantly fewer women, 58%, than men, 83%, were aware of their group's future plans. Men more than women seemed to set the lead for future activities of the group.

d. What would wo/men share with other people?

When members of groups were asked what they would tell someone wanting to improve their water situation, men and women responded differently. Men would focus primarily on the process involved in formation of groups and the need for money collection, 42%.

Compared to men, women would focus on ways and means of ensuring that drinking water was clean, 38%, and on growing of vegetables, 20%.

From the differences in perspectives of what women and men have learnt from participating in WAS, it is obvious that at least in the context of the study villages WAS activities would be poorer if they were restricted primarily to one sex.

6. Impact on women (and men)

The effect of women and men on the water situation has been dramatic. The effect of the changed water situation and the process of wo/men's involvement in WAS has in turn also had profound influence not only on women but also on men and the communities as a whole.

As with differences in roles of men and women, although men and women were similarly influenced in some ways, there were many differences as well.

a) Is the water situation easier?

Women perceived the water situation to be easier in 1987 compared with 1985, despite the fact that a severe drought was being experienced in Timor in 1986/87. Thus while 18% of all responses of women regarding the most difficult activities referred to

water collection in 1985, 10% did so in 1987.
Although both men and women perceived water collection as an easy task more frequently in 1987 than in 1985, this was more true for men, 13% than women, 6%.

While women mentioned water collection as a family problem the most frequently in 1985, 30%, the frequency of mention declined to 15% in 1987. While men were primarily concerned with money affairs in both years, men expressed water collection as a problem more frequently in 1987 than in 1985. Obviously men's greater awareness of water problems and exposure to improved situations had raised their standards of what was considered easy access to water sources.

b) Utilization of protected sources

The improved water situation is also reflected in the fact that people perceived many more advantages (582 compared to 411 in 1985) than disadvantages (106 compared to 125 in 1985) to their primary source in 1987, compared to 1985. Primary sources were also closer to people's homes. In 1985 45% of the sample had to walk over 1 Km to a water source. By 1987 this percentage had dropped to 14%.

While 36% of the sample used secondary sources of water in 1985, only 21% said that they had secondary sources of water in 1987. This decline was because greater number of primary sources were perennial sources that do not dry up in the dry season.

c) Have women saved time?

In 1987, 89% of all water collection trips observed (2,695) were made by women and children, a slight increase from 1985 (87%).

The average number of water journeys made by a household per day had almsot doubled in 1987 from 2.5 (1985) to 4.2.

More water sources were closer to people's homes.

The average time per journey made by women declined from 41.2 minutes in 1985 to 21.1 minutes in 1987.

Although each trip was shorter, because women made more water collection trips, women spent almost the same amount of time in water collection, 52.8 minutes in 1987 as in 1985, 56.9 minutes per day.

Thus women 'chose' to spend time released by shorter water trips to make more water collection trips and use more water.

The overall per capita water consumption increased from 7.8 to 9 litres/capita. However, this masks the doubling of per capita water consumption in the Belu villages from 4.8 litres/capita in 1985 to 9.6 in 1987.

d) Vegetable gardens flourish

Women appear to be busier than ever. Women have taken advantage of easier access to water by planting vegetables near sources and to a limited extent in home compounds. The tremendous importance of these vegetable production activities can be seen from the fact that no matter what the question, women and men ended up talking about vegetables!

A few examples follow:

1. When asked about "value of women" in 1987, 19% of men (0% of women) mentioned vegetable growing as a valued activity. It was mentioned by only 2% of men in 1985.

2. In 1987, 85% of all women compared to 62% in 1985, said that they produced items for sale. While only 21% of women mentioned selling of vegetables in 1985, 60% mentioned vegetables in 1987. These activities had also increased in importance to women. This is especially significant in a drought year when crop yields were lower than in previous years.

3. When asked about activities of water groups, growing of vegetables was mentioned more frequently, 35%, than construction of water source, 31%.

4. In talking about achievements of water groups, 51% of all responses focused on vegetable growing activities (men, 56%, women, 48%).

5. In talking about future plans, vegetables again featured in 32% of all responses while construction activities featured in 34% of the responses.

6. When people were asked whether they had experienced any changes in their lives, 21% of women's responses and 14% of men's responses focused on vegetable production.

7. As mentioned before, in sharing the WAS experience with other people, women would focus primarily on cleanliness of water, 38% and on possibilities of growing vegetables, 20%.

These findings are important not only in themselves, but in also explaining why such community enthusiasm was generated in improving the water situation when only 10% to 20% of men and women perceived water to be a serious problem in 1985.

It is well known that if a development activity addresses a felt need of a group, a group is more likely to take advantage of what is offered by external agents than otherwise.

The findings seem to indicate that the primary reason why WAS was

able to generate such interest was not because water was perceived to be an acute problem per se but because people perceived the potential of engaging in horticultural activities with easier access to perennial sources of water.

These findings also point out that if a community based approach can be successfully applied in a context where not everyone perceives water to be an acute problem, it will be even more applicable in communities where water is perceived to be a greater problem.

On the other hand, it should also be pointed out that WAS has been least successful in areas where the water problem was not one of quantity or distance but one of quality only. This situation was typified by the difficulties experienced in mobilizing people to capture springs and the even greater difficulties in sustaining interest once construction of these springs was completed.

e) Women's self esteem and confidence

In 1985 women themselves, and men rated women lower than men on intelligence, ability to solve problems, leadership abilities and in the degree to which women were well informed compared to men. In addition both women and men felt that women had more leisure than men.

Even though attitudinal differences are the most difficult to change, overall in 1987 women appeared to be more confident of themselves and men were more willing to credit women with some positive skills and abilities.

f) Women's networks and groups

Women in 1987 reported more opportunities to get together with other women than in 1985. Women in 1987 were beginning to discuss problems with women leaders such as the Ibu Desas and Dusuns which they did not do in 1985.

More importantly, the experience of participating jointly in groups, seems to have brought couples closer together. Thus in 1987, men and especially women were more likely to turn to each other to discuss problems than to seek others.

Thus the influence of participation in groups which are mixed sex, fairly large and new, seems to be to draw couples together and begins to encourage women to support each other.

7. Impact on PKK

PKK was the lead agency in implementing WAS. It intended to use WAS not only to test a community based strategy for communal water systems but also use the experience to strengthen PKK institutionally.

The WAS experience has not only achieved a great degree of success in demonstrating the effectiveness of a community based strategy focusing on women to bring about change in the water situation but it has also resulted in strengthening the institutional capabilities of PH.

This institutional capability has been enriched through training of PH managers and cadres at the provincial, district and subdistrict levels who in turn have facilitated the process of change in PH at the village level. At all levels, WAS served as the medium through which PKK provided leaders and non leaders opportunities to experience efficacy in bringing about change. PH at the village level has also undergone dramatic change.

a) PKK leaders

A key indicator of change in PKK is the emergence of PKK women as leaders. In 1987, 86% of the sample perceived at least one female leader, in 1985 only 39% did so. Ibu Desas, Chair of PKK, were mentioned as leaders by 56% of the women and men, a remarkable change from the 15% of women and 7% of men who perceived her as a leader in 1985.

Even Ibu Dusuns were mentioned by 30% of the sample in 1987 while they were hardly mentioned (5%) in 1985.

When data were analyzed by source, more people who were more directly involved in WAS perceived female leaders, 93%, than the others, 82%. Unlike 1985, when Ibu Desas and dusuns had to turn to their husbands for information, in 1987 Kepala Desas and Dusuns turned to their wives for information about PKK and the water groups.

These changes which occurred in such a short time clearly show that women will exert their leadership effectively if they are:

1) provided opportunities to exert leadership in a supportive environment;

2) if the plan of action addresses a felt need (or is perceived as advantageous) and is concrete and goal oriented, example building and managing of water systems;

3) if together with opportunities women are provided with relevant training;

4) if assistance promised is timely, (materials, technical expertise became available when promised so that the context within which women could exert leadership became a reality; and,

5) if the focus on women is not to the exclusion of men or traditional official and unofficial male leaders.

b) Membership in PKK

Even though PKK action teams kept a low profile in the villages, there was an overall increase in self claimed "membership" in PKK from 16% to 43%. Overall 60% of the women and 25% of the men perceived themselves as belonging to PKK.

More people could describe PKK and its activities appropriately in 1987 than in 1985. Almost every person, 97% (74% in 1985) felt that PKK was doing something that was useful in the villages. No specific mention was made of WAS or water systems although mention of vegetable gardens increased significantly.

These findings clearly indicate that despite problems, PKK at the village level was rejuvenated through WAS. More importantly the findings indicate that this was not achieved at the expense of continuing other PKK activities in the villages or at the expense of growth of other ongoing development activities in the village (indicated by increased membership in other village groups).

The fact that dramatic changes in leadership and in PKK could be achieved in such a short time without creation of short term special structures indicates clearly that given certain conditions, the PKK experience can be replicated.

c) Perceived weaknesses

As is obvious from the results PKK has been extremely effective in implementing WAS. However a few problems were also perceived which need attention.

1) Training that was conducted (two rounds) was extremely effective. However more issues focused training especially at the subdistrict level would have helped in making visits by district and subdistrict teams more effective.

2) Once construction was completed, PKK action teams seem to have lost a sense of purpose which could have been made clearer by more supervisory visits from the provincial level and more goal oriented training example how to identify specific problems affecting each group and work with the group to resolve the problem.

3) While PKK teams were successful in three villages, in the Naunu which was caught up in divisive politics, PKK was less successful. These problems needed greater understanding of and sensitivity of local politics. This was relatively lacking.

8. Are there any spread effects?

The WAS experience and concepts have already spread spontaneously

to some extent. This is evidenced in the emergence of new water groups, in new undertakings by old groups, in villages other than the study villages adopting the WAS approach or expressing an interest in the WAS approach.

At the institutional levels, within PHI, participatory methodologies have been adapted to other PHI programmes and training activities.

Technical and planning agencies have had follow up meetings with PHI to try and distill lessons learnt and to try and institute the WAS approach in relevant contexts.

However, spreading the experience takes time. In order to ensure that the WAS experience is not lost, PHK should concentrate heavily in spreading the experiences gained so far especially at the ministerial levels.

At the village level (both within the same village and in other villages) more extensive use can be made of village people as "experts" in assisting other people, groups in organizing themselves to improve drinking water situations.

9. Can the experience be replicated?

The question of replication is crucial if the experiences gained from WAS activities are going to be harnessed by others dealing with issues relevent to water supply.

Paradoxically, in considering the issue of replication, PHK's approach utilizing existing institutions and structures with all their weaknesses becomes it greatest strength, making the approach replicable.

The WAS experience has shown that involving local communities, women and men in improving water systems in partnership with extension agents (field workers) can work.

Several factors and strategies have played important roles in contributing towards PHK's effectiveness in achieving the basic goals of WAS. These are:

1. Leadership - The community based approach focusing on women would not have had an opportunity to prove itself without the leadership, committment and status of the chairperson of PHK, at the provincial level.

   Her leadership was essential in getting WAS off the ground, in eliciting cooperation with relevent Ministries and departments and in motivating PHK workers especially in the beginning to become enthused about trying out a "new approach". Her philosophy of supportive supervision, openness to hearing about problems and committment to women and families kept WAS on the right track.

However, at the same time, the chairperson of PKK kept a very low profile in day to day functioning of WAS and in field activities to allow PKK personnel at all levels to learn and to grow, and to avoid creating a "special" situation that would have resulted by her visiting WAS villages or by being more visibly involved in WAS. It is this judicious use of leadership that created the environment within which WAS could be implemented by PKK without the creation of artificial structures (units) that could not be sustained in the long run.

Thus leadership at the highest levels, especially in small innovative projects is a key not only in giving an approach/strategy a chance to prove itself but more importantly in being noticed by relevant policy makers.

2. Role of applied research- There is more to stimulating wo/men's involvement in community projects than assigning a women's organization or what is sometimes perceived to be a women's organization to be the implementor.

One of the key factors which assisted PKK in finalizing its strategies and provided the content for training activities was applied research (information collection) conducted just prior to implementation.

However the reason the research was useful was that research findings both that reflected well and poorly on PKK or on government created institutions were utilized constructively in innumerable ways.

3. Utilization of existing institutions - Findings from the baseline study about PKK and PKK leadership at the village level were dismal. Rather than taking the easy way out and bypassing PKK, PKK even at the village level was given the overall responsibility of WAS. However awareness of existing weaknesses enabled PKK to plan strategies including training to eliminate perceived weaknesses.

4. Training - The strategy of using PKK personnel and structures to implement WAS worked because of selective training of selected personnel, both in participatory methods and in hardware skills.

This combination of skills was crucial in ensuring that: 1) involvement of community people went beyond lip service and was translated to a greater extent into practice; and 2) PKK field workers were not completely dependent on distant technicians from the Ministry of Health.

However the key was training in participatory methods, skills in communication and instilling a belief that village people do have skills and resources that can be released.

For example, PH field workers had previous training in low cost water technologies. However, the training in working in "partnership with people" made it possible for them to eventually utilize their hardware skills.

5. Project vs. activity - When agency personnel and community people have had extensive exposure to "projects" they often develop a "short term mentality" which can be typified by four assumptions: 1) the project has a finite life time with a definite starting and ending date; 2) the project has special, almost infinite resources; 3) the project has specialized, short term, highly qualified or highly placed official personnel; and 4) success is measured by "number counts" (number of trees planted, kilometers of road built, number of wells dug or toilets built, etc).

Avoiding a project mentality was crucial to WAS. PHK sent a strong signal of its committment to the participatory approach by avoiding the use of the word "project" and instead used the term "activities" (kegiatan). Although it may appear to be a play in semantics, it had the desired effect on all concerned, not only within PHK but also at the village level.

A village head from a study village made the distinction between "activity" and "project" with reference to WAS at an inter village meeting of village heads. To him the difference translated to people's participation, limited money and continuation of activity even after WAS workers stopped coming to the village.

6. Interdepartment cooperation - When community organizing is the responsibility of one agency and the hardware the responsibility of another; when the hardware agency has been implementing water systems for years and the new agency responsible for community preparation and implementation of water systems has no previous experience with hardware, the situation is ripe for inter agency problems.

Much time was spent from the beginning by the chairperson of PHK in creating an environment of cooperation and "suspended judgement" among the relevant ministries at the provincial level.

Thus meetings with heads of departments, followed by information sharing throughout WAS, ensured cooperation and assistance from various Ministries as and when needed. An atmosphere of receptivity to suggestions was created by PHK sharing its strengths and weaknesses as well as successes and failures. PH actively avoided conveying the message that it perceived itself as "the water experts".

7. Monitoring - WAS did not come into being with a blueprint. It did have goals and steps that would have to be taken to achieve the goals. The form, the timing and number of

substeps that would need to be taken were not predetermined.

In implementing such an approach monitoring becomes important. All PHI action teams and field workers were responsible for monitoring activites and for taking appropriate action including bringing it to the notice of the Chair of PHI at the provincial level.

Dr. Nafsiah Mboi overcame the problem of busy schedules by creating "Martha" a book for responding in writing to any queries about WAS from WAS workers at any level. Any WAS worker desiring to communicate with Dr. Mboi about WAS could and did write in the book and got a response/reaction/decision within 24 hours!

8. Indicators of success - Number of water systems built or improved or number of people trained were not the only or primary indicators of success or targets achieved. Progress in the field was evaluated by the degree to which community involvement especially that of women had been generated in undertaking the building and management of water systems.

Thus achievements at the village level were gauged not only by number of groups organized but by who was involved in decisions, how many groups were functioning effectively, gathering local materials, collecting cash contributions, and solving their own problems.

This nexus between stated goals, the process being as important or more important than the building of water systems was crucial in convincing PHI action teams about the importance of working with people in ensuring that long term responsibilities for water systems would be taken over by the communities.

It also allowed PHI field workers to stick to the basic tenets of the WAS approach, working in partnership with communities. Thus when communities did not care to show their interest or committment by raising agreed upon quantities of materials or cash, it allowed PHI field workers to walk away rather than going ahead any way and coordinating technical assistance.

It is because of this ability to go away and come back when the community is ready, that a group in Sillu which took over a year to organize itself, eventually emerged as one of the strongest groups. The group built a spring capture and aspires to collect funds to install a pump and pipes from the spring (which is located lower than most households) to people's homes.

Conclusion

WAS has been extremely successful in demonstrating that a

comunity based strategy focusing on women can have a positive impact on water systems, on women, men, and communities and also result in the strengthening of the institutional capabilities of the implementing organization.

The WAS approach is relicable because it utilized personnel within the institution. However the approach was successful because personnel were carefully trained in key skills and immersed in the main issues facing managers, trainers and implementors of communal water systems.

Not everything went right, smoothly or well. Some village leaders were not cooperative, some PHT cadres, workers lost interest or proved to be too busy, some training activities could not be held, the rains came too early or too late... However if despite the problems, successes could be achieved, as experience accumulates, community based strategies for communal water systems, can be more efficiently applied on a larger scale, if there is a will.

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