Evaluation of the

"COMMUNITY - MANAGED ACTIVITIES" COMPONENT

Of the AusAID Supported

NTB ESWS Project

By the

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Evaluation of the "COMMUNITY-MANAGED ACTIVITIES" Component Environmental, Sanitation & Water Supply Project, Nusa Tenggara Barat

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ACRONYMS, ABBREVIATIONS & INDONESIAN TERMS

AusAID	Australian Agency for International Development
BANGDA	Directorate General of Regional Development within Ministry of Home Affairs
BANGDES	Directorate General of Village Development within Ministry of Home Affairs
BAPPEDA	Regional Development Planning Board
BAPPENAS	National Development Planning Board
Bupati	Head of District Level Administration
CARE	Cooperative for American Relief Everywhere (International NGO)
CF	Community Facilitator
CF – TO	Community Facilitator – Technical Officer
Cipta Karya	Directorate General of Human Settlements (within the Ministry of Public Works)
DEPKES	Ministry of Health
Desa	Village
DG	Directorate General
DIKES	Dinas Kesehatan
Dinas	Provincial or Kabupaten Level Technical Department
Dusun	Hamlet
ES	Environmental Sanitation
ES & WS	Environmental Sanitation & Water Supply
GFS/GPS	Gravity Fed / Gravity Piped System
GOA	Government of Australia
GOI	Government of Indonesia
IKK	Ibu Kota Kecamatan (Capital City of a Kecamatan)
Kabupaten	District – second level of government
Kecamatan	Sub-District – third level of government
Kepala Desa	Village Administrative Head (Formal Leader)
Kepala Dusun	Head of Sub-Village zone or Hamlet
LKMD	Village Councill (Lembaga Ketahanan Masyarakat Desa)
MCK	Public washing, bathing toilet facility
NGO	Non Government Organization
NTB	Nusa Tenggara Barat
O+M	Operation and Maintenance
P3AB	Proyek Penyediaan dan Pengelolaan Air Bersih (formerly PPSAB)
P3P	Proyek Peningkatan Prasarana Pemukiman (formerly P3AB)
PDAM	Autonomous Water Enterprise (owned by second elvel of government)
PHAST	Participatory Hygiene and Sanitation Transformation
PKK	Family Welfare Movement, run by Community (women) all over Indonesia (Pembinaan Kesejahteraan Keluarga)
POKMAIR	Kelompok Pemakai Air – Water Users' Group
POKTAN	Kelompok kegiatan – acitivy group
PPSAB	Proyek Peningkatan Sarana Air Bersih
PRA	Participatory Rural Appraisal

PU	Ministry of Public Works
Relawan	Male volunteer in village
Relawati	Female volunteer in village
Repelita	Government's 5 Year Plan
RWSG-EAP	Regional Water and Sanitation Group for East Asioa and Pacific
RWSS	Rural Water Supply and Sanitation
Tingkat	Level of Government, Level 1 for province, Level II for kabupaten and or kotamadya
TO	Technical Officer
TPL	Indonesian abbreviation for Community Facilitator
WS	Water Supply
WSS	Water Supply & Sanitation

EXECUTIVE SUMMARY

Over the last few years of the current millennium a global consensus has emerged on the principles to guide the provision of community water supply and sanitation services. International policies now call for treating water as an economic as well as social good, managed at the lowest appropriate level. For Rural Water Supply and Sanitation this implies that the majority of consumers be engaged in selecting, financing, constructing, and managing systems that meet their demands[1] and are therefore considered worth sustaining with their own investments. However, putting demand-responsive principles into practice presents significant challenges for WSS sector institutions, most of which still function through systems and policies designed for the supply-oriented modes of the past.

The AusAID-funded Environmental Sanitation and Water Supply (ESWS) project in Nusa Tenggara Barat (NTB) province of Indonesia field-tested a range of approaches and water supply systems ; the purely community-managed (C-type), purely institutionally managed (A-type) and a combination of the two (B-type). At the time of design and inception of the project (1990-91) there was insufficient information and learning available about the value of demand-responsive approaches for the sustainability of rural water supply and sanitation investments. The concepts of "consumer demand" and "sustainability of service" were not stated explicitly in the project objectives – although they were implied. The ESWS project goal was *"to contribute to improved socio-economic and environmental health conditions in Nusa Tenggara Barat."*. The purpose of the project was *"to provide environmental sanitation and water supply facilities which would be effectively used and focussed on community and kabupaten-based development"*. (Project Completion Report, January 1997)

The project introduced several innovations. It was completed in January 1997. At the initiative of AusAID, an evaluation of the project was carried out during December 1998 – February 1999. As a part of this evaluation, Component 2, *i.e.,* Community-Managed Activities, was assessed using a participatory assessment approach. The results bear valuable lessons about what works, what doesn't and why.

The assessment was designed and carried out by the Regional Water and Sanitation Group for East Asia and Pacific (WSP-EAP) of the global UNDP – World Bank Water and Sanitation Program. Two non-governmental organizations partnered WSP-EAP in the process of field work and synthesis of results. These were: the NTB branch of *LP3ES (Lembaga Penelitian, Pendidikan dan Penerangan Ekonomi dan Sosial)*, and the *P3WK – ITB* (Center for Urban and Regional Development Studies, of the Institute of Technology, Bandung).

In consultation with AusAID a sample of 10 villages was selected, 5 in each of the two islands making up the province *i.e., Lombok* and *Sumbawa*. Five of these villages had piped water systems, of which two were gravity-fed and community managed (C-type piped

[1] Global research evidence has now established that consumer demand *i e*, willingness to pay for services, based on informed choice, is critical to the sustainability of services Worldwide, this realization has focussed attention on demand-responsive approaches (DRA), which constitute a radical departure from the earlier need-based approaches whereby "needs" were assessed without reference to the willingness of potential users to pay.

systems). Three others were pumped piped systems which were expected to represent the B-type combined-management systems, but in reality were found to be more like institutionally managed A-type systems. Five other villages had non-piped community managed (C-type, non-piped) water systems, *i.e.,* dug wells. All had a sanitation component which largely consisted of household latrines. Groups of men and women who used the water and sanitation facilities in the 10 villages constituted the co-evaluators with whom participatory researchers assessed the project process and impact, using a specially designed set of PRA and PHAST activities. A technical assessment of water and sanitation systems in the 10 communities was also carried out simultaneously. Field work was undertaken during December 1998, prior to the visit of the Project Evaluation team from Australia.

For the component "Community Managed Activities" which constituted nearly 70 per cent of the total project budget, the summary conclusions are:

1. The Water Supply component has made a major impact on community quality of life. Clean water is now significantly closer to home, takes little time and energy to collect, and is used in quantities 2-5 times more per day per household than was the case before the project. Users also reported reductions in diarrhea and skin diseases and some indirect economic benefits.

2. Users of piped water systems are highly satisfied with the quality and quantity of water they get and the user tariffs they pay. Piped water is used mainly for domestic purposes *i.e.,* drinking and cooking, and to a lesser extent, for washing and bathing.

3. Dug well users are frequently unsatisfied with quality of the water and in half of the villages surveyed, also with the quantity. They continue to use rivers and springs as supplementary sources, mainly for washing and bathing. Spring and river water are also still used for drinking by a part of the population in these villages. Dug well water is used almost equally for domestic as well as non-domestic purposes *e.g.,* watering animals and irrigating kitchen gardens.

4. The Sanitation component has not been as successful as water supply. Although latrine usage by a section of the population has increased, it has not led to a significant reduction in open defecation practices by the majority. Even those who do use latrines, do so conditionally, *i.e.,* only when at home and if water is available in the latrine throughout the year, without having to carry it in from elsewhere. Women are the most frequent users. Children the least. Overall, 73 per cent of the latrines constructed in the 10 villages are still in use.

5. In villages with piped water, latrine owners think it was a useful investment and 90 – 100 per cent of the constructed latrines are currently in use. Most houses with latrines have house connections of piped water and many have built bathing facilities along with latrines.

6. By contrast, in villages with dug wells most people feel that the latrine is not a useful investment, are not satisfied with the design and only 10 – 36 per cent of the latrines constructed are in use in different villages.

7. Project facilities have benefited the better-off proportionately more than the poorer villagers. This may be due, in part, to the criteria used for:

   a) eligibility for household piped water connections (ability to pay Rp.200,000 – Rp.400,000 to PDAM);
   b) siting of public dug wells (ability to contribute land, willingness and ability to pay workers and provide food during construction); and
   c) deciding the recipients of latrine stimulant packages (availability of private land for latrine construction, willingness to contribute rest of the construction cost).

   Future project designs should incorporate strategies for better targeting of the poorest groups, *e.g.,* priority for facilities in poor neighbourhoods, use of public land rather than private land for public facilities, developing a range of options and costs for water supply and sanitation facilities that allow consumers to choose what they can afford – instead of offering them a single option as at present.

8. Community management comes closest to the scenario envisaged by the ESWS Project design in the case of the C-type piped systems observed *(Sesait* and *Teratak).* These communities were fully involved in establishing the services, although the technology (GPS for water supply, pour-flush toilets for sanitation) and level of service (public taps, household latrines) had been pre-determined by the project. Both communities have well established user committees that raise and manage user fees with transparency, take care of repairs, O&M and have even expanded the system in one case. They have built up a sizeable capital for future replacement or expansion of the system, although the technical capacity to do so may be uncertain.

9. Community management is negligible in the designated "B-type" piped systems observed (*Sakuru, Samili, Empang Atas*) in which communities were not involved in planning and construction. The only feature of community management is a fee-collector for each public hydrant who gathers user fees based on an average calculated every month and pays PDAM for the actual consumption. Savings are kept by him, used for minor repairs at public hydrants and not reported to users. Users are reluctant to contribute for repairs of public hydrants as they are unsure of their ownership of the facilities and their authority to repair PDAM-constructed structures. Household connection holders pay for their consumption directly to PDAM and manage their O&M individually. It is more appropriate to classify these B-types as fully institutionally managed A-type systems.

10. Dug wells (C-type non-piped systems) are being managed not by user groups but by an "owner/manager" who owns the land a well is built on. Users contribute when asked by him for annual repairs or maintenance work. This pattern of management evolved as a natural process in all villages observed, after project-constituted user groups ceased to function following construction.

11. Lack of formal water-use rights and legal ownership of water facilities by dug well users has led to the access of the poorer groups declining with time. Villagers reported a tendency of the "owner/manager" household to gradually convert public dug wells into private property. Having voluntarily provided land and a higher than average contribution (cash and wages/food for workers) for construction, these households have been known to establish private ownership by putting fences around the well and discouraging other users. In several cases, land contributed for the well by a man has been reclaimed by his son following his death .

12. The overall evaluation of project implementation (by Egis Consulting , Australia) reports that community contributions exceeded expected projections in the project design by more than 200 per cent, disproving the myth that rural communities cannot pay for Water Supply and Sanitation services. This was despite the fact that they had little choice of types and levels of services. It is likely that projects using a demand-responsive approach that offers a range of options at varying costs will allow this potential for community cost-sharing to be fully utilized. Greater cost-sharing by communities will allow wider population coverage with limited public sector funds presently available for community water and sanitation.

13. It is important, however, to establish poverty targeting strategies that counteract biases against the poor, and incorporate equitable cost-sharing principles in the project rules that progressively reduce subsidies for higher levels of technology and service. ESWS did not seem to have clear rules regarding subsidies. Communities which received lower levels of technology and services (dug wells) paid higher proportions of construction costs than those that received a higher level of technology and service (piped systems).

14. The manner in which key decisions were made in the project was not conducive to building confidence, capacity and a sense of collective ownership among the majority of the users. Reasons were related to aspects of project design and institutional factors in project implementation. (*See box at the end of this section*)

15. Community management is usually the end product of a consistently carried out empowering process throughout the life of a project. Without adequate information sharing, some choice and adequate voice in decisions, empowerment does not happen. It is unrealistic to expect the communities to sustain and manage the facilities in the long run without external assistance. Already the public facilities which are part of more complex piped systems are showing considerable damage (*Empang Atas* and *Samili*) and community–managed gravity pipe systems are being exploited for unplanned household connections beyond the designed capacity (*Sesait and Teratak*). There has been no technical training for O&M of the relatively complex piped systems. At the end of the project user communities still do not have legal ownership of the facilities and are not aware of the implications regarding time-money-technical capacity requirements of sustaining the systems they have received. It is uncertain whether the users would be willing and/or able to sustain the services, if the implications turn out to be "unaffordable" or "not worth it" at a future date.

Whither Community Empowerment ?

The average beneficiary of the project was a passive recipient of services and arrangements made by outside agencies or the *Kepala Desa*. He or she could exercise no choice and voice in the process. Since the villagers were habituated to the top-down mode of development programs that they had experienced, this project process was accepted as normal. They had also made the prescribed contributions for facilities, regardless of whether it was their choice, due to prevalent social norms of conforming and for lack of alternative services. No attempt was made to provide information to and consult women or involve them in project processes, except for the token inclusion of *PKK* in some village meetings. The overall consequence was that the real managers of water – sanitation - hygiene in the community were not included in project processes, dialogue and decisions. That this might happen was predicted by the 1995 Technical Advisory Group, in view of the lack of a gender strategy in the project and paucity of female Community Facilitators.

Another reason for this state of affairs could be the rather inflexible field work process used in the project, which required Community Facilitators to complete work up to the completion of construction in each community within a limited period of time (one year) before moving on to another village. This allowed no flexibility in planning community level work, afforded little time to develop viable community organizations and build their capacity. Inevitably the facilitators concentrated on fulfilling construction targets, as that was the only criterion they were judged by in the project. This happened at the cost of exclusion of the less powerful, less articulate, less vocal majority, *i.e.*, the poor and also the women. Community Facilitators chose to work with the elite minority that constitutes village leadership, which had the necessary authority to get things implemented quickly.

IMPROVING SUSTAINABILITY: LESSONS LEARNED AND RECOMMENDATIONS

Predicting or measuring the sustainability of community water and sanitation services requires taking into account the entire range of diverse factors that influence it. From research evidence and field experience available to date, the following sets of key indicators have been selected by WSP-EAP, to assess the sustainability of water supply and sanitation systems.

For Water Supply:

A. System Performance – in accordance with design
B. Effective Use
C. Extent of User Demands being met by Water Systems
D. Effective Financing
E. Effective Management
F. Extent of Community Ownership

These are sub- divided into 20 sub-indicators as in *Table ES-1.*

For Sanitation *(household latrines only in this case):*

A. System Performance – in accordance with design
B. Effective Use
C. Extent of User Demands being met by Sanitation Facility
D. Effective Financing
E. Effective Management

These are sub- divided into 12 sub-indicators as in *Table ES-2.*

(Methods to quantify Sustainability sub-indicators have been developed and are being applied in larger sample studies for statistical consolidation and hypotheses testing. In view of the small sample and the qualitative focus of the present study it was not considered relevant to proceed beyond the nominal classifications in Tables ES-1 and ES-2. The analysis following the tables examines the differences among the categories and tries to identify the cause/s of those differences, rather than measuring extent).

Table ES-1

SUSTAINABILITY MONITORING INDICATORS	TYPES OF WATER SUPPLY SYSTEMS STUDIED		
	C-TYPE PIPED (GFS)	B-TYPE PIPED (PUMPED)	C-TYPE NON-PIPED (DUGWELLS)
A. *SYSTEM PERFORMANCE AS DESIGNED*			
▫ Functioning/delivering water as per Design	***NO*** – Original public taps based design modified by up to half the users for unofficial house connections	***YES*** - For house connections ***PARTLY*** – For public hydrants which are in poor physical condition	***PARTLY*** – Seasonal fluctuations in quality and quantity
▫ Design appropriate in technical Terms	***NOT*** – for the present pattern of usage ***YES*** - for the original design	***YES*** – Mostly	***YES*** – Mostly
▫ Quality of construction and materials adequate for design	***NOT*** - for the present patterns of usage ***YES*** - for the original design	***YES*** - For house connections ***NO*** – For public hydrants mostly	***YES***
B. EFFECTIVE USE			
▫ Change in water use for better health	***YES***	***YES***	***NO*** – appreciable qualitative change
▫ A sufficient majority of all classes have access (Rich/Poor/middle economic classes)	***YES***	***NO*** – Bias against poor	***PARTLY*** – Biased towards Rich Access of poor reduces with time (see conclusion 11 in Summary)
▫ Environmentally sound usage of Facility	***YES***	***PARTLY*** – Waste water not well managed at public hydrants	***NO*** – Mostly Waste water around wells Locations have high pollution risk in many places
C. SERVICE MEETING USERS' DEMANDS			
▫ Demands for level of service being met	***YES*** – Partly More applications for house connections pending	***YES***	***YES*** - Partly
▫ Demands for quality, quantity, regularity of Water Supply being met	***YES*** – Quantity + quality ***YES*** – Partly for regularity. Long queues at public taps	***YES- Quality & quantity*** ***YES*** – Partly for regularity. Water sometimes available only at night in dry season	***NO – Problems*** with quality + quantity of water reported frequently
D. EFFECTIVE FINANCING			
▫ User fees cover full cost of O&M	***YES***	***YES***	***YES*** – (annual contribution for cleaning, repair, etc)
▫ Users co-financed construction	***YES***	***Minimally.*** *In 1 out of 5 cases, not at all.*	***YES***
▫ Users building up capital for repairs, expansion, replacement	***YES***	***NO***	***NO***
▫ Universality and timelines of user payments	***YES***	***YES*** – Mostly	***YES*** – Mostly
E. EFFECTIVE MANAGEMENT			
▫ Organized community structures for management at Water facility levels and village level	***YES***	***Minimal*** – Only for public facility	***NO*** – An individual assumes "managership"
▫ **Organized community structures have adequate representation of Rich and Poor, Men and Women**	***NO*** - Male only Members mostly non-poor	***NO*** – Male only	***NO*** – Individual ; male landowner, rich
▫ **Technical capacity to operate and maintain at designed level of system performance**	**Partly and inadequately.** Moreover O&M is not happening as per design	***Minimal*** – No training of operators	***YES*** – Know how traditionally exists at village level
▫ Ability to make repairs (technical + financial + spare parts availability)	***YES*** – Evidence of repairs made available	***NO*** – (could be due to lack of authority)	***YES*** – Same as above
▫ Transparent rules, regulations, sanctions for operation + usage	***YES***	***NO***	***NO*** – Has led to misuse by "owner/manager" in many cases
F. COMMUNITY OWNERSHIP			
▫ **Formal proof of collective community ownership of facilities**	***NO*** – But informal understanding to the effect	***NO***	***NO*** – Has led to public dug well becoming private property at times
▫ **Formal authority of community bodies for O&M, repairs, expansions**	***NO*** – But informal authority exists and has been used	***NO*** – Communities hesitant to act, consider the facility to belong to Government	***NO*** – But informal community understanding to the effect exists

Sustainability Implications by Water Supply System Type

Table ES-1 compares the relative sustainability of the three types of water supply systems, as explained below.

C-type Piped Systems: (Sesait, Teratak) These systems scored higher than dug wells and "B-type" piped systems on most aspects of sustainability, *i.e., Effective Use, Meeting Users' Demands, Effective Financing* and *Effective Management* (one exception being the sub-indicator *Technical Capacity for O&M*). *Community Ownership* too is fairly high, although there is no formal, legal proof of ownership. The principal threat to the sustainability of these systems lies in the area "*System Performance as Designed*". These systems were planned as branched networks of public taps. However, users are inserting private hoses and pipes into public tap lines for household connections because that is their desired level of service. 37 % and 49 % of users have done this in the two villages observed. More applications for house connections are pending with the Water Users' Association. House connections only require the users to pay nominally higher user fees per month. No investment cost is necessary except for rubber hoses. Such uncontrolled modification of the system is a serious threat to sustainability. The original water source is a mountain spring. Because supply was dwindling in the original system, villagers in *Sesait* have tapped another available spring by themselves and connected it to their distribution system. The surveyors further discovered that a second village *(Danyang)* that received a similar ESWS piped system source from the same spring, has run dry only 3 months after construction, thus wasting the investment. Researchers were told that this was the result of *Sesait* residents cutting off the supply to *Danyang* from the spring located within *Sesait,* when supplies could not keep up with demands in *Sesait.* Technical observers also found O&M practices inadequate, probably due to a lack of O&M training of community level operators.

The findings suggest the following lessons for improving the sustainability of C-type piped systems :

a) Engineering designs need to be based on proper assessment of community demand for the preferred level of service and type of technology.

b) The assessed demand should be used to project future demand and assess feasibility/ capacity of the primary source of water accordingly. Designs should assume that 90 – 100 per cent of users will eventually want house connections.

c) Costs to users for different levels of service should be worked out by implementing agency personnel (*e.g.,* Public Works, PDAM, Technical officers of Projects) in consultation with communities, at levels that make it difficult to exploit the primary source in an unsustainable manners, e.g. making house connections proportionately much more expensive than public taps, deciding user tariffs with communities in proportion to the ratio of user households to each public tap etc. This is integral to helping communities make "informed choices" regarding their water resources.

d) To assess demand accurately, it is essential to communicate directly with the larger community of potential users, both poor and non-poor. Community leaders/ representatives often do not represent the interests and the voice of the poor, who are the majority.

e) It is also imperative to assess demand directly with both women and men. ESWS project facilitators were unable to involve women in the process for various reasons, which should be addressed in future projects, as women are the real managers of water and hygiene in almost every household.

f) It is necessary to ensure that, i) technical requirements of O&M are discussed with communities before systems are designed and constructed, ii) communities receive relevant training in O&M, and iii) have access to technical support to operate and maintain the systems for aspects that cannot be covered through training. This is yet another aspect of helping communities make "informed choices" *re.* technologies and scales of systems that are feasible for them to operate and maintain .

"B-type" Piped Systems: (Sakuru, Samili, Empang Atas) These systems scored well in terms of "*System performance as designed*"(although the public hydrants in the systems were in poor physical condition) and "*Services meeting users' demands*". They also scored moderately well in terms of "*Effective use*". The threat to their sustainability comes from the poor management of the public facilities by the community, low feelings of community ownership and lack of training of community members operating and managing the systems. The exclusion of the community from the process of planning and construction of the systems by PDAM has created a public impression that the systems are PDAM's property and the villagers are not authorized to make repairs/modifications, and so forth. Thus maintenance of public facilities is poor and no funds are gathered for repairs. House connections were chosen by the richer villagers who could afford the individual investments of Rp.200,000 – Rp.400,000 each. They feel they own their part of the system and take care of repairs needed individually. Public facility users were required to pay little or nothing for construction.

For improving the sustainability of "B-type" systems the emerging lessons are:

a) Community management is the end product of a process of community involvement in planning and construction of the system, which includes, firstly, a degree of choice-making by people for the kind of services they want and choose to pay for. In addition, before construction happens, operation and maintenance requirements must be discussed and agreed between water supply agencies (PDAM in this case) and user communities, and relevant training provided for community operators. Finally, communities need formal, legal proof of ownership of the system and need to understand clearly how responsibility is to be shared between them and the agency, for repairs, replacements, expansion, etc.

b) The manner in which the designated "B-type" systems were designed and built by PDAMs suggests that the PDAMs concerned did not really understand the pre-

requisites of community management. They made all the key decisions about design and construction of services unilaterally, offered no training for O&M and did not formally hand-over the facilities to the community. In future projects, time and resources need to be allocated for improving institutional understanding of how and what they need to do in order to foster community involvement, capacity and ownership.

c) The process needs to ensure that it targets and fully involves the poor and the rich, men and women in planning, choice-making, implementation and management. Systems that serve only the rich minority and take no account of women's preferences are not responding to the majority of users' demands, and therefore are less likely to be sustained by them

C-type Non-Piped Systems (Dug wells in Banggo, Lape, Kayangan, Lenek Lauq, Tebaban): These systems scored moderately on most sustainability indicators, poorly in terms of "*Effective use*" and well in terms of "*Effective financing*" since cost-sharing for construction as well as O&M were high. Risks to sustainability of service from dug wells seem to be social as well as physical. Because the criteria for siting dug wells favored the economically better-off, the poorest households gained less-than-equitable access to begin with. Thereafter, due to the lack of legal proof of collective ownership, poor users were sometimes deprived of access by the owner of the land on which the well is sited.

Wide variations were observed in the design of wells, which influenced patterns of usage and user satisfaction. Some wells were constructed by contractors and others by communities – without specified designs.

Quality of well water was often unsatisfactory due to:

i) Poor wastewater management around wells
ii) Sites being too close to polluted rivers/canals/latrines
iii) Lack of water quality monitoring and treatment.

Quantity of water was also frequently open to seasonal fluctuations.
All of these factors lower the scores for "*Effective use*" and "*Service meeting user demands*"

Lessons for Improving the sustainability of water supply from dugwells for the majority of the users are:

a) Public ownership of each dugwell needs to be formally established. Every household contributing to construction should receive legal proof of shared ownership and rights to operate/maintain the well for the agreed period of time. This can be done even with existing dug wells.

b) Before construction, user groups should be helped to understand the causes of pollution of wells and preventive measures needed to preserve water quality, *e.g.*, safe distance from sources of pollution, waste water management, periodic water treatment.

c) The criteria for siting dugwells should be re-examined to reduce biases towards the land-owning, richer households. Public land or land collectively contributed by groups of poor households should be given priority in siting, to improve the access of the poor.

d) User preferences about design should be catered to by developing a range of optional designs and costs, *e.g.*, diameter, type of lining, types of protective structures and ancillary facilities. Potential user groups should be helped to choose the design (and cost) that best meets their demands. They should then be able to supervise construction in keeping with the chosen design and pay any contractors employed themselves. There is evidence that communities have/can easily acquire technical capacity to accomplish this in Indonesia.

Sustainability of Household Latrines

The sustainability of household latrines in ESWS Project is closely linked to the ready availability of water at household level, since the technology used is water intensive, *i.e.*, pour-flush type with single/twin pits, with or without pit lining. *Table ES-2* below illustrates the major differences between sustainability indicators for latrines in villages with piped water systems and dug wells.

Table ES-2

SUSTAINABILITY MONITORING INDICATORS	HOUSEHOLD LATRINES OBSERVED	
	IN VILLAGES WITH PIPED WATER	IN VILLAGES WITH DUGWELLS
A SYSTEM PERFORMANCE AS DESIGNED		
▫ Functioning as per design	***YES***	***Partly***
▫ Design appropriate in technical terms	***YES***	***Partly*** - NOT appropriate for water scarce village
▫ Quality of construction and materials adequate for design	***YES***	***Partly*** – *pits collapsed in 1 village due to mismatch between soil type and pit lining*
B. EFFECTIVE USE		
Change in defecation practices for better health (consistent, hygienic use of safe excreta disposal systems)	***YES*** - Those who have house connection of piped water	***NO*** – Majority still use rivers and crop fields
A sufficient majority have access (Rich/Poor; Men/Women)	***NO*** - Poor have low access	***NO*** – Poor have low access
Environmentally sound usage of facilities (not polluting water sources, not causing health hazards)	***YES***	***NO*** – Latrines too close to dug wells in 3 of 5 villages
C. SERVICE MEETING USERS' DEMANDS		
Demands for level of service being met (location, convenience, degree of sharing)	***YES***	***NO*** - Supply seems to exceed demand
Demands for quality of construction & design met	***YES***	***NO*** – Water intensive latrine technology is not appropriate where water is scarce/source far away
D. EFFECTIVE FINANCING		
Users fees cover full cost of O & M	***YES***	***YES***
Users meet more than half cost of construction	***YES***	***YES***
E. EFFECTIVE MANAGEMENT		
Technical capacity to operate and maintain at designed level of system performance	***YES***	***YES***
Capacity to make repairs (technical + financial + spare parts availability) exists or developed in the community	***YES*** – Partly Artisan (Tukang) training in 4 of 5 villages	***YES*** – Partly Artisan (Tukang) training in 3 of 5 villages

Although both types of villages have the capacity to operate, maintain and get repairs made locally and both shared similarly high proportions of construction costs, latrines are performing better, being used more effectively and meeting user demands to a greater extent in villages with piped water. The study revealed that wherever people have switched to using latrines rather than rivers and crop fields, women are more frequent users than men and children. It also revealed that latrine use is conditional and not consistent, indicating that a significant community behavior change has not yet been achieved.

Strategies to improve the sustainability of household latrines have to be considered together with strategies to effect sustainable changes in community behavior towards consistent use of sanitation facilities.

Lessons from this study for sustainable sanitation are that the sanitation component of projects should:

a) Avoid an approach that measures success of the sanitation component by the number of latrines constructed.

b) Offer a range of sanitation options that cater to the preferences and habits of communities having varying degrees of access to water. Limiting the option to only the pour-flush type of sanitation facility in the ESWS project met with little success in villages with dug wells, because users are not willing to carry water from an external source to the latrine – which in their opinion is not an essential facility when there are rivers, canals and fields available for defecation.

c) Design and implement the sanitation component in a way that targets behavior change rather than construction. This means that the project staff begin by investigating current sanitation practices and the community's rationale/preferences associated with them. Then they work with community groups of women, men and children to improve community awareness about how diseases spread from open defecation. Finally, they help community groups to choose the key behaviors they wish to change and the services that they want to acquire – to improve their health, convenience, quality of life.

d) Use the Hygiene Awareness component of projects as a dialogue opener with communities as described above. A learning approach should be adopted that allows participatory assessment of community hygiene behavior and joint planning for change, rather than a top-down, standardized, educational-messages-based "Hygiene Education" approach. This will require appropriate training of community facilitators, realistic time schedules for community level work prior to construction (1-2 years on an average in each community) and project performance indicators related to behavior change rather than construction targets.

e) Allow demand for sanitation to emerge before services are provided. If demand for sanitation is not forthcoming, even after awareness building and hygiene promoting

interventions, the provision of sanitation facilities should be postponed until underlying reasons can be understood and addressed.

f) Avoid making latrine construction an obligatory requirement linked to other benefits, unless there are reasonable means to ensure consistent usage (*e.g.,* public and peer pressure in a highly motivated and aware community).

g) Ensure a gender-sensitive approach overall, that directly approaches and involves both women and men in situation analysis, planning and implementation of sanitation interventions.

1. INTRODUCTION

1.1 PROJECT SETTING

For much of the current decade, the Australian Agency for International Development (AusAID) has been providing support for three projects in the water supply and sanitation (WSS) sector in eastern Indonesia. These are an important part of the development cooperation program with the Government of Indonesia (GOI), representing a total Australian financial commitment of approximately A$70 million. The projects, located in the eastern provinces *of* Nusa Tenggara Barat (NTB), Nusa Tenggara Timur (NTT*)* and Timor Timur (East Timor) are :

- Nusa Tenggara Barat Environmental Sanitation and Water Supply Project (NTB ESWS)
- Flores Water Supply and Sanitation Reconstruction and Development Project (FWSSRD), and
- East Timor Water Supply and Sanitation Project (ETWSS).

The NTB ESWS Project, which commenced in December 1991, was a five-year program of development cooperation in the province of Nusa Tenggara Barat (NTB), including all six Kabupaten (districts) on the islands of Lombok and Sumbawa. It was completed in January 1997.

The **project goal** was to contribute to improved socio-economic and environmental health conditions in NTB by provision and effective use of community environmental sanitation and water supply facilities, focusing on community and district-based management. It aimed to achieve this through development of the capacity of local communities to take responsibility for their own sanitation and water supply, and by strengthening the existing government institutions in their capacity to plan, manage, monitor and evaluate more complex water supply and sanitation systems and activities.

The project design drew upon the successful and promising aspects of GOI/GOA-funded projects previously implemented in NTB and elsewhere in Indonesia, with a focus on activities considered sustainable and cost-effective.

The main components were:

- **Community Managed Activities,** which also integrated health and women's perspectives, included working with local NGOs and groups to develop the processes and organization required for the involvement of community groups in the planning, implementation and ongoing maintenance of sanitation and water facilities and community health activities. Specific GOI, GOA and local community inputs (as materials, cash and in-kind contributions) were also provided and monitored;

- **Institutionally Managed Activities** developed the design and management requirements and procedures for medium and large reticulated water supply systems, including work within the Public Works agencies and associated water enterprises, as well as health-related activities and water quality surveillance mechanisms; and

- **Project Planning and Coordination**, which established and maintained management strategies and structures within the existing GOI administrative framework for ESWS, with a focus on the district level and community participation.

For all components, formal and informal training activities were carried out throughout the life of the project. Overall, development sustainability, the transfer of technology and community participation in and ownership of facilities constructed were given a high priority.

The project activities were phased over the six Kabupaten in NTB, taking in East, West and Central Districts in Lombok Island and Bima, Dompu and Sumbawa Districts in the island of Sumbawa, with the precise scope of activities being determined by the actual needs and absorptive capacity of the communities concerned. The project design estimated that more than 800,000 people would benefit from improved water supply and sanitation through the provision of a range of new and/or rehabilitated facilities during the project. Activities commenced in East Lombok, Sumbawa and West Lombok, and subsequently expanded to include Dompu, Bima and Central Lombok.

The Australian contribution to project costs, totaling approximately A$26 million, were committed to long and short term consultancy inputs, the involvement of Indonesian non-government organizations (NGOs) and local consultants in the community development activities, the supply of equipment and transport, including pipes and fittings for the piped water systems for towns and rural areas, and for training associated with community development and the strengthening of GOI institutions and enterprises. The Indonesian contributions, for local materials, construction, support and running costs, were met from GOI budgets and community contributions.

The NTB project was the first AusAID-assisted project of its style and structure in Indonesia. The other two projects listed above were based on similar concepts, and are due for completion in 1999. AusAID is currently considering support for two new WSS sector projects in NTT and East Timor. Design missions are scheduled for the first semester of 1999. In addition, AusAID is supporting other initiatives in the sector in Indonesia, including direct assistance at the policy level in the form of WASPOLA – a project to analyze and test successful approaches to WSS investments and facilitate any necessary amendments to GOI sector policy.

1.2 TASK TERMS OF REFERENCE

As part of the post-project evaluation of selected elements of their program, AusAID planned an evaluation of this project during 1998. Such evaluations are carried out independently of the country program, by the Performance Information and Assessment Section within AusAID, normally calling on external Australian-based resources for both desk review and field evaluation. Often similar activities are grouped and evaluated together (a cluster evaluation), though significant activities, such as the present project, may be evaluated as a separate undertaking. This was the procedure intended to be followed for evaluation of the NTB ESWS project.

However, a closer relationship was being developed between AusAID and the UNDP/ World Bank Regional Water and Sanitation Program for East Asia and the Pacific (WSP-EAP), based in Jakarta, particularly with WSP-EAP's role in executing the Indonesian Water and Sanitation Sector Policy Formulation and Action Planning Project (WASPOLA). An important part of the WASPOLA project is to gain a detailed understanding of recent and current sector activities in Indonesia, of which the AusAID program, including the NTB project, form an important part. In view of this common interest, it was agreed to apply evaluation methods consistent with information gathered for WASPOLA using participatory evaluation techniques. To satisfy these mutual interests, it was determined to use WSP-EAP methods and teams to undertake a detailed evaluation of a sample of community-managed schemes, including schemes managed by both communities and institutions. The WSP-EAP evaluations were to be conducted in advance of the main evaluation team's arrival, and incorporated as appropriate into the overall evaluation findings.

The Terms of Reference for the main Australian-based evaluation team - the initial ToR for the overall evaluation of the whole project - were compiled by AusAID Canberra and issued in July 1998. A copy is included in Annex A to this report. Following the agreement to modify the approach as described above, elements suitable to be undertaken by the WSP-EAP team were extracted from these ToR. Discussions between WSP-EAP and AusAID resulted in elements being taken from the scope of the main ToR, and some additional elements identified. These are summarized in point form as the scope of the participatory evaluation by the WSP-EAP team. A copy of this summary is also included in Annex A.

1.3 APPROACH

WSP-EAP has been developing participatory methods of appraisal and evaluation over an extended period, particularly in community-based (rural) water supply and sanitation. The methods draw on the repertoires of Participatory Rural Appraisal (PRA) and Participatory Hygiene and Sanitation Transformation (PHAST). They are designed to enable communities to express their views and assessment through visualization, using media and materials familiar to

village men and women. The methodology, and its application to this evaluation, are described in the following chapters.

The participatory evaluation was conducted in November and December 1998, with synthesis and reporting of findings extending for the following two months. In addition to personnel from the WSP-EAP Jakarta office, field staff were engaged from two local NGOs: P3WK based in the Institute of Technology Bandung, and LP3ES based in NTB. The key personnel gathered in Jakarta during the week starting 23 November 1998, and departed for NTB at the end of that week. The field work extended to 18 December 1998, in time for the start of the fasting period and the festive season break. The analysis and report preparation re-commenced in early January 1999. Draft sections of this report were available for referral and use by the Australian-based evaluation team in Indonesia in late January and early February 1999. The final version of the report, incorporating comments from AusAID and other inputs arising from the Australian-based site visits in February, is to be issued in early March 1999.

The following Chapter of the report introduces the methodology used, and provides details of the scoring systems applied to field findings. The selection of representative sites for the evaluation survey, and the results of that selection process conducted in November 1998, are described in Chapter 3 of the report. The fourth and fifth Chapters describe the main findings of the surveys, with preliminary evaluation results. The Executive Summary draws together these results and lesson learned.

2. METHODOLOGY

2.1 INTRODUCTION

AusAID required an evaluation of the community managed systems of the ESWS project. A participatory evaluation approach was selected in which user communities themselves assessed how the project had been implemented and what its impact had been.. Due to the need to preserve uniformity in data collected in all 10 villages, the process could not be fully opened up to people's participation - which would have allowed community groups to begin by selecting the indicators to assess. AusAID's Terms Of Reference (Annex A) specified the broad indicators. Methods were then designed to maximize people's participation in collecting related information, analyzing it, reaching and expressing conclusions.

Why Participatory Assessment Approach?

Communities are complex systems. Research studies tend to simplify complex realities for the ease of analysis. In order that research findings are able to grasp and illustrate the community's own reality, research methods must be open-ended and allow unexpected information to flow in. Thus, although the indicators of this study were pre-determined, the methodology to assess them was designed specifically not to limit the inflow of information. The most important reasons for selecting participatory methods were :

Conventional surveys extract factual information from communities. Participatory methods allow them to provide not only information but also their assessment and analysis of their situation. The information produced is thus richer and more reliable as it is not open to misinterpretation by external researchers.

Participatory methods are group methods, which minimize data biases due to individual researchers or respondents.

Participatory methods can benefit both sides. They bring about mutual learning by researchers as well as communities, usually resulting in community action to improve their own situation – due to the group insights gained from participatory analysis.

Participatory methods are faster and more effective for getting insights into community situations than conventional surveys. Conclusions from participatory research are reached and confirmed on-the-spot, with the community groups involved, as compared to survey results that become available only weeks or months after field work and may be distorted by the researchers' interpretation of the situation.

Participatory methods are specially useful for finding answers to WHY questions, which yield explanations for what has happened and help predict the future.

2.2 PARTICIPATORY ASSESSMENT PLUS : A COMBINATION OF TOOLS

The aim of this study was to seek the user community's assessment of the project. A second requirement was that the results of this study should be comparable with findings of similar studies carried out by WSP-EAP of water supply and sanitation projects in Indonesia. These began with the Indonesian chapter of the Global Rural Water Supply study carried out in 1996 by the global UNDP-World Bank Water Supply and Sanitation Program.

To meet both requirements the evaluation used a combination of qualitative, participatory and technical assessment methods. The participatory assessment exercises were designed to fit the study objectives and the socio-cultural contexts of the communities involved. They were drawn from the repertoires of Participatory Rural Appraisal (PRA) and Participatory Hygiene and Sanitation Transformation (PHAST), and built upon the evolving methodology for the global *Participatory Learning and Action Initiative* (collaborative effort of the UNDP-World Bank Water and Sanitation Program and IRC International Water and Sanitation Center). *See Table 2.1.*

Table 2.1

Data Collection Methods

▪ **Technical Assessment of Systems** *(Tool adapted from Global RWS Study)*
▪ **Village Water Sanitation Committee/Managing Group Interview** *(Tool adapted from Global RWS Study)*
▪ **Review of Community Records**
▪ **Participatory Assessments with Men and Women's Groups, in the following sequence:** 1. Wealth classification of community members. 2. Mapping access to services 3. Water-use pattern matrix before/after project (pocket voting). 4. Defecation sites used by communities before/after project (pocket voting) 5. Group rating scales for consumer satisfaction. 6. Hygiene awareness – pile sorting. 7. Contamination routes awareness – flow diagram. 8. Trend analysis for impact of services on quality of life. 9. Decision making pattern for service establishment (matrix – variation of pocket voting) 10. Project's micro-credit scheme in comparison to others credit sources (Venn Diagram) ▪ **Focus Group Discussions with Men and Women's Groups, linking the above exercises**
Photographic Records of Village WSS Situation and Systems/Facilities Observed

Sample data collection instruments and outputs are in the Annex B. Data from different instruments were triangulated and cross-checked for consistency during analysis. Details of how results were obtained are described in the relevant sections of findings.

2.3 TECHNICAL ASSESSMENT

The evaluation of the NTB ESWS project included both technical and social components. The aim of the technical assessment was to gauge the performance characteristics of the facilities constructed under the project, mostly from the point of view of the users, but including some elements of external technical evaluation by the field surveyor.

2.3.1 Water Supply System Assessment

Eleven parameters were used to measure the performance of water supply systems. The points of observation and evaluation were interpreted according to the type of system (using the project classification of Types A, "B" and C, and within Type C differentiating between piped and non-piped facilities). For example, for Type C pipe systems, aspects included the pipe network, water source protection, supporting units like water tanks, break pressure tanks, and water outlets (which could be house connections or public taps and washing slab), For the non-piped systems, well lining for dug wells were observed. For Type "B" (or A), only the sub-systems consisting of a water tank, washing slab, taps and water source protection were assessed. For all piped system types, a sample of the water outlets (like public taps and household connections) were checked by the surveyors. Approximately 50% of public water outlets and about 13 household connections were checked within each of the selected sites. The selection of households was based on the social mapping criteria of wealthy, middle-income and poor households, as determined by the community.

The eleven parameters used as the basis for assessment of the water supply systems were:

1. Proportion of system/s functioning in each site represented by public facilities and household water outlets
2. Water availability in wet and dry season
3. Water utilization for drinking/cooking, bathing and washing in the wet and dry season
4 Physical condition of the systems
5. Design quality
6. Potential for water source contamination
7. Water testing/quality control
8. Land ownership (only for public facilities)
9. Facility ownership (only for public facilities)
10. Replicability of system by the community – can the community expand or replace the system?*
11. Ability to operate and maintain the water supply system

* *Data on system replicability was collected from qualitative assessment .*

These parameters, and the assessment criteria and marking system are described in Table 2.2 below.

2.3.2 Technical Assessment of Sanitation Facilities

Eight parameters were used to check the performance of the sanitation facilities constructed by the project. The household toilet introduced by the project is a standard simple single pit latrine with a water-seal plastic squat plate. The construction and maintenance of the facility is very easy, and local artisans can easily build the facilities. The high-tech plastic squat plate used by this project is quite popular among the people, because of its durability and that it needs only a small amount of water for flushing. In certain sites, this type of squat plate is clearly in demand, but it is not available in the local market. About 15 unit facilities were thoroughly checked by the surveyors in each site.

The eight parameters applied to the evaluation of sanitation facilities are:

1. Proportion of project-supported toilets that are functional and at least partially used at each site
2. Physical condition of main elements
3. Physical condition of supporting structure
4. Type of digester
5. Type sanitation pan
6. Maintenance
7. Distance of pit from drinking water source
8. Replicability

These parameters are set out in more detail in Table 2.3 with a brief explanation of the method of measurement and the scoring system applied.

Table2.2

Scoring Criteria for Water Supply Systems (Technical Assessment)

Item	Condition	Score	Max. Score	Criteria
1. System Functioning			**2**	
	Good	2		Water available 12 - 24 hours/day
	Fair	1		Water rationed (water available 6 – 12 hours/day)
	Poor	0		No/limited water available (water flows less than 6 hours/day)
2. Water Availability			**9**	
Rainy Season	Poor	1		If water availability is less than 10 lcpd for dug wells and less than 20 lcpd for pipe systems
	Fair	2		If water availability is between 11 to 20 lcpd for dug wells and between 21 to 40 lcpd for pipe systems
	Good	3		If water availability is between 21 to 30 lcpd for dug wells and between 41 to 60 lcpd for pipe systems
Dry Season	Poor	2		If water availability is less than 10 lcpd for dug wells and less than 20 lcpd for pipe systems
	Fair	4		If water availability is between 11 to 20 lcpd for dug wells and between 21 to 40 lcpd for pipe systems
	Good	6		If water availability is between 21 to 30 lcpd for dug wells and between 41 to 60 lcpd for pipe systems
3. Water Utilization			**12**	
Drinking	Rainy season	3		Water is used for drinking in the rainy season
	Dry season	6		Water is used for drinking in the dry season
Washing	Rainy season	2		Water is used for washing in the rainy season
	Dry season	4		Water is used for washing in the dry season
Bathing	Rainy season	1		Water is used for bathing in the rainy season
	Dry season	2		Water is used for bathing in the dry season
4. Physical Performance			**4**	
	Good	4		Dug wells no cracks on the well lining/washing slab/drain Pipe Systems *no leaks on the piping network, distribution tanks functioning as designed, no broken or leaking supporting units (break-pressure* tanks, bridges, etc , spring or water source well protected.
	Slightly damaged	3		Dug wells minor cracks on well lining/washing slab/drain Pipe Systems minor leaks on piping network, minor leaks on distribution tanks but still functioning as designed, minor breaks/cracks on supporting units, spring or water source is still well protected
	Moderately damaged	2		Dug wells significant cracks on well lining/washing slab/drain but does not effect water quality Pipe Systems leaks on piping network/distribution tanks, leaks/cracks on supporting units/leaks at spring catchment that affect water availability and/or quality
	Seriously damaged	1		Dug wells major cracks on well lining/washing slab/drain that affect water quality Pipe Systems. major leaks in piping network/distribution tanks, major leaks/cracks/damage on supporting units, leaks/damage at spring catchment that effect water quality and seriously effect water availability
	Total loss	0		The facility is not functioning at all
5. Design fault			**2**	
	None	2		
	Yes	0		Dug wells well diameter not wide enough (less than 120 cm) make it difficult and dangerous for user to deepen the well in the dry season Pipe Systems Hydraulic water gradient line not used as base for DED
6. Contamination			**2**	
	None	2		Dug wells· Distance from closest pollutant source 10 m or more, no broken washing slabs/drain/well lining Pipe Systems· water source protected, distribution water tanks covered
	Possible	0		Dug wells. Distance from closest pollutant source less than 10 m, broken washing slabs/drain/well lining Pipe Systems. water source unprotected, distribution water tanks uncovered
7. Water Testing			**2**	

Table 2.2 – **Continued**

Item	Condition	Score	Max. Score	Criteria
	Regular	2		Water testing done in a regular basis
	Once	1		Water testing done only once, when the system was constrcucted
	Never	0		Water testing never done at all
8. Land Ownership			2	
Not applicable for house *Connection*	Public	2		Land publicly owned (formal letter documenting this available)
	Private	0		Land privately owned
9. Facility Ownership			2	
Not applicable for house *Connection*	Public	2		Facility publicly owned (available formal letter back up) and used
	Private	0		Facility privately owned and used
10. Replicability			2	
	Institution & Evidence	2		Institution for WS management was established and has clear development plans, ***and*** (from qualitative assessment) Physical evidence of water system expansion observed (e g. expanded pipe network, additional dug wells)
	Institution or Evidence	1		Institution for WS management was established and has clear development plans, ***or*** Evidence of water system expansion observed
	No Institution and no Evidence	0		No Institution for WS management was established and/or the community has no clear water development plans; also, no evidence of water system expansion
11. Able to Operate & Maintain			2	
	Management Workmanship Regularity	2		*Communal system/pipe systems* All 3 criteria were proven 1 WS management organization established, 2 Evidence of ability to physically maintain the system through the use of either local skilled labor or outside contractors (i e physical evidence of good repair/maintenance work) and, 3 Has regular user fee collection, maintenance plans, or money is collected when the water committee is in need *Individual system/dug wells* All 2 criteria were proven 1 Evidence of ability to physically maintain the system through the use of either local skilled labor or outside contractors (i.e. physical evidence of good repair/maintenance work) and, 2. Has regular user fee collection and WS maintenance plans, or money is collected when repairs/maintenance is needed
	Management Workmanship Regularity	1		*Communal system/pipe systems* Two (2) criteria of three (3) were proven 1. Organized WS management system established, 2. . Evidence of ability to physically maintain the system through the use of either local skilled labor or outside contractors (i e. physical evidence of good repair/maintenance work) and, 3. Has regular user fee collection, maintenance plans, or money is collected when the water committee is in need *Individual system/dug wells.* One (1) criteria of two (2) is proven. 1. . Evidence of ability to physically maintain the system through the use of either local skilled labor or outside contractors (i e. physical evidence of good repair/maintenance work) and, and 2. Has regular user fee collection and WS maintenance plans, or money is collected when repairs/maintenance is needed
	Management Workmanship Regularity	0		*Communal system/pipe systems* One (1) criterion or none of three (3) were proven 1 Organized WS management system established, 2 Evidence of ability in workmanship (could be the use of outside artisan) and, 3. Has regular user fee collection, maintenance plans, or money is collected when the water committee is in need *Individual system/dug wells*· One (1) criterion or none of two (2) is proven. 1.Evidence of ability in workmanship (including the use of outside artisan) and 2 Has regular user fee collection and WS maintenance plans, or money is collected repairs/maintenance is needed
Total			**41**	The maximum score a water system could achieve

Table 2.3

Scoring Criteria for Sanitation Systems (Technical Assessment)

Item	Condition	Score	Max. Score	Criteria
1. System Functioning			2	
	Functioning	2		The system is functional (i e the essential parts are in working order) and it appears to be used at least partially
	Not functioning	0		The system is functional but not used or, not functioning at all
2. Physical Condition of Main Elements	(toilet bowl, slab, digester, pipes)		2	
	No damage	2		System functions as planned without any damage
	Seriously damaged	0		System could function but has construction problems
3. Physical Condition on Supporting Structure	(water box for cleansing, walls, floor plaster)		2	
	No damage	2		Supporting structure functions as planned without any damage
	Seriously damaged	0		System could function but has construction problems or is damaged
4. Type of Digester			3	
	Septic tank	3		Proper septic tank as digester
	Unlined pit	2		Unlined pit as digester
	Pool	1		Pond used as digester – latrine empties directly into pond
	River	0		Latrine empties directly into river
5. Type of Sanitation Bowl			2	
		2		Bowl with water seal installed
		1		Bowl without water seal installed
		0		Open pit without sanitation installed
6. Maintenance			2	
	Bowl, room	2		Bowl clean, and toilet interior clean with no smell
	Bowl, room	1		Bowl not so clean, and/or toilet interior not so clean and smelly
	Bowl, room	0		Bowl dirty, and dirty toilet interior with strong smell
7. Distance to Drinking Water Source			1	
	> 10 meters	1		Distance to closest water source (well/pump) more than 10 meters
	< 10 meters	0		Distance to closest water source (well/pump) less than 10 meters
8. Replicability			2	
	Institution & Evidence	2		*Institution* for Sanitation replication established and has clear development plans, ***and*** *Evidence* of additional, non-subsidized latrines being constructed
	Institution or Evidence	1		*Institution* for Sanitation replication established and has clear development plans, ***or*** *Evidence* of additional, non-subsidized latrines being constructed
	No Institution no Evidence	0		No *Institution* for sanitation replication was established and has no clear development plans *Evidence* of additional, non-subsidized latrines being constructed
Total			16	The maximum score a sanitation system could reach

3. SELECTION OF SITES

3.1 NUMBERS AND TYPES OF SITES

3.1.1 Classification of Water Supply Schemes by Type

The approach to the provision of water supply in Indonesia since the early 1970's has been based on administrative definitions related to population size. In the late 1980's the boundaries between "urban" and "rural" approaches and responsibilities were moved, and the distinguishing features became less distinct. The design of the NTB ESWS project, compiled over 1989-90 at the beginning of *Repelita V,* instead of relying on such definitions of "urban" and "rural," introduced a classification of approaches to water supply in terms of primary functions and responsibilities, namely:

- Type A - wholly institutionally managed;
- Type C - wholly community-managed; and between those
- Type B - involving both institutions and communities in joint management responsibilities.

The NTB ESWS Project Design Document provides a thorough discussion of this classification. For ease of reference, an extract of text and diagrams illustrating the classification system are reproduced as Annex C of this report.

In summary, the classification is functionally-based, and distinctions between the three classes of system are related primarily to the approach to implementing and managing the scheme; as well as consideration of the physical attributes of the system. It accommodates recognition, within limitations of scheme size and complexity, of the community's capacity to plan, construct, operate and manage its own facilities. At the same time, it acknowledges that the technical and managerial expertise necessary to implement and manage very complex systems resides only within (GOI) institutions. These give rise to the definition of Types C and A classifications respectively. However, an additional class of scheme is defined (Type B) for which success depends upon a combination of the best attributes of communities and institutions working together to achieve a viable and sustainable result. The original definition extends to further subdivisions of each category, as described in Annex C, but these are not relevant to the discussion in this report.

The definitions which were actually applied in the implementation of the NTB ESWS, and used to describe systems in project documents, were clearly different from those described in the PDD. This is particularly the case for Type B systems, as borne out by the observations of the evaluation team and described below. However, the project documents reviewed by the evaluation team did not include clarification or amendment of the PDD definitions, so the nature of any differences of understanding can only be surmised.

This classification system was adopted and further developed for subsequent sector projects with GOI; notable amongst those was the World-Bank assisted Water Supply and Sanitation for

Low Income Communities (WSSLIC) project. The rules for implementation of the WSSLIC project differed from those under the AusAID program (for example, involving annual TA appointments and greater use of contractors for construction) so the definitions for Types A, B and C were modified to suit.

Again, it is not necessary to discuss the detail of these differences in the context of this report. However, it is of interest to note that the classification system has been applied more widely, and continues to be used and referred to in broader sector activities.

3.1.2 Numbers of Schemes by Type

The principal sources of data describing the project which were available to the WSP-EAP evaluation team were the Project Completion Report (January 1997) and a summary description of the project, dated September 1995. These documents contain lists of works completed under the project and their contents. In terms of water supply works, it is possible to extract a summary of the schemes undertaken as:

Type A: 24 schemes; and
Type C: 153 schemes or village sites.

For Type B schemes these appear in many cases to be described as "mixed" schemes, either as Type A/B or Type B/C, and the descriptions for some of these schemes are not consistent in the reports. This grouping, or mixture of definitions, underlines the lack of clarity in the classification of Type B schemes mentioned above.

Sanitation interventions were undertaken integrally with the community program. Thus in all sites where water supply facilities were of Type C (and probably also Type B) the sanitation component activities were implemented simultaneously with water supply-related activities. As Type A water supply schemes did not directly involve communities, any sanitation interventions in those areas would have been undertaken with community facilitators independently of water supply construction. As the present survey was concerned only with Types B and C water supply sites, it was expected that they would all include sanitation elements which would be suitable for inclusion in the survey.

3.2 SELECTION CRITERIA

The present evaluation is concerned with those elements of the project which had some measure of community responsibility in their implementation and subsequent management. The aim of this exercise was to select a representative sample of sites suitable for evaluation in the field using participatory techniques. By definition then, it was desirable to include in the sample:

- mostly Type C (solely community-managed) schemes or sites, covering the range of technologies applied under the project (piped and non-piped); and

- some Type B schemes (with both community-managed and institutionally-managed elements together).

In order to be representative, the sample included a geographical spread in the selection of sites, with approximately equal numbers of sites on each of the two islands. In general, it was possible to select good sites which were relatively convenient to constructed roads, and involved reasonable travel times from main centers.

The technology sample within Type C schemes was limited to distinguishing between piped systems (generally gravity-fed from springs, but including pumped groundwater sources as well) and non-piped facilities (mostly shallow wells, as hand pump technology was not favored in this project, and rainwater collection and storage applications were very limited). Within Type B systems, piped water supply was the only technology option.

Identification of Type B systems from the available project documents was not straightforward, as this terminology seemed to be used inconsistently (as described above). The initial selection was therefore based on the assumption that schemes identified by the project as B (or A/B or B/C) contained some elements of Type B schemes, and could be included for selection under that category.

The presence or otherwise of project-supported environmental sanitation facilities was not considered as a criterion for site selection. It was assumed that all active project sites for community-based water supply, whether Type C or Type B, would include integrated sanitation interventions.

3.3 THE SELECTED SCHEMES AND SITES

The selection was undertaken in two stages. The initial selection in the office was based on project documents. The team then went to NTB and made some preliminary observations to ensure that the chosen sites were indeed a representative sample, and adjusted the selection accordingly.

Initial Site Selection. The preferred sample size for this initial assessment was a total of 10 sites, covering water supply Types C (community-managed) and B (elements managed by both communities and institutions). During the meetings in Jakarta prior to the field visit, attention was given to the selection of representative sites, based on (limited) available project reports, consultations with AusAID and their evaluation consultants, and other local knowledge available to team members. The result was the nomination of a minimum of two Type B systems, which appeared to be predominately on Sumbawa island, and equal numbers of sites on Lombok and Sumbawa islands. The Type C site selection also had to take into account relative weightings given to different technology options, differentiating particularly between shallow wells and piped systems. As noted above, environmental

sanitation interventions were not part of the site selection criteria, though sanitation elements were included in the evaluation methodology.

At each village, the area chosen for detailed analysis (dusun, RT or similar) was to be determined so as to reflect the representation and balance of the total sample.

Modifications to Survey Sites. During the first week on site, preliminary inspections were made of several of the initially selected sites and the surrounding areas. In the course of this assessment, a very interesting situation was discovered in the village of Samili, adjacent to Sakuru in the DKSTBS system. This is more fully described in the Back-To-Office notes attached as Annex D to this report.

As a result of these preliminary findings, it was determined to include Desa Samili in the list of sites to be surveyed, and drop one of the Type C non-piped sites in Kabupaten Sumbawa, initially nominated as Lopok. This was to be finally decided when the field team had actually visited two further sites in Sumbawa, to ensure that the sample total remained representative. This was later confirmed by the survey team.

The village sites finally selected were as follows:

Lombok Island			Sumbawa Island		
Village Name	Hamlet	Type *	Village Name	Hamlet	Type*
Teratak	Ketangge	C piped	Sakuru-DKSTBS		B/A
Sesait	Sumur Pande	C piped	Lape	Batu Peraga	C non-piped
Kayangan	Sidutan	C non-piped	Empang Atas	Ponong	B-piped
Tebaban	T. Barat +Timur	C non-piped	Banggo	Mpongge	C non-piped
Leneklauq		C non-piped	Samili	Rangajao	B-piped

* Type as described in the available project documents

Table 5.1

WEALTH CLASSIFICATION : NUSA TENGGARA BARAT

Critena Used to Describe					
Poor	F	In-between	F	Rich	F
Children education · Elementary - Junior High School	6	Children education Junior - Senior High School	6	Children education · Senior High School - college	10
I ownership of land 0-2 hectare	12	ownership of land 0.5 – 3 hectare	11	ownership of land 2 – 10 hectare	18
Do not have permanent house (no permanent floor)	9	Semi permanent house (with cement floor)	6	Permanent house (with cement floor)	12
House with 9 pillars / stilts	5	House with 9 - 12 pillars/stilts	5	House with 12 - 18 pillars/stilts	5
Occupation peasant farmer / unskilled laborer	11	Occupation farmer, trader, government employee	14	Occupation farmer, trader, government employee	22
Eat twice a day	1	Occupation · peasant farmer	3	Eat 3 times a day	2
Have food reserve for 1 week or less	5	Eat 3 times a day	2	Have food reserve for up to 1 year	8
Have few chicken	3	Have food reserve for up to 6 months	4	Have lots of chickens	3
Have few livestock	5	Have few chickens	2	Have livestock 10-30 heads. Can be up to 100.	18
Size of household up to 12 members	2	Have livestock 1-9 heads	8	Size of household up to 5 members	2
Annual earnings Rp 0 5 mill 1 2 millions	3	Size of household · up to 8 members	1	**Have latrine**	3
Have no latrine	4	**Have latrine**	2	Annual earnings Rp 2 5 – 10 million	4
Have clean house but dirty surroundings	1	Annual earnings Rp 1 mill.-2.5 million	3	Have clean house, sweeping twice a day	2
Have no access to credit	1	Have clean house	1	Color TV, VCR, Refrigerator, fan	10
Have radio	2	Have Black & White TV 14"	5	Parabola	5
Have Black & White TV	1	Have radio	3	Have Telephone set	1
Bicycle	3	**Have small access to credit (Rp. 50,000)**	1	**Have access to credit up to millions rupiah**	1
Using detergent for washing	1	Bicycle	3	Have cars	5
		Motorcycle	4	Motorcycle	3
Use detergent for bathing	1	**Using soap for bathing**	1	**Using soap & tooth paste**	1
				Have hand pump	1

- Most of those now using latrines have moved from being users of the river, paddy fields, under water and crop fields for defecation. The greatest shift is again by women – as they value the privacy and convenience of a latrine more than men or children. The shift is appreciable in villages with piped water, and marginal in villages with dug wells. *(Figure 5.3b)*

- However, latrine usage by some has not reduced the practice of open defecation by most. Several reasons explain this:

Preferred defecation sites:

- ❖ are close to home/workplace (fields, plantations, clothes washing places)
- ❖ are accessible all the time,
- ❖ have water available always for ease of cleaning
- ❖ are without bad odors, with fresh air (as outdoors)
- ❖ offer some privacy
- ❖ are those that are integrated with local tradition, learned from elders

Rivers and paddy fields meet all these criteria, whereas latrines meet only some or few. In addition, only a small percentage of households have latrines and not all of them have a water supply/source at the latrine site. Some have water only in the rainy season.

- Flowing waters of rivers are preferred sites, as excreta can not be seen after defecation. The water is thought to wash it away and that makes it a "clean, healthy practice".

- When water is scarce, or water sources are considered "owned" by certain individuals, people avoid practices requiring non-essential water collection. This affects the use of pour-flush latrines which constitute a "non-essential" type of water use, due to available alternative sites. This is mostly true of villages with dug wells.

- People who have constructed household latrines may have done so due to pressure from project staff rather than voluntarily (as reported in *Lenek Lauq, Tebaban, Lape*). They see no reason to change their traditional habits are not motivated to make use of the facility.

The above reasons suggest that health improvement may not be assured by the introduction of latrines in the village. Despite a sizeable proportion using latrines for defecation, there seems to be widespread pollution of the environment with excreta. Even those who use latrines are not protected from the health risk due to inadequate hygiene behavior of non-users. The reasons are explored further in this report. They seem to be related to insufficient community dialogues to promote better hygiene behavior, lack of a participatory approach to behavioral change, use of construction-target-oriented and coercive approaches and the required types of skills not-being available in project field teams.

5.2 COMMUNITY VIEW OF LEVEL OF FUNCTIONING OF SERVICES

One particularly revealing aspect of the evaluation was the community's assessment of the extent to which WSS facilities were meeting their demands. This was assessed using group rating scales whereby scales were drawn on the ground, with two ends of the scale marked with pictures depicting "Full satisfaction" and "No satisfaction at all". This was done at sites for common facilities wherever possible. Men and women users asked a volunteer to take up a position on the scale to show where their level of collective satisfaction lay. The volunteer's position was decided after much moving to and fro on the scale until all were satisfied. Generally this represented a consensus reached by the 20 – 25 users present on the scene. For Water Supply the aspects so assessed included: Quality of water, Quantity of water, Regularity of service, Efficiency of management of the service and Fairness of fees. Probing the rationale for users' assessment provided clues about the nature of community demand and preferences, which, if investigated before construction, could have led to a better match between what was provided and what desired. The rating scale summaries are presented in *Figure 5.4* through *Figure 5.6.*

5.2.1 Water Supply Services

Quality: Users were generally more satisfied with the quality of piped water than water from dug wells. Greatest dissatisfaction was with water in some *Sumbawa* dug wells *(Lape, Banggo)* in the dry season and one piped system in *Sumbawa (Samili)* in the rainy season. Dug wells water in the dry season was reportedly too saline to drink in *Kayangan (Sidutan), Lape* and some areas of *Banggo. Banggo* has highly turbid water in wells in the rainy season. Water testing has never been done for wells in these villages, or done only once when constructed. Users' judged good quality by visual clarity, lack of a distinctive or unpleasant taste and lack of odor. By these criteria dug well water was considered inappropriate for drinking in most villages and wells were used mainly for washing and bathing – unless water quality was also a problem.

Water quality was perceived to be lower in *Samili* than in *Sakuru,* both served from the same, "B-type"(in actuality more like an A-type) *DKSTBS* system in *Bima.* The group of users evaluating the quality of water from public hydrants in *Samili* were unanimous in their rating. Reportedly the water contains black particles of suspended matter at times during the rainy season. Since the source is a deep tube well from which water is pumped to all unclear where the problem lay. Possibly there is contamination from leaking pipes or an inadequately protected reservoir that supplies *Samili.* The community management stops at the level of 5 public hydrants inside village *Samili,* all served from the reservoir – which is presumably under PDAM's control.

Quantity: Except taps in *Sakuru* and dug wells of *Lenek Lauq* and *Tebaban,* all systems reportedly experience a reduction of supply in the dry season. The situation is extreme in *Kayangan , Banggo* and *Lape* where wells dry up or produce only cooking water for a fraction of the users.These wells don't have enough water even during rains or the water is brackish. According to users, the wells were dug in the rainy season. Due to the danger of walls caving in, they were dug in haste and not deep enough. As a result they work more as

5.3 COMMUNITY MANAGEMENT AND FINANCING

Information about how services are being managed and financed was obtained through focus group discussions with groups of user households. The Technical Surveyors also gathered this information from designated Water-Sanitation Committee members and looked at records available at the village administration office. The three sets of information were compared for consistency.

5.3.1 Existence of Users' Communities

A formal water users' association at village level and organized user groups for specific public facilities were only found in the two villages with C-type piped systems, *i.e., Sesait* and *Teratak. Figure 5.6* shows that was in both villages were highly satisfied with the efficiency of management of their facilities.

Sesait had 6 Water User Groups *(Pokmair)* for the 6 pressured release tanks that supply water to 22 public taps in the village. Each *Pokmair* consists of heads of households served by the public taps from each tank. The *Pokmair* is responsible for operation and maintenance of the tank and taps supplied from it, collections and management of monthly fees from user households and repairs. Each public tap also has a designated manager, who is either the owner of land on which the tap is located or the user living nearest to the tap. The users reported that *Pokmairs* have traditional, written regulations about membership and rules for O&M could *Aweg-Awig,* which are written on a User card of each household. The money collected as user fees is kept by each *Pokmair,* after paying 10 per cent to the Village Administration and 10 per cent to the fee collector. ESWS staff determined the rate of fees (at Rp.250 per month at first, later raised to Rp.500 for those with household connections). In *Sesait* the funds thus collected are sufficient to finance any repairs needed so far. The remaining balance is used by the *Pokmair* as a source of small credit to its users. Every three months the Water Users Association of the village holds a meeting to inform users of its activities. The villagers of *Sesait h*ave even expanded their system by adding a pressure release tank from a second spring, since the initial system built by ESWS was not adequate for their needs.

Teratak has a formal *Water User Association (HIPPAM)* for its two Gravity piped systems. The *HIPPAM* is a legally constituted body including the hamlet chiefs and formed in accordance with the provincial Governors' decree. It is responsible for major repairs and management of user fees. In addition every public tap has a *Pokmair* (users' group) with a fees collector. Minor repairs at the tap level are handled by the *Pokmair.* The *HIPPAM* pays 15 per cent of its income to the village administration, a local mosque and orphanage. 35 per cent of its income is paid as management fees to *HIPPAM* members and *Pokmair* managers/collectors. The remaining 50 per cent are kept and used for major repairs when needed. They deposited Rp.3 million in their bank account in 1998. So far there have been no major repairs necessary. Unlike in *Sesait,* there is no formal mechanism for financial information sharing with users in *Teratak. Teratak* too has a set of traditional regulations

governing the management of water facilities called *Aweg-awig.* Public tap users pay Rp.500 per family per month while those with house connections pay Rp.1000 per month.

In the villages served by C-type, dug well systems a different kind of management system has evolved from local social norms. ESWS project staff initially formed user groups of about 10 households for each well. These did not endure. Since there is no monthly user fee paid by dug well users anywhere, there is no collector. The manager of the dug well is the owner of land on which it is sited. He is a relatively rich landowner, who was willing to provide private land for the public dug well as well as food and payments to laborers during construction. This had led to his gaining an informally recognized ownership of the well although all potential users had contributed either some cash or cash and materials and labor for construction. The "owner" undertakes to keep their functioning and organizes repair/ maintenance as needed, by collecting contributions from all users. Generally this has meant an annual cleaning of sediment and deepening of the well in the dry season. Users in some villages reported that the owner has put a fence or enclosure around the well and discourages its use by others, thus converting the dug well to more of a private property.

In the three villages served by "B-type" piped systems, *i.e., Empang Atas, Sakuru* and *Samili* there is very little community management-taking place. Communities reported not being involved at all in planning and construction of these systems, which were built by PDAM or the Public Works Department. Only after public hydrants and secondary pipelines were completed were villagers informed that they could apply for household connections. Household connection holders take care of their own operation and maintenance. Each public hydrant has a designated manager who does not receive any salary. He is responsible for O&M and repairs of the public hydrant as well as collecting user fees and paying monthly charges to PDAM. Users of household connections pay on an average Rp.5,000 – Rp.8,500 per month directly to PDAM. Public hydrant users pay between Rp.1,500 – Rp.2,500 per family per month to the collector, depending on an average estimated from the monthly consumption of public hydrant water. Users do not receive any reports of income and expenditure. They have no idea how much is paid on their behalf to PDAM and what savings are kept by the collector/manager, out of which he pays for repairs and maintenance. It is common knowledge that there are savings from user fees every month. User seem to accept that it is kept by the manager/collector without formally accounting to anyone. They however expect the savings to take care of repairs and are unwilling to contribute extra for repairs.

Household latrines are operated and maintained by the households owning them, even if several other households might share the usage. No fees are charged. However, as reported in the section on *Access and Use,* latrines are in disrepair in large numbers in villages served by dug wells.

There has been no formal handing over of water or sanitation facilities to the community in any village. Due to the extent of community involvement in planning and financing in the C-type piped water systems, there is a higher sense of community ownership and responsibility for facilities in these villages than in the three with "B-typed" piped systems which were built by PDAM without community involvement in planning.

4. TECHNICAL FINDINGS

4.1 INTRODUCTION

As described in Chapter 2, the field assessment of the selected sites was aimed at evaluation from both technical and social perspectives. This Chapter describes the technical aspects of the assessment. To the extent possible, the evaluation of technical issues was based on the views of the beneficiaries and in all respects the community participants in the project were consulted on these issues. The nature of the project required that some of the assessment was external, so that the findings in relation to particular issues (*e.g.*, soundness of design, material selection, condition) were principally based on the observations of the evaluation team members.

The detailed field reports (translated into English) are presented in *Annex E*, and the scoring sheets based on the system described in Chapter 2. The following text attempts to draw from those field reports and numerical scores to present an overview of the main findings. The approach followed has been to plot the main results graphically for ease of understanding; as well as looking at the results of each site individually, comparisons are made between groups of sites and groups of related issues. In this way it is possible to reach some overall conclusions about the most successful elements of project interventions, from a technical perspective. These findings are complemented by the social perspective described in Chapter 5.

For ease of comparison, the water supply section has been subdivided into discussion on piped and non-piped water systems. The project sites that were surveyed are summarized in Table 4.1 below.

Table 4.1

Piped and Non-Piped Water Supplies

No	Village	Hamlet	Type of System	No of Households
1	Sesait	Sumur Pande	C Pipe System	120
2	Teratak	Ketangge	C Pipe System	145
3	Empang Atas		"B" Pipe System	808
4	Sakuru		"B" Pipe System	704
5	Samili		"B" Pipe System	890
6	Banggo		C Dug well	589
7	Kayangan	Sedutan	C Dug well	141
8	Lape	Batu Peraga	C Dug well	256
9	Lenek Lauq		C Dug well	885
10	Tebaban		C Dug well	1231

4.2 MAIN FINDINGS ON WATER SUPPLY SYSTEMS

Water availability and utilization

Piped Systems

The amount, accessibility, and perceived quality of water provided by a water system in comparison with possible alternative sources will influence the users' preference for actual use of that source of water. Provision of a piped water supply facility cannot guarantee that people will not use other competing water sources such as rivers, ponds, and canals, particularly for washing and bathing. In piped systems where water availability is fair or poor, consumers will use alternative water sources if the piped supply does not meet their demand for all uses. In systems where they have enough water, even users with house connections may continue to wash clothes and bathe in convenient rivers or ponds, but often for a different reason: to save money. In sites such as Sakuru and Samili where they do not have other competing water resources, the improved facilities serve the entire household demand. In all cases the people valued piped water, and they use it as their daily drinking and cooking water source the whole year long.

Table 4.2

Number of Pipe Systems Facilities Assessed

#	Site	Type of Facility	Total No. of Water Facility	Water Facility Assessed	Percent Assessed	Remarks
1	Sesait	Pub. Tap Water Tank House con.	24 5	6 5 4	25 % 100 %	Water Tank act also as dist. box
2	Teratak	Pub. Tap	10	10	100 %	
3	Empang Atas	Pub. Hydrant House Con.	4 332	4 7	100 % 2 %	1 seriously damaged 2 disconnected
4	Sakuru	House Con.	98	6	6 %	
5	Samili	Pub. Hydrant	6	6	100 %	1 disconnected
	Totals		**479**	**48**	**10 %**	

In Sesait the people served by the piped system use it for drinking and cooking in both dry and wet season. Only a few house connections and public taps provide enough water for those families to use also for bathing and washing throughout the year. The remaining villagers wash and bathe at springs, which are located below and relatively far from the village, as well as at ponds, a dug well or a nearby river. The project constructed a gravity pipe system, which was later connected to an additional system installed by the villagers themselves. The elevations of the two springs are different and it creates some difficulties for the water committee to distribute water evenly to all water outlets. Originally, the system was designed to provide water only through public facilities, but the community subsequently modified the system to include house connections. Uncontrolled expansion and modification of the

distribution system in this way, without adequate appreciation of technical constraints until they become very apparent, has created problems in the operation and management of the system.

In Teratak (Sumur Pande), the villagers are using water for all purposes such as: drinking, cooking, washing and bathing, no doubt because alternative sources of water are not abundant, especially in the dry season. Like Sesait, the users in this village installed house connections through plastic hoses, which are connected on a time-share basis to the public taps. One single public tap could have between 3 and 14 of these semi-permanent house connections in addition to the public facility users. This uneven access causes problems between the users. Since proposals for more such house connections are still being considered by the village committee, the risks to the long-term sustainability of the system are high. The current situation is illustrated in Table 4.3.

Table 4.3: System of Water Distribution in Teratak

Public Tap No	Total HH Served	No. of Public Facility Users (HH)	No. of House Connections (HH)
1	30	30	0
2	9	9	0
3	1	1	0
4	8	5	3
5	6	2	4
6	8	0	8
7	22	19	3
8	19	5	14
9	8	3	5
10	11	2	9
11	3	0	3
Totals	**125**	**76**	**49**

Empang Atas has what was originally proposed to be a Type "B" system which is now managed by PDAM. Water is abundant in the wet and dry season. However, most of the community is using it for drinking and cooking purposes only. Most of the people, even those users with house connections (for reasons of "efficiency" or cost) do their washing and bathing at dug wells, river or ponds. The water source for the pipe system is a spring high up in the hills above the settlement. Water flows to a storage reservoir and is distributed through house connections and some public hydrants.

Sakuru, is part of a large, multi-village piped water supply system called DKSTBS (Dadibau, Kelampa, Samili, Tengah, Baralau and Sakuru). Similar to Empang Atas, this water supply system is managed by PDAM. The main water sources are two deep wells, fitted with submersible pumps operating with PLN (State Electric Company) power. The two wells are located in Dadibau and Sakuru, at each end of the system. Water is pumped up to storage reservoirs which were installed at each of the villages, and distributed to the users, mostly

through house connections, with some public hydrants (except in Baralau and Sakuru). The survey selected two hamlets (Sakuru and Samili) to study. The people in Sakuru, adjacent to the largest of the two sources, have no problem with the quantity of water throughout the whole year, and they are using it for all purposes. Since Sakuru has no public facility, the evaluation of this element was focused on house connections. In this village, dug wells were also constructed and rehabilitated under the NTB-ESWS project, as were sanitation facilities[1].

In Samili, five public facilities were observed. Originally, six public hydrants were constructed in this village, but one was disconnected by PDAM. These facilities comprise a small storage tank fitted with several taps/outlets. On average, each public hydrant is used by 28 families or approximately 140 people. These facilities are obviously fulfilling a high demand, though the high user numbers makes the per capita supply (water availability) low. The families served by these facilities use the water for all purposes because there are generally no other alternatives. One public hydrant was disconnected by PDAM, reportedly in part because the users did not pay the tariff, and partly because many of the users applied for house connections.

Table 4.4

DKSTBS Water Supply System

Village	House Connections		Public hydrants	
	Total Users	Active Users*	Active**	Disconnected**
Dadibau	10	8	2	3
Kelampa	131	126	5	0
Samili	245	239	5	1
Tengah	42	39	1	2 + 2 (inactive)
Baralau	112	92	0	0
Sakuru	98	98	0	0
Totals	638	602	13	7

Source: PDAM Sub-Office Dadibau

Dug wells

With respect to water availability and utilization almost all sites with dug wells scored lower than those with piped systems. There is fluctuation in water availability in the wet and dry season, although the difference was not reported to be significant. In many cases the dug wells are under-used because they are not the only option available, particularly for washing clothes and bathing. Traditional competing water sources such as rivers and ponds are still attractive alternatives for these purposes.

[1] The dug wells were constructed in the early years of the project before the large, multi-village piped scheme was planned or constructed.

* For house connections, Active Users means people who pays their water bills regularly

** For public facilities, Disconnected means permanently disconnected, and inactive means temporarily disconnected (PDAM will re-connect the facility to the system if the users pays their debts).

Table 4.5

Number of Dug Wells Assessed

#	Site	Type of Facility	Total No. of Water Facilities	Water Facilities Assessed	Percent Assessed
1	Banggo	Dug Well	29	9	31 %
2	Teratak	Dug Well	6	6	100 %
3	Kayangan	Dug Well	7	7	100 %
4	Lape	Dug Well	113	7	6 %
5	Lenek Lauq	Dug Well	32	15	47%

The dug wells in Banggo, have sufficient quantity of water in the wet season, but some wells are inadequate in the dry months (see users' assessment in Chap. 5). Some of the wells are not used for drinking and cooking purposes because of the poor water quality, though most are used regularly for washing and bathing.

In Kayangan (Sedutan), the dug wells constructed by the project performed very poorly. The wells routinely contain water for only up to three hours, so that only those families who are close to the wells can benefit from the facilities. In contrast to this situation, a traditional well built by the community in the same area contains adequate water to be used for all purposes in all seasons. Due to the poor condition of the wells, most of the community wash and bathe in the rivers.

Out of seven wells assessed in Lape not one showed an optimal score for water availability and utilization. Water is not available throughout the year. Fortunately the community has an important alternative water source, from a UNICEF-sponsored hand pump, which is used for drinking, cooking and washing.

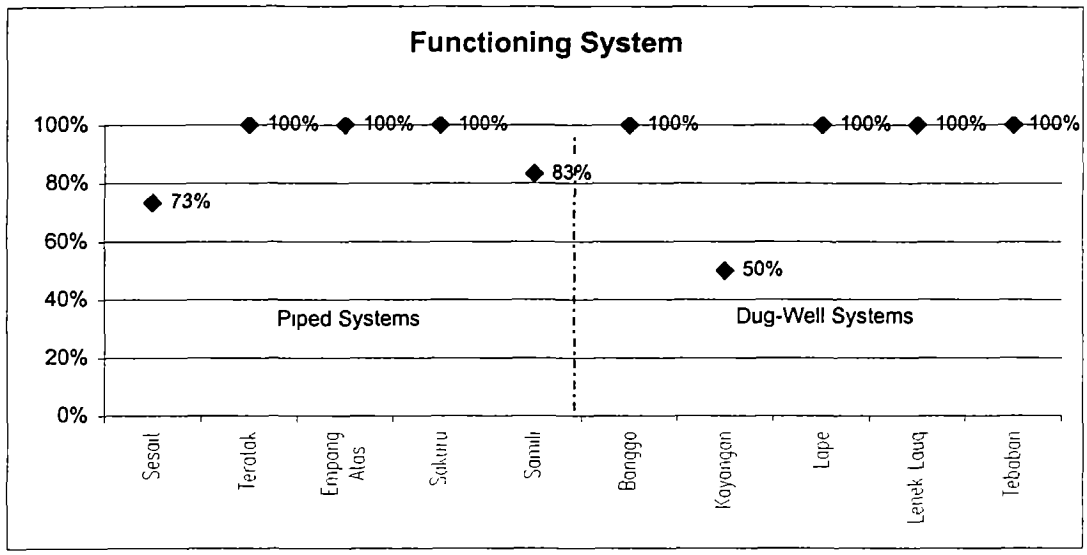
Even though water is not abundant both in wet and dry seasons in Lenek Lauq, the people use the dug wells as the primary source for their drinking and cooking water. To meet the need for washing and bathing a part of the community is still using their former supply: a small pipe system built by the community themselves.

All wells in Tebaban have insufficient water available in both the dry and wet seasons. They were constructed at the height of the wet season when the water table was particularly high, and as a result they are not deep enough to reach water for much of the year. Consequently, use of these wells is minimal; the well water is mostly used for drinking and cooking. Other competing alternatives to the project-assisted dug wells included a small piped system installed by the community, springs and traditional dug wells. A positive outcome of the project was that some of the wealthier families were stimulated to construct their own, deeper dug wells during the dry season

Functioning System

Piped Systems

For the piped systems, individual water outlets (public taps or hydrants/ tanks, or house connections) were examined by the field surveyors. For the assessment for functioning to be rated good, each water outlet should provide water 12 - 24 hours per day. As noted in Table 4.2, for the purposes of this study detailed field assessments were carried out on a sample comprising 9 percent of the total water outlets. In overall terms, three systems were rated as good, meaning that 100 percent of the outlets provide water for at least 12 hours per day. It does not automatically follow that water utilization was also high in these locations.



Fifteen water outlets in Sesait were thoroughly checked. Only 7 (47 percent) out of 15 outlets provide water for 12 - 24 hours per day; the remaining outlets (53 percent) have rationed flows. In Teratak, Empang Atas and Sakuru all the water points performed well. In Samili, one public hydrant was disconnected by PDAM, and this affected the functioning score of this water system.

Dug Wells

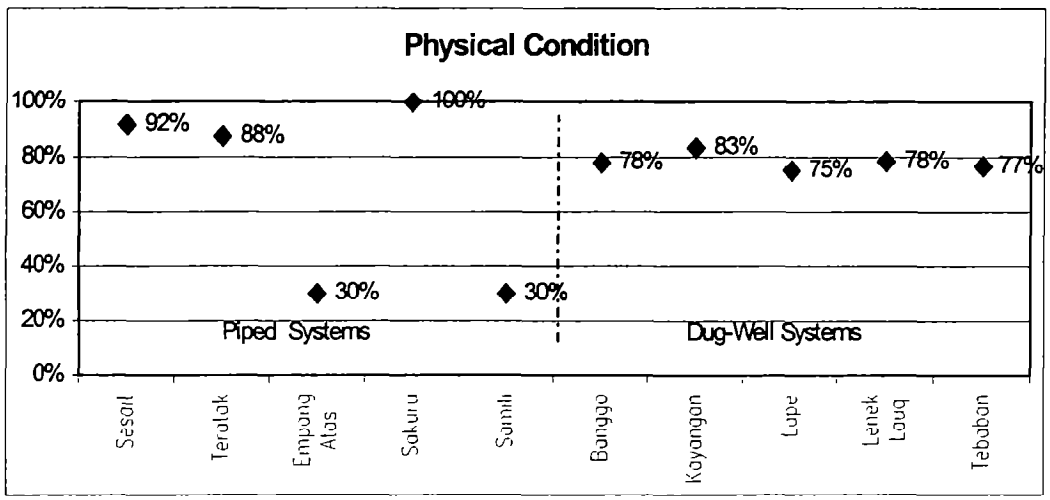
The assessment of function of the facilities in Kayangan (Sedutan) scored the lowest compared with the other sites with dug well water systems. In all other sites the wells are functioning satisfactorily, which means that water is generally available throughout the day. All wells in Kayangan provide water for only up to three hours a day. According to the community, the project-assisted wells were dug in the rainy season, and did not reach the appropriate aquifer, even though the average depth is about 15 meters. There seems to have been no attempt, or incentive, to deepen them.

Physical Condition

Piped Systems

The score for physical condition of the water system is based on visual assessment by the field surveyor. For piped systems, the pipe network and the spring catchment are not specifically identified in the technical evaluation matrix, but are included in the total score.

Physically, the performance of the water outlets in Teratak is relatively good. Only a few of the facilities show minor cracks, the pipe network has no major leaks and the spring was well protected. The overall condition in Sesait is similar to Teratak, except that the spring catchment is absolutely unprotected. In Empang Atas seven house connections were examined, and all were in good physical condition. However, the condition of the public hydrants was very poor; the foundations of the fiberglass tanks had major cracks and the slabs need major repairs. In general, the piping network is in good condition; some time ago a major leak occurred, but was rehabilitated by the PDAM. In Sakuru, the community has no complaints about the physical condition of outlets and they were rated good. In Samili, all the public hydrants are in very poor condition; the tank foundations have major cracks, the washing slabs are severely deteriorated, and the general environment around the facilities is unsanitary because wastewater is not channeled and properly drained. Samili and Sakuru are both parts of the same larger system (DKSTBS) for which the source development and pipe network are in good condition.



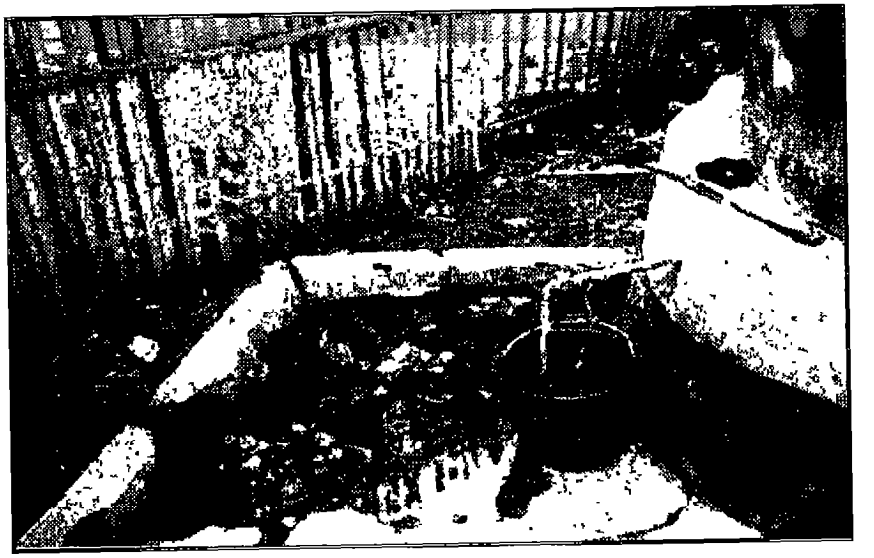
Dug Wells

The main structure such as the well lining and the washing apron of the dug wells constructed under the project are in relatively good physical condition. None of them were seriously (structurally) damaged, nor in a condition that could harm the people of utilizing the water facility. However, it is common that the floor plaster has minor cracks and wastewater in many sites was not well drained.

NUSA TENGGARA BARAT
ENVIRONMENTAL, SANITATION AND WATER SUPPLY

Unprotected Spring in Teratak

A Public Water Facility in Samili

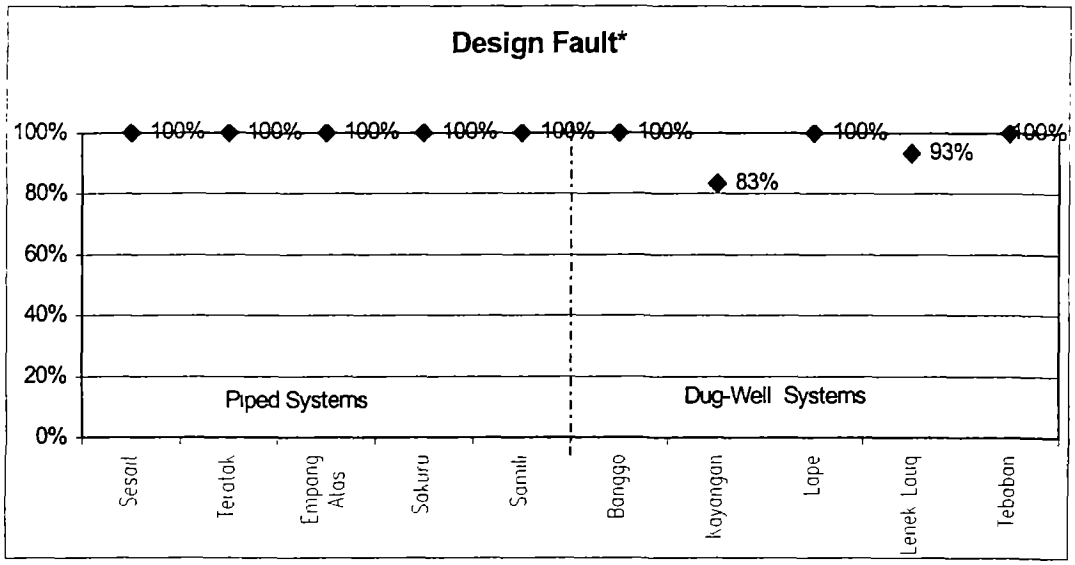


Innovative way of distributing water by the Community

Design Faults

Piped Systems

No major design faults were detected in the piped systems, based on an assessment of the original design criteria. However, significant design-related problems have subsequently appeared in Teratak and Sesait, due to the modifications of the pipe system by the community, with the changes of public facilities to house connections. It may be concluded that this could have been anticipated to some extent in the original design by assuming that all or the large majority of households would obtain house connections and increase their per capita water consumption within the design life of the system. With appropriate community input into the decision-making (design) process, a more flexible design could have been adopted, especially considering that the available yield from the source is big enough to meet the demand for house connections.

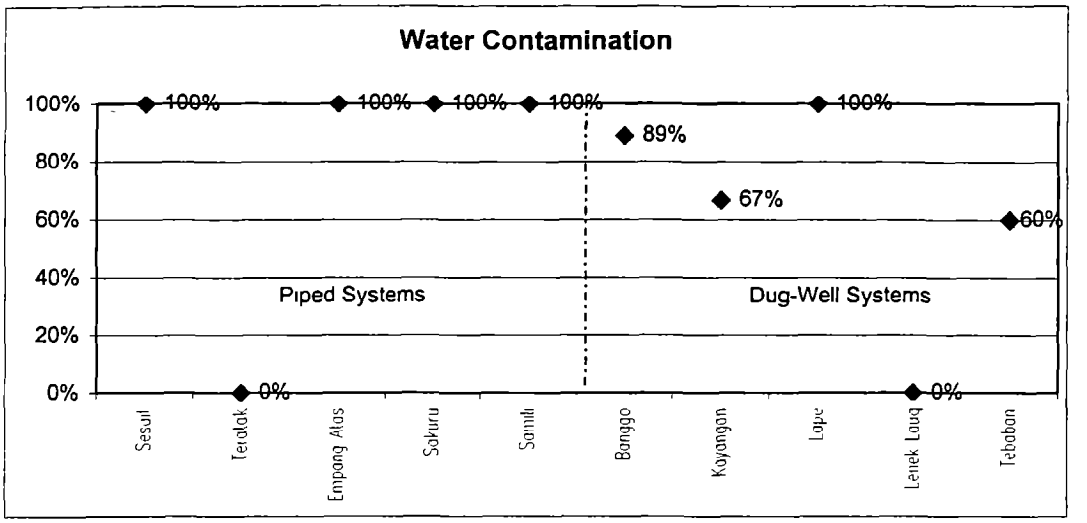


For the inter-connected water supply system in DKSTBS, where separate storage reservoirs were constructed for each village, the PDAM is not able to operate the system effectively, for reasons that were not fully clear to the field team. It appeared that non-functioning float valves in the reservoirs and a lack of understanding of the intended operations and management of the system are contributing factors. As a result, however, the operator is required to expend considerable energy, especially late in the evening and early in the morning, manually regulating flows. He is only marginally successful, and the actual system operations are well below optimum (assumed design) levels. Some of the reservoirs appear to overflow regularly, while others do not fill during the pumping cycle. These problems have not yet had a large, obvious impact on consumers, as the system remains considerably under-utilized (the present population served being approximately one-third of the reported design service population).

**Although most of the systems met project design criteria, the scores do not reflect the fact that the dug well designs were flawed – the stipulated well diameter is less than the minimum required (120cm) for maintenance access*

Dug Wells

The wells appeared to have been constructed in accordance with project design details or standards, though there were no engineering design criteria or details available with the community. Assessment results therefore relied mostly on visual inspection rather than review of documented designs. Based on nationally recognized design criteria a dug well should be large enough for safe maintenance by the users (at least 120 cm. In diameter), have well lining reaching the water-bearing aquifer, and have capping and an apron large enough to avoid return seepage of wastewater. From observation it appeared that very few wells met these criteria.



Water contamination

Piped Systems

In only one of the piped systems evaluated, the water source was assessed as being at high risk of being contaminated by outside polluters. The spring in Teratak is absolutely unprotected. It is unclear why the implementers built such an unprotected spring catchment. In all other piped systems the risk of contamination was assessed as negligible, as in all cases the sources were well protected and the reservoirs and public hydrants have proper covers. It could be argued that the criteria used for this assessment are too narrow, as it does not include consideration of other sources of contamination, *e.g.,,* ingress into the pipe network. Such considerations may be important in pumped systems for at least two reasons: firstly, the source itself can become polluted if contaminated water flows back to the source when the pumps are turned off. Secondly, because pumped supplies are typically non-continuous, and pipe networks are dry, or only partially full for long periods, polluted water can leak into the network. However, the DKSTBS system was not assessed in this way because the survey team did not have the time or equipment to adequately assess the potential for ingress, and it scored highly.

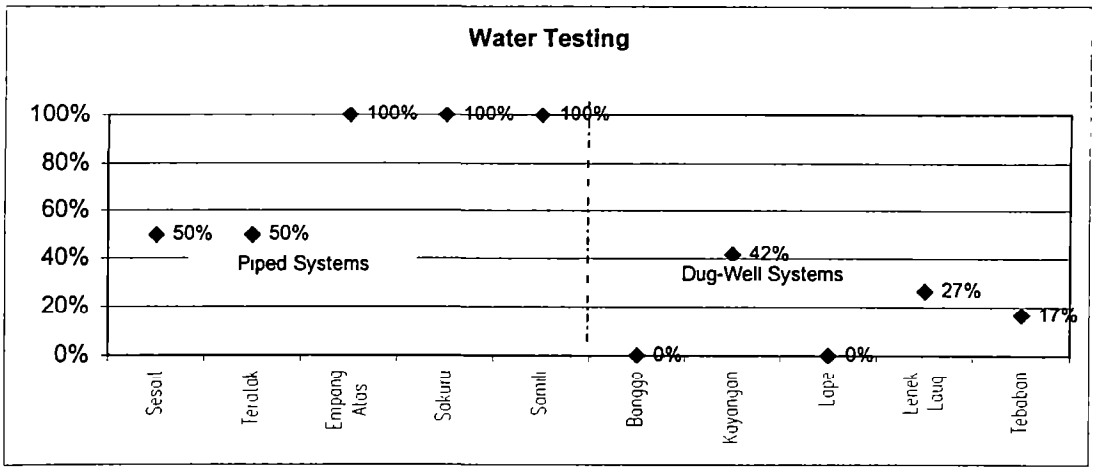
Dug Wells

All the wells in Lenek Lauq have a high risk of being contaminated (*e.g.,* by E. Coli bacteria), since the wells are located close to a river or irrigation ditch which is also the people's traditional place for defecating. In Tebaban, the number of wells with this risk is 40 percent, with some 30 percent in Kayangan and 10 percent in Banggo assessed similarly. Only in Lape does the placement of wells meet the criteria of location more than 10 meters from polluting sources.

Water Testing

Piped Systems

Of the five piped systems assessed, only three water supply systems conduct regular water testing. Under Department of Health requirements, all PDAMs should test the quality of their water supply regularly. This has happened in Empang Atas, Sakuru and Samili. For the remainder, in Teratak and Sesait the source was tested once at the beginning of the project.



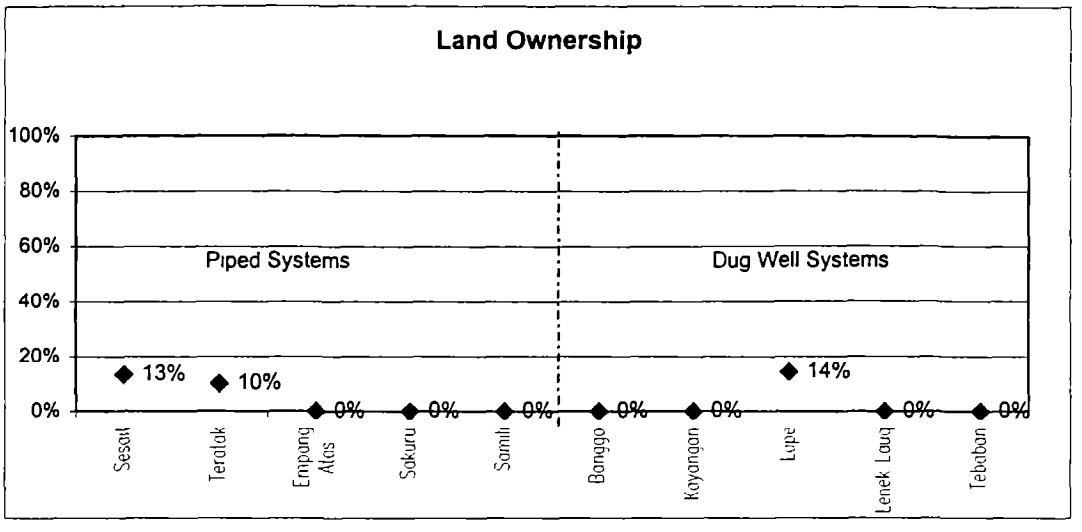
Dug Wells

Normally for a single well, the users do not regularly conduct water testing. Some of the well owners/ users reported that testing was done once at the time of construction. It should be noted that the wells are typically used as people's drinking and cooking source. Should problems of water quality become apparent, the Department of Health has a water chlorination program, but unfortunately this is unpopular with most users since it effects the smell and taste of the water.

Land Ownership and Facility Ownership

Piped Systems

These criteria are important for sustainability. At the time of the survey, the materials being used by the field surveyors had originally been designed for purely community-based facilities, and were not really appropriate to circumstances involving PDAMs. During the course of the studies the measures used were varied to accommodate these circumstances. The changes were subtle, such that ownership was assessed not only in terms of "public" and "private" but whether ownership resided with the principal users of the facilities.



There are many recorded cases of people donating or "sacrificing" land and access rights for public facilities, and which agreements were taken back by the children once the parents die. A written mandate is therefore important to back up the water committee, so as to avoid such practices which could jeopardize the water supply system in the future. Also, it is common that such people feel that the highly subsidized public facility is "owned" by them because they are sacrificing land and providing the biggest contribution.

All the public facilities evaluated were not owned by the principal users, and were not supported with written papers giving any recognition of rights, or formal handing over to the water committee. It showed a low awareness of the community and water committees of the importance of formal ownership arrangements.

Dug Wells

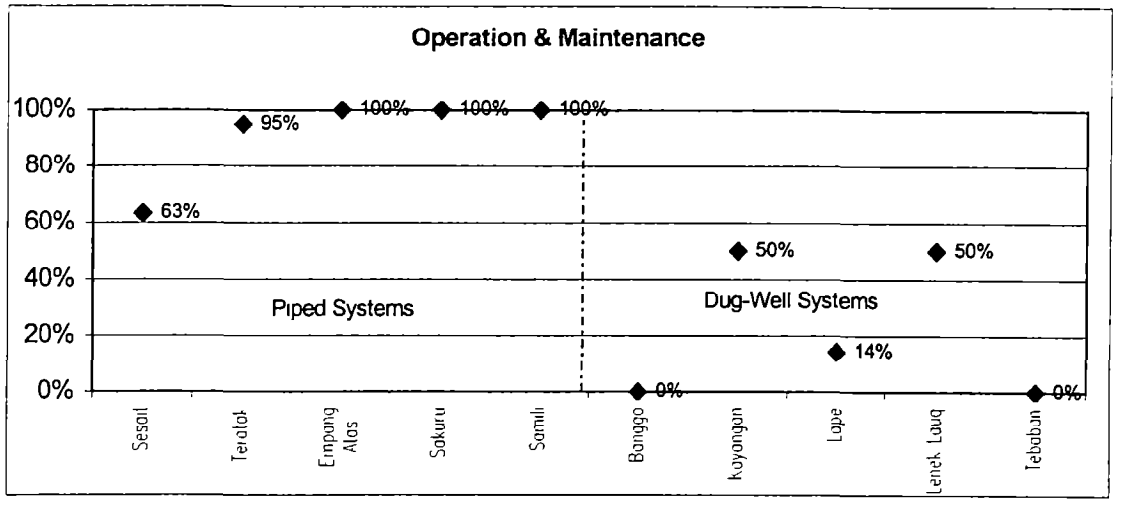
The project began the construction of dug wells with a stimulant approach. The community was provided with fixed amounts of material such as: cement, bricks, sand, etc. with the remainder being required to be provided by the community. This strategy created a condition where the wealthy community members appeared to have more participation in the development. They are the people who could provide land, cash and other materials needed

to complete the system. Only a few wells in Lape and Tebaban were constructed on public property. Despite the high input of individual families in land provision, most of the villagers do not consider the facilities constructed by the project as privately owned. Relatively few families did not allow other people to use the facilities after they were constructed.

Operation and Maintenance of the Water Supply systems

Piped Systems

To be sustainable, a piped water systems should have an organized water supply management system, demonstrated abilities in operations and necessary trades skills, as well as a system of regular users' fee collection, and maintenance plans. Overall, the piped systems assessed met these criteria, in most cases with these responsibilities falling on the PDAM. In such circumstances, particularly where the users do not have ownership of the facility, there is an issue with the effectiveness of maintenance arrangements, as is reflected in the previous discussion on the condition of facilities. Sesait scored lower compared to the other systems, since at this site, users of the public facilities are not required to pay fees.



Dug Wells

The villagers in all sites have no problem in maintaining the facilities which have been constructed. There was plenty of evidence that the community could rehabilitate the systems, or repair them by themselves. Unfortunately, this burden is most often carried out by the land owner only, and is not shared with other users. Ideally, a regular fee is collected from the users, to meet any costs of maintenance or repair, but in fact there was no well site identified which had adopted this system.

4.2.1 Additional Findings regarding Water Supply Systems

Coverage of water supply systems assisted by the Project

The average coverage of the project-assisted piped water systems is 57 percent of total population within the service area (based on village or hamlet size depending where the project intervention is located). For dug well sites the percentage is slightly lower with a coverage of 46 percent. The total number of dug wells facilitated at each project site is very uneven. In Lenek Lauq, for example, the project assisted 113 wells (including rehabilitation), compared with only 29 and 32 units in Banggo and Tebaban respectively. The reasons for this are unclear, but could reflect coverage by existing facilities, and the willingness of communities to participate in the program.

Water Availability, utilization and quality

Almost all the water supply facilities assisted under the project were used as people's drinking and cooking water source. For other purposes like bathing and washing the people tend to use other water sources like irrigation ditches, rivers, etc. The reason for users of Type "B" systems using alternative sources for bathing and washing was to reduce their water charges. In the case of dug wells, the people feel more comfortable to use rivers or public bathing and washing facilities. It is also of interest to note the variation in preferred source with the seasons.

Physical Condition and Performance, Operation and Maintenance

The age of the water systems inspected vary from about 2 to 6 years. In general, the Type C water systems, both piped and non-piped, are in good condition, although some are slightly damaged. The communities managed the construction of these facilities, even in those cases where they hired local contractors/artisans to build some works. Supervision was by the community and the project facilitators.

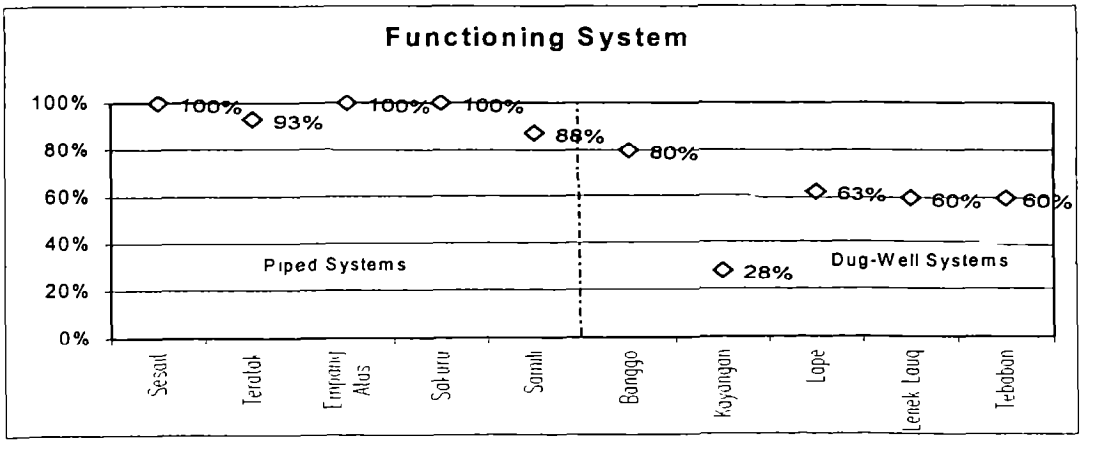
In contrast, the public facilities of the Type "B" systems are seriously deteriorated, although the water flow is not yet affected, except when taps are broken or leaking. These public hydrants, which are now only two years of age, were constructed by contractors under the control of Ministry of Public Works (PU Cipta Karya). Even though these facilities are in very poor physical condition, the users do not complain as long as the facilities provide them with enough water. There is a long-term problem of maintenance of these facilities, and this is also linked to the issue of ownership. In several cases visited by the team, it appeared that the community users' group was capable of making quite major repairs (even more capable, and certainly more responsive than the PDAM); however, as the facility is not owned by them, they are not able to undertake the necessary repairs. In other cases, although the incentives and willingness were evident, the users' group required additional facilitation, including appropriate tools and training, to be able to undertake other than minor maintenance tasks.

Given that the construction, operation and management of these systems has been outside the control and influence of the community (all by PU – Cipta Karya/ P3AB and PDAM), these systems would be better described as Type A, rather than as Type B. It was evident from consultations with the PDAMs that the concept of Type B systems was not widely understood. Notwithstanding this, the fact that public facilities, based on users' groups, were proving successful in several locations, demonstrates that the concept could have been better developed under the project. Without any facilitation, the current users' groups have proved the viability of key elements of the Type B concept, though for the outstanding elements to be realized would require the active **involvement of the PDAM.**

4.3 SANITATION FACILITIES

A total of 1,317 private latrines (*Jamban Keluarga*) were constructed in the ten study sites between 1993 and 1996. The approach adopted by the project to stimulate sanitation activities (*i.e.*, the construction of latrines) was to offer a package of basic materials as a grant in kind to families who are willing to contribute the remainder of materials and labor necessary to complete the installation of a family latrine. The project also provided technical assistance including design and construction details. The grant package included 2 bags of cement, a durable toilet pan (polypropylene squat plate), 1 to 1.5 m of 3-inch PVC pipe and a quantity of 8mm reinforcement steel. The project's technical advice was mostly concerned with the details of the main elements of the toilet at and below ground level, *i.e.*, the squat plate and flushing arrangements, the type and detail of the treatment pit, and the connection between them. The superstructure was the owner's responsibility. Depending on individual preferences and capacity, the families could construct fancy toilets with ceramic tile walls, or one without any permanent walls at all. A single household could contribute from Rp.25,000 to Rp.490,000 to complete their sanitation facility. The project only promoted one basic technical option, a pour-flush pit latrine with an offset pit. While this proved to be a popular and culturally appropriate option, affordable design choices for poor to very poor families were not explored.

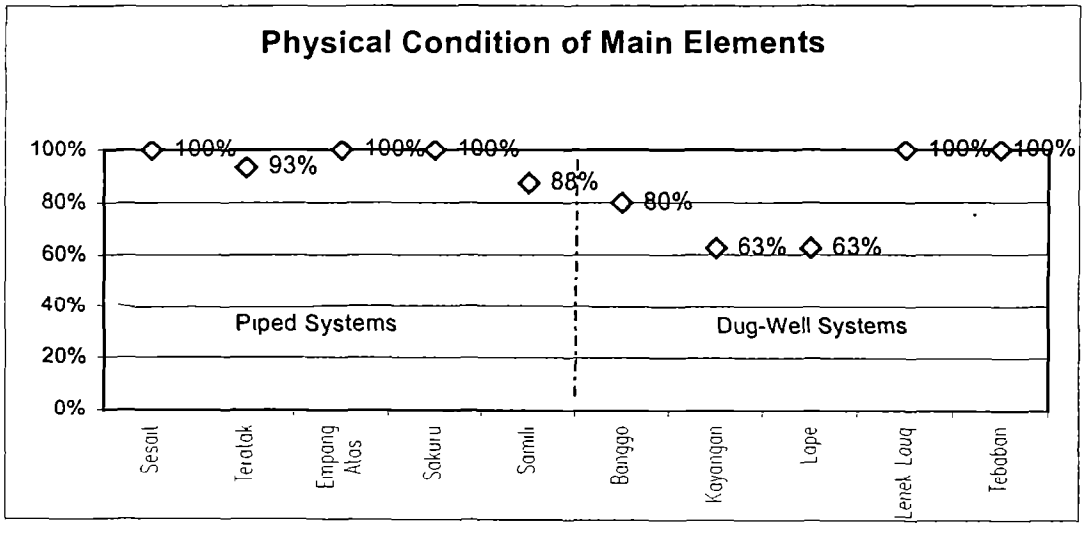
1. Functioning System



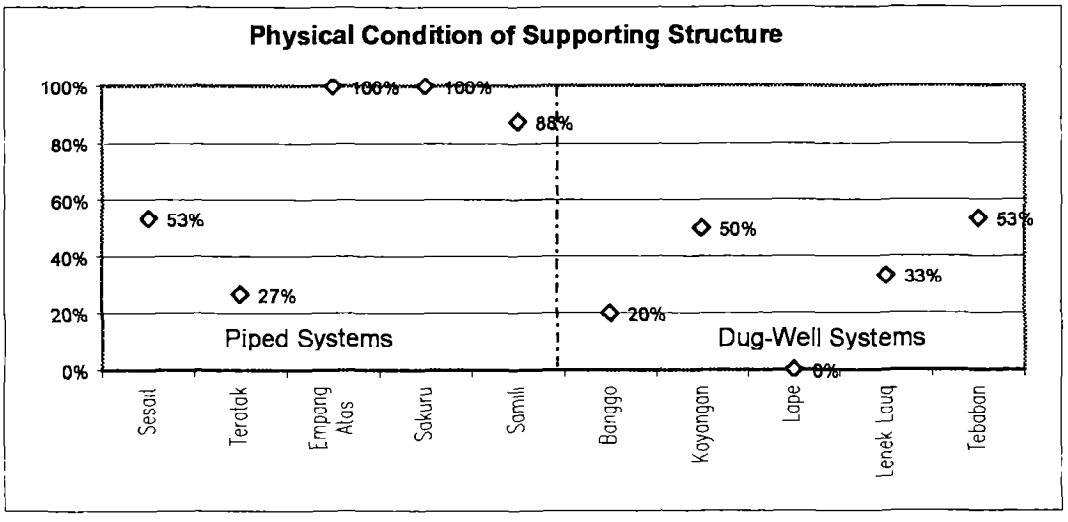
Overall, the sanitation facilities constructed on sites with piped water supply systems performed better than those facilities constructed on sites with dug wells. In most households with latrines, the latrine was only used for defecation a part of the time. Further analysis of latrine use patterns can be found in Chapter 5.

In Kayangan (Sedutan), the latrines function very poorly compared with the other sites. Less than fifty percent are working and useable. The reason for this is the scarcity of water. Not much better are the scores of Lape and Lenek Lauq. In Lenek Lauq the people still prefer to go to the river or ponds rather than using their latrines, and in Lape many of the systems are broken. Lenek Lauq and Tebaban are villages under the administration of Kabupaten Lombok Barat. In this area, the Bupati decreed that people who plan to join the Haj pilgrimage should have a latrine at their house to be eligible for any assistance. Perhaps this explains why Tebaban scored relatively highly.

2. Physical Condition

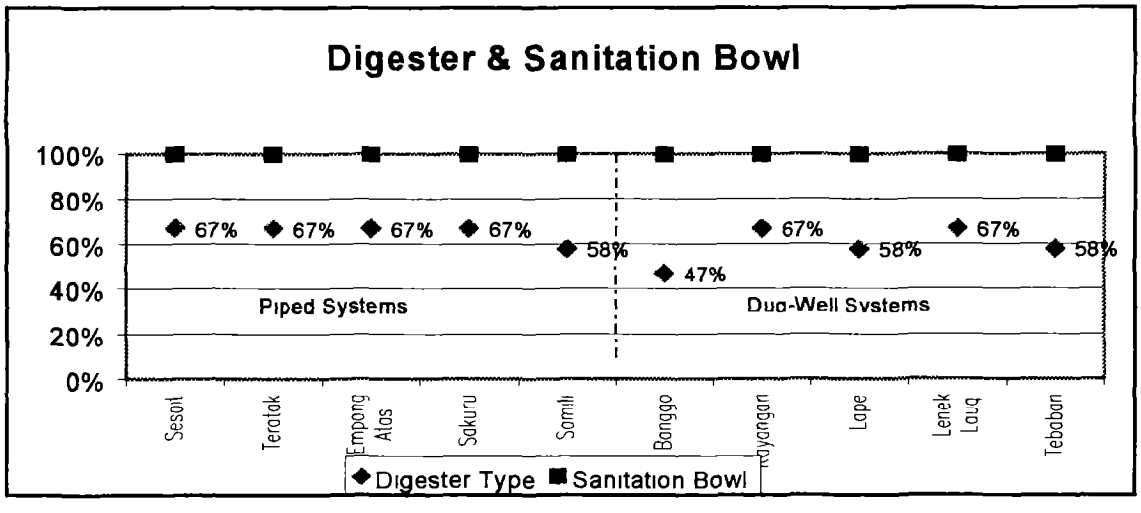


The physical condition assessment for the whole sanitation facility was split into two parts. First, the substructure was considered, consisting of: concrete slab, sanitation pan, pipe and pit; the second part is the supporting structure including the water tank (*bak*), plastering and walls. It is interesting to note that people in nearly all sites do not seem to care much about the quality of the supporting structure, in both piped water supply and dug well sites. It is not unusual to see latrines that appear to be used regularly with no walls in such locations, while others have a temporary structure for a sarong or other material drape. In Banggo the community reported that they only used their latrines at night. Only in Empang Atas and Sakuru sites did the assessments score at maximum rating.



3. Type of Digester and Sanitation Bowl.

The project introduced options for the type of digesters for the treatment of the latrine waste The community could construct a fully lined septic tank, with brick, rock or pre-cast concrete lining, semi-lined pits with unsealed concrete ring lining, or an unlined pit The final decision was left to the villagers, depending on their ability to provide the materials, though reportedly with technical advice from the project based on contamination risks (depth of water table and like considerations). It was often found that people utilized one pit for two latrines, with same pit dimensions as for a single latrine. Such pits would obviously fill more quickly.

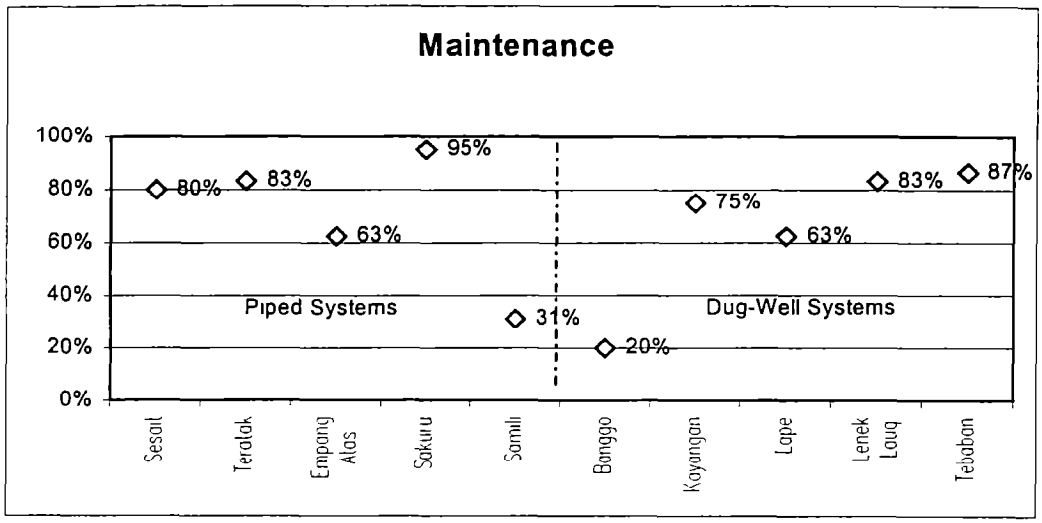


The sanitation bowl was provided by the project Typically this was a durable scratch-resistant plastic (polypropylene) water sealed squat plate. However, there are some households in Sedutan and Lape who are using ceramic pans Most of the people recognized the plastic pan as very good, it is strong, easy to clean and need only a small amount of water to flush. The disadvantage of this type of pan is that it is not available on the open market Many people in Sakuru and Samili are looking for this type of bowl.

The project had obviously ordered large quantities of this pan directly from the suppliers and, while they had proved popular and appeared to have created a follow-up demand, links had not been established to ensure the continuity of supply after the project.

4. Maintenance of the Sanitation Facilities

The people who are utilizing the family latrines are maintaining the sanitation facilities relatively well, except in Banggo and Samili. In both of these sites the facilities were maintained very poorly; the users do flush the toilets after use, but they do not care too much for the cleaning of the facilities.



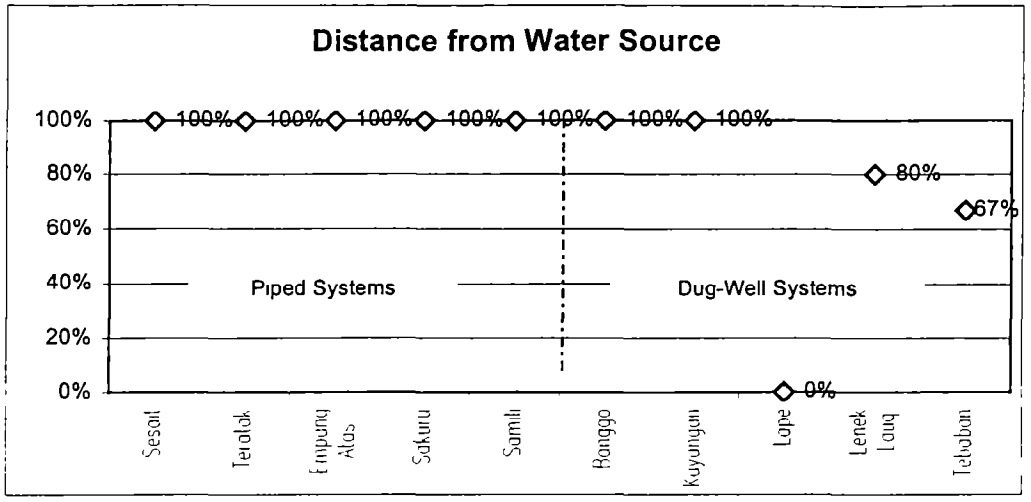
5. Distance to Drinking Water Source

In three villages, Lape, Lenek Lauq, and Tebaban several of the latrines are constructed too near to their drinking water sources, which were dug wells. In Banggo and Sedutan, where the people are also using dug wells, the latrines were located at a safe distance from the wells. Also in the remaining sites, where they have piped water supply systems, the latrines were constructed well away from other competing drinking water sources.

6. Replicability

While there seems to be latent demand for convenient and private sanitation facilities, at all the sites there was no evidence that additional households were building sanitation facilities without further subsidies on their own initiative as a result of the "stimulant" program of the project. The only other evidence relating to this issue was the stated demand for more of the polypropylene squat plates provided by the project, though it was not established that this was the only constraint affecting motivation to construct more latrines. There are many possible reasons for this, including affordability, low real demand in the absence of subsidy or project encouragement, lack of technical assistance, no source of latrine pans, etc. This is

a complex issue that deserves further study to inform the design of future sanitation programs.



Supplementary Observations

- The availability of water (distance from water source) plays an important role in the success of the sanitation programme, with the presence of a house connection being a major motivational factor leading to increased latrine use (see Chapter 5 for further analysis);
- A stimulant approach may benefit only (or mostly) the relatively wealthy people who can afford to provide the additional materials and cash needed to construct the facility. A range of technical alternatives covering a wider range of costs may enhance the participation of the poor in sanitation programs;
- High levels of community "contributions" that are brought about through coercion (*e.g.*, necessary in order to be eligible for the Haj pilgrimage) or as a result purely of project "rules" do not necessarily ensure that people will effectively use the facilities they have built.

The motivations behind an individual's decision to build a latrine may be different from those encouraged by the project (*e.g.*, health messages). People may build sanitation facilities for a wide variety of reasons, including that they are coerced into doing it. The primary *initial* motivating factors seem to be convenience, privacy, and in some instances prestige.

5. PARTICIPATORY ASSESSMENT RESULTS

Participatory assessments were carried out with groups of village men and women in the 10 villages selected. The aim was to understand community perceptions of project outcomes and rationale for their perceptions.

The results are presented and discussed in the following sections:

a. *Access to and Use of Services*

b. *Community View of Level of Functioning of Services*

c. *Community Management and Financing*

d. *Community Participation in the Project Process*

e. *Impact of project on Quality of Life*

f. *Current community awareness of hygiene and environmental health*

5.1 ACCESS TO AND USE OF SERVICES

5.1.1 Water Supply Facilities

Access information was gathered from records available with village leaders and Water Committees and verified from maps (Annexed) drawn by community groups showing location and number of facilities vis-à-vis homes of the rich, poor and middle economic classes of the village. The classification of households in these three categories was done by communities in every village, using locally relevant criteria. In general, the criteria were higher for *Sumbawa, i.e.,* characteristics which would classify a household as "middle economic category" in *Lombok* were classified as "poor" in *Sumbawa*. The "rich" in *Lombok* were similar to the "middle" category in *Sumbawa*. A summary of the criteria used by community groups can be seen in *Table 5.1.*

In the 10 communities visited ESWS-supported clean water facilities were serving between 14 and 100 per cent of the target population. On an average *Lombok* villages were better served (>70 per cent households) than *Sumbawa* villages (around 30 per cent of households). Piped systems serve about 57 per cent of village/hamlet households, where they are located. Dug wells serve approximately 46 per cent.

In 3 villages with the piped systems, between 63 and 100 per cent user households had official house connections from PDAM. These were in *Empang Atas, Sakuru* and *Samili,* where the systems were more A-type systems than B-type (as they had been originally designated). In 2 villages with C-type piped systems (*Sumur Pande* and *Teratak*), house connections had been taken from public taps by 37 – 49 per cent of user households. Since

house connections from PDAM cost Rp.125,000 – Rp.400,000 to get and house connection holders pay higher monthly fees, the bulk of these households are in the "rich" or "middle income" category. 52 per cent of the population in these villages falling in the "poor" category account for only 6 per cent of all house connections. *(Figure 5.1)*

This implies that the majority who are poor depend on public taps, public hydrants and public dug wells – which should, ideally, be distributed equitably or with some bias towards the poorer households. Except in *Sesait (Dusun Sumur Pande)* and *Teratak (Dusun Ketangge),* this does not seem to be the case. See maps in Annex F). These two were also the only villages where there were well organized community structures to collect and manage user fees, operate and maintain water supply services at both tap level and village level.

The process of delivering services largely determined the patterns of access. Dug wells were sited on land contributed by the community. This was usually private land given by a better-off landowner, who also provided food to well-construction teams. Although the dug wells were designated as public facilities, the process of siting then on private land tended to confer informal ownership and responsibility for maintenance on the owner of the land. Most dug wells end up being located on land adjoining the house of a rich or middle-income villager, which could be considerable distance away from clusters of poor households in the village.

It is unclear what criteria were used to decide the number of public water facilities in each village. *Batu Peraga Dusun* in *Lape* (256 households) and *Sidutan Dusun* in *Kayangan* (141 households) received a total of 7 and 6 dugwells respectively. *Bango* (589 households) and *Tebaban* (1231 households) received 29 and 32 . *Lenek Lauq* (885 households) received 113.

Table 5.1

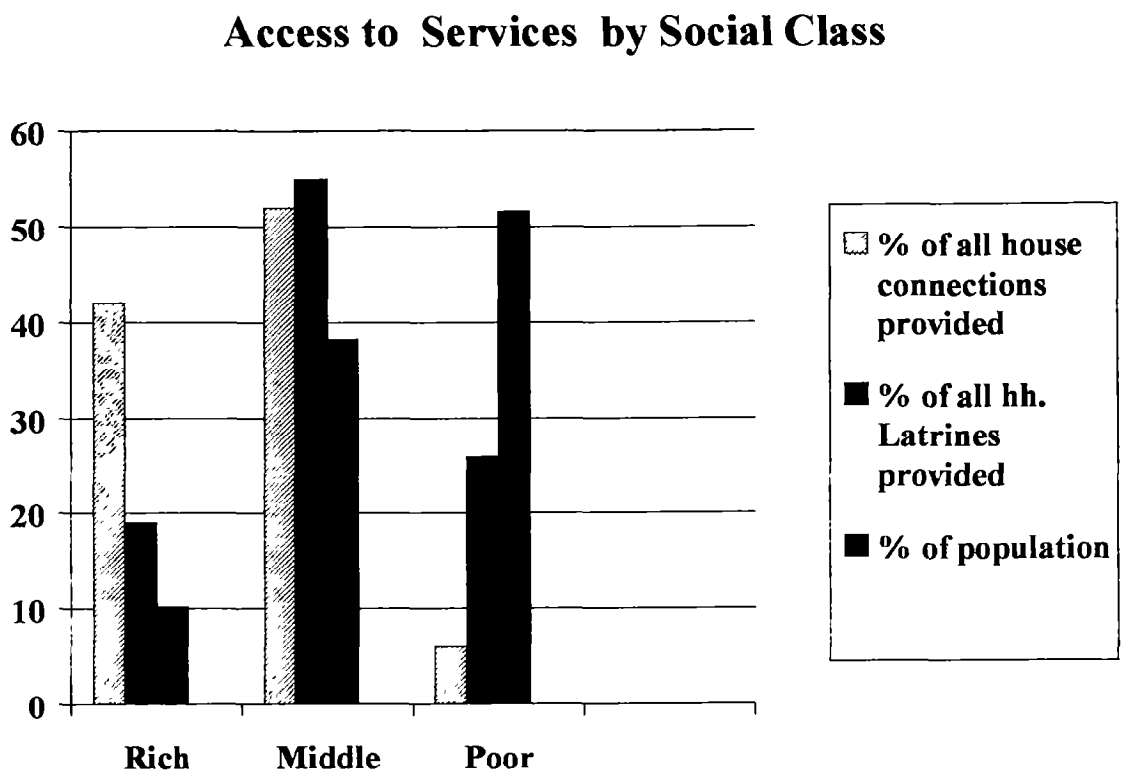
WEALTH CLASSIFICATION : NUSA TENGGARA BARAT

Criteria Used to Describe					
Poor	F	In-between	F	Rich	F
Children education Elementary - Junior High School	6	Children education Junior - Senior High School	6	Children education Senior High School - college	10
l ownership of land 0-2 hectare	12	ownership of land 0 5 – 3 hectare	11	ownership of land 2 – 10 hectare	18
Do not have permanent house (no permanent floor)	9	Semi permanent house (with cement floor)	6	Permanent house (with cement floor)	12
House with 9 pillars / stilts	5	House with 9 - 12 pillars/stilts	5	House with 12 - 18 pillars/stilts	5
Occupation · peasant farmer / unskilled laborer	11	Occupation farmer, trader, government employee	14	Occupation · farmer, trader, government employee	22
Eat twice a day	1	Occupation . peasant farmer	3	Eat 3 times a day	2
Have food reserve for 1 week or less	5	Eat 3 times a day	2	Have food reserve for up to 1 year	8
Have few chicken	3	Have food reserve for up to 6 months	4	Have lots of chickens	3
Have few livestock	5	Have few chickens	2	Have livestock 10-30 heads Can be up to 100	18
Size of household : up to 12 members	2	Have livestock 1-9 heads	8	Size of household up to 5 members	2
Annual earnings Rp 0 5 mill 1.2 millions	3	Size of household : up to 8 members	1	**Have latrine**	3
Have no latrine	4	**Have latrine**	2	Annual earnings Rp.2.5 – 10 million	4
Have clean house but dirty surroundings	1	Annual earnings Rp. 1 mill.-2 5 million	3	Have clean house, sweeping twice a day	2
Have no access to credit	1	Have clean house	1	Color TV, VCR, Refrigerator, fan	10
Have radio	2	Have Black & White TV 14"	5	Parabola	5
Have Black & White TV	1	Have radio	3	Have Telephone set	1
Bicycle	3	**Have small access to credit (Rp. 50,000)**	1	**Have access to credit up to milllons ruplah**	1
Using detergent for washing	1	Bicycle	3	Have cars	5
		Motorcycle	4	Motorcycle	3
Use detergent for bathing	1	**Using soap for bathing**	1	**Using soap & tooth paste**	1
				Have hand pump	1

Mapping access of the Rich and Poor to services in BANGGO, DOMPU

Identifying which water source was used for what purpose and why, before and after project interventions... in BANGGO

Figure 5.1



Villagers reported only being informed of the type and approximate numbers of facilities that will be constructed. There were no attempts to assess users' preference or demand.

5.1.2 Water Sources Used: Before/After Project

Community usage of available water source for different purposes before and after the project was explored using pocket voting Groups of about 25 men and women were presented with a matrix showing pictures of water sources along tops of columns. The pictures were chosen by them from a larger set, to depict only the types of source available in the village Pictures of three major types of users were placed in 3 rows on the left hand side. These were pictures showing Drinking and Cooking, Washing and Bathing, and non domestic users such as watering cattle or irrigating kitchen gardens. Envelopes were attached in place of cells in the resulting matrix Men and women were given card tokens to place in relevant envelopes to indicate which sources they used for what purpose Pocket voting was done twice using two different colored voting tokens The first voting was for water sources used before the ESWS project, and the second voting for the water use pattern after the ESWS facilities had been established Results were consolidated publicly by counting both types of token in each envelope. The results were then discussed with the group, to understand their reasons for the emerging pattern of use and changes in use

In aggregating responses from different villages care was taken to draw average figures on the basis of the numbers of villages that had each type of source. Nevertheless, it is emphasized that it is more relevant to focus on the patterns that emerge rather than the individual percentages while interpreting the results. *(Figures 5.2a – 5.2c)*

The following conclusions emerged from pocket voting:

- The ESWS project has enhanced the availability of clean water significantly in the study villages through public hydrants, public taps, household tap connections and dug wells

- In the study villages, piped systems (household taps, public taps and public hydrants), are benefiting twice as large a proportion of users as are benefiting from dug wells. *(consolidated responses from all villages in Figure 5.2c)*. The most frequent use of piped water is for drinking/cooking, followed by washing and bathing. It is used for non-domestic purposes only about half as often as for drinking/cooking purposes. Because these supplies are metered, people restrict their use to essential purposes requiring clean water. Thus the project objective of shifting community usage from unsafe traditional source to safer sources for drinking, cooking and hygiene are achieved in the case of piped water systems.

- Dug well water is used almost equally for domestic and non-domestic purposes, *e.g.,* watering animals or irrigating kitchen gardens. As illustrated by *Figures 5.2b* and *5.2c,* the dug wells have added to the overall water availability, making only small changes in sources used for drinking and cooking water, as users reported being frequently dissatisfied with the quality of dug well water.

- The effect of Project intervention can be seen on the use of other sources in the accompanying bar chart. The changes from other sources to project facilities are most marked in villages with piped systems *(Figure 5.2a)*. After project water facilities were established, communities seem to have reduced their usage of older (non-ESWS) dug wells for all purposes. They have also reduced their dependence on natural springs for domestic purposes. They no longer take drinking water from ponds. They use river and canal water less often for drinking and washing purposes. Rivers and canals remain the most important source for non-domestic uses both before and after the project, due to their being free sources and convenient locations, *e.g.,* flowing along crop fields *(Figure 5.2c)*.

- All of the differences seen in the Before/After picture on water use cannot be attributed to ESWS. During the same period hand pumps were provided from another project in 4 of the 10 villages. Two other villages that received ESWS dug wells already had a few piped water outlets. One village that received piped water also reported having received a few dug wells from the project.

Figure 5.2a

PERCENTAGE OF RESPONSES FROM POCKET VOTING ABOUT WATER SOURCES USED FOR 3 MAIN PURPOSES, BEFORE AND AFTER PROJECT INTERVENTION
(Villages with Piped Water Supply Systems)

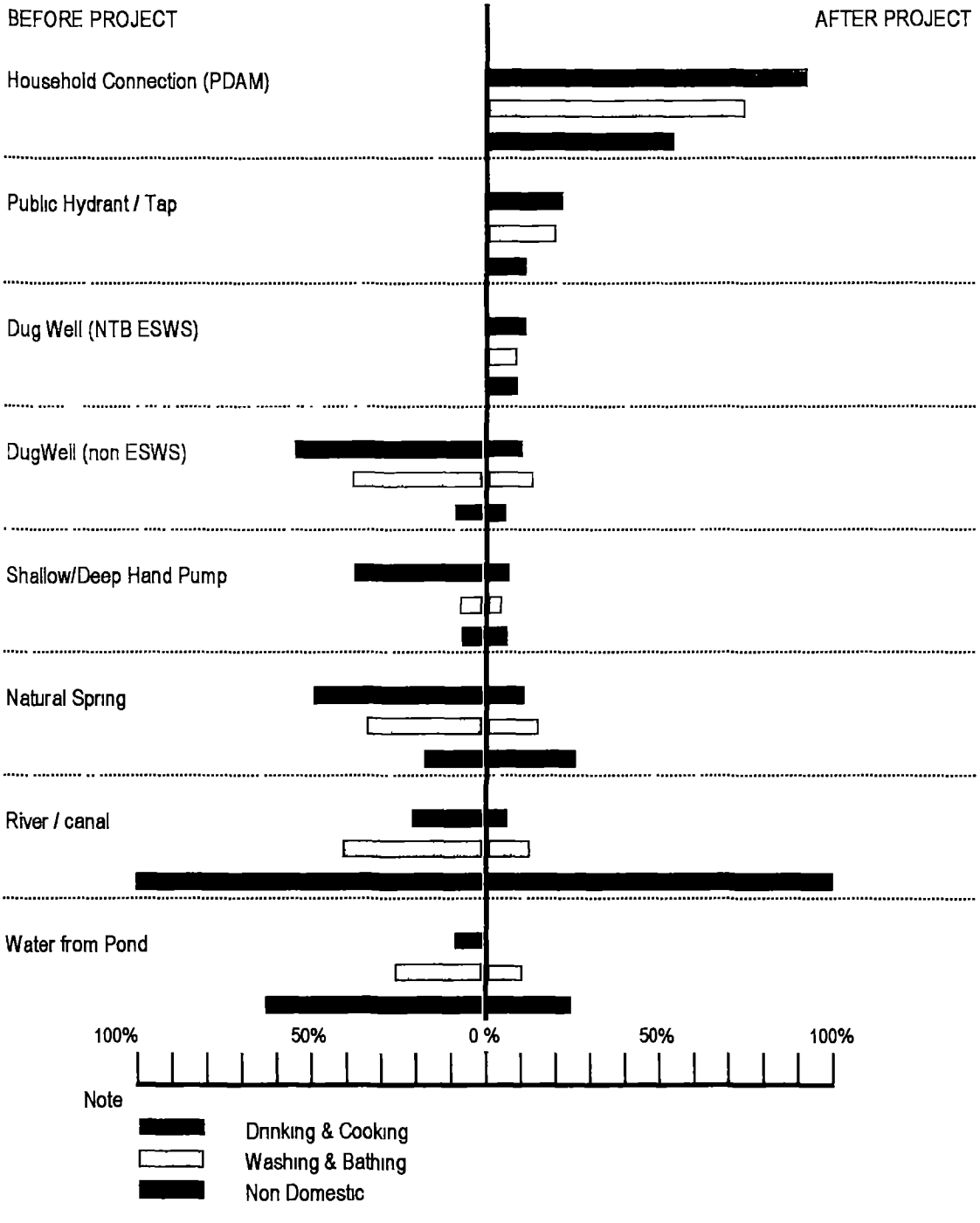


Figure 5.2b

PERCENTAGE OF RESPONSES FROM POCKET VOTING ABOUT WATER SOURCES USED FOR 3 MAIN PURPOSES, BEFORE AND AFTER PROJECT INTERVENTION
(Villages with Dug-Well Systems)

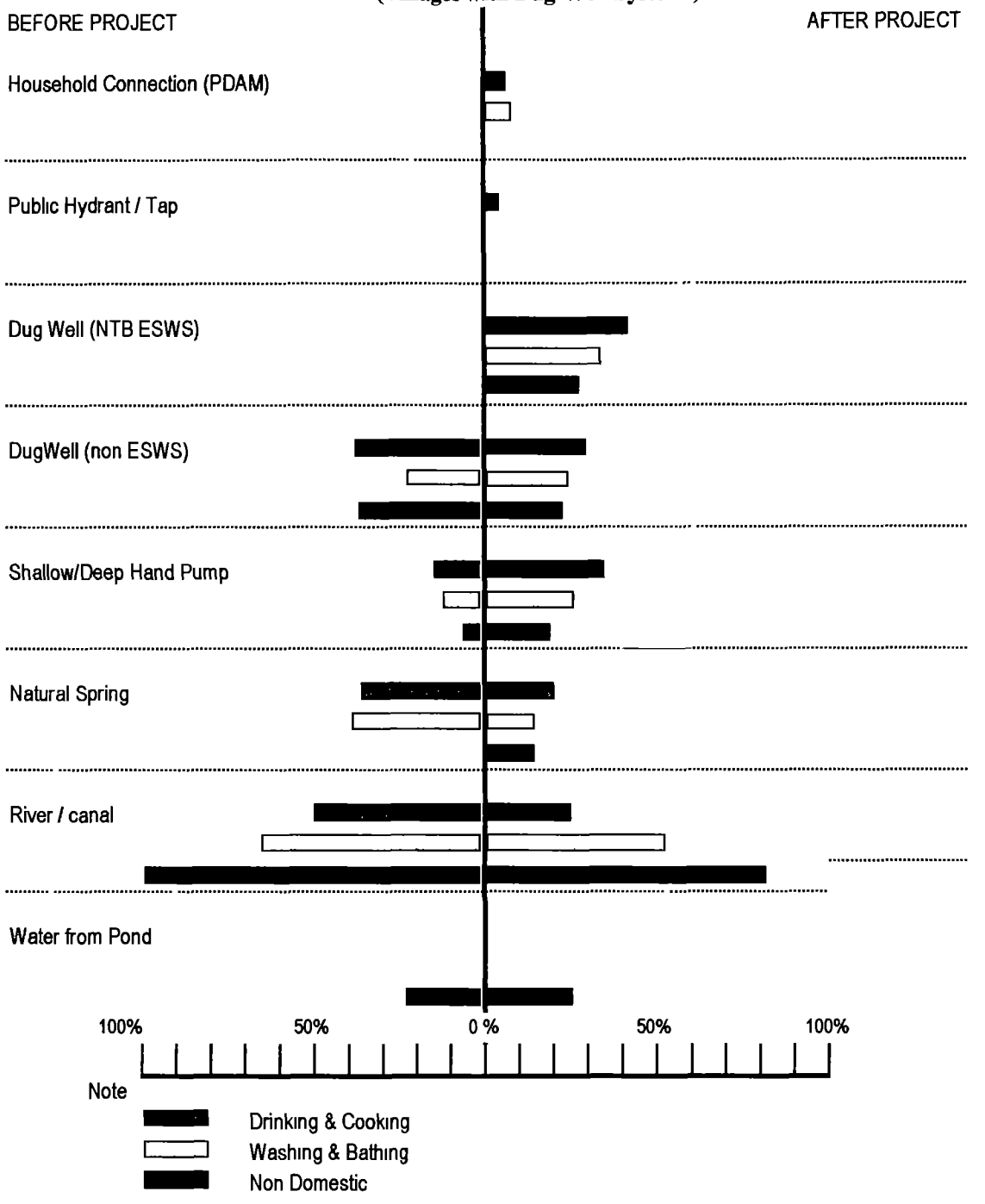
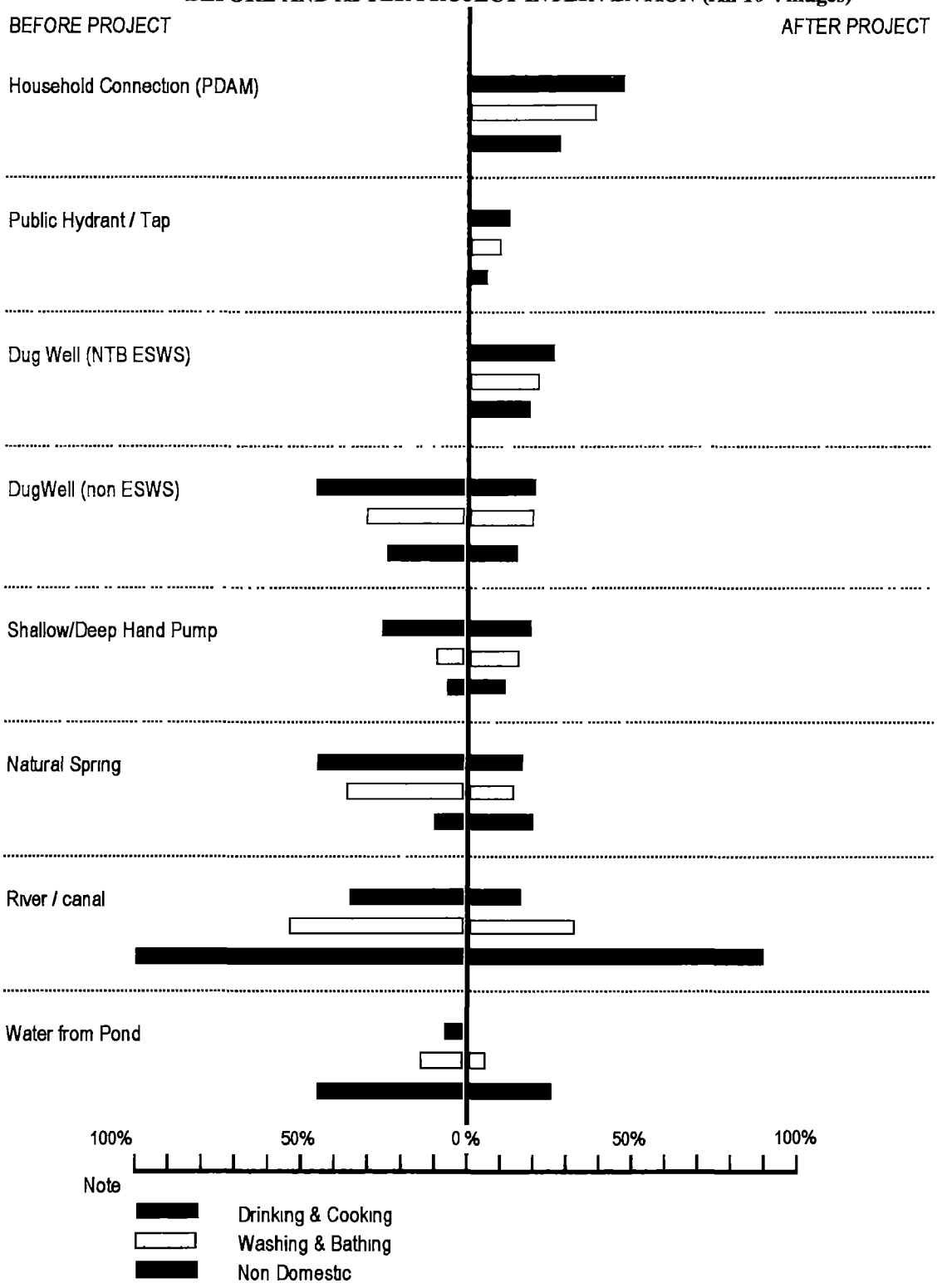


Figure 5.2c

PERCENTAGE OF RESPONSES FROM POCKET VOTING
WATER SOURCES USED FOR 3 MAIN PURPOSES,
BEFORE AND AFTER PROJECT INTERVENTION (All 10 Villages)



5.1.3 Sanitation Facilities: Access and Use

Sanitation facilities made available by ESWS in these 10 villages included new and rehabilitated public household latrines and washing and bathing facilities. As they were very few in the 10 selected villages, this evaluation deals only with household latrines.

Sanitation coverage seemed to vary with the type of water supply technology. In villages served by dug wells latrines constructed covered about 14 per cent of all households. In villages with piped-systems latrine coverage was nearly thrice as high, *i.e.*, 38 per cent.

However, the number of latrines constructed is rarely an accurate estimate of access. The concept of access is linked to the proportion of latrines functional at any given time and the pattern of actual use, consistently or otherwise, by men, women and children. Usage has much to do with the way household latrines are provided to the potential users. ESWS implementation required a specified numbers of toilets to be constructed in keeping with annual targets. This caused a downward distribution and allocation whereby villagers were informed that their village would get X, Y or Z stimulant package for building their own toilets. The following table shows the numbers of toilet constructed and reported by villagers to be in use and *Figure 5.1.* illustrates their distribution in home of poor, middle and rich categories of the community.

Village & Dusun	Total Households*	No. of Household Toilets Built*	Percentage of Population Covered*	Percentage of Toilets Reported Currently in Use out of those built**
Sumur Pande (Sesait)	127	60	47.2	Almost all
Teratak (Ketangge)	145	70	48.2	Almost all
Empang Atas	808	309	38.2	Almost all
Sakuru	704	290	41.2	Almost all
Samili	890	295	33.1	Almost all
Banggo	589	144	24.4	10%
Kayangan (Sidutan)	141	50	35.4	20% (only in rainy season)
Lape (Batu Peraga)	256	22	8.5	36%
Lenek Lauq	885	156	17.6	25%
Tebaban	1231	54	4.3	25%
Total	5776	1450	25	72.9% (Average)

Based on:

a) Records available at village level*
b) Results of Pocket Voting for Defecation sites Before/After Project**
c) Information given by user groups as rationale for their scores on group rating scales for "Usefulness of household latrines"**

While almost all toilets constructed in villages with piped water supply were still in use, only 10 - 36 per cent were being used in villages with dug wells. This feature is common to other WSS projects in Indonesia and elsewhere. Because piped systems brings the water supply to home (all villages had a very high percentage of house connections), they make the pour-flush latrines convenience to use. Dug wells, however, unless located next to latrines, require users to carry water for flushing from some distance. It just is not considered worth the effort! In water-scarce villages this problem is further aggravated. (Reported in *Banggo, Kayangan* and *Lape*).

People expressed a traditional preference to defecate in running water (*i.e.,* a river/irrigation canal) as it is considered 'cleaner'. They also prefer not to have to change habits of defecation in paddy fields/plantations where they work from early morning. It is inconvenient to go home for defecation because of fields are far from homes.

Users in some villages reported coercion used by project functionaries in getting latrines constructed. People who owned land adjacent to their homes which could accommodate a latrine (mostly rich and middle income households) were pressured by heads of hamlets or the village chief (at the request of project functionaries) to accept stimulant packages and build latrines *(Lenek Lauq, Tebaban, Lape).* Some also complain that technical guidance was not available to them during construction, resulting in toilets collapsing into pits within the first year. In the West *Lombok* district, there is a decree by the *Bupati* making it necessary to have a latrine if one wants to qualify to make a 'Haj" pilgrimage. This has caused some forced compliance among the better-off who can afford to make the trip.

All these reasons for not using the latrines constructed were reported in villages with dug wells. It is unlikely that the project used a different approach to implement the sanitation component in villages with piped-systems. Possibly in villages with piped water there was less resistance to the construction of toilets because using them thereafter did not place a burden on the users of carrying water for flushing from a source out of the house.

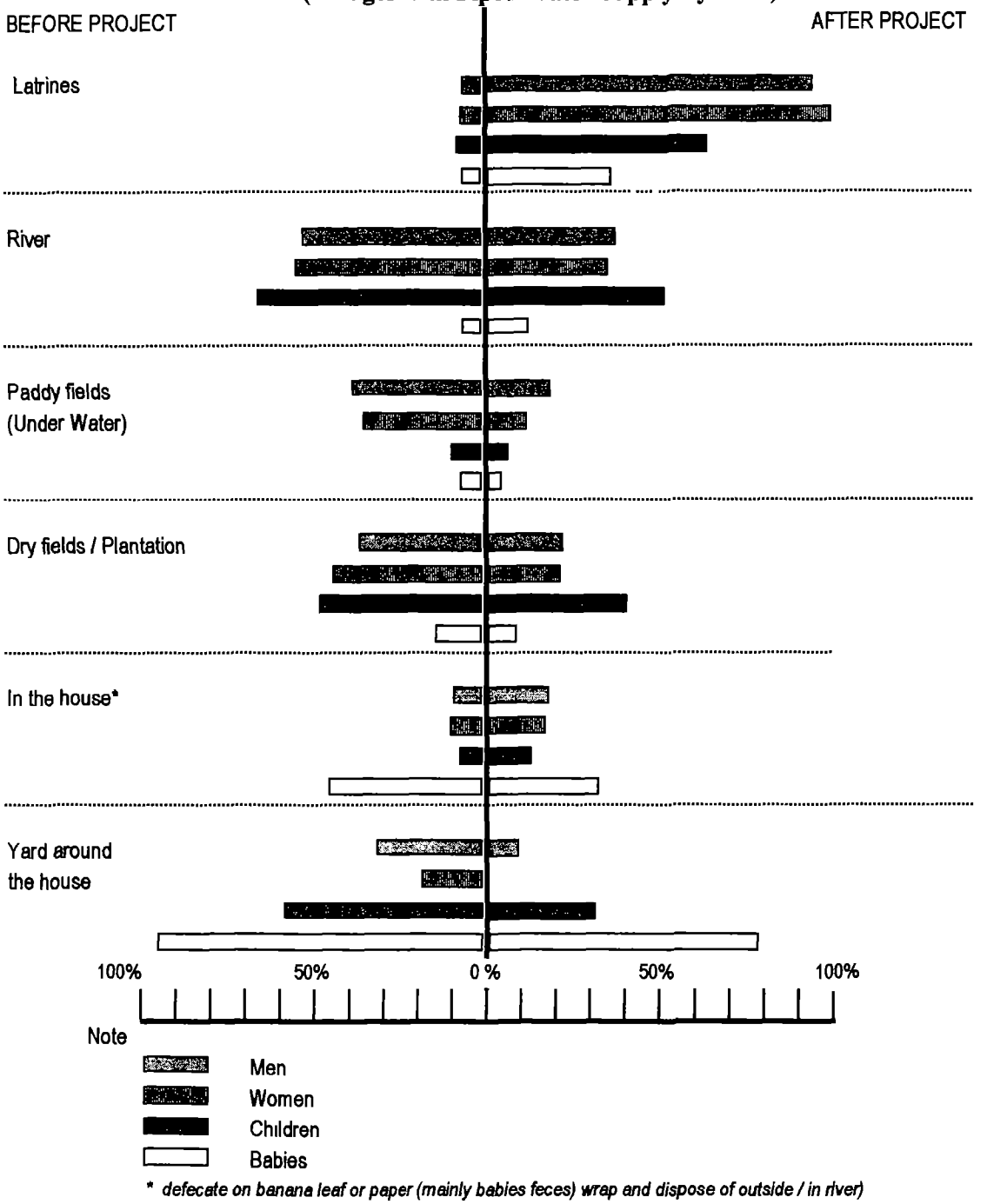
5.1.4 Defecation Habits Before/After Project:

Pocket voting was used to learn about the sites men, women and children used for defecation before and after the project. The process was the same as for water source used, using pictures of available sites placed on tops of columns (*e.g.,* river, crop field, latrine, etc.) and pictures of man, woman, child and baby placed beside the rows of the matrix. The following results emerged (see *Figures 5.3a, 5.3b* and *5.3c)*

- The proportion of latrine users seems to have gone up substantially after the project. *(Figure 5.3c).* The increase is more dramatic in villages with piped water supply *(Figure 5.3a).* Women are the most frequent users, closely followed by men. Children seem to be using latrine a little more than half as often as women. However, even those who do use latrines, are not consistent users, *i.e.,* all the time. Latrine usage is conditional upon where people are when they want to defecate, whether there is a latrine close by and whether water is available to flush it.

Figure 5.3a

PERCENTAGE OF RESPONSES FROM POCKET VOTING ABOUT DEFECATION SITES USED BEFORE AND AFTER PROJECT
(Villages with Piped Water Supply Systems)

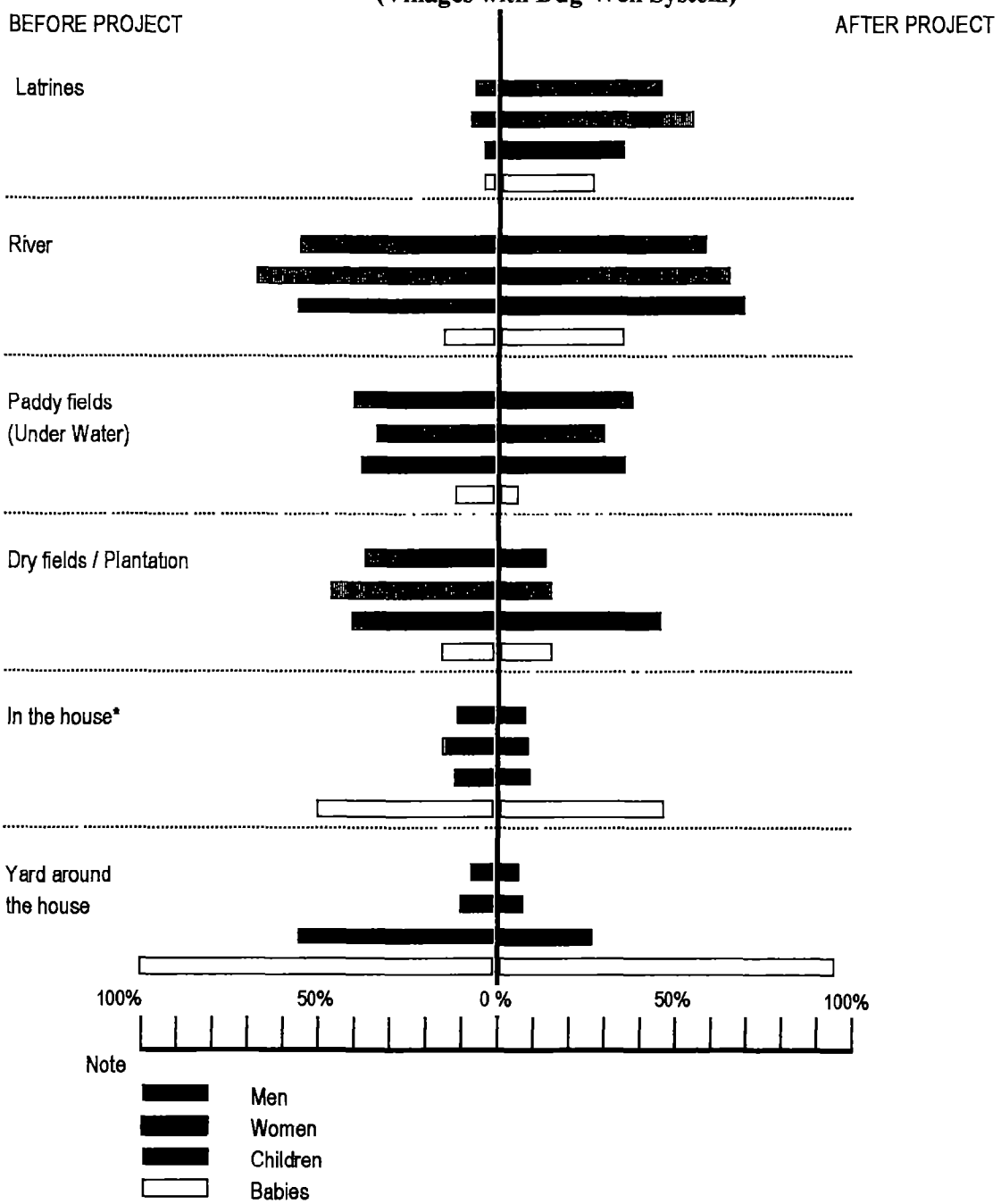


* *defecate on banana leaf or paper (mainly babies feces) wrap and dispose of outside / in river)*

Adults may only urinate on the ground from houses on stilts.

Figure 5.3b

PERCENTAGE OF RESPONSES FROM POCKET VOTING ABOUT DEFECATION SITES USED BEFORE AND AFTER PROJECT
(Villages with Dug-Well System)

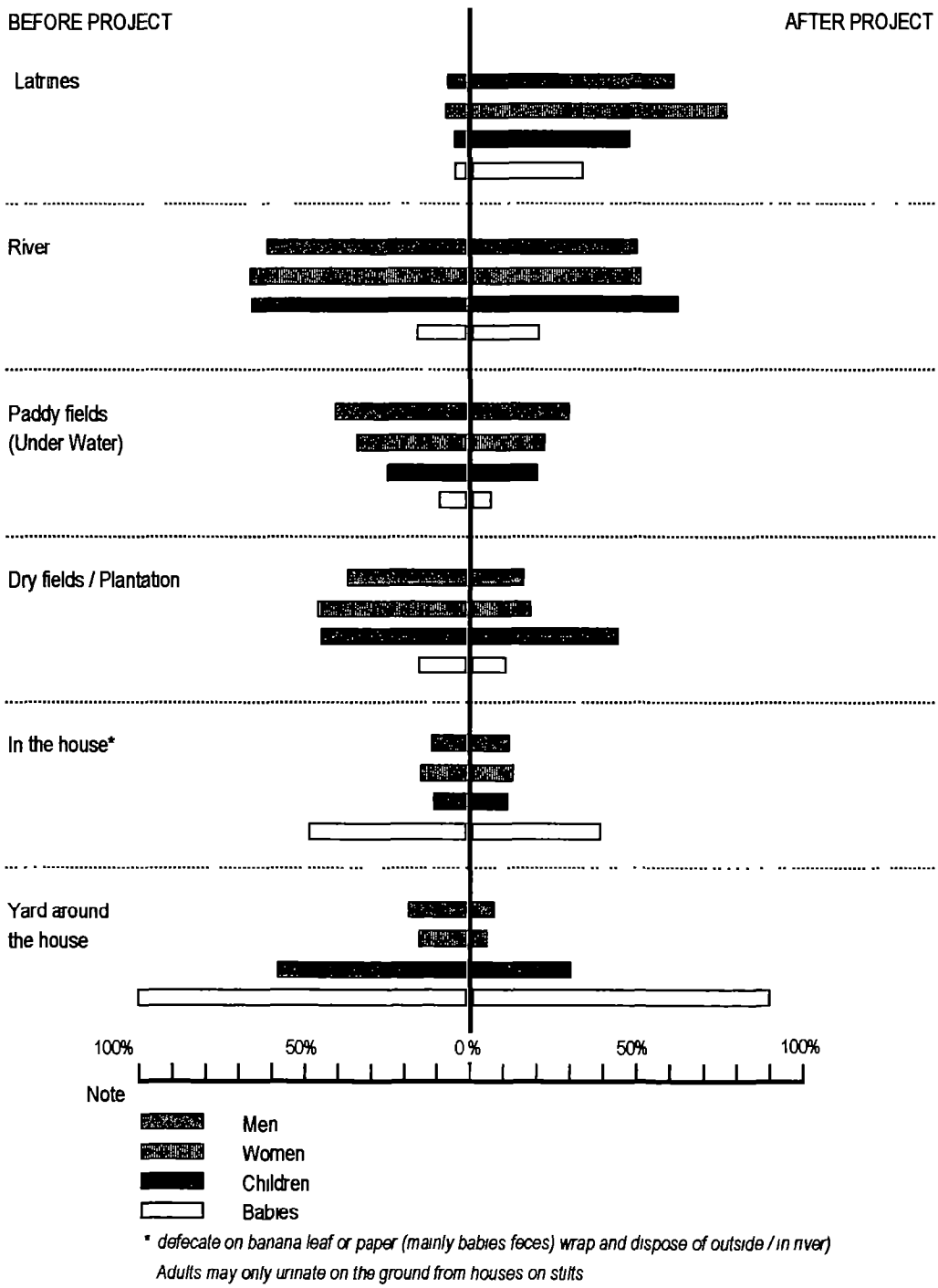


** defecate on banana leaf or paper (mainly babies feces) wrap and dispose of outside / in river)*

Adults may only urinate on the ground from houses on stilts.

Figure 5.3c

PERCENTAGE OF RESPONSES FROM POCKET VOTING ABOUT DEFECATION SITES USED BEFORE AND AFTER PROJECT (All 10 Villages)



* *defecate on banana leaf or paper (mainly babies feces) wrap and dispose of outside / in river)*

Adults may only urinate on the ground from houses on stilts

- Most of those now using latrines have moved from being users of the river, paddy fields, under water and crop fields for defecation. The greatest shift is again by women – as they value the privacy and convenience of a latrine more than men or children. The shift is appreciable in villages with piped water, and marginal in villages with dug wells. *(Figure 5.3b)*

- However, latrine usage by some has not reduced the practice of open defecation by most. Several reasons explain this:

Preferred defecation sites:
- ❖ are close to home/workplace (fields, plantations, clothes washing places)
- ❖ are accessible all the time,
- ❖ have water available always for ease of cleaning
- ❖ are without bad odors, with fresh air (as outdoors)
- ❖ offer some privacy
- ❖ are those that are integrated with local tradition, learned from elders

Rivers and paddy fields meet all these criteria, whereas latrines meet only some or few. In addition, only a small percentage of households have latrines and not all of them have a water supply/source at the latrine site. Some have water only in the rainy season.

- Flowing waters of rivers are preferred sites, as excreta can not be seen after defecation. The water is thought to wash it away and that makes it a "clean, healthy practice".

- When water is scarce, or water sources are considered "owned" by certain individuals, people avoid practices requiring non-essential water collection. This affects the use of pour-flush latrines which constitute a "non-essential" type of water use, due to available alternative sites. This is mostly true of villages with dug wells.

- People who have constructed household latrines may have done so due to pressure from project staff rather than voluntarily (as reported in *Lenek Lauq, Tebaban, Lape*). They see no reason to change their traditional habits are not motivated to make use of the facility.

The above reasons suggest that health improvement may not be assured by the introduction of latrines in the village. Despite a sizeable proportion using latrines for defecation, there seems to be widespread pollution of the environment with excreta. Even those who use latrines are not protected from the health risk due to inadequate hygiene behavior of non-users. The reasons are explored further in this report. They seem to be related to insufficient community dialogues to promote better hygiene behavior, lack of a participatory approach to behavioral change, use of construction-target-oriented and coercive approaches and the required types of skills not-being available in project field teams.

5.2 COMMUNITY VIEW OF LEVEL OF FUNCTIONING OF SERVICES

One particularly revealing aspect of the evaluation was the community's assessment of the extent to which WSS facilities were meeting their demands. This was assessed using group rating scales whereby scales were drawn on the ground, with two ends of the scale marked with pictures depicting "Full satisfaction" and "No satisfaction at all". This was done at sites for common facilities wherever possible. Men and women users asked a volunteer to take up a position on the scale to show where their level of collective satisfaction lay. The volunteer's position was decided after much moving to and fro on the scale until all were satisfied. Generally this represented a consensus reached by the 20 – 25 users present on the scene. For Water Supply the aspects so assessed included: Quality of water, Quantity of water, Regularity of service, Efficiency of management of the service and Fairness of fees. Probing the rationale for users' assessment provided clues about the nature of community demand and preferences, which, if investigated before construction, could have led to a better match between what was provided and what desired. The rating scale summaries are presented in *Figure 5.4* through *Figure 5.6.*

5.2.1 Water Supply Services

Quality: Users were generally more satisfied with the quality of piped water than water from dug wells. Greatest dissatisfaction was with water in some *Sumbawa* dug wells *(Lape, Banggo)* in the dry season and one piped system in *Sumbawa (Samili)* in the rainy season. Dug wells water in the dry season was reportedly too saline to drink in *Kayangan (Sidutan), Lape* and some areas of *Banggo. Banggo* has highly turbid water in wells in the rainy season. Water testing has never been done for wells in these villages, or done only once when constructed. Users' judged good quality by visual clarity, lack of a distinctive or unpleasant taste and lack of odor. By these criteria dug well water was considered inappropriate for drinking in most villages and wells were used mainly for washing and bathing – unless water quality was also a problem.

Water quality was perceived to be lower in *Samili* than in *Sakuru,* both served from the same, "B-type"(in actuality more like an A-type) *DKSTBS* system in *Bima.* The group of users evaluating the quality of water from public hydrants in *Samili* were unanimous in their rating. Reportedly the water contains black particles of suspended matter at times during the rainy season. Since the source is a deep tube well from which water is pumped to all unclear where the problem lay. Possibly there is contamination from leaking pipes or an inadequately protected reservoir that supplies *Samili.* The community management stops at the level of 5 public hydrants inside village *Samili,* all served from the reservoir – which is presumably under PDAM's control.

Quantity: Except taps in *Sakuru* and dug wells of *Lenek Lauq* and *Tebaban,* all systems reportedly experience a reduction of supply in the dry season. The situation is extreme in *Kayangan , Banggo* and *Lape* where wells dry up or produce only cooking water for a fraction of the users.These wells don't have enough water even during rains or the water is brackish. According to users, the wells were dug in the rainy season. Due to the danger of walls caving in, they were dug in haste and not deep enough. As a result they work more as

rainwater collectors rather than as wells. Curiously, a traditional well built by the community in *Kayangan* (where project dug wells were least functional) has sufficient water for all purposes in both dry and rainy seasons. Where dug wells are inadequate, villagers dig temporary shallow wells in the sand besides the river to get drinking water which in their opinion is clean, clear and good-tasting (perhaps a surface-water filtration system would be a better alternative to dug wells here?). *Lape* and *Banggo* have similar problems with wells drying up, but people manage with alternative sources such as hand pumps from UNICEF and shallow wells on river banks.

Piped systems are less affected by seasonal fluctuation in supply than dug wells. One exception was *Empang Atas* where users get water only at night during the dry season. Only 1 out of the 4 public hydrants constructed by PDAM is still working. In *Samili* too, water supply is not available during the day at least twice in week in the dry season. In *Sesait* and *Teratak* (C-piped) the seasonal reduction is probably due to large number of unofficial house connections taken from public taps – which had not been designed for the purpose. In both villages the users reported long queues at public taps, reduced flow in taps in far from the reservoir, house tap owners having to wait a long time for their turn until public tap users and other homes along the line had been served, *i.e.,* household tanks filled. *(Figure 5.4)*

Figure 5.4

USERS' ASSESSMENT OF QUALITY OF WATER FROM SYSTEM

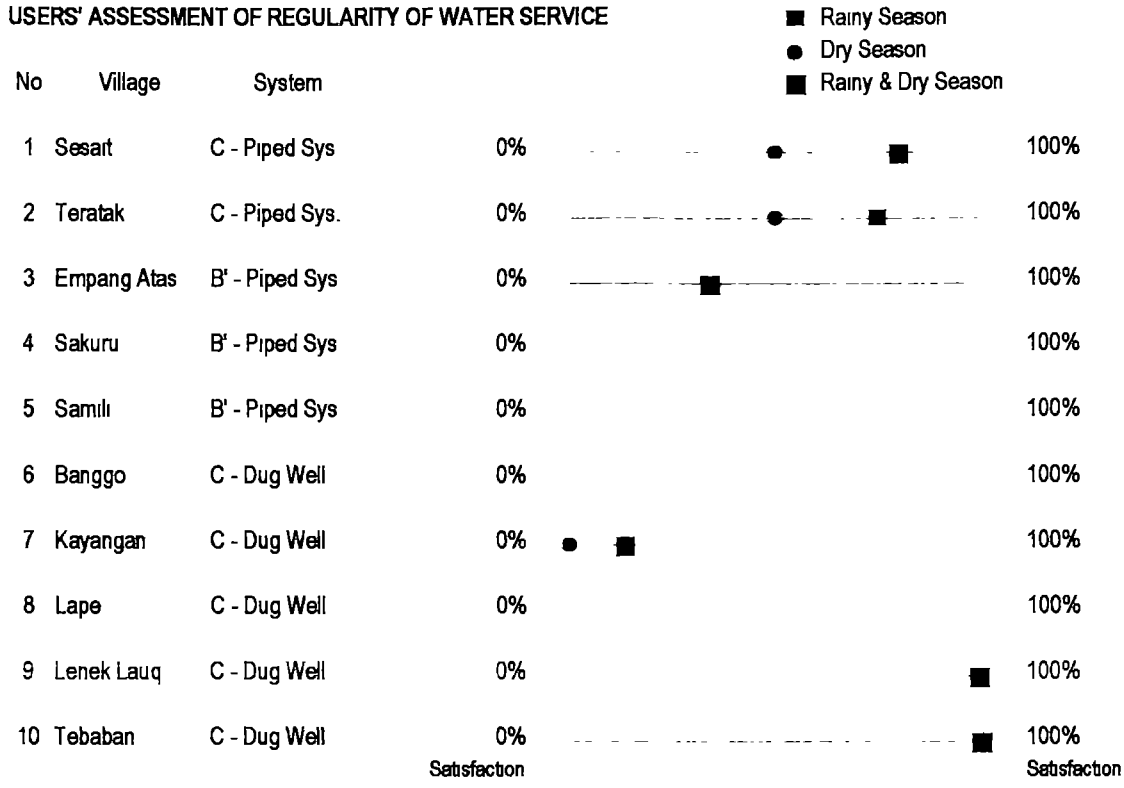
■ Rainy Season
● Dry Season
■ Rainy & Dry Season

No	Village	System		
1	Sesait	C - Piped Sys	0%	100%
2	Teratak	C - Piped Sys.	0%	100%
3	Empang Atas	B' - Piped Sys	0%	100%
4	Sakuru	B' - Piped Sys	0%	100%
5	Samili	B' - Piped Sys	0%	100%
6	Banggo	C - Dug Well	0%	100%
7	Kayangan	C - Dug Well	0%	100%
8	Lape	C - Dug Well	0%	100%
9	Lenek Lauq	C - Dug Well	0%	100%
10	Tebaban	C - Dug Well	0%	100%
			Satisfaction	Satisfaction

USERS' ASSESSMENT OF QUANTITY OF WATER FROM SYSTEM

No	Village	System		
1	Sesait	C - Piped Sys	0%	100%
2	Teratak	C - Piped Sys	0%	100%
3	Empang Atas	B' - Piped Sys	0%	100%
4	Sakuru	B' - Piped Sys	0%	100%
5	Samili	B' - Piped Sys	0%	100%
6	Banggo	C - Dug Well	0%	100%
7	Kayangan	C - Dug Well	0%	100%
8	Lape	C - Dug Well	0%	100%
9	Lenek Lauq	C - Dug Well	0%	100%
10	Tebaban	C - Dug Well	0%	100%
			Satisfaction	Satisfaction

Figure 5.5


USERS' ASSESSMENT OF REGULARITY OF WATER SERVICE
Rainy Season
Dry Season
Rainy & Dry Season
No Village System
1 Sesait C - Piped Sys 0% 100%
2 Teratak C - Piped Sys. 0% 100%
3 Empang Atas B' - Piped Sys 0% 100%
4 Sakuru B' - Piped Sys 0% 100%
5 Samili B' - Piped Sys 0% 100%
6 Banggo C - Dug Well 0% 100%
7 Kayangan C - Dug Well 0% 100%
8 Lape C - Dug Well 0% 100%
9 Lenek Lauq C - Dug Well 0% 100%
10 Tebaban C - Dug Well 0% 100%
Satisfaction
Satisfaction

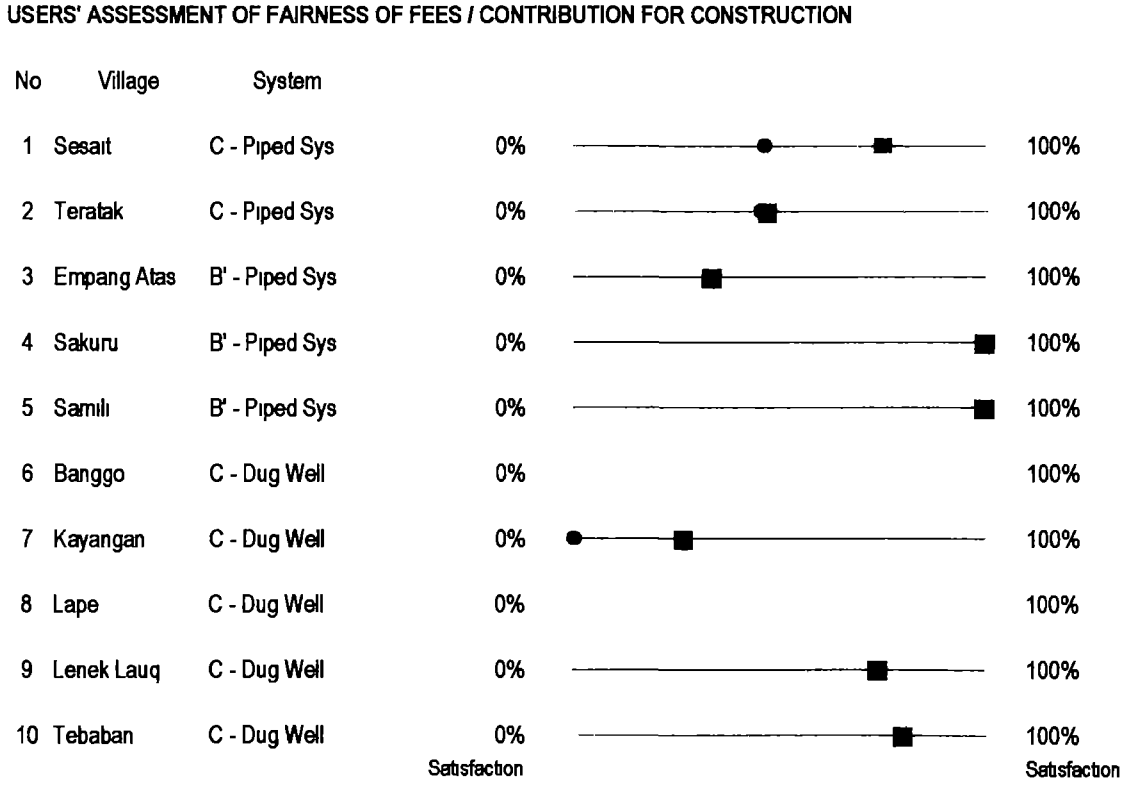
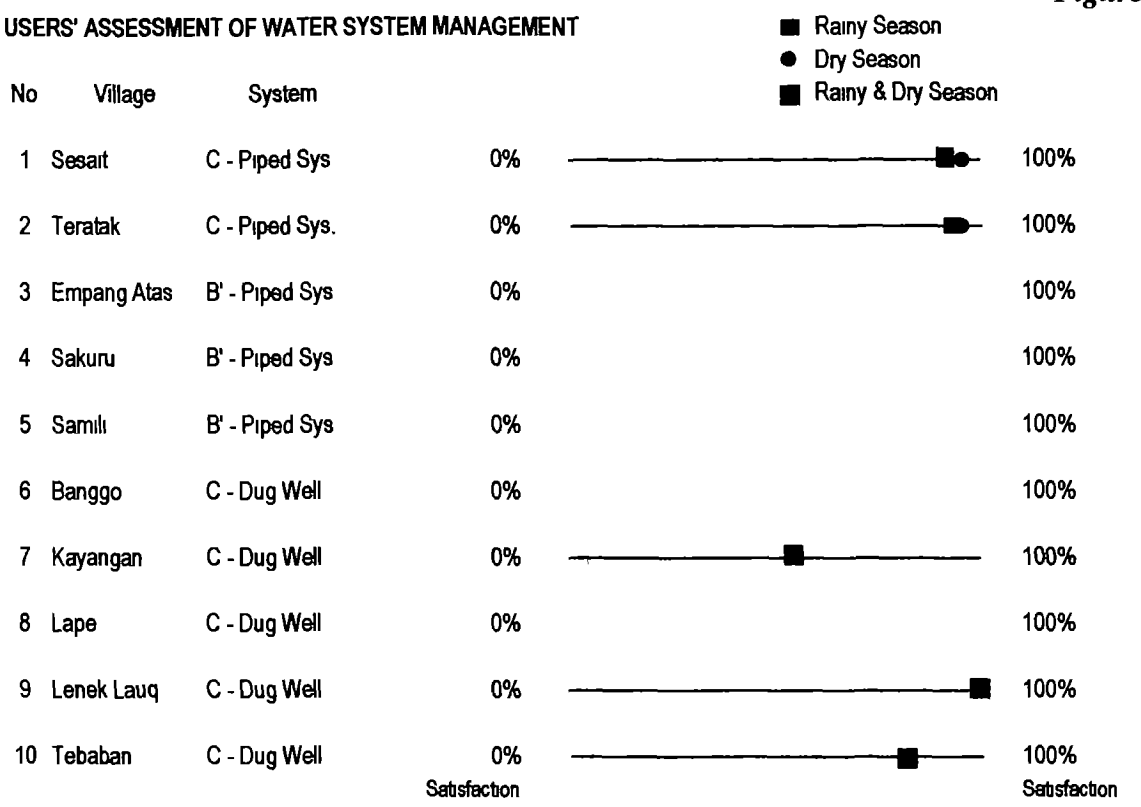

USERS' ASSESSMENT OF FAIRNESS OF FEES / CONTRIBUTION FOR CONSTRUCTION
No Village System
1 Sesait C - Piped Sys 0% 100%
2 Teratak C - Piped Sys 0% 100%
3 Empang Atas B' - Piped Sys 0% 100%
4 Sakuru B' - Piped Sys 0% 100%
5 Samili B' - Piped Sys 0% 100%
6 Banggo C - Dug Well 0% 100%
7 Kayangan C - Dug Well 0% 100%
8 Lape C - Dug Well 0% 100%
9 Lenek Lauq C - Dug Well 0% 100%
10 Tebaban C - Dug Well 0% 100%
Satisfaction
Satisfaction

Figure 5.6



When users have house connections, they are found to be using about 14-15 cubic meters of water per month per family and do their washing and bathing at home In comparison, users of public taps/public hydrants typically take about 3-4 cubic meters per month mainly for drinking and cooking. They continue to use traditional "free" sources such as rivers and springs for washing and bathing They pay at proportionally different rates for the different levels of service.

The emerging lessons are that communities make varying demands upon different types of water sources, according to their perceived appropriateness of a water source for a specific purpose. And this can vary from one village to another. It is unrealistic for project authorities to plan on the basis of their own assumptions about the intended use of project-provided types of water facilities.

Unless potential consumer demand for varying types of water facilities as well as levels of service is assessed in each community and used as the basis for designing systems, it is highly unlikely that the systems will measure up and be possible to sustain – regardless of how motivated users are to sustain it.

Regularity of Service and Fairness of Fees: Users paying fees have a certain level of expectation from the service The rating scale summaries show that the least satisfied customers consider the fees/contributions they make for the service to be the least "fair". This is usually felt in the dry season when supplies get less regular in the piped systems *(Sesait, Teratak, Empang Atas)* and when well dry up *(Kayangan). (Figure 5.5)*

The PDAM-system-served villages *(Sakuru, Samili)* seem satisfied with the fees they pay, *i.e.,* Rp.5,100 – Rp.8,400 per month for household connections and Rp.1,500 – Rp.2,000 per month per household for using public hydrants/taps. They consider it a very good deal for having a supply of water available all the time. *(The systems designed for a much larger number of connections and capacity).* Conversely, the C-type piped system users in *Sesait, Teratak, Empang Atas* (B-type) have several complaints with the way the fees were fixed (by ESWS officers) as one flat rate for all. They feel that the fixed fees are unfair because different public facilities have different ratios of users, varying between 1:6 – 1:30 per public tap. Some taps get a better flow than others due to their nearness to reservoirs. Three out of four public hydrant constructed in *Empang Atas* are no longer functioning. There is lack of transparency in what fees are collected and how it is used. Unplanned increases in fees have taken place. While all users benefit from the facility, the "land owner" (considered also owner of the facility) feels unfairly burdened with the O&M responsibility. The users met during the study apparently feel they do not have sufficient voice in financial decisions and this is reflected in their assessments. Among the villages with dug wells, only *Kayangan* residents expressed dissatisfaction with the contributions they made to get the wells – evidently as the service from the wells is so inadequate for their needs.

Management of Water System: Only 5 villages considered it relevant to mark their satisfaction with management of the services. These were the two villages with C-piped systems in *Sesait* and *Teratak* and three other villages served by dug wells. The "B-type" systems in *Sakuru, Samili* and *Empang Atas* were not rated by users as they were more like A-type systems and managed entirely by PDAM. *(Figure 5.6)*

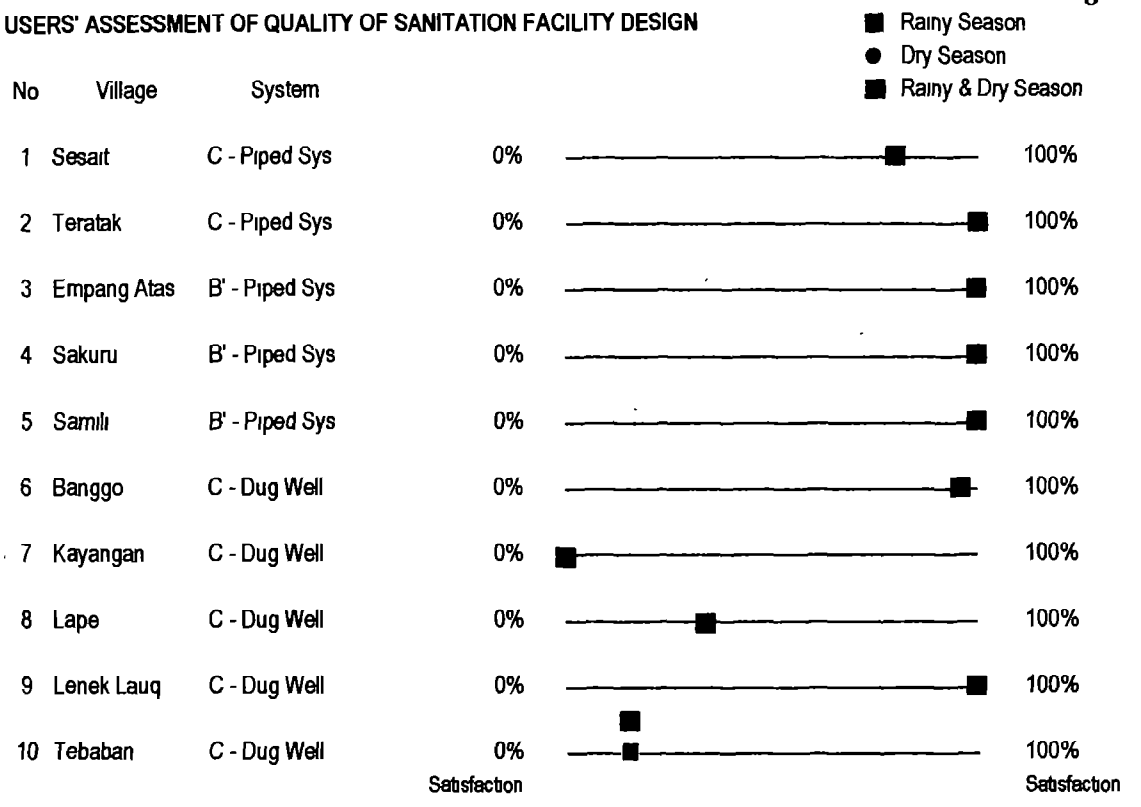
The dug wells do not have a group-based management system. The general pattern is for the owner of the land (on which public tap, hydrant or well is located) to be the "manager" who has to keep the facility clean and organize repairs when needed – by raising contributions from users. He is the de-facto "owner" and "manager" of the facility and the majority of users seem to find the arrangement acceptable. However, in the case of dug wells there is a tendency for the public facility to gradually turn into a private one, as with passage of time, the owner attempts to restricts free access to the well located in his private home or yard.

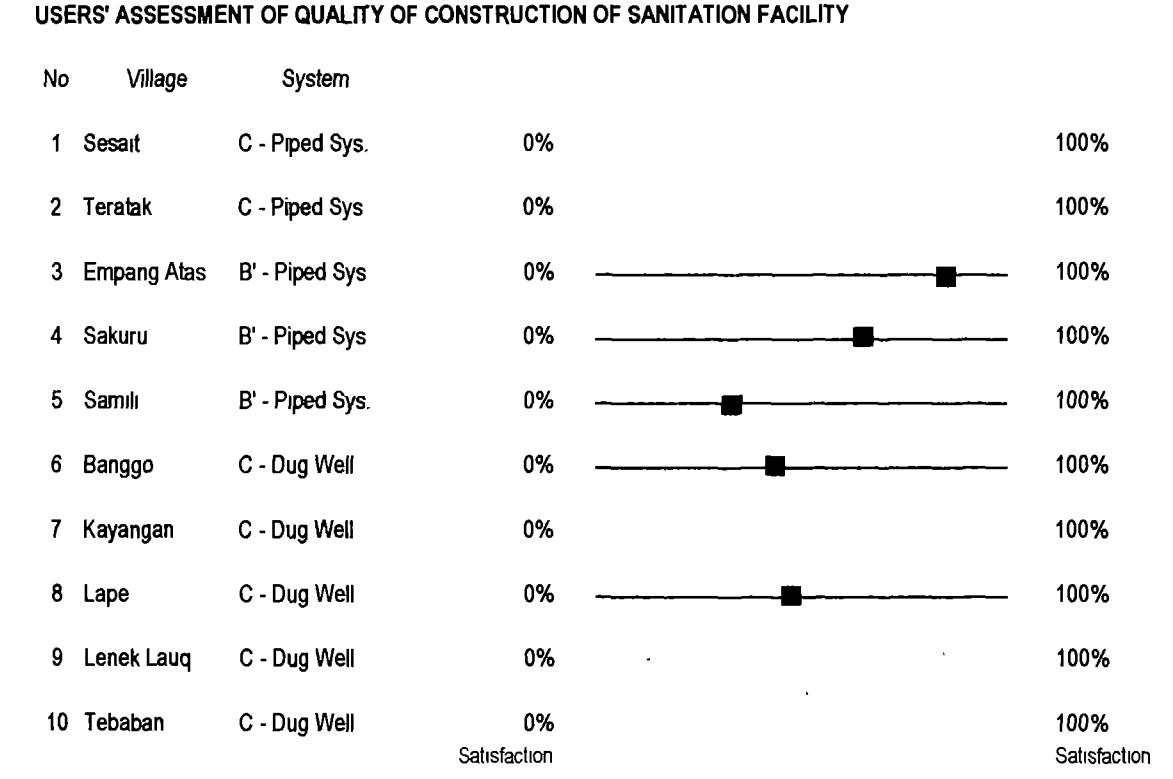
5.2.2 Sanitation Services

The aspects rated by users were *Quality of Design, Quality of Construction* and *Usefulness of household latrines* built with ESWS assistance. *Figures 5.7* and 5.8 illustrate the ratings given.

Quality of construction was rated by 5 villages. They seemed partially satisfied in 4 villages. *(Kayangan, Banggo, Samili, Lape).* These 4 were also where the technical observation team found a fairly high proportion of latrines without above ground structures like semi-permanent enclosures, roofs or walls. The lack of protection from the elements damaged the surface of the plastic pan, making it more difficult to clean and probably shortened its life. These latrines belonged mostly to poor households. In 7 out of 10 villages the design of the latrine was rated as fully satisfactory, and the pan described as "easy to clean".

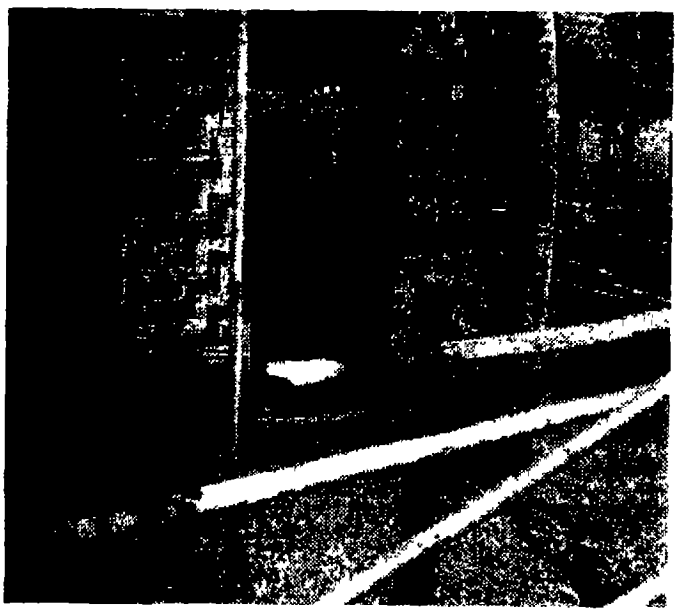
Figure 5.7


USERS' ASSESSMENT OF QUALITY OF SANITATION FACILITY DESIGN
Rainy Season
Dry Season
Rainy & Dry Season
No Village System
1 Sesait C - Piped Sys 0% 100%
2 Teratak C - Piped Sys 0% 100%
3 Empang Atas B' - Piped Sys 0% 100%
4 Sakuru B' - Piped Sys 0% 100%
5 Samili B' - Piped Sys 0% 100%
6 Banggo C - Dug Well 0% 100%
7 Kayangan C - Dug Well 0% 100%
8 Lape C - Dug Well 0% 100%
9 Lenek Lauq C - Dug Well 0% 100%
10 Tebaban C - Dug Well 0% 100%
Satisfaction
Satisfaction


USERS' ASSESSMENT OF QUALITY OF CONSTRUCTION OF SANITATION FACILITY
No Village System
1 Sesait C - Piped Sys. 0% 100%
2 Teratak C - Piped Sys 0% 100%
3 Empang Atas B' - Piped Sys 0% 100%
4 Sakuru B' - Piped Sys 0% 100%
5 Samili B' - Piped Sys. 0% 100%
6 Banggo C - Dug Well 0% 100%
7 Kayangan C - Dug Well 0% 100%
8 Lape C - Dug Well 0% 100%
9 Lenek Lauq C - Dug Well 0% 100%
10 Tebaban C - Dug Well 0% 100%
Satisfaction
Satisfaction

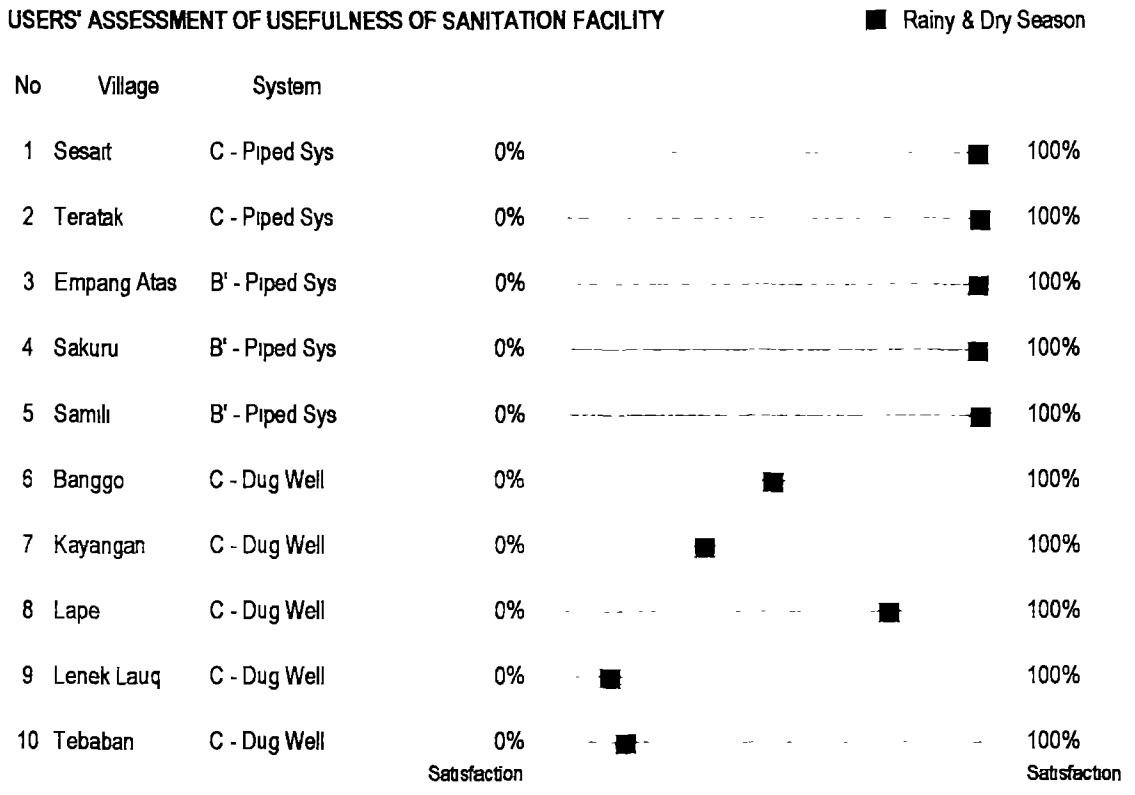
Household latrines not used, in disrepair, and with no superstructure, in BANGGO and TEBABAN

These villages had dug wells for water facilities



The difference a piped water connection makes to household latrine use and maintenance. EMPANG ATAS

Figure 5.8



The difference between ratings about usefulness of the latrine in villages served with piped systems and dug wells is starkly illustrated in *Figure 5.8.* The first 5 villages, all served with piped system scored 100 per cent in their satisfaction with household latrines. All 5 villages served with dug wells are partially satisfied, with 3 out of 5 having very low scores These were the same villages which reported a variety of reasons for not using of the latrines constructed (see previous Section "Sanitation Facilities Access and Use" for explanation) Observation of a random number of latrines in these villages found less than half supplied with water for flushing. In *Lape* not a single one had water available. Exposed excreta was observed in the yard around and behind the latrines in 44 per cent home observed in the same villages, as compared to only 14 per cent home in villages with piped water

Table 5.2 shows the results consolidated from an observation of 83 latrines in the 10 villages 8-10 latrines per village were picked randomly for observation from the clusters of homes served by project facilities, from the community map prepared by villagers The results show a very high proportion of latrines (95 per cent) to be currently functional, clean and appearing to be in use in villages with piped water supply, but less so in villages with dug wells (71 – 76 per cent) The results of pocket voting (*Figure 5.3*), focus group discussions on users' rationale for rating scale assessments (see table in Section 5.1 3) however clarify that usage is not consistent (not all the time) and not by all members of households (men, women, children) This finding is reinforced by the observation that exposed excreta was found in the yard and behind homes more frequently in villages with dug wells An average one quarter of all latrines observed had no enclosures built around them This was true of 17 per cent more

latrines in villages with dug wells than in those with piped water. Almost half had water available in the latrine for flushing, although soap was available only 25 per cent of the time. Soap was usually found where a bathing facility was combined with the latrines. This was only in villages with piped water, and usually in "rich" households. 78 per cent of the observed latrines were built at least 10 meters or more away from water source. By implication, 22 per cent were close enough to water sources to pose a pollution risk. Most of these were in villages with dug wells.

Table 5.2

LATRINE OBSERVATION CHECKLIST SUMMARY

(83 latrines randomly observed in 10villages, Approx. 7-9 in each)

Villages with Piped Water	Hamlet	1	2	3	4	5	6	7	8	9	Freq
Sesait	Sumur Pande	9	9	9	5	9	9	8	6	6	70
Teratak	Ketangge	8	8	9	4	7	9	9	5	7	66
Empang Atas		8	8	8	8	8	7	8	2	8	65
Sakuru		8	8	8	8	8	7	8	8	8	71
Samili		7	7	7	7	7	4	7	1	7	54
Total Frequency		40	40	41	32	39	35	40	22	36	325
% of total 42 Observed		95%	95%	98%	76%	93%	83%	95%	52%	86%	

Villages With Dug wells	Hamlet	1	2	3	4	5	6	7	8	9	Freq
Banggo		7	7	7	7	7	2	7	2	7	53
Kayangan	Sedutan	4	4	9	9	9	5	4	4	5	53
Lape	Batu Peraga	5	5	5	5	5	5	6	3	5	44
Lenek Lauq		5	6	7	7	6	7	7	4	3	52
Tebaban		9	9	9	9	4	9	9	7	4	69
Total Frequency		29	30	36	32	26	27	31	17	23	256
% of total 41 observed		71%	73%	88%	78%	63%	66%	76%	41%	56%	

Aspect Observed	In Villages with Piped Water	In Villages with Dug wells	Overall Average
1. Functioning systems	95%	71%	83%
2. Appear to be in Use	95%	73%	84%
3. Good design according to DED	98%	88%	93%
4. Good construction according to technical scoring	76%	78%	77%
5. Distance from water source at least 10 meters or more	93%	63%	78%
6. Superstructure (walls, enclosures) present	83%	66%	75%
7. No feces visible on wall/pan/floor	95%	76%	83%
8. Water available for flushing	52%	41%	49%
9. Environment outside latrine free of excreta	86%	56%	71%

5.3 COMMUNITY MANAGEMENT AND FINANCING

Information about how services are being managed and financed was obtained through focus group discussions with groups of user households. The Technical Surveyors also gathered this information from designated Water-Sanitation Committee members and looked at records available at the village administration office. The three sets of information were compared for consistency.

5.3.1 Existence of Users' Communities

A formal water users' association at village level and organized user groups for specific public facilities were only found in the two villages with C-type piped systems, *i.e., Sesait* and *Teratak. Figure 5.6* shows that was in both villages were highly satisfied with the efficiency of management of their facilities.

Sesait had 6 Water User Groups *(Pokmair)* for the 6 pressured release tanks that supply water to 22 public taps in the village. Each *Pokmair* consists of heads of households served by the public taps from each tank. The *Pokmair* is responsible for operation and maintenance of the tank and taps supplied from it, collections and management of monthly fees from user households and repairs. Each public tap also has a designated manager, who is either the owner of land on which the tap is located or the user living nearest to the tap. The users reported that *Pokmairs* have traditional, written regulations about membership and rules for O&M could *Aweg-Awig,* which are written on a User card of each household. The money collected as user fees is kept by each *Pokmair,* after paying 10 per cent to the Village Administration and 10 per cent to the fee collector. ESWS staff determined the rate of fees (at Rp.250 per month at first, later raised to Rp.500 for those with household connections). In *Sesait* the funds thus collected are sufficient to finance any repairs needed so far. The remaining balance is used by the *Pokmair* as a source of small credit to its users. Every three months the Water Users Association of the village holds a meeting to inform users of its activities. The villagers of *Sesait h*ave even expanded their system by adding a pressure release tank from a second spring, since the initial system built by ESWS was not adequate for their needs.

Teratak has a formal *Water User Association (HIPPAM)* for its two Gravity piped systems. The *HIPPAM* is a legally constituted body including the hamlet chiefs and formed in accordance with the provincial Governors' decree. It is responsible for major repairs and management of user fees. In addition every public tap has a *Pokmair* (users' group) with a fees collector. Minor repairs at the tap level are handled by the *Pokmair.* The *HIPPAM* pays 15 per cent of its income to the village administration, a local mosque and orphanage. 35 per cent of its income is paid as management fees to *HIPPAM* members and *Pokmair* managers/collectors. The remaining 50 per cent are kept and used for major repairs when needed. They deposited Rp.3 million in their bank account in 1998. So far there have been no major repairs necessary. Unlike in *Sesait*, there is no formal mechanism for financial information sharing with users in *Teratak. Teratak* too has a set of traditional regulations

governing the management of water facilities called *Aweg-awig.* Public tap users pay Rp.500 per family per month while those with house connections pay Rp.1000 per month.

In the villages served by C-type, dug well systems a different kind of management system has evolved from local social norms. ESWS project staff initially formed user groups of about 10 households for each well. These did not endure. Since there is no monthly user fee paid by dug well users anywhere, there is no collector. The manager of the dug well is the owner of land on which it is sited. He is a relatively rich landowner, who was willing to provide private land for the public dug well as well as food and payments to laborers during construction. This had led to his gaining an informally recognized ownership of the well although all potential users had contributed either some cash or cash and materials and labor for construction. The "owner" undertakes to keep their functioning and organizes repair/ maintenance as needed, by collecting contributions from all users. Generally this has meant an annual cleaning of sediment and deepening of the well in the dry season. Users in some villages reported that the owner has put a fence or enclosure around the well and discourages its use by others, thus converting the dug well to more of a private property.

In the three villages served by "B-type" piped systems, *i.e., Empang Atas, Sakuru* and *Samili* there is very little community management-taking place. Communities reported not being involved at all in planning and construction of these systems, which were built by PDAM or the Public Works Department. Only after public hydrants and secondary pipelines were completed were villagers informed that they could apply for household connections. Household connection holders take care of their own operation and maintenance. Each public hydrant has a designated manager who does not receive any salary. He is responsible for O&M and repairs of the public hydrant as well as collecting user fees and paying monthly charges to PDAM. Users of household connections pay on an average Rp.5,000 – Rp.8,500 per month directly to PDAM. Public hydrant users pay between Rp.1,500 – Rp.2,500 per family per month to the collector, depending on an average estimated from the monthly consumption of public hydrant water. Users do not receive any reports of income and expenditure. They have no idea how much is paid on their behalf to PDAM and what savings are kept by the collector/manager, out of which he pays for repairs and maintenance. It is common knowledge that there are savings from user fees every month. User seem to accept that it is kept by the manager/collector without formally accounting to anyone. They however expect the savings to take care of repairs and are unwilling to contribute extra for repairs.

Household latrines are operated and maintained by the households owning them, even if several other households might share the usage. No fees are charged. However, as reported in the section on *Access and Use,* latrines are in disrepair in large numbers in villages served by dug wells.

There has been no formal handing over of water or sanitation facilities to the community in any village. Due to the extent of community involvement in planning and financing in the C-type piped water systems, there is a higher sense of community ownership and responsibility for facilities in these villages than in the three with "B-typed" piped systems which were built by PDAM without community involvement in planning.

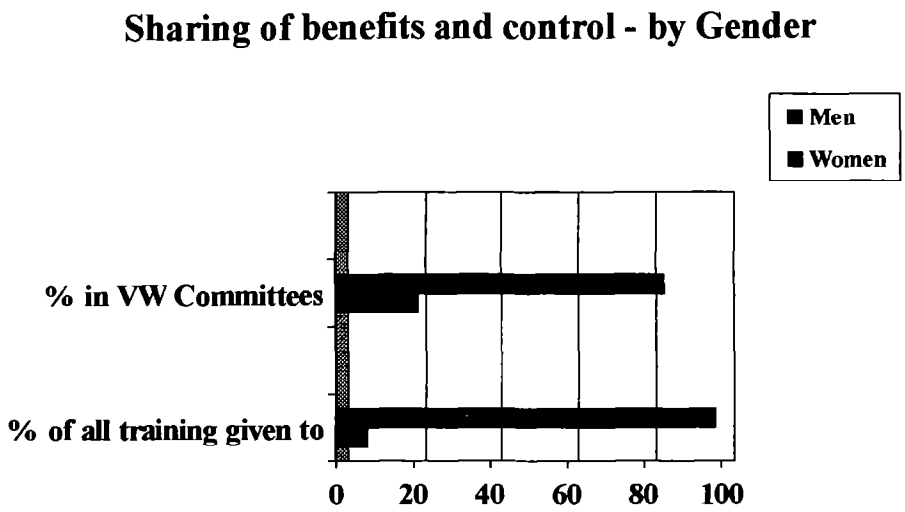
5.3.2 Sharing of Benefits and Control of Facilities

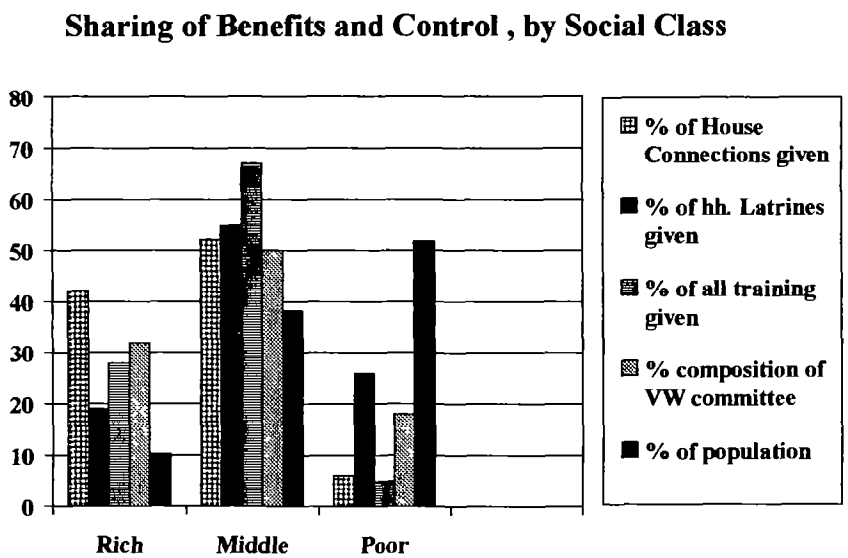
There seems to be a general bias towards the better-off households in terms of both benefits from the water and sanitation facilities established by the project and their control. This is to be expected as the benefits are linked to the willingness (and capacity) to pay for household water connections and household latrines. *Figure 9* shows that the rich 10 per cent of the villagers have 43 per cent of the house connections and 19 per cent of the household latrines. The middle 38 per cent have a little over half of all house connections and household latrines. By contrast the poor 52 per cent of the villagers have 6 per cent of the house connections, but 26 per cent of all the household latrines. The latter indicates that ownership of household latrines is not a simple function of the willingness to pay. This may be the result of an attempt to meet targets for construction, as indicated by findings on use of latrines, manner of deciding beneficiaries and the pattern of making key decisions. The poor also received only 5 per cent of all training given by the project. The rich received 28 per cent and the middle category got 67 per cent.

The same bias is evident in the management of Water facilities. The rich 10 per cent hold 38 per cent of all memberships in the Village Water Committees. The middle 38 per cent constitute half of the members. The poor 53 per cent account for only 18 per cent of the members.

The male-dominated nature of community level processes is also illustrated in *Figure 5.9*, which shows women to have received only 5 per cent of the trainings given by the project. This was a one-day health and sanitation orientation. Women also constitute less than one fifth of the members of village water committees.

Figure 5.9


Sharing of benefits and control - by Gender
Men
Women
% in VW Committees
% of all training given to
0
20
40
60
80
100


Sharing of Benefits and Control , by Social Class
80
70
60
50
40
30
20
10
0
Rich
Middle
Poor
% of House Connections given
% of hh. Latrines given
% of all training given
% composition of VW committee
% of population

5.4 COMMUNITY PARTICIPATION IN PROJECT PROCESS

Community participation can take many forms and can manifest itself at many different levels in a project depending on the king of participation envisaged and planned for in project design. The ESWS Project Information Document outlines the contents and process of the component "Community Managed Activities" which is one of three major components. It also reports project achievements for the component from 1993 – 1996, in terms of: a) a number of facilities constructed; b) numbers of training and workshops held and c) percentage of contribution from communities.

These figures provide an indication but cannot help us verify the extent to which communities did participate in planning, implementing and then operating and maintaining/managing WSS services. This evaluation attempted to capture the process as viewed and experienced by the village community.

Three aspects were studied, *i.e.,*:

- Who made a set of key decisions for establishing the services
- The project process as experienced by the community of present users of services
- Cost-sharing by the community for construction.

5.4.1 Decision-Making Pattern

A visual tool was used to help village men and women express their perception of the process in terms of a series of 13 key decisions that had to be made to implement project interventions in their village. The decisions were about 'selection of the village', 'choice of technology', levels of service', 'sites for facilities', 'O&M arrangements', 'cost-sharing', 'who will construct', 'who would get what facility', 'who would be trained', etc. The types of decisions were depicted in rows on a large matrix on the ground. The columns headings were picture of possible individuals and groups who may have been involved in making the decisions, *e.g.,*: a Village Chief, ESWS Officer/extension worker, a Public Works Department functionary, group of village men, group of village women, a mixed group, etc. In every village, one matrix was filled out by groups of men and women users of water and sanitation facilities built with ESWS support. Their entries on the matrix represented their collective view as to how and who made these key decisions. The results are presented in the following *Table 5.3*; illustrated in *Figure 5 10* and discussed thereafter.

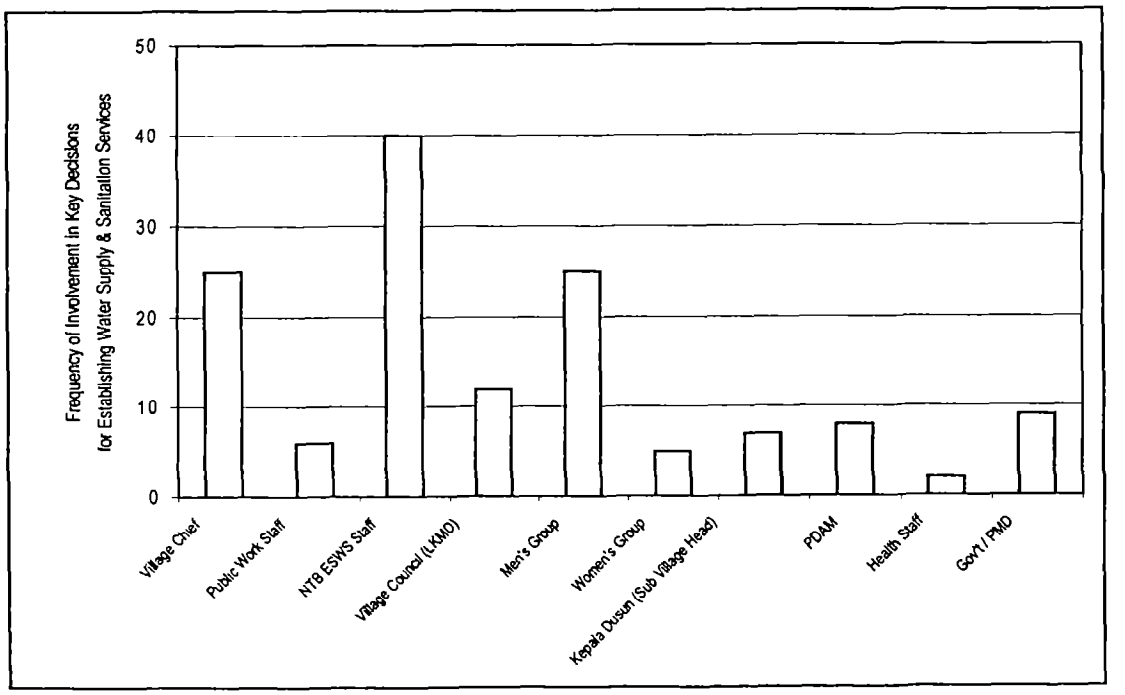
Table 5.3

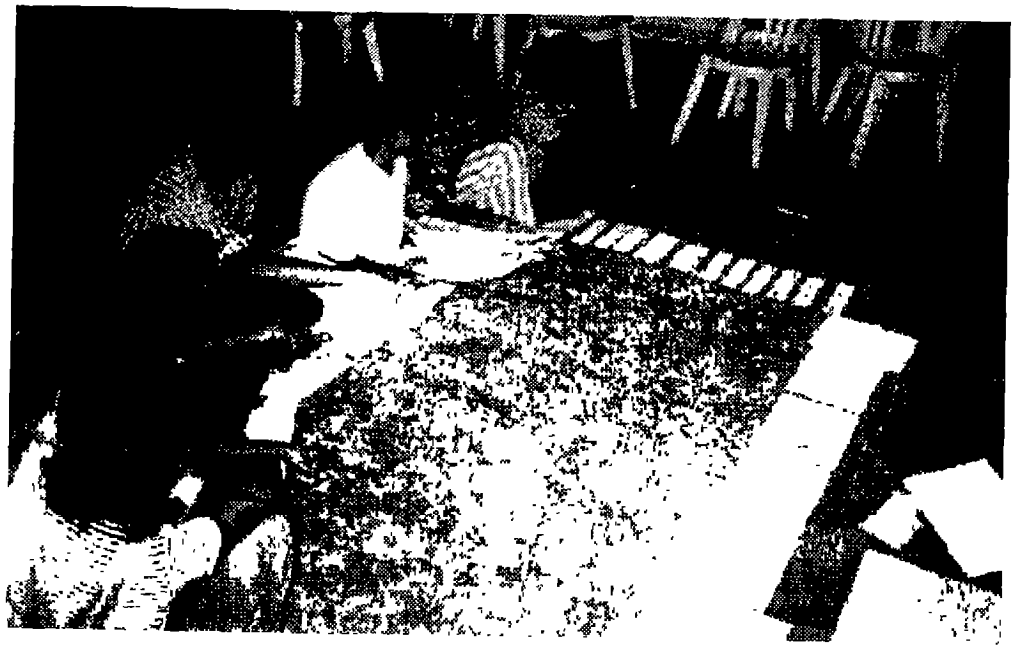
Decision Matrix – Sum of Frequencies from 10 Villages

No.	Type of Decision / Who was involved In deciding	Village Chief	Public Work Staff	Contractor	NTB ESWS Staff	Village Council	Men Group	Women Group	Local Body	Other Parties	PDAM	Health Staff
1	Selection of village for project	4	4		3	2			3		1	1
2	Dissemination of information	2				1			1	2		
3	Site of facilities	2			7		5	2		1		
4	Technology Option	1	1		10		1			1	2	
5	Choice of level of service		1		3		1			1	2	
6	Schedule of implementation	2			7	1	5	1		1	3	
7	Determination of community contribution	4			5	1	2	1		1		
8	Who will be trained	7			3	1				1		
9	Who will manage water facility	2			1	2	2		1	2		1
10	Monthly fee for water					1	3					
11	Who will construct facility					1						
12	Who will receive water facility					1	2	1			1	
13	Who will get latrine facility				1	1	2	1				
		24	6	0	40	12	23	6	5	10	9	2

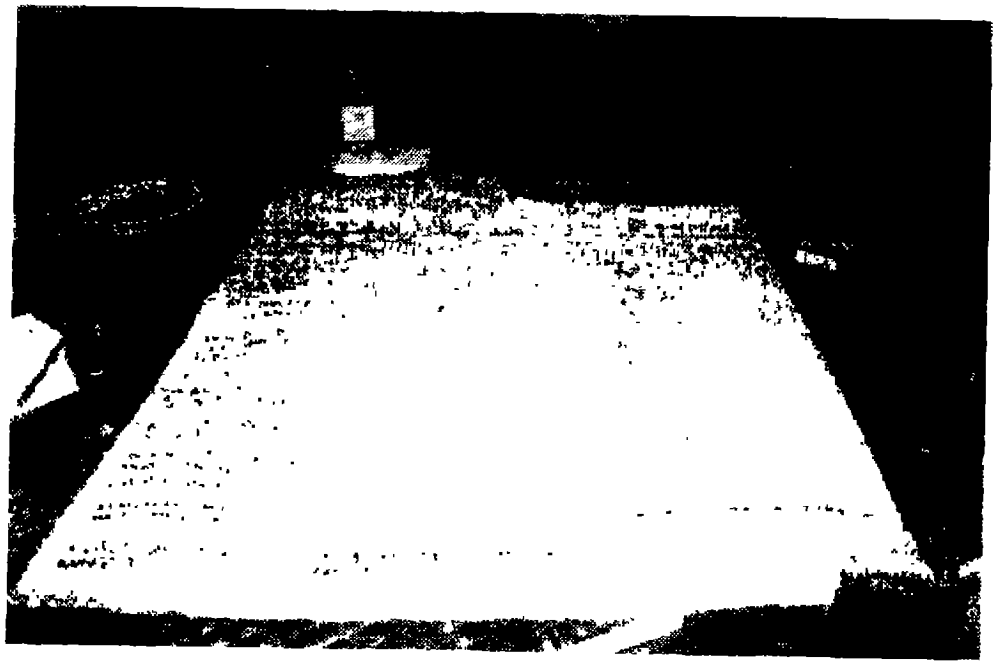
Figure 5.10

Community Perception About Who Made Key Decisions





"Who participated in which decisions about water and sanitation facilities?" Decision matrix being prepared by women and men of LAPE, Sumbawa



"The difference made by water supply facilities to users' lives." Results of Trend Analysis by men in SESAIT, Central Lombok

According to community groups in the 10 villages, the greatest number of key decisions were made by ESWS staff, *i.e.,* Technical Officers and Community Facilitators. The Village Chief was seen as the main partner of the ESWS staff. He was involved in decisions about 60 per cent of the time with project personnel. The village men's group was also involved as often as the Village Chief *(Kepala Desa)* while the village Council *(LKMD)* participated in decisions half as often as the *Kepala Desa*. Sub-village leaders, *i.e.,: Kepala Dusuns* had a minor role compared to *the Kepala Desa*. Women were rarely involved in decision making. Their scores on the graph (indicating involvement in 5 decisions out of 130) represent women's participation in the form of PKK members, who are usually the wives and daughters of the village chief and other village elite.

On the whole, outside agency personnel from the project or government agencies (PDAM, Public Works, Health, PMD) made about 50 per cent of the key decisions for establishing services. Communities, represented mainly by the *Kepala Desa* and men's group made or were involved in deciding the other 50 per cent.

Communities had a voice in deciding:

- Sites for facilities
- Levels of service (in piped systems only, household connections or public taps)
- How much they will contribute for facilities
- Schedule of implementations (when the facility required community labor contribution)
- Who will be trained
- Who will manage water facilities

Even on these issues and decisions the Village Chief and men's group/LKMD were the only ones involved.

The reasons given by men for the lack of women's involvement in decision-making were:

- **"Women in our village trust their men to make the right decisions"**
- **"Women are already represented by PKK's membership in the village council (LKMD)"**

In contrast, the reasons given by women for lack of their involvement were:

- **"Women have less free time to attend meetings than men"**
- **"Women feel awkward attending meetings with men. They cannot speak their minds in front of men"**
- **"Women in PKK *(well-off, elite, minority)* have time to participate. Other women are too busy *(working in crop fields, homes, plantations)*"**
- **"Women wait until they are asked to participate *(culturally appropriate behavior).* No one asked us"**

The reasons for the *Kepala Desa's* dominance in decision making were reported as:

- "He is trusted by the villagers/represents the community"
- "It ensures that there are no problems with project implementation later on"
- "He is very active"
- "Project came to the village during the busy agricultural season. No one had time to be involved except the *Kepala Desa*"
- "The *Surat Keputusan* from *Bupati* specifies how water facility is to be managed. We cannot decide ourselves"

The community of service users had little or no voice in deciding:

- Selection of village for the project
- Technology options (type of water or sanitation facilities)
- Level of service (in villages given dug wells)
- Who will benefit from the water facility
- Who will be trained (initially decided by the Village Chief)

People's perception is that villages are selected for the project by the government. Only in 1 case (*Teratak)* had there been an initiative by the *Kepala Desa* who had sent a proposal to the local government (PEMDA) in *Lombok Tengah* district. The Villagers usually got to learn about their village being selected at the first introductory meeting with project personnel and local government officials who came to their village to inform them of the fact.

Their lack of involvement in decisions about type of facility, levels of service and identification of beneficiaries were explained by them as:

- "The community does not understand about technical things. Only PDAM and ESWS staff know which type of facility will be suitable"
- "We only receive what is decided from above"
- "ESWS staff had specified targets given to them from above. They could only implement the targets, nothing else"
- "We gave our suggestions about the water facilities but PDAM rejected them"
- "The TPL only contacted *Kepala Desa* for all decisions" *(TPL – Project functionary)*

5.4.2 Project Process Through the Eyes of the Users

The project process as experienced by users was described as follows.

The first village meeting was convened by ESWS personnel and a local government staff member to communicate about selection of the village, project benefits and rules. This meeting was only with the *Kepala Desa* and *Kepala Dusuns* in 2 villages, with the *Kepala Desa* and village council (*LKMD, LMD, Kepala Dusuns*) in the rest of the villages. 2 -3 PKK members (women) were present in 4 out of 10 villages. Elsewhere it was a males-only meeting.

Thereafter several monthly meetings were held for forming user groups for operation and maintenance of facilities, siting of facilities and environmental sanitation awareness. Villagers were sometimes confused about who should constitute these groups and why because specific facilities and their users were not always being planned with them. In the 2 villages with C-type piped system (*Sesait* and *Teratak)* and 1 B-type *(Samili*) they were able to participate in planning the locations of public taps or hydrants and identify the potential user families for group formation. In the 2 villages with "B-type" piped systems (*Empang Atas, Sakuru*) the community had no role in planning or constructing the systems as these activities were handled entirely by PDAM. In fact *Sakuru* villagers reported that PDAM rejected all their suggestions about the water facilities. Only after the construction of public hydrants, reservoirs and secondary pipelines were completed, were people given the choice of applying for and getting house connections from PDAM, at costs ranging from Rp.110,000–Rp. 400,000 in different villages. Public dug well locations were decided by ESWS facilitators, in consultation with *Kepala Desa or Kepala Dusuns.*

Users report that those who got dug wells (located in their homes/yards) were:

- persons well known/close to the *Kepala Desa* and ESWS staff
- the rich or middle income group, because they were more able to contribute land, wages and food for workers

Following monthly meetings, field training for 3 days was reportedly held in 7 out of the 10 villages. The training covered: a) well digging; b) latrine construction and c) concrete mixing. No technical training was given in *Lape,* where only a 1-day sanitation and health orientation was given by the Health staff.

At the end of the process there was no formal handing over of the facilities to the village. Villagers when asked about formal ownership of the facilities are not sure whether the facility belongs to users, the village administration or the government.

The process for sanitation interventions consisted of project staff introducing the health benefits of sanitation facilities at the introductory meetings. Stimulant packages for sanitation (squat plate, pan + water seal, some cement) were made available 1-2 months after water facilities had been established. In 7 out of 10 villages field training was provided for construction of latrines. ESWS staff together with the village chief decided who would get the stimulant packages, out of a specific number allocated by the project for a village. Those who received the package had to be prepared to contribute land to build the latrine, the rest of the needed materials for construction of below and above ground structures, and provide labor or payment plus food for paid laborers.

Villagers reported widely varying degrees of satisfaction with the process. The villages that had willing and interested households were those with piped water supply and a high proportion of house connections. Elsewhere, people complained of being obliged to build latrines when they did not feel they needed them. These were villages with dug wells, villages where very little "project socialization" had happened (reported by villagers), and where a river or irrigation canal flowed conveniently close to most households. The most

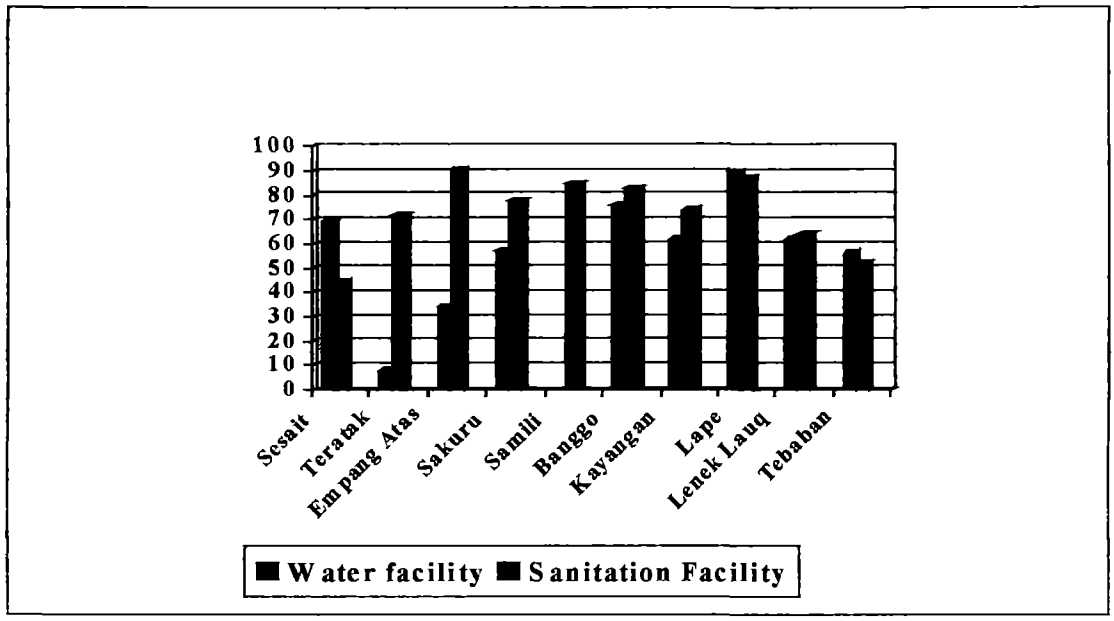
frequent recipient of a household latrine stimulant was a rich/middle income households who also had a house connection of piped water or a dug well in their own yards.

5.4.3 Cost-Sharing by Communities

The village chief or the Water Users' Association kept records of investments made by users for water and sanitation facilities, and the materials received as subsidies/stimulants from the project. The research team and community-records-keepers together worked out costs of the materials contributed by villagers and inputs received from the project. Community contributions were usually in the form of unskilled labor (person days), sand, rocks, bricks and in a few cases, cash. Project contribution known to and recorded by communities were in terms of sacks of cement, valves and taps and secondary pipes (in one case) for piped systems. Project contributions for dug wells were in terms of cement, concrete rings, pulleys and iron rods. The amounts of each type of material received per dug well was not standard and varied widely among villages. In case of latrine stimulant packages there was greater uniformity. The project provided some cement, a plastic squat plate or ceramic toilet pan, and a short, specified length of PVC pipe per latrine. The cost-sharing information presented below was calculated in each village with respect to the costing for all recorded material and labor at current prices. Thus actual costs worked out in Rupiah are not meaningful. The proportional sharing of total construction cost, of systems within the community, is presented below.

Figure 5.11

Community Share of % Cost of Construction



The extent of cost-sharing by communities ranged between 8 – 90 per cent of the cost of construction of water facilities (*Figure 5.11*) Community contributions were usually in the form of materials such as sand, rocks, bricks and unpaid labor. In addition, three villages also paid Rp 2000 – Rp.5000 in cash per household, for construction of public facilities. For dug wells, representing a low level of technology and service, community contributions were 62 – 90 per cent of construction cost For piped systems, representing a higher level of technology as well as service, the contributions were between 0 - 69 per cent of construction cost One village reported paying nothing for public piped facilities The only payment was for getting house connections.

The Dublin-Rio principle about treating water as an economic (as well as social) good implies that a reversal of this situation is necessary Equity principles also require user contributions to be a higher proportion of investment costs for higher levels of service and technological options. Since the users had no choice in the technology/type of facility offered to them, it seems doubly unfair that those who received the better service paid less of the cost

For household latrines, although the stimulant package was standard, community contributions were found to vary as widely as 44 – 91 per cent of the construction cost in different villages This may be due to some users not building superstructures above the ground (25 per cent of observed latrines), lack of technical guidance/training for construction (reported in *Lape*), or users building different kinds of superstructures *e.g.*, brick walls, matting enclosures, with or without bathing and washing facilities

5.5 IMPACT OF PROJECT INTERVENTIONS ON QUALITY OF LIFE

This aspect was studied using Trend Analysis, wherein community groups selected aspects of their lives affected by project interventions and described the nature of their impact. Almost all responses related only to Water Supply interventions. They identified impact both in qualitative and quantitative teams. Trend Analysis provided them with means to express their perceptions quantitatively using objects that could be counted, *e.g.,* seeds, stones. To express qualitative changes people used symbols, drawings or words. The following information should be interpreted in light of access of rich/poor/middle classes of village populations described in *Section 1.* These views are of those who were included among project beneficiaries. They reflect a very positive impact on users' quality of life resulting from the construction and functioning of the water supply facilities.

Differences perceived by users after project facilities were built:

Time Spent Collecting Water:	Reduced from 1-2 hours before to 5-15 minutes after project.
Energy:	50% - 90% less energy spent now. Women do not feel tired as they used to before. Water collection which was solely women's burden before, is now done by all family members, as the source is close by.
Distance to source:	Reduced from (300 m – 1 km) to (3 m – 10 m)
Amount of water now collected/day:	On an average 2-5 times the amount collected before the project. Those with household connections could not readily quantify the amount as they had ceased "collecting" it. They now use as and when and as much as they want.
Hygiene improvement:	Reported by 4 villages. They now bathe 2-3 time/day as compared to once/day before. Clothes are washed everyday instead of twice a week before.
Diseases reduced:	Diarrhea/cholera : 9 out of 10 villages reported Skin infections : 6 out of 10 villages reported Malaria (?) : 4 out of 10 villages reported Headache/backaches: 4 out of 10 villages reported
Economic benefits:	Reported in 5 out of 10 villages. These included increase in income due to growing vegetables and herbs in household garden; having time to go out of the village to market one's produce; not having to buy water in the dry season and for house building; being able to make bricks for house building
Social benefits:	Reported in 5 villages. Neighborhood and family relationship have improved because there are fewer fights about water. Women have more time to rest, watch TV, attend PKK meetings or go for family planning services.

Access to Credit:

Only 2 out of the 10 villages studied had received credit assistance from the project *(Empang Atas* and *Samili).* They however, did not mention it during the trend analysis. The usefulness of the credit scheme *(BMT)* in the two villages was assessed in comparison to other sources of credit, using Venn Diagrams, whereby people cut/select paper circles of varying sizes to represent the aspect being measured *e.g.,* in this case Usefulness of the credit source to them. They were then asked to arrange circles representing all the credit source around a central circle representing their village community. Credit source that are easily accessible are placed on or near the control circle and vice versa. *Figure 5.12* shows the Venn Diagrams produced by villagers in *Empang Atas* and *Samili.*

The credit scheme in ESWS was reportedly implemented through the *Baitul Mal Wat Tamil (BMT)* which is an Islamic financial institution. The other source of credit available to villages were the State owned *Bank Rakyat Indonesia (BRI), the Lembaga Perkreditan Pedesaan* (not clear whether Public or Private Sector), the Army's Cooperative credit agency KOPABRI, some semi-private lending banks *(BSK and BIAS)* and private many lenders.

The size of the Venn diagrams indicate that the *BMT* was seen as one of the 3 most important source of credit in *Empang Atas* and the most important one in *Samili.* It was also seen as the most accessible of all source in *Empang Atas.* In *Samili* too, it was easily accessible, although placed second to the money lender in tunes of access. The advantages of *BMT* were perceived to be:

a) Interest rate and administrations fees were lower than for banks and cooperatives. This was despite the fact that the interest rates they reported worked out to 80 - 140 per cent per annum. Because repayments were usually at a daily or weekly rate for a period of three months, it is possible that the users did not realize how high the rates per annum actually were.

b) Quickly available when needed. No long processing required.

c) Repayment installments flexible, can be paid daily or weekly and there is not too much pressure if repayments are late.

d) Run by people who are known and familiar, *e.g.,* ex-ESWS personnel, *Kaders.*

The only disadvantage perceived was the low upper limit of credit from *BMT, i.e.,* Rp.500,000 which was enough only for very small enterprises. It was mostly useful as a source of consumption credit.

Figure 5.12

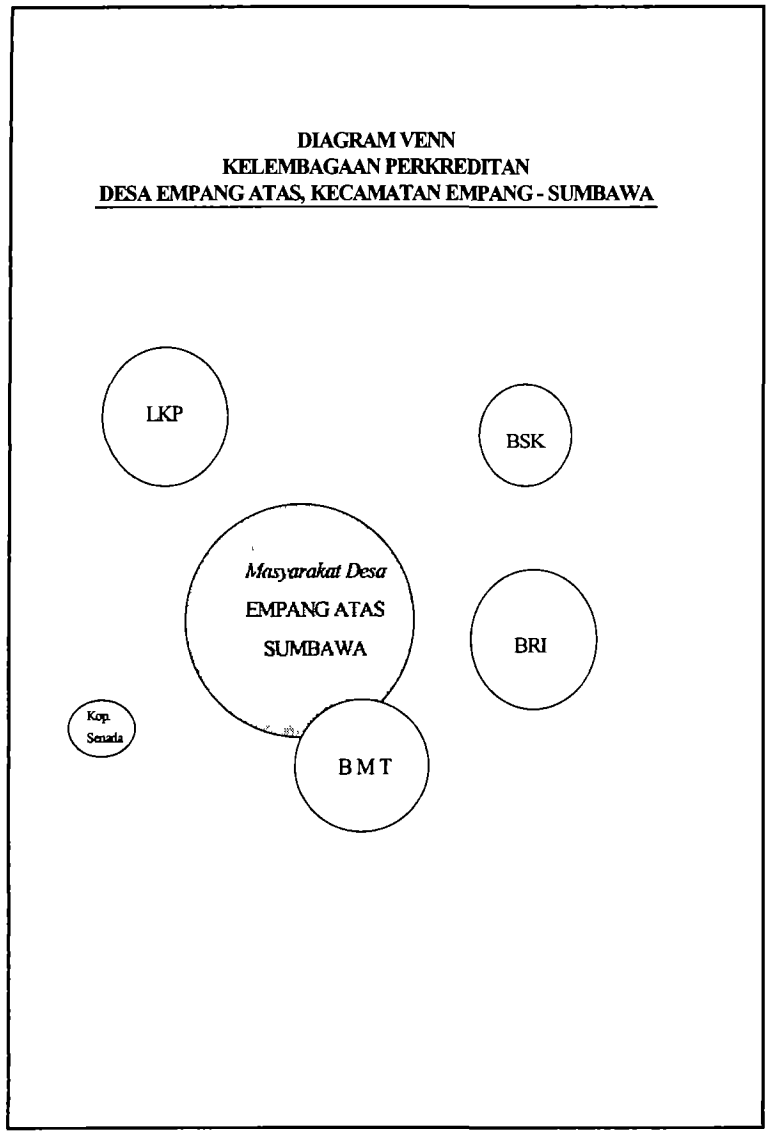


DIAGRAM VENN
KELEMBAGAAN PERKREDITAN
DESA EMPANG ATAS, KECAMATAN EMPANG - SUMBAWA
LKP
BSK
Masyarakat Desa
EMPANG ATAS
SUMBAWA
BRI
Kop.
Senada
BMT

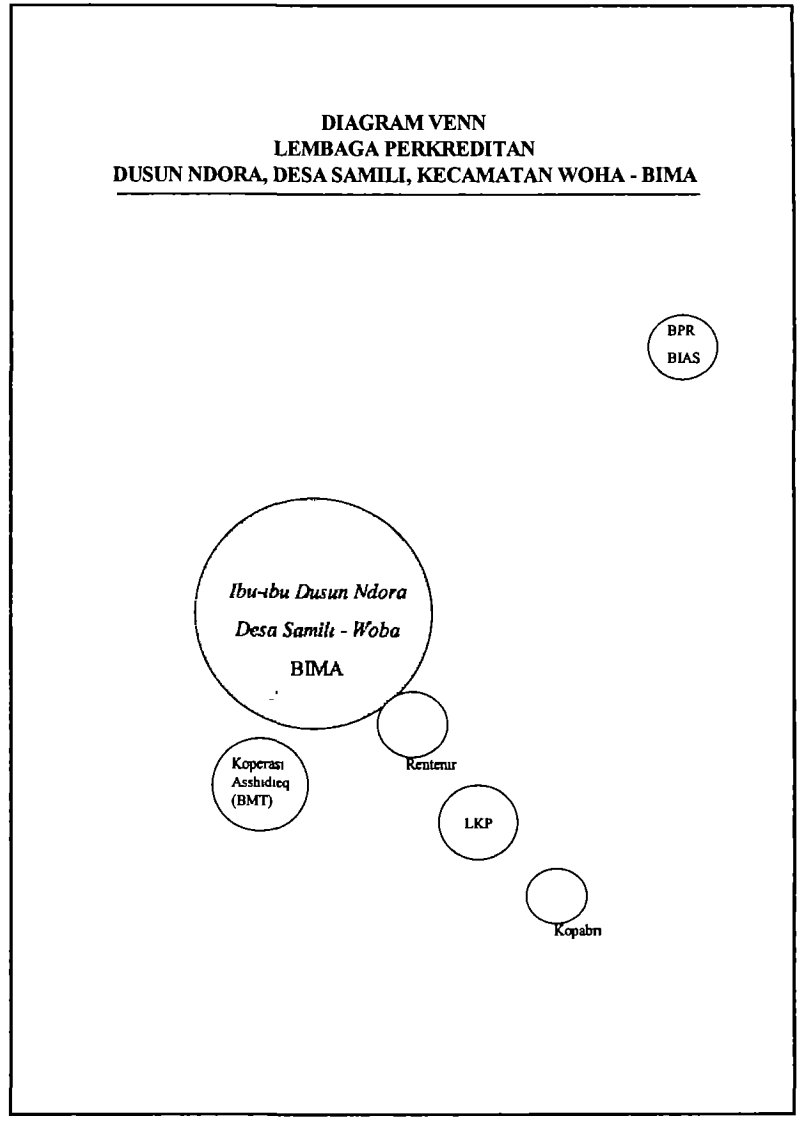


DIAGRAM VENN
LEMBAGA PERKREDITAN
DUSUN NDORA, DESA SAMILI, KECAMATAN WOHA - BIMA
BPR
BIAS
Ibu-ibu Dusun Ndora
Desa Samili - Woha
BIMA
Koperasi
Asshidieq
(BMT)
Rentenir
LKP
Kopabri

5.6 CURRENT COMMUNITY HYGIENE AWARENESS

It was not possible to evaluate the effectiveness of the project's Hygiene Education interventions since no baseline information was available on hygiene knowledge and beliefs. Some information was collected in this evaluation on current hygiene practices vis-à-vis practices before and after the project – in terms of water sources used and sites used for defecation (Section on *Access to and Use of Services).* The current section summaries what was learnt using PHAST methods, about current levels of hygiene awareness.

5.6.1 Hygiene Behavior Classification

Two methods were used. The "Hygiene Behavior Pile Sorting" consisted of community groups being asked to sort a collection of 30 pictures showing water-sanitation related behaviors into 3 categories, *i.e.,* GOOD for health, BAD for health, IRRELEVANT to health. The pictures contained an assorted mix of all 3 kinds and were drawn by a local illustrator from *Lombok. (Samples of pictures are in Annex B)*

After groups of men and women had separately sorted the pictures, focus group discussion were used to probe their rationale and beliefs underlying the sorting. The results are summarized as "Frequencies of Hygiene Behavior Classification" by men and women (in *Bahasa Indonesia*) in Annex G. Salient findings from the summary are presented below.

Awareness of behaviors considered *"good for health"*:

Among Women	Among Men
▪ Keeping food and drinking water covered } 10 out of ▪ Defecating in latrine } 10 villages ▪ Sweeping floor }	---
▪ Hand washing with soap } ▪ Washing fruits & vegetables before } 9 out of eating and cooking } 10 villages ▪ Sleeping inside mosquito net }	---
▪ Disposing of child's feces in latrine } ▪ Cleaning child after defecation, in the } 8 out of the latrine } 10 villages	---
	▪ Hand washing with soap } 7 out of ▪ Keeping drinking water covered } 10 villages
	▪ Drinking boiled water } ▪ Cleaning child after defecation } 6 out of ▪ Wash hand before eating in } 10 villages Finger bowl }

Awareness of behaviors considered *"bad for health"*:

Among Women	Among Men
▪ Defecation in the open/exposed excreta } 10 out of ▪ Food exposed to flies } 10 villages ▪ Dirty well with bucket on the ground }	---
▪ Taking water from river polluted by defecation } 9 out of } 10 villages	---
▪ Household waste water flowing into river } 8 out of ▪ Child eating with hand from plate on floor } 10 villages }	---
▪ Defecation in the river } 7 out of 10 villages	
	▪ Defecation in the open/exposed excreta } ▪ Dirty well with bucket on the ground } ▪ Drinking water not kept covered } 9 out of ▪ Food exposed to flies } 10 villages ▪ Taking water from river polluted by Defecation }
	▪ Household waste water flowing into river } 8 out of ▪ Child eating with hand from plate on floor } 10 villages
	▪ Defecation in the river } 7 out of 10 villages

Some anomalies in Community Hygiene awareness:

Among Women	Among Men
▪ A latrine far from the house considered *"good for health"* } 8 out of } 10 villages	---
▪ Hand washing (without soap) considered *"not relevant for health"* } 6 out of } 10 villages }	---
▪ *"Helicopters"* (latrine over river, discharging feces directly into river) or defecation in the river considered *"not relevant for health"* } 5 out of } 10 villages }	---
	▪ *"Helicopters"* over river/pounds considered *"not relevant for health"* } 8 out of } 10 villages }
	▪ Use of finger bowl considered *"good for health"* } 6 out of } 10 villages
	▪ Hand washing (without soap) considered *"not relevant for health"* } 5 out of } 10 villages

5.6.2 Awareness of Contamination Routes:

The second method was a flow diagram that sought to understand men and women's perception of how fecal contamination can travel to the mouth to spread disease.

A set of 32 pictures showing various possible stages in the process, mixed with same pictures not relevant to the process were made available to community groups. They selected pictures from the set and arranged them in sequences to show how feces can be transmitted to mouths. They were then given pictures on colored cards showing assorted preventive hygiene practices, as the means to block disease transmission. They selected the "block" they considered relevant and placed them on the sequence earlier produced, to show where and how the transmission route can be blocked. Discussions about the resulting diagram were used to understand people's underlying rationale and perceptions. Samples of resulting flow diagrams (recorded in words by researchers) are in Annex B. Salient findings were as follows.

Community Awareness of Contamination Routes:

Starting Point for Disease Transmission	Frequency of Village Groups Out of 10
Defecating in the River	10
Dirty well	5
Defecating on the Ground	2
How Contamination Reaches the Mouth	
Through food, hands and drinking water	9
Through food, hands, drinking water and food washed in dirty water	1
Ways to Block Contamination Route	
Hand washing before eating, feeding	10
Boiling drinking water	10
Defecating in a latrine	10
Using clean water to wash food and cook	10
Keeping drinking water covered	9
Keeping food covered	3
Hand washing with soap before eating and feeding	1

- The starting point for contamination was perceived as defecation in the river in all 10 villages and dirty well in 5 village groups.
- All village groups identified all three major routes by which contamination directly reaches the mouth *i.e.,* food, drinking water and dirty hands.
- Boiling drinking water, hand washing before eating/feeding and defecating in a latrine are preventive practices identified in all village groups. However, hand washing with soap was mentioned only in three village groups and only one village group mentioned hand washing before eating/feeding.
- Keeping food covered and protected from flies, washing and cooking food, keeping drinking water covered were mentioned in all village groups. Five village groups also selected *"throwing babies' feces in latrine"* as a way to block disease transmission.

Men sorting hygiene – related behaviors as 'good', 'bad' or 'irrelevant' for health. EMPANG ATAS, Sumbawa

Women in SAKURU (Bima) trace the route of disease transmission through pictures

5.6.3 Conclusions Re: Community Hygiene Awareness

1. Women are more aware than men of what is good for health and what is not.

2. Fairly good knowledge of hygiene exists, but practice is not consistent with knowledge. In all villages people know that use of latrines can block diseases transmission. Still defecation in water bodies is a widespread community practice, despite universal awareness (but perhaps lack of convictions) that it is bad for health. Despite the provision of latrines by the project, rivers, crop fields and paddy fields under standing water continue to be used for defecation 40-50% of the time. Boiling drinking water, keeping food and water covered are known preventive practices. However, in practice water is not always boiled before drinking.

3. Hand washing is universally recognized as a good preventive practice. Hand washing with soap was, however, only recognized as a preventive practice in 1 out of 10 villages.

4. Contamination route flow diagrams produced by villages show linear progression of contamination from exposed excreta to the mouth, but without clear 'cause-effect' relationships. This indicates lack of clarity about just how contamination travels – which probably is the reason for lack of convictions about why certain practices are harmful to health.

In the design of future projects it would be useful to start with a community level analysis of existing hygiene behavior and reasons for it. Understanding the rationale for what people do *would be the most effective way to address the barriers that exist in people's minds about* adopting better hygiene practices. "Hygiene Education" is a didactic concept based on the assumption that people are ignorant and must be "educated". For behavioral change, it would be better to adopt a learning approach, whereby project personnel first learn and understand with communities about what causes the existing behavior. Hygiene promotion needs to be designed on the basis of that understanding and interaction with communities regarding the kinds of changes the community is most motivated to make, both in their behavior and in their services.


Alaska

Items from "SCOPE OF THE EVALUATION" in the TOR that could be covered using participatory evaluation methods

- Condition, maintenance and **community use of physical infrastructure delivered.**

  - Water quantity, quality, condition of infrastructure (Technical Assessment)
  - **User's perception of adequacy of quantity, quality, regularity of service**
  - Sustainability of Type A, B, C type Water Supply Systems

    Sustainability:
    - Physical condition & functioning (Technical Assessment)
    - **Effective Use**
    - **Effective Management**
    - **Effective Financing**

- Status of Community management structures and procedures developed under the project **(covered in "Sustainability" above).**

- Involvement of women in decision making, management, implementation **(Process of making key decisions leading to creation of services; Current sharing of burdens for implementation, O&M.)**

- Changes in incidence of water borne-diseases **(Community perception).**

- **Community perception of project benefits** - to men, women, children.

- Status of Credit Scheme & benefits **(Men & Women's awareness and perceptions of scheme & benefits).**

ADDITIONS SUGGESTED

- **Sustainability of Environment Sanitation Facilities**
  Physical Condition (Tech Assessmt) / **Effective use / Effective financing / Effective management**

- **Knowledge, Attitudes, Practices in Environmental health** *(No baseline on Knowledge and Attitudes, but some on Practices available.* Suggest doing it as follows:)

- **Current Awareness of disease transmission routes & blocks**
- **Current Awareness of practices good/bad/irrelevant for health**
- **Before/After picture of Water source use**
- **Before/After picture of places used for defecation by men,women, children under 5.**

Approx. 2-3 days per village by a team of 2 (1 sanitary engineer + 1 participatory researcher)

Q. Is it possible to find villages with only AusAID project inputs during the reference period ?

DRAFT TERMS OF REFERENCE

Indonesia: Evaluation of the Nusa Tenggara Barat Environmental Sanitation and Water Supply Project (NTB ES&WS)

I. BACKGROUND TO THE PROJECT

Nusa Tenggara Barat (NTB) province is one of the poorest, most isolated and least developed provinces in Indonesia, suffering from overcrowding on limited fertile land. At the commencement of preparation of the NTB project (1990) an unacceptably high proportion of the 3.4 million population suffered from health problems related to inadequate water supply and sanitation, and infant and maternal mortality were higher than the national average.

I.1 Project Goal, Objectives, Duration, Cost, Contractor and Location

The goal of the NTB ES&WS project was to contribute to improved socio-economic and environmental health conditions in NTB. Its purpose was to provide environmental sanitation and water supply facilities, which would be effectively used and focussed on community and kabupaten-based management

The project commenced in December 1991, the Project Implementation Document was approved in December 1992, and implementation was completed in May 1997. The total cost to Australia was A$25.5 million, with 5,400 million Rp contributed by the GoI and a further 14,500 million Rp contributed by beneficiary communities.

The Australian contractors were Kinhill Engineers Pty Ltd, ACIL Australia Pty Ltd and IDSS Pty Ltd. The Indonesian Executing Authority was the Ministry of Health, Directorate General of Communicable Disease Control and Environmental Health.

The project sites were in the Province of NTB, with activities in the Kabupaten of Lombok Barat, Lombok Tengah, Lombok Timur, Sumbawa, Dompu, and Bima

I.2 Project Description

The project had three components:

- **project management**, which established project planning and management structures and strategies, within the existing GoI administrative framework for WS&S. The project strategies supported both community managed and GoI institutionally managed activities;
- **community managed activities**, which set the framework for specific donor and GoI agency support for the community managed activities; and then described the community process; and
- **institutionally managed activities**, which concentrated on those activities for which GoI Agencies were responsible.

The project aimed to benefit some 800,000 persons in rural and small urban communities, with a focus on community based water supply and sanitation improvement Training and information systems were emphasised. Three water supply models were used:

Type C Community managed piped, or non-piped, systems

Type B Small and medium-sized pipe systems which were intended to have a balance of institutional and community involvement.

Type A: Large, complex networked pipe systems operated and maintained by the institution (water enterprise).

The readily measurable outputs of the project included:

Construction	
– Wells (Community)[1]	8775
– Latrines (Community)[2]	93,929
– Community managed piped water supplies[3]	14
– Institutionally managed (PDAM) new and rehabilitated piped water supplies[4]	11
– Miscellaneous environmental sanitation facilities (Community)	2356
Training Courses	
– Community	230
– Institutional	164
– Total persons trained	15,578
Community Based Credit Schemes[5]	
– BMT (Muslim) banks and branches established	31
– BMT (Muslim) cooperatives established	47

II. EVALUATION OBJECTIVES

The objectives of the evaluation of the Indonesia NTB ES&WS Project are to examine and assess.

- the appropriateness of the goal and purpose of the project in the context of recipient government needs and priorities, AusAID's relevant Country Strategy and AusAID's objectives;
- the extent to which the activity has achieved its stated goal and objectives;
- the economic, social, cultural, institutional, and environmental outcomes and, if appropriate, impact, of the project (both intended and unintended);
- the efficiency of project implementation; and
- the sustainability of benefits.

The evaluation will also identify the major lessons learned from the activity in all stages of its implementation

III. SCOPE OF THE EVALUATION

The Evaluation Team will examine, assess and report on, *inter alia*

[1] As a rule of thumb, each well served 25 users
[2] It was estimated that 5 people used each latrine.
[3] These Type C piped water supplies benefited about 21,400 people.
[4] Six rehabilitated Type A systems serving 113,000 beneficiaries and 5 new Type B systems with 39,000 beneficiaries.
[5] Total number of borrowers was 3,955.

- the condition, maintenance and community use of physical infrastructure delivered under the project ie. latrines, piped and non-piped water systems, including,
  - water quantity and quality as well as the condition of the infrastructure; and
  - the relative sustainability of Type A, Type B and Type C water supply systems;
- the status of community management structures and procedures developed under the project, and the retention of knowledge provided through project training;
- the involvement of women in management, decision-making and activity implementation in current structures;
- the status of institutional structures and procedures set up under the project to manage more complex water systems, and the retention of knowledge provided through project training;
- developments in the provision of water and sanitation facilities in the region since the completion of the project, and the influence of the project on these,
- changes in the incidence of waterborne diseases in the province and the possible role of the project;
- community perceptions of the benefits to men, women and children of project-derived outputs;
- the status of the credit schemes established under the project and their benefits to the community;
- strengths and weaknesses of project implementation;
- the institutional/counterpart arrangements for the implementation of the project, and their impact on the project's performance,
- the criteria for determining the priorities for implementation of facilities within the project,
- the interaction among AusAID water supply projects in the region; and
- the need for additional donor inputs in the ES & WS sector, particularly on Sumbawa Island

If feasible, the Evaluation Team will undertake a cost-benefit analysis of the project

IV. METHOD

The evaluation will follow the method generally used in AusAID's project evaluations and reviews. That is, the evaluation will commence with a desk study where the Team is briefed, collects information, prepares a method to achieve the objectives of the evaluation, and finalises its itinerary The information will then be verified and expanded in a field visit

To the extent practicable, the Evaluation Team will use the basic information collection method and survey questionnaires developed by the UNDP/World Bank Water and Sanitation Program, Water and Sanitation Program for East Asia and the Pacific (WSP-EAP). In this way the results of the study should be comparable to a series of similar studies being carried out in Indonesia by WSP-EAP.

The evaluation will use a combination of qualitative, participatory, quantitative and technical assessment methods.

A draft report will be written by the Team and agreed with the AusAID Post and GoI. This report will be circulated more widely for comment and finalised in Canberra. It is expected that the evaluation will take up to eight weeks to complete, allowing three weeks for comments to be provided on the draft report.

An AusAID Advisory Group will guide the evaluation process and co-ordinate comments on the evaluation report. Membership of the Advisory Group will be from:

Indonesia Section;
Performance Information and Assessment Section;
Infrastructure and Environment Group,
Gender and Education Group; and
Health Group

Dr Philip Fradd, the Task Manager, Performance Information & Assessment Section will manage the evaluation.

V. EVALUATION TEAM COMPOSITION

The Evaluation Team will consist of a Team Leader and two to three Team Members, including a GoI facilitator in Nusa Tenggara Barat Additional resources may be contracted in Indonesia to assist with information collection The Team will work under the direction of the Team Leader who will report to the AusAID Task Manager

Among them, Team Members will have the following expertise:

General

- experience with development projects in Indonesia, particularly in design and/or evaluation; and an understanding of GoI's development objectives,
- familiarity with AusAID requirements for reviews and evaluations,
- excellent communication and writing skills;
- understanding of Bahasa Indonesian and/or local dialects in NTB;

Sectoral

- experience in analysis of community-based development activities, including social and cultural aspects and assessment of gender impact,
- experience in analysis of institutional development activities;
- experience in economic and financial assessment in developing countries, including cost-benefit analysis of development activities;
- experience in the design, construction, operation and assessment of piped and non-piped water supply systems, preferably in a similar climatic and social environment; to that of the project,
- experience in design, construction, operation and assessment of environmental sanitation systems (human and solid waste disposal, drainage etc) in a similar climatic and social environment to that in the project; and

- experience in health work in similar climatic and social conditions to that of the project, especially experience with environmental sanitation and water-related health issues, including experience in health education activities for community-based programs.

VI. EVALUATION TEAM OUTPUTS

Desk Review

At the conclusion of the desk review the Team will have:

- become familiar with issues to be examined during the field work;
- developed a detailed workplan to implement the task, including allocation of team responsibilities, agreed with AusAID,
- a field work itinerary, as agreed with AusAID;
- an annotated format for the draft Report; and
- developed assessment instruments, interview schedules and questions agreed with AusAID (see Method above).

Field Study

The primary output of the team at the conclusion of the Field Study will be the Draft Evaluation Report, which has been agreed with the Task Manager, the AusAID Post and the recipient government. The team will also prepare an aide-memoire to be signed at the wrap-up meeting.

The field study will be conducted according to the itinerary, and using the questionnaires and interview schedules agreed during the desk review.

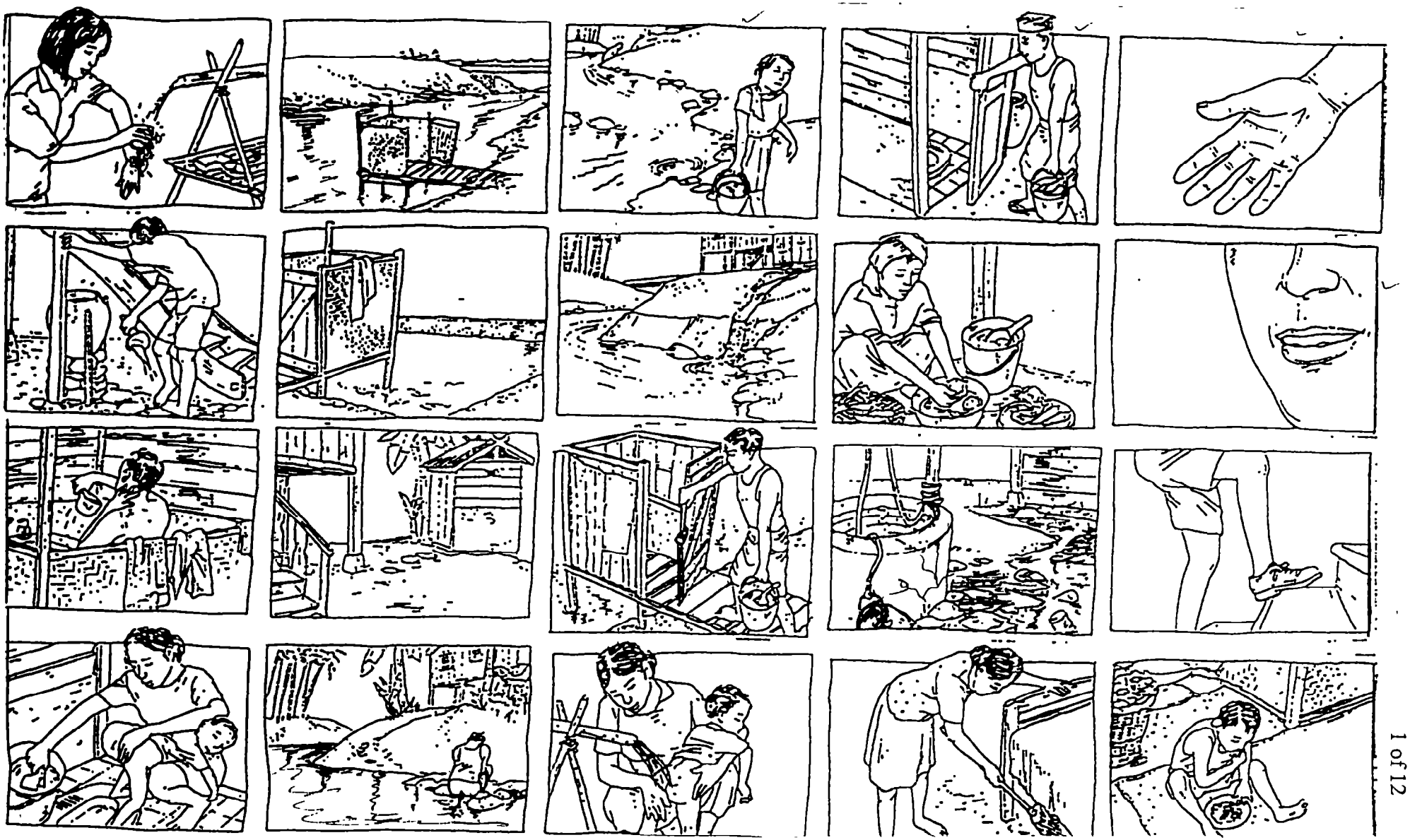
VII. REPORTING

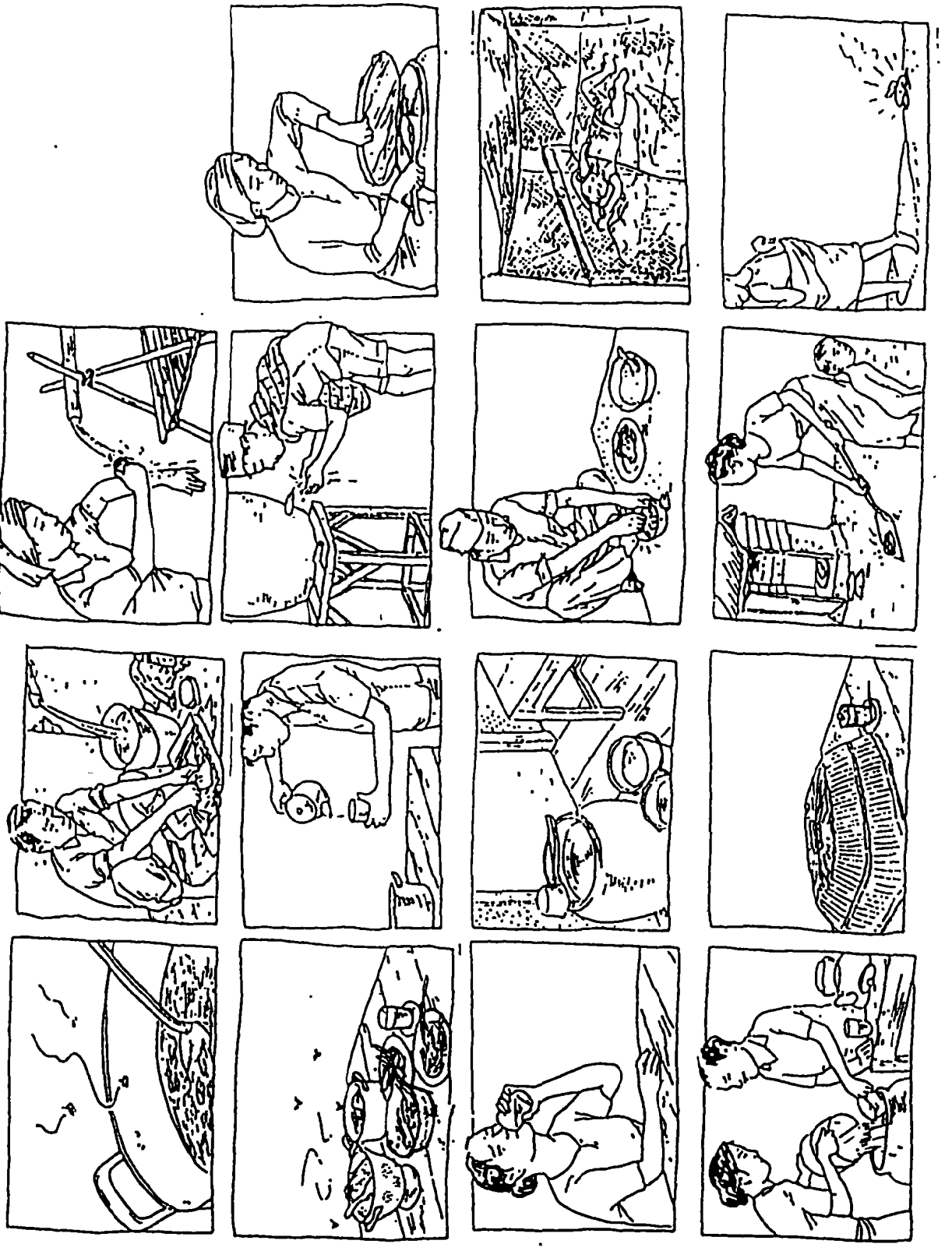
The Final Report will be approximately 30 - 40 pages, together with any essential appendices. The report will be drafted during the fieldwork phase, to produce the draft for presentation and agreement at the wrap-up meeting. The report will be finalised after the Evaluation Team's return to Australia.

Annex B

EXAMPLES OF ILLUSTRATIONS USED FOR

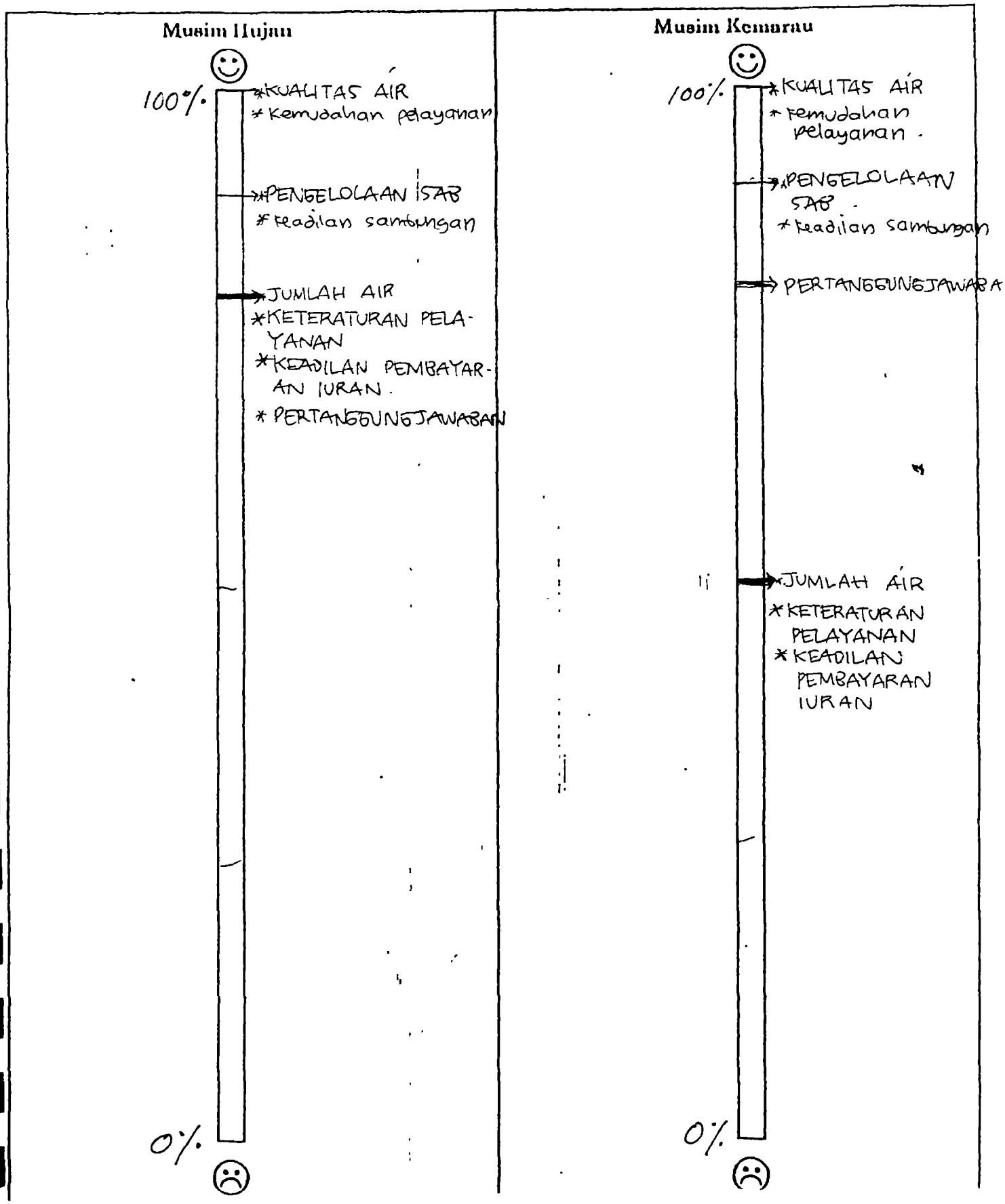
- **Hygiene Behavior Pile Sorting**
- **Tracing Community Perceptions of Routes of Disease Transmission**





RESPONSES RECORD FROM SCALES DRAWN ON THE GROUND

Kegiatan : **Rating Scale Air Bersih**
Nama Desa/Kabupaten : SESAIT / Lombok Barat
Nama Dusun : SUMUR PANDE DAYA
Jumlah Peserta : 15 orang 12 W 3 P
8 orang Aktif 7 orang Tidak Aktif
Waktu Pelaksanaan : 21 ^00 WITA
Tanggal : 5 Desember 1998.



SUMBER AIR BERSIH YANG MANA SAJA YANG BIASANYA BAPAK / IBU GUNAKAN UNTUK KEPERLUAN : Minum / Masak , Cuci / Mandi , dan Kegiatan Lainnya ?

SESAIT

POCKET VOTING RESULTS

SUMBER AIR / JENIS KEGIATAN	KRAN BSWS IIC (dari proyek)	MATA AIR	TELAGA AIR	SUNGAI	KOLAM SAWAH	
MINUM + MASAK	▷▷▷▷▷ ▷▷▷▷▷	□□□□□ □□□□□	□	□□		
CUCI / MANDI	▷▷▷▷ ▷▷▷▷▷	□□□□□ ▷▷	□□□	□□□□□		
KEPERLUAN DI LUAR RUMAH TANGGA (Menyiram tan, ternak dsb)				□□□□□ ▷▷▷		

- Dusun, Desa, Kabupaten :
- Jumlah Yg hadir :

□ SEBELUM

▷ SETUDAH

TEBABAN — DI LINGKUNGAN BAPAK ± dan IBU ±, SIAPA SAJA YANG BIASA MENGGUNAKAN SARANA BAB INI ?

POCKET VOTING RESULTS

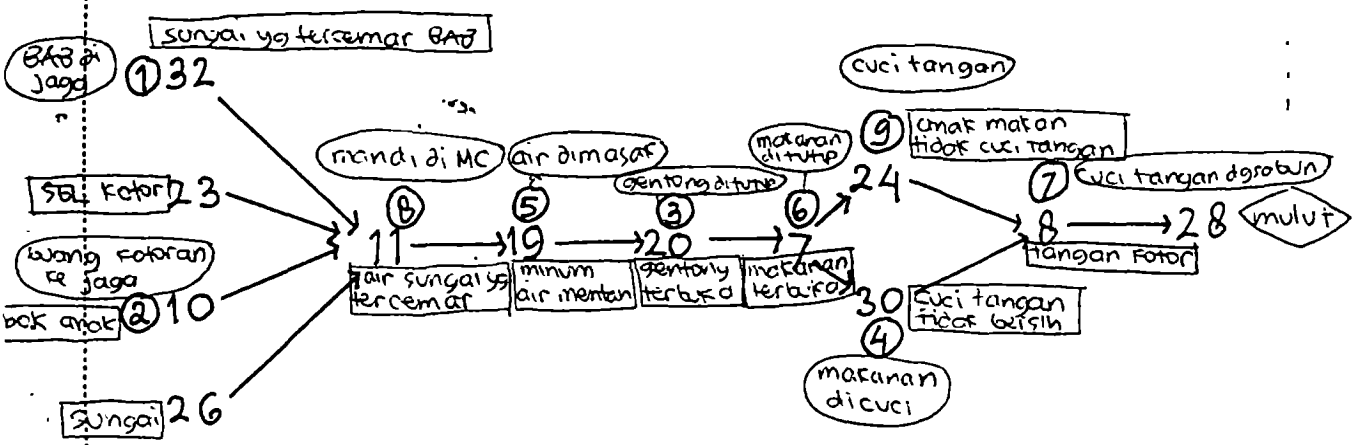
JENIS SARANA / YANG MENGGUNAKAN	JAMBAN	PARIT SAWAH	KEBUN / PEKARANGAN	SUNGAI / SALURAN AIR	HALAMAN RUMAH	
Bapak	□□ ▷▷▷▷	□□□□□ □□ ▷▷▷▷▷ ▷▷		□□□□ ▷▷▷▷		
Ibu	□ ▷▷	□□□□□ □□ ▷▷▷▷▷ ▷▷		□□□□□ ▷▷▷▷▷		
Anak - anak		□□□□□ □□ ▷▷▷▷▷▷	□□□□ ▷▷▷▷	□□ ▷▷		
Bayi			□□□ ▷▷▷		□□□□□ □□ ▷▷▷▷▷ ▷▷	

- Dusun, Desa, Kabupaten :
- Jumlah Yg hadir :

□: SEBELUM

▷: SESUDAH

10 b Contamination Block



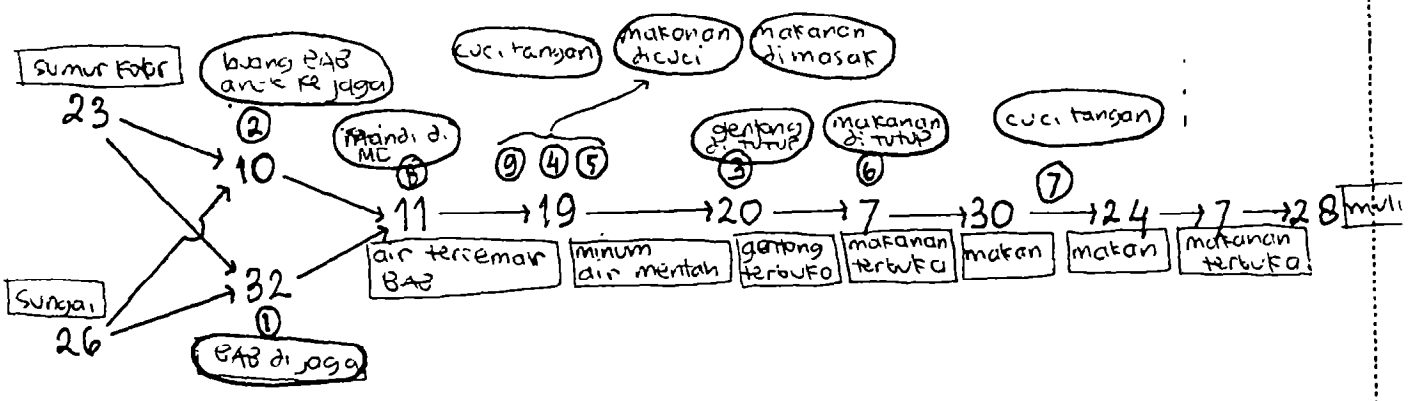
Penjelasan

Tempat mengambil air (32), (23), (10) dan (26) semuanya tercemar, digunakan mandi dan airnya diambil (11). Setelah di tampah di gentong, bapak langsung mengambil untuk diminum (19), Gentongnya pun tidak tertutup (20). Masakan yang disinggahkan tidak ditutup (7) sehingga lalat banyak hinggap, kemudian dimakan oleh Bapak dan anak yang juga tidak cuci tangan (24 dan 30). Kemudian masuk ke mulut (28).

Block ◯

BAB seharusnya di wc ①, kotoran anak pun harus dimasukkan ke wc ②; kemudian mandi sebaiknya di kamar mandi ⑧. Air sebelum diminum harus dimasak terlebih dahulu ⑤ Gentong tempat air pun (20) harus di tutup ③ Masakan yang dihidangkan (7) harus ditutup ⑥ Sebelum makan harus cuci tangan ⑨, termasuk makanan atau lauk-lauknya harus dicuci terlebih dahulu ④ Tangan yang dipakai makan (8) harus di cuci dengan sabun ⑦ supaya bersih.

10 b Contamination Block



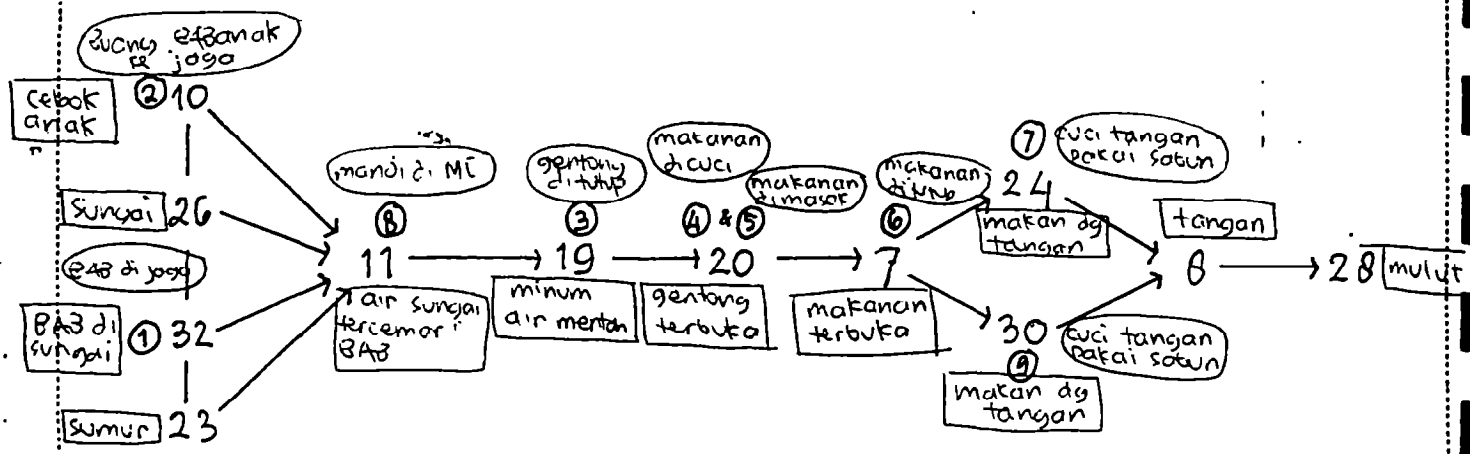
Keterangan ○ Block

Penjelasan

Dua sumber air (23) dan (26), jika digunakan BAB (32) dan membersihkan anak kabis BAB di sembarang tempat (10), maka akan tercemar. dipakai mandi dan ambil air kotor oleh ibu (11), ditumpah ke gentong dan Bapak langsung ngambil mau minum (19) Gentong tidak ditutup (20) dan hidangan tidak ditutup (7)

Block ○

BAB anak (10) harus dibersihkan dan dibuang ke wc ②, Bapak jika BAB (32) harus di kamar (wc) ①. Mandi yang baik adalah di Bak mandi Ⓑ, Sebelum bekerja di dapur harus Cuci tangan dulu ⑨, baru membersihkan sayur dan lain-lain ④ dan kemudian masak ⑤, gentong penyimpan air (20) harus ditutup ③ termasuk hidangan makanan ⑥ Sebelum makan Cuci tangan harus pakai sabun ⑦



Penjelasan

Sumber-sumber air yang kotor (10), (26), (32), (23), digunakan mandi dan airnya dibawa pulang (11). Kemudian Bapak langsung mau minum air yg masih kotor tadi (19); terlebih lagi gentong tempat airnya didak ditutup (20). Kemudian hidangan makanan tidak ditutup (7) sehingga banyak lalat. Anak-anak (24) dan Bapak (30) langsung makan dengan tangan kemudian dimasukkan mulut.

Block ○

Biasakan membuang kotoran anak ke lubang WC ② BAB (32) Seharusnya di jamban ① Mandi yang sehat berikan di kali kotor (11) tapi harus di kamar mandi ⑧, Air di gentong (19) harus ditutup ③, Air yang di gentong (20) bisa dipakai mencuci tangnan yang mau dimasak ④ dan jika mau diminum harus dimasak terlebih dahulu ⑤. Hidangan makanan (7) harus ditutup ⑥ Anak-anak dan Bapak-Bapak jika mau makan (24) dan (30) harus cuci tangan terlebih dahulu ⑨ dan ⑧

3 PENGKLASIFIKASIAN TINGKAT HIDUP (PENGHIDUPAN) MASYARAKAT

Dusun : Ndora
Desa : Samili
Kec. / Kab : Woha / Bima

Waktu :
Peserta : 99 Kk

	KAYA	MENENGAH (SEDANG)	MISKIN
1. Kepemilikan lahan	Lebih besar dari 4 ha	0,1 - 3 ha	tak punya lahan
2. Kepemilikan Ternak	Sapi/Kerbau diatas 5 ekor	Sapi/Kerbau dibawah 4 ekor	tidak punya ternak besar, hanya Ayam
3. Jenis & Luas rumah	- Rumah dinding Papan rumah panggung tiang 12 - 16 tiang - Rumah Batu : 6 kamar	- Rumah papan 9 tiang - Rumah Batu 3 kamar	- Rumah dinding Bedeg luasnya ada 6 tiang - Beratapnya Gubug.
4. Perabot rumah tangga	- Dipan, kursi sudut, Lemari, Bufet Rp. 500.000	- Dipan, kursi plastik, Lemari, Bufet Rp 150.000	- Dipan, Lemari Rp. 50.000
5. Alat Elektronik	- Parabda, Video, TV warna, Tape deck, Kulkas, Telepon	- TV, Radio	-
6. Pendapatan/th.	2,5 - 5 juta	1 - 2,4 juta	500.000 - 900.000
7. Pekerjaan	• Petani pemilik + Pegawai • Pengusaha/Pedagang • Petani Pemilik	• Pegawai tanpa punya lahan • Kusir • Petani pemilik • Pedagang tak, ber lahan - Pedagang, Pegawai Penyewa lahan	• Buruh tani • Petani penyewa
8. Fasilitas lain	• Mobil • Sepeda motor	• Benhur - Sepeda	-
	5 %	41 %	54 %

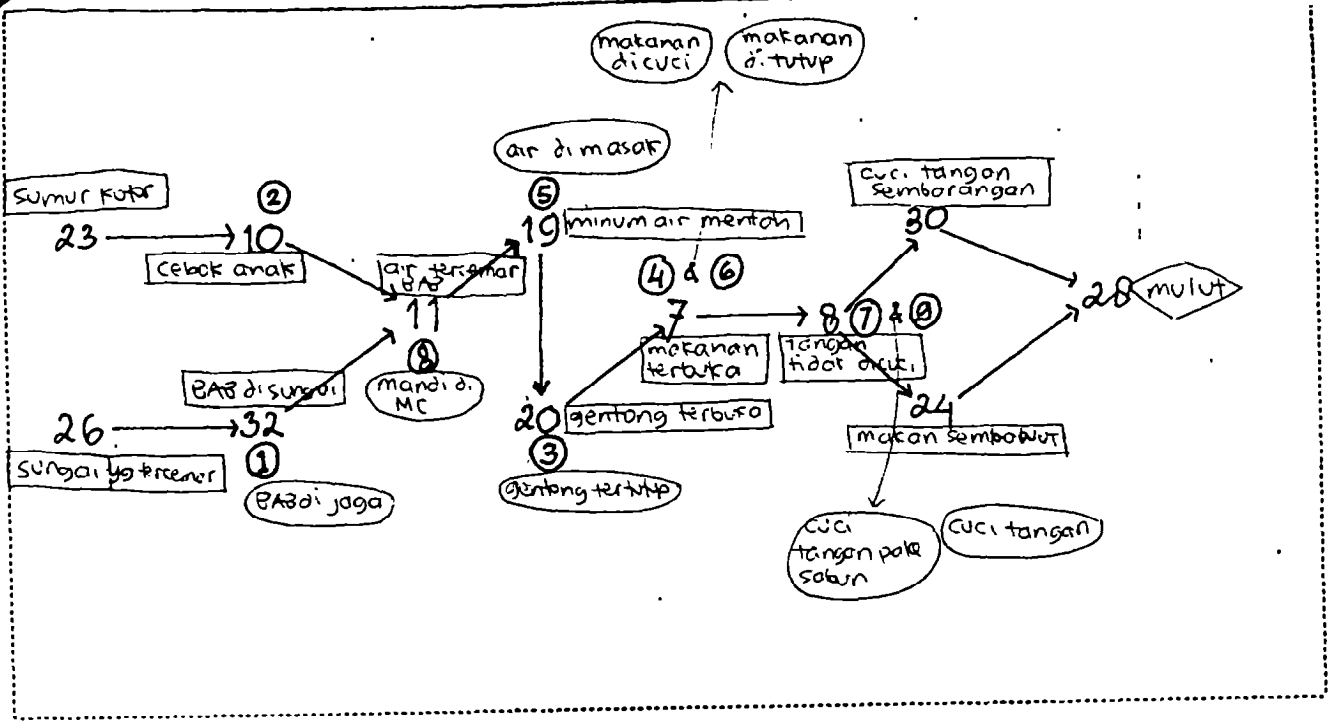
UAPE

SIAPA YANG TERLIBAT DALAM PENGAMBILAN KEPUTUSAN ?

KEPUTUSAN MENGENAI ↓	Kepala Desa (2)	PU (7)	Muspika (9)	Tenaga Lapangan ESWS (8)	Tenaga Dinas Kesehatan (6)	LKMD (5)	Kelompok Bapak ∑ (4)	Kelompok Ibu ∑ (3)	Kelompok Bapak / Ibu	Pihak lain (1) Toma
1. Pilihan Desa untuk Proyek ESWS			[9] (9)							
2. Sosialisasi proyek			[9] (9)							
3. Jenis / Teknologi Sarana				[9] (9)						
4. Tempat bangunan Jamban dan Sumur				[9] (9)						
5. Jadwal / Waktu Pelaksanaan				[3] (3)			[3] (3)	[3] (3)		
6. Besarnya sumbangan				[9] (9)						
7. Peserta Pelatihan	[9] (9)									
8. Masy. yang dapat Jamban						(9)				
9. Iuran Bulanan										
10.										
Frequensi Total	[9] (9)		[18] (18)	[30] (30)		(9)	[3] (3)	[3] (3)		

- Dusun - Desa, Kabupaten
- Keputusan mengenai
  - SAB □
  - Sarana Sanitasi ○

> Nilai tertinggi 9



Penjelasan

Sumber air yang tercemar adalah rumah tangga (26) dan sumur yang tinggalnya jauh ke tanah (23) kemudian digunakan BAB (32) serta untuk cebok anak-anak (10) diambil airnya dan untuk mandi (11). Air tersebut digunakan minum (19) dan gentong-nya tidak ditutup (20) digunakan masak dan Bidangnya tidak ditutup (7) kemudian makan tanpa cuci tangan (8) atau cuci tangan sembarangan (30) dan anak-anak makan sembarangan (24) sehingga bisa menimbulkan penyakit.

Block O

Biasakan sejak kecil menggunakan jamban ②. sehingga setelah besar terbiasa ①. Mandi (11) sebaiknya di bak kamar mandi ⑧ Biasakan minum air yang dimasak terlebih dahulu ⑤ Gentong tempat air harus ditutup ③ baru kemudian digunakan untuk mencuci bahan yang akan dimasak ④ dan masakan harus ditutup di meja makan ⑥. Tangan (8) harus dicuci ⑨ dan menggunakan sabun supaya lebih bersih ⑦

(7)

Kegiatan : Analisa Trend (Balur 2)
Nama Desa/Kabupaten : LENEK LAUQ
Nama Dusun : DOBOL
Jumlah Peserta : 15 orang (W) – P
orang Aktif orang Tidak Aktif
Waktu Pelaksanaan :
Tanggal : 15 DESEMBER 1998

Topik	Perubahan	
	Sebelum Proyek	Sesudah Proyek
Waktu	- Saling tunggu, karena tidak berani pergi sendiri	- Kapan saja bisa.
~~Kesehatan~~ Tempat ambil air	- Pancuran di sungai	- Sumur
Jarak	± 1 km	3 - 10 m
Energi / Tenaga untuk mengambil air	- Terasa sangat lelah	Tidak terasa lelah
Jml air yg diambil / KK / hari	- Maksimal 4 ember	Sepuas-puasnya
Waktu utk mengambil air / ~~KK/hari~~	± 1 jam bolak-balik, maksimal 2 kali (pagi dan sore)	5 menit
Waktu utk kegiatan lain	- Ambil air dulu baru masak - Tidak ada waktu santai	- Sambil masak bisa ambil air - Bisa mendengar radio dan nonton TV
Penyakit (berapa kali/th)	- Banyak yg kena diare	- Sedikit yg terkena diare
Kemudahan mendapat kredit		
Pendapatan		
Kegiatan Ibadah	- Sering terlambat sholat subuh	- Tidak kesulitan mandi
Kebersihan	- Cuci pakaian 2 x seminggu	- Setiap hari bisa mencuci pakaian
Mandi	- 2 x sehari	- Sesering mungkin (tiap akan sholat)
Pesta	- Jauh ambil air	- Dekat

* catatan : ada data kualitatif dan kuantitatif

3. PENGKLASIFIKASIAN TINGKAT HIDUP (PENGHIDUPAN) MASYARAKAT

Dusun : Ndora
Desa : Samili
Kec. / Kab : Woha / Bima

Waktu :
Peserta : ♀♀ ♂♂

	KAYA	MENENGAH (SEDANG)	MISKIN
1. Kepemilikan lahan	Lebih besar dari 4 ha	0,1 - 3 ha	tak punya lahan
2. Kepemilikan Ternak	Sapi/Kerbau diatas 5 ekor	Sapi/Kerbau dibawah 4 ekor	tidak punya ternak besar, hanya Ayam
3. Jenis & Luas rumah	- Rumah dinding Papan rumah panggung tiang 12 - 16 tiang - Rumah Batu : 6 kamar	- Rumah papan 9 tiang - Rumah Batu 3 kamar	- Rumah dinding Bedeg luasnya ada 6 tiang - Bentuknya Gubug.
4. Perabot rumah tangga	- Dipan, kursi sudut, Lemari, Bufet Rp. 500.000	- Dipan, kursi plastik, Lemari, Bufet Rp 150.000	- Dipan, Lemari Rp. 50.000
5. Alat Elektronik	- Parabola, Video, TV warna, Tape deck, kulkas, Telepon	- TV, Radio	-
6. Pendapatan/th.	2,5 - 5 juta	1 - 2,4 juta	500.000 - 900.000
7. Pekerjaan	• Petani pemilik + Pegawai • Pengusaha/Pedagang • Petani Pemilik	• Pegawai tanpa punya lahan • Kusir • Petani pemilik • Pedagang tak, berlahan • Pedagang, Pegawai Penyewa lahan	• Buruh tani • Petani penyewa
8. Fasilitas lain	• Mobil • Sepeda motor	• Benhur • Sepeda	-
	5 %	41 %	54 %

LAPE

SIAPA YANG TERLIBAT DALAM PENGAMBILAN KEPUTUSAN ?

KEPUTUSAN MENGENAI ↓	Kepala Desa [2]	PU [7]	Muspika [9]	Tenaga Lapangan ESWS [8]	Tenaga Dinas Kesehatan [6]	LKMD [5]	Kelompok Bapak I [4]	Kelompok Ibu I [3]	Kelompok Bapak / Ibu	Pihak lain [1] Toma
1. Pilihan Desa untuk Proyek ESWS			9 (9)							
2. Sosialisasi proyek			9 (9)							
3. Jenis / Teknologi Sarana				9 (9)						
4. Tempat bangunan Jamban dan sumur				9 (9)						
5. Jadwal / Waktu Pelaksanaan				3 (3)			3 (3)	3 (3)		
6. Besarnya sumbangan				9 (9)						
7. Peserta Pelatihan	9 (9)									
8. Masy. yang dapat Jamban						(9)				
9. Iuran Bulanan										
10.										
Freguensi Total	9 (9)		18 (18)	30 (30)		(9)	3 (3)	3 (3)		

- Dusun . Desa, Kabupaten :
- Keputusan mengenai
  - SAB □
  - Sarana Sanitasi ○

> Nilai tertinggi 9

Annex C

Water Supply Systems Classification

The project document uses a functionally-based rather than a physically-based classification of water supply systems, defined here simply as: Types A, B and C.

The distinction between these three Types is related to:

- The approach to implementing and managing the scheme;
- The physical attributes of the system.

The main advantage of this classification is that construction, operation and maintenance have a high profile, allowing scope to identify both community and institutional contributions to the implementation and management of water supplies. Community contributions, from the bottom up, of land, labor, supplies and management capacity can be recognised, and compared to government agency contributions from the top down (see *Figure 1*) Within certain limitations of size and complexity the community capacity to plan, construct, operate and manage its own facilities is increasingly being recognised (Cipta Karya 1990). This capacity may be higher than credited, with appropriate facilitation.

Yet at the same time, the technical and managerial expertise necessary to implement and manage very complex systems resides only within government institutions. There are also schemes where success depends upon a combination of the best attributes of communities and institutions working together to achieve viable and sustainable results. The three types of water supply system are described below.

Type C: Community Managed Schemes

The principal defining feature of this category is that community groups are able (with appropriate support) to manage all aspects of their water supply system, from the initial planning through construction to operation, maintenance and effective use, without the need for government institutional intervention. This category covers a wide technical range, from undeveloped point sources (a well, for example) to small, relatively simple piped distribution systems serving several sub-groups of user sharing a suitable source. This category has been sub-divided into three, as shown in *Figure 2*. Greater subdivision is also possible; those suggested sub-groups are not regarded as limiting the scope for innovation within the definition of Type C systems.

- Type C1 are the simple point sources (usually a well) serving a single, small group of households, perhaps up to Rukun Tetangga (RT) size or about 120 people, depending on the relative ease of access of the source.
- Type C2 is the simple development of a point source by, and wholly for, a single small group, perhaps an RT or dusun.
- Type C3 takes that the development a step further to where the community may include several groups, physically separate but unified in their approach, joining together to construct and manage a scheme to share a suitable source. These are generally simple gravity systems, but can include simple pumped systems. There are limits to both the size and number of groups which can be

unified with high reliability, and to the complexity of systems which communities can manage.

The communities themselves determine and collect the charges necessary to operate and maintain the systems, in effect ensuring cost recovery through self-financing.

Type B : Small and Medium-Sized Pipe System

This central category draws upon the strengths and recognises the weaknesses of both communities and institutions. Type B schemes attempt to find the right balance between top down and bottom up approaches to achieves sustainability.

The institution generally provides a "bulk supply" source to defined user groups and areas. Within these areas, the community has the capacity to construct, operate and maintain the scheme.

The size of each group shown in *Figure 3* is a dusun or possibly a desa. The communities pay for the water supplied to the boundary, clearly expecting that the bulk tariff be reduced considerably from the "full service" tariff level, in return for their input into operation and maintenance of the smaller distribution pipes and outlets. Communities could organise the collection of the reduced bulk service tariff payable to the water enterprise in whatever way they wished.

Type B has been sub-divided to distinguish between those systems which serve different settlement types·

- "Rural" settlements, for example clusters of desa; or
- "Urban" settlements, probably closely arranged on formal gridlines.

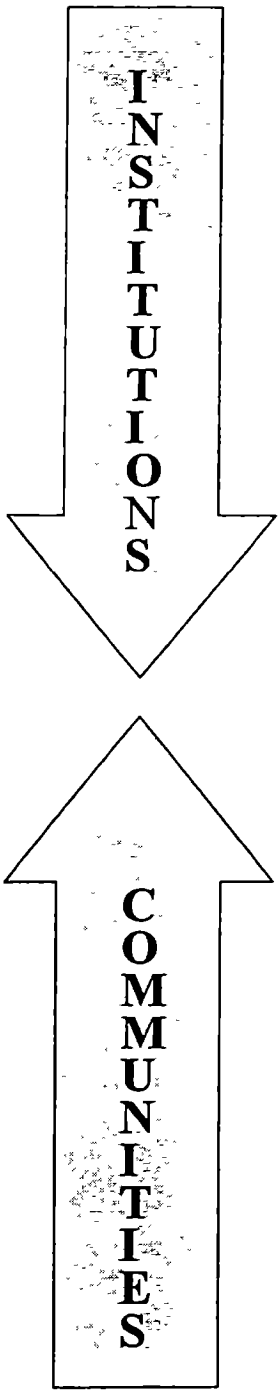
Type A: Large, Complex Networked Pipe Systems

The development, operation and maintenance of these complex piped systems depends upon government institutions – the water enterprise, in the case of operation and maintenance. There is usually little scope for community initiative or participation, except possibly in the construction and operation of public standpipes. The relationship between the communities connected to such a system and the water enterprise is as "consumers", or customers, with full service tariffs being payable, even though the structure of the tariff may vary. The system is dependent on the institution, and so the schemes sustainability depends upon the technical and managerial capacity, efficiency and effectiveness of that institution in operation and maintenance.

Figure 1

WATER SUPPLY SYSTEMS – APPROACH BY TYPE

TOP DOWN



TYPE A

LARGE PIPE NETWORKS

Development dependant on
- Institutions
- Physical / Technical

TYPE B

SMALL / MEDIUM PIPE SYSTEMS

Development dependant on
- Institutions
- Technical / Financial
- Community

TYPE C

POINT SOURCES, SMALL / INTERNAL DISTRIBUTION

Development dependant on

- Community (all skills)

BOTTOM UP

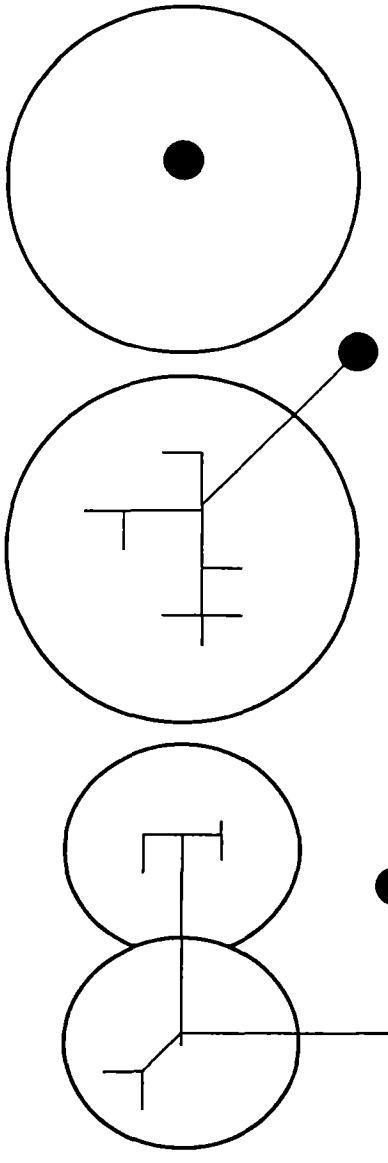
Figure 2

Type C Water Supply Systems

(Point Sources, small / internal distribution systems)

Features : Homogeneous community : single or
Small groups – systems able to be fully
Constructed, operated and managed by
Community – no need for Institution.

Examples :



C1 well, single group

C2 simple development
Single group

C3 sharing source
Unified groups
(e.g. dusun, 1 desa)

Figure 3

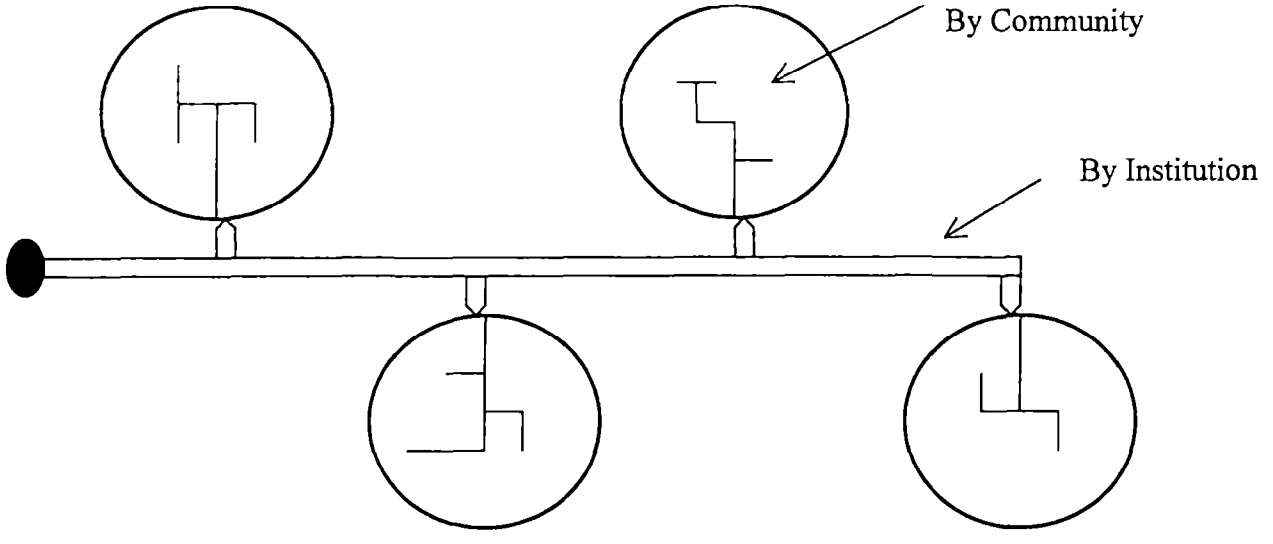
Type B Water Supply Systems

(small / medium pipe system)

Features : Collection of community groups - internally able to construct, operate and manage a system, require an Institution to provide a bulk supply service (single shared source)

Examples :

B1 basically "rural"



B2 basically "urban"

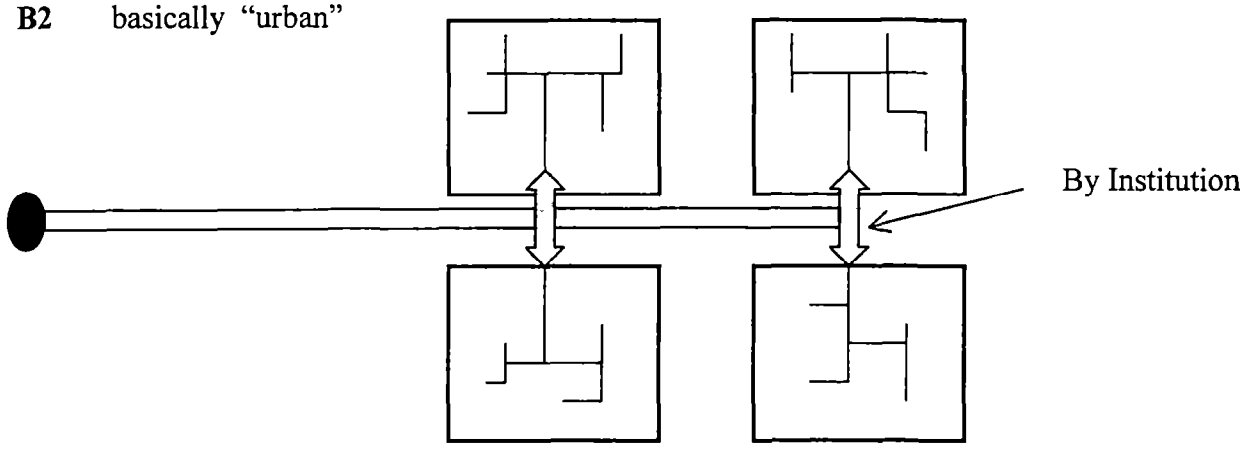


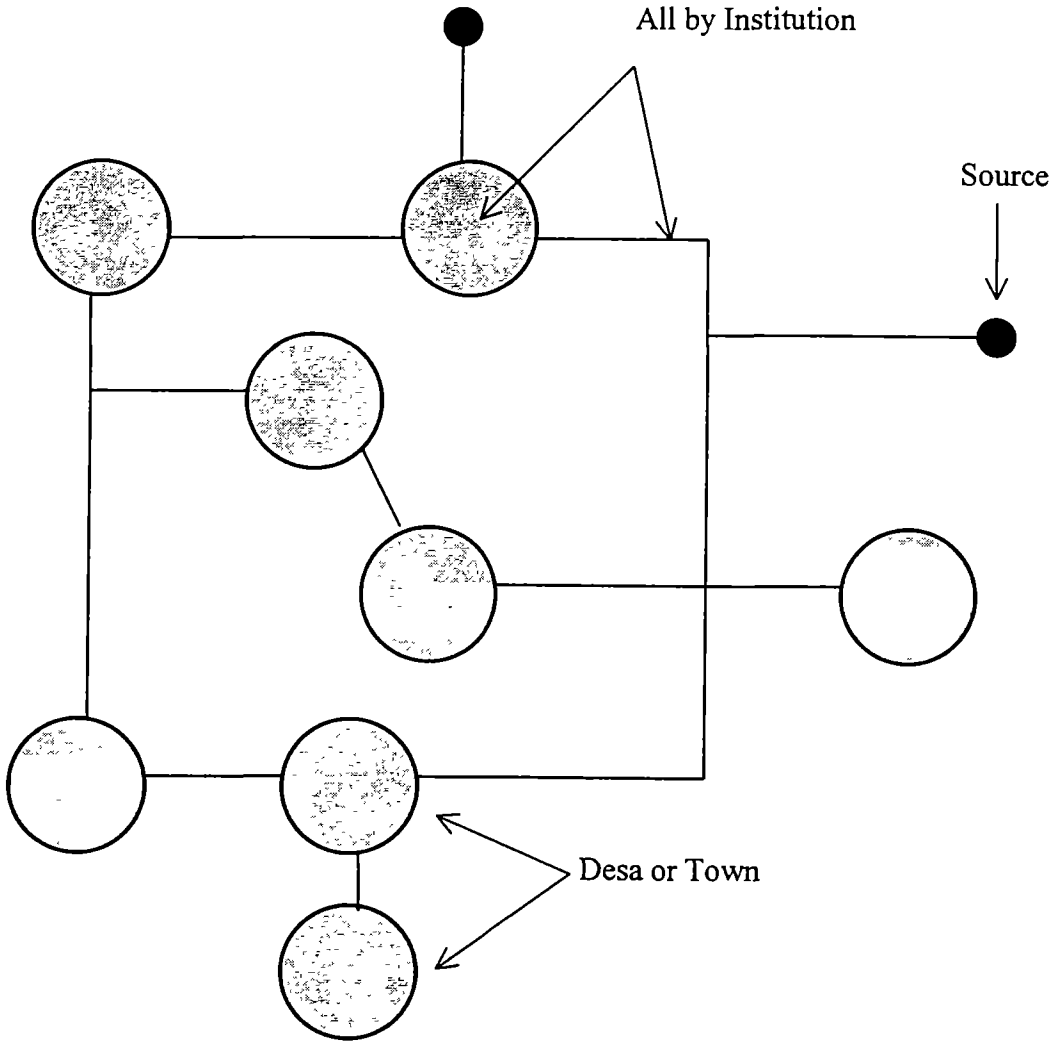
Figure 4

Type A Water Supply Systems

Complex networked pipe systems
(already established in whole or part)

Features : High degree of interdependance, dpendance on Institution, multiple sources, little or no community initiative possible.

Examples :



Visit to NTB December 1 – 6, 1998
Initial PRA Evaluation Survey of AusAID NTB ESWS Project
Back to Office Notes

The Project and the Task

AusAID funded a five-year water and sanitation project in NTB (ESWS - Environmental Sanitation and Water Supply), which was completed in early 1997. It is one of the key WSS projects for evaluation under PFAP. It was agreed with AusAID that, as part of PFAP, WSP-EAP would undertake an initial evaluation of a sample of Types B and C schemes implemented under this project. This will form part of a total project evaluation for AusAID, as well as contributing to the database of sector experience already gathered by WSP-EAP. To undertake this task, WSP-EAP engaged field staff with previous experience with Participatory Rural Appraisal (PRA) techniques, originating from Institute of Technology Bandung (ITB) and the NTB office of the LSM LP3ES.

The objectives of the visit by WSP-EAP Jakarta office personnel were to:

- observe the data gathering in progress,
- provide any necessary background information and technical support to the team, at the start of their field activities,
- gain a preliminary impression of actual achievements of the project, and
- seek examples of successful approaches for sustainable WSS activities, for further action during PFAP.

In this respect, the schemes described as "Type B" (jointly undertaken and managed by institutions and communities) were of particular interest.

Team and Itinerary

The members of WSP-EAP Jakarta office attending were Messrs. Richard Hopkins and Alfred Lambertus. They joined the two evaluation teams already in the field for the commencement of the initial evaluation survey of the community-involved components of the AusAID NTB ESWS project. The field teams each comprised two members: one each from ITB and LP3ES covering technical and social issues respectively. Team members had met for several days in Jakarta the previous week, fixing details of site selection, modifications to methodology, logistics etc.

The WSP-EAP personnel arrived in Mataram, Lombok, on Tuesday 1st; on 2nd they visited the first site being surveyed by one field team on Lombok island, at Desa Teratak in Central Lombok, and then traveled on to Dompu on Sumbawa island with the second field team. From Thursday 3rd through to Saturday 5th inclusive, they assisted with technical matters relating to the first survey in Kabupaten Bima, Desa Sakuru, within a complex project site of six villages known as DKSTBS. The WSP-EAP personnel left Bima to return to Jakarta on Sunday 6th.

Main Observations

Initial Site Selection. The preferred sample size for this initial assessment was a total of 10 sites, covering water supply Types C (community-managed) and B (elements managed by both communities and institutions). During the meetings in Jakarta prior to the field visit, much attention was given to the selection of representative sites, based on (limited) available project reports, consultations with AusAID and their evaluation consultants, and other local knowledge available to team members. The result was the nomination of a minimum of two Type B systems, which appeared to be predominately on Sumbawa island, and equal numbers of sites on Lombok and Sumbawa islands. The Type C site selection also had to take into account relative weightings given to different technology options, differentiating particularly between shallow wells and piped systems. At each site it was expected that a complementary sanitation component had been completed, and sanitation elements were included in the evaluation methodology.

The village sites initially selected were as follows:

Lombok Island		**Sumbawa Island**	
Site Name	**Type ***	**Site Name**	**Type ***
Teratak	C piped	DKSTBS - Sakuru	B/C
Santong	C piped	Lape	B
Kayangan	C non-piped	Empang	C non-piped
Tebataran	C non-piped	Bango	C non-piped
Leneklauq	C non-piped	Lapok	C non-piped

* Type as described in the available project documentation.

At each village, the area chosen for detailed analysis (dusun, RT or similar) was to be determined so as to reflect the representation and balance of the total sample.

Desa Teratak Site, Kabupaten Lombok Tengah. This village was the location of the first survey on Lombok island, nominated as a Type C piped system.

In fact there were two systems in the same village which were constructed under the project: the first in 1994/95 covering one dusun, the second in 1995/96, drawing from the same source, covering the remaining four dusun. For practical reasons it was determined that the survey be undertaken in the dusun served by the "independent" system. However, the whole village water supply arrangements, and especially those covering the other four dusun, were of interest to the mission. A brief description follows.

As the entire supply was community managed, the system type fits within the Type C category. That system covering the four dusun (a total of about 1500 people) was sufficiently large to warrant a formal management structure which may almost evolve

into a Type B. The institutional arrangements involve a dusun-level organisation (POKMAIR) to manage the water supplies in each dusun, and a village/ system-level organisation (HIPAM) with overall responsibilities for managing the main system. This structure was reported to have been "given" to the village by the project, though in practical terms it may not be operating exactly as might have been envisaged two years ago. The operating lines of responsibility between the HIPAM and the POKMAIR were not clear (at least to the visiting mission), neither were the financial arrangements. It is hoped that the PRA methodology will shed more light on these aspects.

The four-dusun system includes a large storage tank (reported at 200 m^3 but may be slightly larger), which coincidentally boasts a plaque commemorating the 25 April 1998 visit by Hon. Alexander Downer. The reservoir was almost empty at the time of the present visit, and was reported to be often in this state. It was difficult to see from this brief site visit exactly what was the designers' intent, and the operations and control assumptions on which it may have been based. Whatever the basis, it appeared that design intent was not being followed. Possible explanations might include that the water supply intake does not in fact have reliable access to at least 2.5 litres/sec (variously described at up to about 5.5 litres/sec) constant flow from the 44 litres/sec spring source, and/ or that the actual system drawdown (usage plus losses) is much greater than design demand. There may also have been some control systems and/ or operating rules which are now dysfunctional. The community operators may reveal further clarifying information during the PRA process.

It was noted that the HIPAM had no drawings, nor technical details of the "as-constructed" scheme, other than tables of equipment. Neither did they appear to know how to access any technical support. On their own initiative, since completion of the project scheme, the community organisations (HIPAM/ POKMAIRs) had constructed some extensions to the distribution network. They reported that these works had not been successful, and had caused local distribution problems. Such problems may have been avoided, or the subsequent problems resolved, with appropriate technical understanding.

System DKSTBS, Kabupaten Bima. This is the name given to a single piped water supply system drawing from two tubewells to supply six villages: Dadibau, Kelampa, Samili, Tenga, Baralau and Sakuru. A schematic sketch describing the original design intent is attached as Figure 1. It is described in the project documentation as a Type B (or B/C) system, but does not appear to satisfy the criteria for Type B. The WSP-EAP team spent considerable time trying to understand the background and present situation, without fully appreciating the reasoning behind the scheme nor its current operation and management.

It appeared that there was already a community programme being implemented under the project in some or all of these villages, focussed on wells (Type C) and sanitation. It is unclear who was responsible for the decision to implement the piped scheme, except that it did not involve the communities (nor, according to some accounts, the project community team). It seems most likely that the design concept and the decision to

proceed originated in Mataram, between P3AB and the urban section of the project team, possibly involving some consultation with Bima PDAM. The works were constructed entirely by contractors, under P3AB and possibly project supervision, and were handed over completely to Bima PDAM to be responsible for their operation and management. The piped scheme comprises mostly house connections (presently reported to be 602), but there are also a few (up to 13) public facilities reported to be still operating. No community groups were involved in the construction phase, neither was any trained nor organised as users groups by the project. Thus the piped supply is really a Type A (institutionally managed) system. It also happened to be superimposed on Type C activities being undertaken separately and in parallel under the same project.

Again, the rationale behind interconnection on such a large scale, and the design assumptions, can only be speculated upon, as they were not evident from the site inspection nor the available data. It was clear however that the PDAM was not able to control and operate the system effectively. The intent must have been to keep the reservoirs (one for each village) full enough to serve peak demand periods. Even though the population served is presently only 20% of the design level, the operators actually have great difficulty in filling all the reservoirs, and have effectively split the system such that two villages (DB, with 134 house connections) are served from one pumped tubewell, and four (STBS) from the other. The pumps are only run for a total of 8 or 9 hours each day, in two periods: early morning and early afternoon.

To complicate matters a little further, independently from the project, P3AB had constructed another pumped tubewell system, not connected but adjoining this scheme and operated from the same PDAM branch office, with an additional 850 or more house connections. The branch office reports also include the data from this scheme. Furthermore, it was reported that a large multi-purpose dam, including provision of domestic water supplies, was proposed to be constructed nearby, and for which tenders had already been called. This may be considered by the PDAM as an alternative source to the pumped groundwater currently used for all these schemes.

During brief discussions with users, while collecting general information on the system, they expressed satisfaction with the water supplied, but had consistent complaints concerning metering (mostly that they were not read regularly nor reliably, and that they knew of others with no meter or broken meters whose payments were unfairly low) and maintenance by the PDAM (almost no response to requests for repairs).

Desa Sakuru. This was the site selected for the detailed survey using the PRA methodology. In the light of the findings above, particularly that there had been no community involvement in any aspect of the piped system, and there were no public facilities in the piped system for this village, it was decided to focus more attention on those aspects of the project that the community had been actively involved in, i.e. the wells and sanitation programme. Obviously, as there are 98 official house connections in Sakuru, it was expected that facts and opinions related to the piped supply would also

emerge in the PRA process. That process was underway while the investigations referred to above were being conducted; the results will be reported at a later date.

Desa Samili. This village contains the largest group of customers of the piped system, with about 240 house connections and 5 public facilities reported to be still operational (one permanently closed by the PDAM for non-payment), i.e. approximately 40% of the current users of the total system. The mission was particularly interested in the public facilities, and visited the site to gain a first-hand appreciation of their characteristics.

Two such facilities were inspected. Although referred to as public taps, they each actually comprise a small (approximately 2 m^3) tank on a stand, with four or five taps drawing from the tank. The tanks are molded fibreglass, and the stands are rubble masonry and concrete construction with a small concrete apron slab under the taps, all to Cipta Karya standard design details. Although only two years old, the two tank stands visited were in an advanced state of disrepair; on one, the slab under the taps had almost entirely disintegrated, and the tank stand has deteriorated almost to the point of structural failure. On first failure of the original taps, the community users had replaced them with small bungs, which were quite effective.

Even though they were situated in areas which included wells and house connections, these facilities were clearly fulfilling a need. The communities surrounding each had formed themselves into a user group, collecting fees from each household and making regular bulk payments to the PDAM, monitoring usage, and organising essential minor maintenance (including replacement of meters) to keep the facilities operating. These arrangements were close to the principles of a Type B system, with two important exceptions:

- the community group did not own the facility (and thus could not affect major repairs, though they were likely to have the capability to do so); and
- there was no formal arrangement between the group and the PDAM, though the PDAM apparently applied a bulk tariff in calculating the payments due.

There were other aspects of the social arrangements supporting the formation and operation of these groups, which were not able to be investigated at the time, but were considered likely to yield useful lessons for future schemes.

Given the findings of this brief visit, it was considered that a more detailed understanding of this area was warranted, and the PRA methodology would be likely to provide such useful insight. Following discussions with field team members it was decided to include this site in the field survey, instead of proceeding with one of the selected sites based on non-piped Type C systems. The precise area to be studied (within the village) was to be determined based on the best available local information.

Modifications to Survey Sites. In accordance with the above it was determined to include Desa Samili in the list of sites to be surveyed, and drop one of the Type C non-

piped sites in Kabupaten Sumbawa, initially nominated as Lopok. This was to be finally decided when the field team had actually visited two further sites in Sumbawa, to ensure that the sample total remained representative.

Sanitation. Sanitation facilities were inspected randomly at each location visited, and will be covered more thoroughly in the selected sites, through both technical and social aspects of the PRA method. The initial impression was that rates of project coverage and continuing usage are both high.

The core of the approach taken by the project was the selection of the squat plate used as standard throughout the project. It is a hard, resilient, scratch-resistant modern plastic which looks good, is easy to keep clean, and uses the minimum amount of water to flush. Most importantly, people like them. In fact, there appears to be a continuing demand for these particular toilets, and discussions were held with local groups concerning securing supplies which might satisfy the demand on a commercial basis. Coincidentally this same product created a similar impact on the current AusAID East Timor project, and the LSM established under that project is planning to continue meeting the demand on a commercial basis after the project is completed.

There were two notes of caution concerning these very positive impressions. First was that several families had not proceeded with any above-ground construction; the toilet had been left exposed to the elements for some years, and the surface of the plastic had deteriorated, considerably shortening its design life. Second was that details of methods used below-ground, and provisions for pit renewal/ replacement were not able to be checked. In most cases the time when the first pit is full is critical to the continued use and sustainability of the system. That time should be near for many of the project toilets.

Local Cooperative. An unexpected side-benefit arising post-project was that several local staff engaged by the project have subsequently formed or joined local LSM. One such group of ex-project staff based in Bima formed a cooperative which still has some 80 members. Two senior members of that group joined the field team to learn more about the PRA methodology.

Postscript

For unforeseen personal reasons, one of the field team members had to depart from the assignment on Saturday 5th. At the time of writing it was expected that she would return to NTB within three days. This would mean that, for one site at least, the expected correlation between technical and social aspects of the process may be weak. This will be taken into account in the analysis phase, to ensure that the validity of the overall results is not affected.

PROJECT TYPE	: PIPE - C
HAMLET	: SUMUR PANDE
VILLAGE #1	: SESAIT
SUB-DISTRICT	: GANGGA
DISTRICT	: WEST LOMBOK

GENERAL DESCRIPTION

PHYSICAL CONDITION

Sesait village is located 62 km from the capital of West Lombok District. The village with an area of 31.01 km^2 is located 525 m above sea level with high plateau topography. Rainfall in this village is 2000 mm/year with temperature range 23^0-27^0C. Administrative borders of the villages are:

Northern border : Kayangan Village Eastern border : Bayan Sub-district
Southern border : Narmada Sub-district Western border : Rempek Village.

NTB ES&WS Projects are located at Sumur Pande Daye and Sumur Pande Lauk hamlets.

DEMOGRAPHY

Number of population of Sumur Pande Hamlet in 1997 is 844 people or 120 families. Main means of subsistence is farming. The rest are farm workers, merchants and civil servants.

There is the Clean Friday program in this village, which influences very much the improvement of environmental and family health. The role of religious scholars and teachers is very important in this program.

RESIDENTIAL AREA

Residential area of Sumur Pande stretches from the north to the south, with residential pattern following village road. In Sumur Pande there are a mosque, a mushalla, and PLN office.

CLASSIFICATION OF LIVING STANDARD

Almost half of the population of Sumur Pande Hamlet are poor people with general characteristics as follows: children education: elementary school - junior high school, occupation: farm workers, own only 1 – 2 acres of land, semi-permanent house, meals twice a day, own only 1-5 hens and ducks, food supply is only for 1 – 7 days.

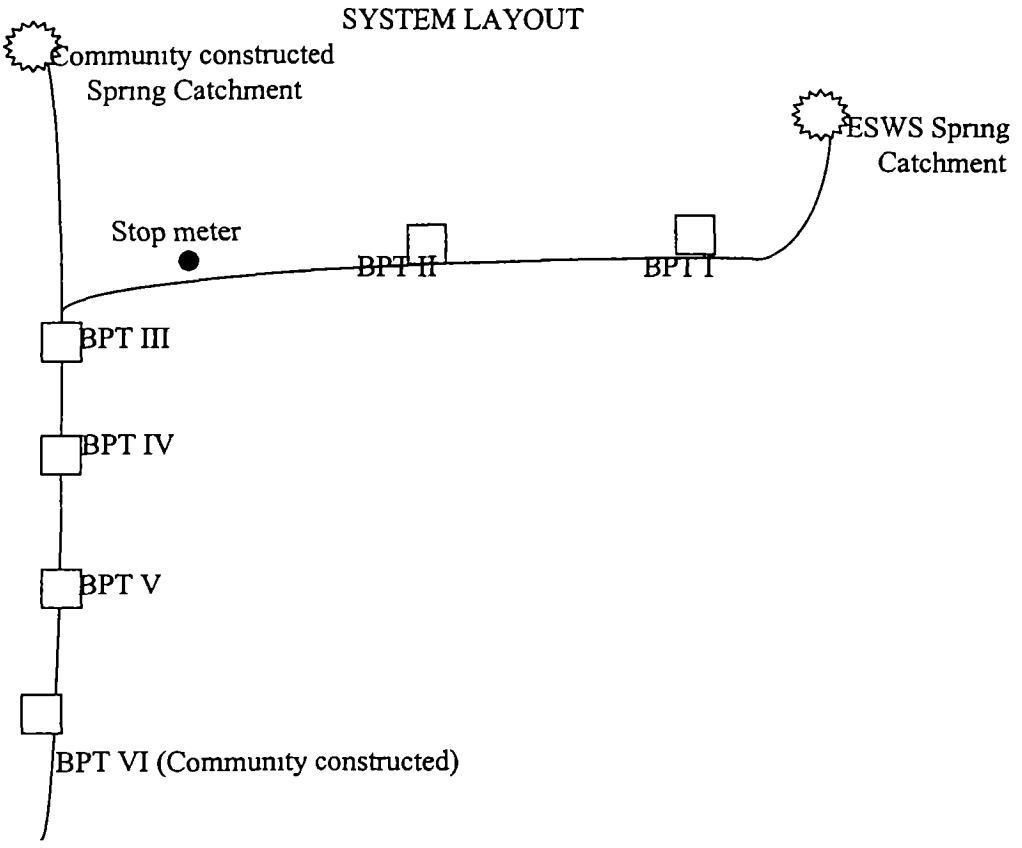


Table 1
CLASSIFICATION OF LIVING STANDARD OF SUMUR PANDE HAMLET, SESAIT VILLAGE

ITEM	RICH	MEDIUM	POOR
Land Ownership	- paddy field 1 – 10 ha - farm 1 – 3 ha	- paddy field 0.5 – 1 ha - farm < 0.5 ha	Owns only house yard of 1 – 2 acres.
Cattle Ownership	- cows 5 – 15 heads - goats 3-10 heads - hens 50 – 100 heads	- cows 1 – 2 heads - hens 5 – 10 heads - ducks 5 – 10 heads	- hens 1 – 5 heads - ducks 1 – 5 heads
Children Education	- average: high school – junior high school - mostly study outside the village - take skill courses at Mataram.	- average. high school - junior high school - mostly study outside the village. - a few take skill courses at Mataram	- average: Elementary school, junior high school. - generally attend school in the village.
Occupation	- more than one: farmer merchant - owns basic food shop	- farmer - merchant - teacher/civil servant - *ojeck* driver	- farm worker - market labor
House	- permanent, area 50 m^2 - brick wall, plastered - tile roof - cement floor - with toilet - yard 4 – 10 acres	- semi- permanent, area 35 m^2 - plaited bamboo wall - thatch-grass roof - cement floor - with toilet - yard 2 – 4 acres	- semi permanent house - plaited bamboo wall - coconut leave roof - dirt floor - generally no toilets - yard 1 - 4 acres

ITEM	RICH	MEDIUM	POOR
Meals	- three times a day - rice and dishes - extra food: banana, corn	- three times a day - rice and vegetables - extra food· tuber	- twice a day - rice and vegetables - tuber for breakfast
Food Supply	1 year	1 month	1 – 7 days.
FREQUENCY	12 %	37%	51%

CHANGE IN THE PATTERN OF THE UTILIZATION OF FACILITIES

CLEAN WATER FACILITIES (SAB)

BEFORE THE PROJECT

The community used spring water, pond water, well, old well, and river for drinking water, cooking, and bath. The community used spring water especially for drinking and cooking, because the cleanliness can be guaranteed and water is flowing in big enough quantity. Pond can be used for bathing and washing, because the distance from the house is quite close, even though the quantity of water is limited. The river is used foras water facilties because it is close from the house/land, the source is a spring, and the quantity is abundant.
The community also used one old water well for drinking water, cooking, bathing, and washing. The former well of a blacksmith is where the name of the hamlet originated, i.e. Sumur Pande (Blacksmith's well).

AFTER THE PROJECT

Table 2
CHANGE IN THE UTILIZATION OF CLEAN WATER FACILITIES IN SUMUR PANDE HAMLET
(Based on Pocket Voting)

	PUBLIC TAP		SPRING		POND		RIVER	
	B	A	B	A	B	A	B	A
Drink/cook		10	10		1		2	
Wash & bath		10	5	2	3		5	
Non domestic							5	3

Note:
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

The community relies on ES&WS public tap for drinking water, cooking, washing and bathing. Springs are still used for washing and bathing, while river for non domestic necessities.

Changes in the use of SAB (Clean Water Facilities) before and after the NTB ES&WS Project can be seen in Table 2.

FAMILY TOILET FACILITIES (BAB)

BEFORE THE PROJECT

Defecating facilities used by the community were paddy field, garden, yard, and river. Garden was used as defecating facilities because the location of the house has not been reached by water facilities and they were not used to toilet yet. Yard was used as toilet especially during the night.

AFTER THE PROJECT

The community shifts to using ES&WS *jaga* (family toilet) as defecating facilities. Other facilities such as paddy field, garden, and yards are still used for defecating. The community uses ES&WS facilities because of environmental cleanliness awareness, shame and to avoid sources of diseases to occur. Paddy field, garden and house yard are used as defecating facilities because no ES&WS facilities are available yet, and the children are used to the yard and also it is easier to do in the yard.

The change in the utilization of defecating facilities before and after NTB ES&WS Project can be seen in Table 3.

Table 3
CHANGE IN THE UTILIZATION OF DEFECATING FACILITIES IN SUMUR PANDE HAMLET (Based on Pocket Voting)

	JAGA		PADDY FIELD		GARDEN		YARD		RIVER	
	B	A	B	A	B	A	B	A	B	A
Father		10	5	3	5	5	10	5	2	
Mother		10	5	2	10	5	2			
Children		5			5	5	10	10		
Baby							10			

Note:
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

FACILITIES AID FROM NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Clean water facilities of ES&WS constructed in 1994/1995 are in form of type C piping system with the following facilities:

a. WATER SOURCES
- Type of water sources : Springs with protection
- Name of springs : Lokok Gedang (NTB ES&WS) and Lokok Kangkung (community constructe).
- Debit : 20 l/second
- Utilized debit : 8 l/second.

Spring water utilized at the beginning of the NTB ES&WS Project was only Lokok Gedang. Debit of the spring could not cover the need of community SAB. To fulfill the need, the community constructed network from other spring, i.e. Lokok Kangkung by injecting the existing ES&WS network.

Spring water from Lokok Gedang is mainly used by Air Release Tanks which act also as reservoir No.1 and No.2. Spring water Source from Lokok Kangkung is used to add water from Lokok Gedang at BPT Nos.3 – 6.

Water from Lokok Gedang, aside of supplying water for ES&WS piping, is also used for privately constructed pipelines, utilized for rice mills

b. PIPING
Pipe network has a total length of 5 km with the size of 2 inches.

c. PIPING FACILITIES
Piping facilities consist of:
Pressure relief tank which has the function as distribution tank with a volume of 7 m3 A KU (Public Tap) located at BPT No.1 has already been moved, since the owner of the land moved.

Table 4
NUMBER OF PIPING FACILITIES IN SUMUR PANDE HAMLET

No.	TYPE OF FACILITIES	NTB ES&WS PROJECT	SELF SUPPORTING
1	Spring protection	1	1
2	Spring water catchment	1	1
3	Pressure Release Tank (BPT)	5	1
4	Public Tap (KU)	22	3

d. PUBLIC TAP
The number of families (KK) served by piped SAB is 127 families. The whole families in Sumur Pande are served by this SAB.

Table 5
NUMBER OF KK SERVED BY PIPELINE PUBLIC TAP

No. Of BPT	NUMBER OF PUBLIC TAP	FAMILIES SERVED	FAMILIES COMING TO PUBLIC TAP	NUMBER OF HOUSE CONNECTIONS
I	5	34	22	12
II	6	32	13	19
III	3	11	6	5
IV	5	23	7	16
V	3	18	10	8
VI	3	9	7	2
TOTAL	25	127	65	62

House connection represents self supporting efforts of the community using plastic hose. Water for the hose comes from the hose directly inserted to KU. The hose also has branches.

FAMILY TOILET FACILITIES

60 units of family toilets (jaga) were constructed in 1994. Toilet aid was received in form of white plastic toilets, two sacks of cement, and 4 m of pipe for waste disposal. Toilet aid was given ± 1 month after SAB was constructed.

PROJECT SOCIALIZATION

Project socialization was carried out by ES&WS employees through meeting attended by men. The community was involved in every development activity. Every decision was made through deliberation of the community with approval from head of the hamlet and ES&WS officer (especially in technical aspects). Involvement of the community gave good result, which can be seen from the development of piping facilities self- supportingly, to complement the existing facilities.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES

To prepare development stage, three volunteers were chosen to participate in training. The training was carried out three months before development stage took place. The training given was technical training, environmental sanitation, and management administration.

Project preparation also covers the establishment of SAB management organization, i.e. Pokmair Geruk Rante for managing pre-construction stage up to post construction stage.

FAMILY TOILET FACILITIES

The community received environmental health guidance before getting the toilet. It was carried out that way so that the distributed toilet can be utilized as good as possible. The toilets were particularly given to families which are close to water sources and are willing to contribute for material and wage of labor.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Contributions given by the community are in form of:

- Money
  Minimum amount was Rp. 2000.00 depending on the short of fund per tank. Used to buy the needed material and food.
- Manpower
  To carry the material and to make the construction. Many people worked as construction worker, which saved the wage of craft workers.

Construction craft workers did only main and big works, such as construction of spring water catchment and Pressure Release Tank . The community did the other works such as digging, carrying material, and construct public tap.

Cost estimates of Pressure Release Tank and Public Tap construction can be seen in Tables 4 and 5.

Table 4
COST ESTIMATES FOR THE CONSTRUCTION OF ES&WS PRESSURE RELEASE TANK (BPT) OF SUMUR PANDE HAMLET 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contribution	Project	Contribution	Project	Contribution	Project	Contribution
Material								
Cement	Sack		22		7500		165000	
Sand		M^3		3.75		3000		11250
Brick		Unit		2000		20		40000
River Stone		M^3		2		5000		10000
Gravel		M^3		7.5		3000		
Construction Cost								
Skilled Workers		Mandays		10		7500		75000
TOTAL							165000	158750
							51%	49%

Table 5
COST ESTIMATES FOR THE CONSTRUCTION OF ES&WS PUBLIC TAP (KU) OF SUMUR PANDE HAMLET 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contribution	Project	Contribution	Project	Contribution	Project	Contribution
Material								
Cement	sack		3		7500		22500	
Sand		M^3		1		3000		3000
Brick		Unit		200		20		4000
Rocks		M^3		1		5000		5000
Construction Cost								
Skilled Workers		Mandays		5		7500		37500
TOTAL							22500	49500
							31%	69%

FAMILY TOILET FACILITIES (JAGA)

Family toilets are generally constructed by craftmen from digging to constructing. The toilet in general consists of closet, water tank, floor, and septic tank. Almost all toilets are equipped with wall made of plaited coconut leaves, sack or brick wall. Most toilets are without roof, because of the tradition of the community to defecate in open air. Contribution of the community in the construction is 44% of project value as can be seen in table 6.

Table 6
COST ESTIMATES FOR THE CONSTRUCTION OF ES&WS FAMILY TOILET OF SUMUR PANDE HAMLET 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	Sack		2		7500		15000	
Sand		M^3		1		3000		3000
Brick		Unit		300		20		6000
Closet	Unit		1		7500		7500	
Pipe	M		4		5000		20000	
Construction Cost								
Skilled Workers		Mandays		5		5000		25000
TOTAL							42500	34000
							56%	44%

HANDOVER OF FACILITIES

There was no official hand-over for *SAB* and *jaga. Jaga* facilities were handed over orally. The existing hand-over is only hand-over of material in writing, reported by ES&WS volunteers.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES

a. MANAGEMENT ORGANIZATION

To manage SAB, Pokmair (Water User Group) was established, which was called Pokmair Geruk Rante. This Pokmair consists of tank manager and tap manager. There are 6 pokmairs, one pokmair for each BPT, which is responsible for operation and maintenance, repair, collecting contribution, and managing the contribution. Management of every Pokmair consists of chairman, treasurer, and secretary and technicians. Management conducts meeting every three months to report the result of activities.

Members of pokmair are Heads of the Families served by the Public Tap. Requirements for becoming a member of pokmair are Head of the Family domiciling in Sumur Pande, willing to obey all regulations, and willing to pay contribution.

For operation and maintenance of every KU (Public Tap), one person responsible for the tap was appointed, who generally is the owner of the land or a man who lives closest to the public tap.

b. CONTRIBUTION

The amount of contribution for year 1 was Rp 250/month/Family. In the second year he contribution was increased to Rp. 500/month/Family. Fixing the contribution was controlled by ES&WS officer. Not all Families paid their contribution smoothly. In average 4-5 Families/Pressure Release Tank were late in paying their contribution.

Utilization of contribution:

- Pokmair cash : 80%
- Collector : 10%
- APPKD : 10%
  (Village Yearly Income and Development Budge)

Aside of depositing in bank, the contribution is also kept at the Pokmair, exploited by way of loaning, or giving credit (initial capital for farming), and production sharing agreement. The utilization of the contribution depends on the management and the community at each Pressure Release Tank .

c. REGULATIONS

To organize the implementation of SAB written traditional regulations which are called awig-awig are prepared. These awig-awig are written on every contribution card of every member.

d. OPERATION AND MAINTENANCE

Damages occurred to the facilities :

- leaking pipe hit by fallen tree.
- Water float did not function.
- Outer wall of Pressure Release Tank not properly maintained. Can be easily noticed from the
  condition of the wall
- No floor around Pressure Release Tank
- Broken metering valve (in every Pressure Release Tank)
- Broken stop valve (between BPT 2 and BPT 3)

Problems occurred:

- Pipe at the spring is often plucked by the surrounding people, because they consider it is draining up the spring water.
- Broken float, which is connected to stop meter at BPT no.5 had caused water to flow continuously to BPT no.5, because BPT no.5 is the lowest of the six Pressure Release Tanks. The result was short of water at BPT Nos.3, 4 and 6, since water just arrives in the afternoon.

FAMILY TOILET FACILITIES

No management organization for operation and maintenance of jaga. Responsibility of Operation and Maintenance is put to the owner of the facilities. Problems usually occurred in form of leaks of septic tank.

PROJECT TYPE	. PIPE - C
HAMLET	: KETANGGE
VILLAGE #2	: TERATAK
SUB-DISTRICT	: BATUK LIANG
DISTRICT	: CENTRAL LOMBOK

GENERAL DESCRIPTION

PHYSICAL CONDITION

Teratak village is located in Batuk Liang Sub-District which has a distance of 15 km from the capital of Central Lombok District. The village has an area of 729.350 ha, located 400 m above sea level. The village has 5 hamlets with administrative borders:

Northern border	: Aik Brik Village	Western border	: Aik Darek Village
Southern border	: Selebung Village	Eastern border	: Aik Bukaq Village.

The use of land at Teratak is dominated by paddy field area, i e. 311.810 ha semi technical paddy field & 118.990 irrigation paddy field, while the area of buildings is only 10.567 ha & yards 32.620 ha.

NTB ES&WS Pipe-C Piping Projects is located Ketangge Hamlet which is located in the northern part of Teratak Village. Ketangge is the only hamlet in Teratak with its axis road is still in form of dirt road and no electricity yet.The condition s are caused by the location of Ketangge hamlet which is separated from the other hamlets in Teratak Village.

VILLAGE DEMOGRAPHY

Number of population of Teratak Village in 1996 was 6473 people which consisted of 1504 Families. Based on the level of family welfare, in Teratak Village there were 780 Families of Pre-Prosperous category; 356 Families of Prosperous I category; 210 Families of Prosperous II category; 134 Families of Prosperous III category; and only 24 Families of Prosperous III+ category.

The number of working age population is 4675 people which in general is absorbed by agricultural sector. Main means of subsistence are farming and farm workers with land ownership structure as follows: < 0.5 ha 0.25%; 0.5-2 ha 80% and the rest > 2 ha. Based on level of education, 55% did not finish elementary school, 27% finished elementary school and only 18% has secondary school or higher education.

RESIDENTIAL AREA

Teratak residential area is divided into two separate groups. In one group there are 4 hamlets, while in the other group there is only one hamlet, i.e. Ketangge Hamlet. Distribution of residences in Ketangge is in form of groups with distribution of medium density housings.

CLASSIFICATION OF LIVING STANDARD

57% of the population of Ketangge Hamlet are poor people with general characteristics among others as follows: means of subsistence: farm workers and *ojek* drivers, children education: elementary school, some of them junior high school, own no paddy field, own 3 production sharing cows, house with plaited bamboo and dirt floor, and no food supply for more than one day.

Table 7
CLASSIFICATION OF LIVING STANDARD OF KETANGGE HAMLET, TERATAK VILLAGE

ITEM	RICH	MEDIUM	POOR
Land Ownership	> 5 ha	4 ha	Owns no land. (house yard 1 – 8 acres).
Cows Ownership	> 6 heads	1 – 5 heads	3 production sharing cows.
Children Education	university	High school	Only elementary school, some up to junior high school.
Occupation	Farmer, owner of the land.	- farmer - industry/furniture makers - Civil servants.	- farm worker - *ojek* driver.
House	- size 10x11 m^2 - brick wall, plastered - cement and ceramic floor, sometimes with WC	- medium - brick wall, plastered - cement floor - sometimes WC	- size 4x4 m^2 - plaited bamboo wall - tile roof - dirt floor - mostly no WC
Food Supply	1 year	1 – 2 weeks	-No food supply for more than one day. -sometimes on credit.
FREQUENCY	5 %	38%	57%

CHANGE IN THE PATTERN OF THE UTILIZATION OF FACILITIES

CLEAN WATER FACILITIES (SAB)

BEFORE THE PROJECT

The community used SAB in form of springs and irrigation channel (the water originates from springs). The community used spring water especially for drinking and cooking, bathing and washing with the reasons that it was close from their house, satisfaction in the utilization of water, the spring water was warm, and reduced pain (sore bone). Irrigation channel was used for bathing, washing and non-domestic needs with the reasons that they had been using it as the place for cleaning their cattle and it did not disturb the cleanliness of the environment.

Ketangge community used two springs, i.e.

a. Ketangge Spring
   This spring was used by the community of the southern part of Ketangge. The location of this spring is below the Ketangge residential area, so it is difficult to utilize the water.
b. Eatambung spring
   This spring is located in other village, i e. Aik Bukaq Village. The people of the northern part of Ketangge used this spring. The location of the spring is above the Ketangge residential area, which enable the utilization of the water by channeling it to Ketangge residential area.

Both of them represent the source of irrigation water. The distance to the springs± 1 km. Springs are mainly used for drinking and cooking. For bathing and washing, aside of the springs people also use irrigation channel which is closer. There was once RWSS project in Ketangge with SAB system in form of SGL. The project failed because up to the depth of 25 m no water was found.

AFTER THE PROJECT

SAB used is public taps, springs and river ditch. Taps are used for cooking, drinking, bathing, and washing because the water is abundant, available all the time, cleanliness guaranteed and healthy. Springs are still used by the people whose houses are close to the springs and cannot be served by ES&WS public taps, i.e 25 Families.

Changes in the utilization of SAB before and after NTB ES&WS Project can be seen in Table 8.

Table 8
CHANGE IN THE UTILIZATION OF VILLAGE CLEAN WATER FACILITIES
(Based on Pocket Voting)

	PUBLIC TAP		SPRING		POND		PADDY FIELD DITCH	
	B	A	B	A	B	A	B	A
Drink/cook		10	10	5	2			
Wash & bath		8	8	3	10	5		
Non domestic		7					10	10

Note:
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

FAMILY TOILET FACILITIES

BEFORE THE PROJECT

DEFECATING facilities used by the community were garden, yard, river paddy field. Before having ES&WS toilet, Ketangge people once received toilet from RWSS, but it could not be used because there was no water in the toilet to clean themselves.
Garden was used as Defecating facilities by father, mother, children and the baby with the reasons that it is not far from the house, the location is hidden from public view and cool, not used to toilet, and mostly used at night. While DEFECATING facilities in the paddy field is used by father and mother with the reason they use it when they work in the pady field, easy to clean, old tradition, as well as that it is spacious.

AFTER THE PROJECT

Defecating facilities at *jaga* (family toilet) are used by father, mother, children and Defecatingy with the reason of environmental cleanliness, water is available for cleaning, avoid diseases and facilities are limited. Other defecating facilities such as garden, paddy field, river and yard are still used. There are still 17 Families which have no *jaga* yet.

The change in the utilization of defecating facilities before and after NTB ES&WS Project can be seen in Table 9.

Table 9
CHANGE IN THE UTILIZATION OF VILLAGE DEFECATING FACILITIES
(Based on Pocket Voting)

	JAGA		RIVER		GARDEN		PADDY FIELD		YARD	
	B	A	B	A	B	A	B	A	B	A
Father		5	7	5	8	5	8	5	2	
Mother		10	7	5	8	4	5	2		
Children		2			5	5			10	10
Baby									8	8

Note:
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

FACILITIES AID FROM NTB ES&WS PROJECT

CLEAN WATER FACILITIES

NTB ES&WS Project was carried out in Ketangge Hamlet using type C piping system. The project was carried out at Ketangge Hamlet because:

- The location of Ketangge is remote from other hamlets, so that it is difficult for the people to ask SAB aid from other hamlets.
- Ketangge represents the most suffering hamlet concerning SAB, even though they have Ketangge spring with a big debit (18 l/second), but the location is below the residential area, so it is not possible to channel water to Ketangge.
- Ketangge is closer to a spring in other hamlet, i.e. Eatambung Spring which is located above the residential area and can be channeled to Ketangge.

At Teratak Village there are two NTB ES&WS piping systems which come from the same water source, i.e. Eatambung Spring. The two systems are:

a. Ketangge System Piping, i.e. type C piping system constructed in 1994/1995, which serves Ketangge Hamlet. Ketangge system uses direct distribution to public taps.
b. Teratak System Piping, i.e. type semi-B piping system constructed in 1995/1996 using reservoir which serves four other hamlets at Teratak Village with public tap system and house connection. This system represents the combination of ES&WS project aid and self constructed for house connection.

Evaluation was carried out for type C piping system, so that Ketangge System piping was chosen. Teratak System piping was not observed in this evaluation.

ES&WS piping system for Ketangge System was constructed from 15 October 1994 to 3 November 1994, consists of :

A. WATER SOURCES

- Type of water sources : Open Springs without protection
- Name of springs : Eatambung
- Location of spring : Pengerem Daye Hamlet Aik Bukak Village
- Debit : 43.7 l/second
- Utilized debit : 1 l/second.
- Project Debit : 3.9 l/second
- Water quality : Tasteless, colorless, odorless. Color of water is rather white during rainy season.

Because of the use of the spring by other villages, the permission to use it was requested to:

- owner of the land
- head of the village and community of Aik Bukak Village, because they also use the water for SAB.
- PU Cipta Karya at the Sub-District, because the spring represents the source of irrigation water which covers several villages.

The big debit of Eatambung Spring (43.7 l/second) is utilized for:

- Water source for Ketangge System ES&WS piping with used debit 1 l/sec.
- Water source for Teratak System ES&WS piping with used debit 5.8 l/sec which is collected in a reservoir with a capacity of 200 m3, with outflow of 7.4 l/sec. For four hamlets in Teratak which consist of 626 Families or ± 2600 people.
- irrigation which provides water for paddy fields and gardens of several villages.
- SAB of the community around the spring by using waterspout.

B. PIPING

Pipes used for Ketangge system are as follows:

Table 10
TYPE AND DIAMETER OF PIPES USED IN KETANGGE SYSTEM PIPING NETWORK

TYPE/DIAMETER	80 mm 3"	63 mm 2"	50 mm 1.5"	40 mm 1.25"	32 mm 1"	TOTAL
HDPE		270	65	338	535	1028
PVC	1060					1060
GI	60					60

Pipe network passed through paddy field and gardens of other villages. For that written permission among head of villages for using the land affected in the burying of pipe must be made, in order that no problem can occur in the future. Burying pipe network in paddy field has a depth of ± 1 m under the surface and in farming area 0.8 m. Length of pipe network is 1.9 km from the spring to the last public tap. For primary pipe with length of 924 m digging was carried out for 3 days from 07.00 – 05.00

c. PIPING FACILITIES

Piping facilities constructed consist of:

- Spring water catchment : 1 unit
- Distribution tank : 1 unit
  Distributing water for Ketangge system and Teratak system.
- Public Tap : 10 units
- Bath wash facilities : 2 units
  Bath wash facilities (MC) are located at the house of the head of hamlet near the mushalla and near the spring, as gesture of gratitude to the owner of the land and the community around the spring which are using the spring as SAB.

d. PUBLIC TAPS

Table 11

NUMBER OF FAMILIES SERVED BY PUBLIC TAPS OF KETANGGE SYSTEM PIPING

NO OF PUBLIC TAPS	NUMBER OF FAMILIES SERVED	NUMBER OF FAMILIES COMING TO PUBLIC TAPS	NUMBER OF HOUSE CONNECTIONS
1	30	30	-
2	9	9	-
3	1	1	-
4	8	5	3
5	6	2	4
6	8	-	8
7	22	19	3
8	19	5	14
9	8	3	5
10	11	2	9
11	3	-	3
TOTAL	125	76	49

- Number of Families served by Public Taps are only 125 Families, the remaining 25 Families still get their water from Ketangge Spring under the hamlet.
- Public Tap No.1 has a very heavy ;load, because it must serve 30 Families. Very often they have to fight to get water, because the debit is small and there is no reservoir. The community must stand on queue for quite a long time to collect water in a bucket. Several Families use irrigation for washing and bathing.
- Public Tap No.3 is located in the mosque, so that it is only used by the owner of the land of the mosque and for the congregation of the mosque for ablution,

except if Public Taps No.1 and No.2 are full the community uses Public Tap No.3. Public Tap No.3 has community constructed MC.
- Public Tap No.8 did not function anymore as Public Tap, because all families had used SR (House Connection) with water coming from Public Tap No.8.
- Public Tap No.11 represents community constructed tap, constructed in 1995/1996.

From every Public Tap the community constructed house connection. This house connection (SR) is only in form of plastic hose inserted directly into the valve or constructing a branch before the valve. From the branch more branches were made in form of branches of hoses to distribute water to houses. For house connection water is often late and the quantity is small, because it must wait for other house connection reservoir to become full.

FAMILY TOILET FACILITIES

Family toilets (jaga) were constructed in 1994/1995 $\pm$ 3 months after SAB ran smoothly. The number of family toilets distributed was 70 units.

PROJECT SOCIALIZATION

ES&WS employees gave information about the project to Village Heads and the community. Decision about establishing the project and the technology chosen was made by ES&WS employees, while head of the Village, heads of Hamlets and the community decided the location, type of management organization and the contribution.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Locations and distribution of Public Taps are spread all over the hamlet in order to be able to serve the whole Families equally. Public Taps were placed at the place of prosperous people, because the have land and can contribute food during construction.

To prepare development of SAB, head of the village appointed volunteers to participate in technical training about SAB and PLP, environmental sanitation, and SAB management organization.

FAMILY TOILET FACILITIES

Generally public toilets are placed at the place of prosperous people because they are willing to contribute material and wages of craftmen. There are no institutional toilets, because:
- For schools: construction of school building includes toilets for teachers and students.

- For mushalla/Mosque/Islamic schools: it is not allowed to construct toilets at those places, because it might make those places dirty. People might come to the mushalla/mosque/Islamic schools just to answer nature's call, and not to pray.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Contributions of the community are in form of:

a. Manpower: men and women
   - Digging and filling pipeline.
   - Installation and transportation of material

b. Local material: sand, gravel, stones, bamboo.

c. Food and cigarettes.

Cost estimates for the development of Clean Water Facilities consist of Public Tap, distribution tank and Bath and Washing Facilities (MC). In the calculation, price of land is not included, since land is not for sales. The land is used for public facilities with the permission of the owner of the land.

Cost estimates did not include the price of primary pipes, since the price was not known. The pipes were directly imported from Australia. What estimated here was the price of secondary pipes which are to be connected from primary pipes to Public Taps.

- Length of primary pipes : 1000 m
- Length of secondary pipes : 900 m

For cost estimate calculation, for one Public Tap 90 m of secondary pipes was used.

Cost estimates for one Public Tap consist of tap stand, washing floor, and waste water gutter. In the cost estimates for Public Tap wage component for craftmen was included. Actually wage for craftmen was not for one Public Tap, but for one piping system. Casual labor (unskilled workers) were local people which were paid from the price of skilled craftmen. Their working hours was from 07.00-16.00 for 1.5 months.

Table 12
COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS PUBLIC TAPS FOR KETANGGE HAMLET 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	Sack		3		5000		15000	
Sand		M3		2		2500		5000
Brick	Unit		500		15		7500	
River Stone		M3		1		5000		5000
Secondary Pipes	M		90		1000		90000	
Valves	Unit		1		45000		45000	
Construction Cost								
Unskilled Workers	HOK		145		3000		435000	
TOTAL							592500	10000
							98%	2%

Table 13
COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS DISTRIBUTION TANK FOR KETANGGE HAMLET 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		5		5000		25000	
Sand		M3		1		2500		2500
Brick	Unit		500		15		7500	
River Stone		M3		2		5000		10000
TOTAL							32500	12500
							72%	28%

Table 14
COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS BATHING AND WASHING FACILITIES FOR KETANGGE HAMLET 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		25		5000		22500	
Sand		M3		7		2500		17500
Brick	Unit		4000		15		60000	
River Stone		M3		3		5000		15000
Valve	Unit		1		45000		45000	
TOTAL							230000	32500
							88%	12%

Table 15
COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&SW PIPING CLEAN WATER FACILITIES FOR KETANGGE HAMLET 1994/1995

FACILITIES	PROJECT	CONTRIBUTION
Public Tap 10 Units	1575000	100000
Distribution Tank	32500	12500
Bathing Washing Facilities	230000	32500
Menpower	435000	
TOTAL	2272500	55000
	98%	2%

- Based on the overall cost estimates for the construction of Clean Water Facilities as can be seen in Table 15, the contribution of the community was only 2% of the value of the project.
- Based on interview with the management of Pokmair the following information about construction cost of Clean Water Facilities was acquired:

GOI	Rp. 1,727,750	(10%)
GOA	Rp. 14,299,297	(82%)
Community Rp.	1,471,500	(8%)
TOTAL	Rp. 17,498,547	

FAMILY TOILET FACILITIES (JAGA)

Family toilets are generally constructed by craftmen who are employed from digging stage up to installation of closet for 3-4 days for 2 persons. The construction of Family toilets which was carried out almost at the same time, was fully controlled. Family toilets were given to families who declared that they are capable of constructing &/spending money for purchasing material.

In general family toilet consists of plastic closet with rubber swan neck, open water tank, floor, and septic tank covered with cement casting. Generally the construction of family toilet by a family is carried out in stages. In the beginning family toilet uses only bag/plaited coconut leaves wall, then brick wall is constructed, only after that a family toilet complete with bath-room is constructed. Water tank is filled by way of manually carried or by using house connection hose.

Contribution of the community in the construction of family toilet is + 72% of project value.

Table 16
COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS FAMILY TOILET OF KETANGGE HAMLET 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	Sack		2		5000		10000	
Sand		M3		1		2500		2500
Brick		Unit		300		15		4500
Closet	Unit		1		6000		6000	
Construction Cost								
Skilled Workers		HOK		6		6000		36000
TOTAL							16000	42000
							28%	72%

HANDOVER OF FACILITIES

There was no hand-over of the facilities officially and in writing. The owner of the place for Public Tap, distribution tank and bathing and washing facilities received the material on site without any written document. The use of private land for public facilities was carried out only trough oral permit with head of the hamlet, ES&WS officers, and user community. For Public toilets there were no hand-over of facilities ownership, only oral hand-over of material.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES

a. WATER USER GROUP

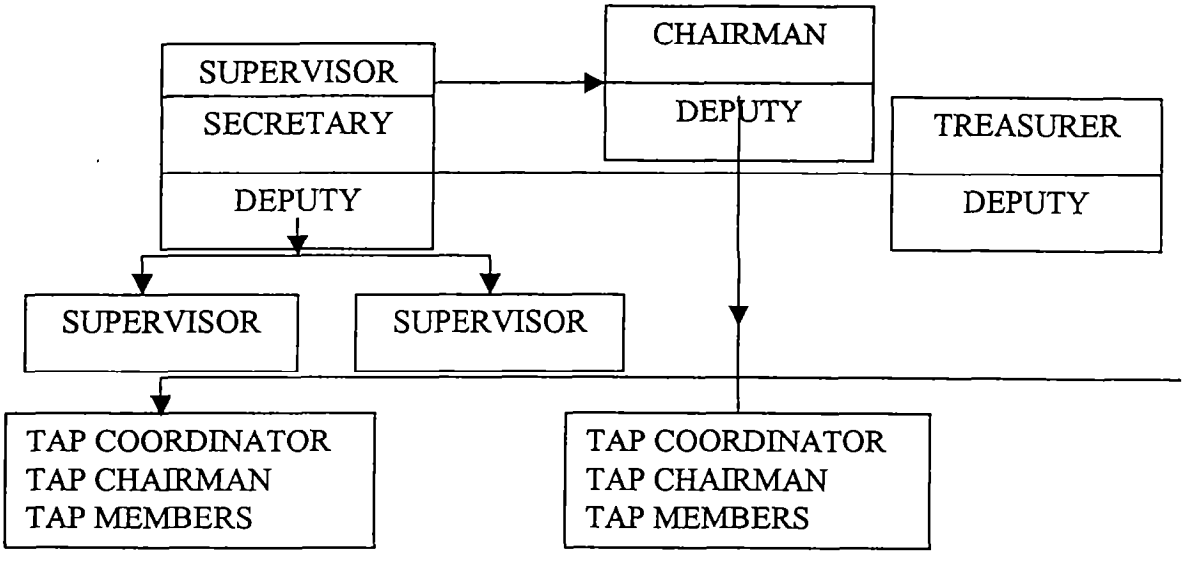
For Ketangge system, at every Public Tap there is a Pokmair (Water User Group) which is managed by only one collector. Pokmair's are coordinated by head of the hamlet.

In Teratak Village there is a complete management for the 2 GPS systems of Ketangge and Teratak, which controls heads of hamlets. The complete management is found in Hippam (Association of Water Users) which has 9 members).

Legal base for the establishment of Hippam is the Instruction of the Governor of NTB No.3/1990.
Job descriptions of Hippam and Pokmair:

- Hippam is responsible for O&M of the whole system & repair of big damage.
- Pokmair is responsible for O&M of every Public Tap & repairing light damage.

Figure 1
HIPPAM ORGANIZATION STRUCTURE OF TERATAK VILLAGE



For every Pokmair, the collector gets a wage of Rp. 2000/month, while for head of hamlet as coordinator gets Rp. 5000/month.

The utilization of Clean Water Facilities is organized in written village regulation/traditional law which is called "awig-awig", which regulate about water sources, utilization, O&M, as well as sanction for various violations.

b. CONTRIBUTION

For O&M costs the whole Families served are subject to contribution of Rp.500/Family/month, and those having house connection Rp.1000/month/Family. The contribution was decided by Hippam based on discussion with input from ES&WS officers.

Utilization of contribution:

- Hippam cash : 50%
- Social (mosque and orphanage) : 5%
- APPKD : 10%
- Hippam and Pokmair management : 35%

The balance of 1997 business result is $\pm$ 1.3 million and for 1998 $\pm$ 3 million deposited in bank.

c. DAMAGES TO FACILITIES

Generally small damages to facilities occurred on the tap. Almost all taps had been replaced, except Public Tap no.1, which is still broken, so that water keeps flowing. General condition of public taps, such as tap stand, washing floor and waste ditches are still good. Small damages only occurred on the floor in form of fine cracks.

FAMILY TOILET FACILITIES

In general the toilets are properly maintained, which can be seen from the condition of closets, which are still white and can still be used properly. The quality of closets is good, it is not easily broken, not easily worn out (like ceramic closets) and can be easily cleaned. The owner of the family toilet is responsible for the O&M . Damages of toilets in general occurred on the septic tanks which are full or leaking.

NOTE:

In Ketangge there were changes in the utilization of Clean Water Facilities and PLP as follows:

Table 17

CHANGES IN THE NUMBER OF FAMILIES UTILIZING SAB AND PLP

FAMILIES		PEOPLE		SAB/ FAMILIES		PLP/ FAMILIES		HEALTHY HOUSE		POOR FAMILIES	
93/94	97/98	93/94	97/98	93/94	97/98	93/94	97/98	93/94	97/98	93/94	97/98
145	167	504	672	2	115	6	150	2	52	43	20

Not all families in Ketangge can be served by Clean Water Facilities and Family Toilets.

Working plan of Hippam in the future among other:

- Construct collecting tank at every Public Tap to shorten queue.
- Install water meter at house connection to control water and leaks.

Empang Atas

PROJECT TYPE	: B-Type-Piping Clean Water System
VILLAGE #3	: EMPANG ATAS
SUB-DISTRICT	: EMPANG
DISTRICT	: SUMBAWA (WEST NUSA TENGGARA)

GENERAL DESCRIPTION

Empang Atas village is located 9 Km from the capital of Sumbawa (Sumbawa Besar) District with an area of 1,191 Ha. Empang Atas village is located on the regional road network connecting Sumbawa Besar town with Bima town. Residences of the populations are grouping on the northern part of the existing regional road network. Empang Atas region is relatively flat.

The number of population of Empang Atas Village in 1997 was 3855 people with number of families of 808. From the total population only 2% who didn't have formal education, 64% graduated from elementary school, and the rest 34% have had junior high school and high school up to university.

Empang Atas Village consists of 4 (four) hamlets which consist of 13 RT (Neighborhood Association), i.e.:

a. Ponong Hamlet: RT01, RT02, and RT03
b. Awo Hamlet: RT04, RT05, and RT06
c. Kemboja Hamlet: RT07 and RT10
d. Pemantu Hamlet: RT08, RT09, RT11, RT12, and RT13.

CLASSIFICATION OF LIVING STANDARD

Around 51% of the population of Empang Atas Village are included in poor people category. In general characteristics of poor people are among others as follows: land ownership less than 1Ha/family, means of subsistence: farm workers, income less than Rp. 100,000.-/month/family, and the house with plaited bamboo wall and dirt floor.

CLASSIFICATION OF LIVING STANDARD OF EMPANG ATAS VILLACE COMMUNITY

	RICH	MEDIUM	POOR
House & Furniture	Permanent house, ceramic floor Stage house with 12-16 pillars, tile roof. Parabola, TV 20"-24"; two-wheel vehicle; Sofa, buffet with value Rp.1000,000.-, sound system.	Stage house 12 pillars Permanent house, with cement floor and tile roof TV 14"; two wheel vehicle; plastic chairs; buffet with value Rp. 300,000.-; sound system	Stage house 9 pillars Semi permanent house with dirt floor House with plaited bamboo wall
Land ownership	2-4 Ha/Family	1-1.9 Ha/Family	< 1 Ha/Family

	RICH	MEDIUM	POOR
Cattle Ownership	10 – hundreds of heads of cattle	1 – 9 heads	Does not own cattle.
Means of sub-sistence	Land Owner Farmers, business-man and civil servants.	Land Owner farmers, coach-man, merchant.	Farm worker or other worker.
Income	- Paddy 200 sacks/year - Rp. 5 million/year - > Rp.200,000.-/month.	Rp. 100,000-Rp.200,000/mo	< Rp.100,000.-/month
Education of children	At least high school and University.	At least Junior High school, some attend university	Elementary school, some attend junior high school
	17 %	32%	51%

WATER SUPPLY AND ITS UTILIZATION

In general Clean Water Facilities used by Empang Atas Village before the existence of NTB ES&WS Project for domestic needs were traditional wells (well without wall or brick wall), pump well, also some families utilized water from improved traditional wells. River waterand stagnant water around paddy fields are usually used for non domestic needs (watering plants, bathing cattle etc.)

After the implementation of NTB ES&WS Project several changes occurred in the utilization of clean water from every existing water source. Clean Water Facilities aid from NTB ES&WS Project was piping Clean Water Facilities (in form of house connection and public hydrant) and improvement of traditional wells (traditional well with wall/improved wells). Cleanwater from piping house connection (PDAM tap) and public hydrant, pump well as well as improved traditional wells are generally used for various domestic needs. For non domestic needs, people usually use water from improved traditional wells.

After aid facilities from NTB ES&WS Project water source from pipeline (house connection and public hydrant) and improved traditional wells become main water source for the people for drinking-cooking and bathing-washing. Nevertheless a lot of people still use river water for bathing and washing with the reason of tradition and for efficiency in the utilization of PDAM water (cost efficiency)
Clean water from PDAM (public hydrant/house connection) is used for drinking and cooking, considering that according the public, the quality is good (cleaner compared to other water).

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Empang Atas Village

	ES&SW SR		SGL Improved		River		SGL Traditional		Paddy Field		Pump Well		Public Hydrant	
	B	A	B	A	B	A	B	A	B	A	B5	A	B	A
Drink/Cook		8	4	7			9	4			5	6		5
Wash/Bath		5	4	7	4	5	7	5			6	6		3
Non Domestic		1	2	7	5	2	3	3	3	1	3	3		1

Note:
SR ES&WS : house connection piping (NTB ES&WS Project)

SGL Improved	: improved traditional well (NTB ES&WS Project and Non Project)- Concrete well with pulley hoist.
River	: creek or dam/spring collector
SGL Traditional	: well with dirt or cement wall
Paddy field	: Stagnant water at the edge of paddy field.
Pump Well	: hand-pump/motor pump well
B	: Before NTB ES&WS Project
A	: After NTB ES&WS Project.

CHANGE IN THE PATTERN OF THE UTILIZATION OF DEFECATING FACILITIES

In general before NTB ES&WS Project, the people of Empang Atas Village defecate at the river, farm/field, paddy field. Some people still use yard around the house as defecating facilities, while some other people utilize toilet (constructed by the community). After aid toilet from the project, most of the people do their defecating activities at toilet, yet there are still some people who defecate at the river or farm. In general people who use the river as defecating facilities are those who could not be served by the existing toilet facilities, aside of the fact that in their opinion it is more practical (doing it when bathing or washing in the river). While those utilizing farm field as defecating facilities because they don't have toilet facilities and their location is far from the river.

Sometimes people use yard around the house as defecating facilities (especially for babies) because it is more practical and easy.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Empang Atas Village

	River		Farm/Field		Paddy Field		On the House		Edge of the house		Toilet	
	B	A	B	A	B	A	B	A	B	A	B5	A
Father	7	4	5	3	6	2	2	1			3	5
Mother	7	4	6	3	2	2	4	1			3	5
Children	7	3	6	4	3	1	2	2	4		5	5
Baby	5	3	6	4	1	1	2	2	7		3	5

From observation, at Empang Atas Village there were no group toilet aid, toilet aid given was family toilet. The number of Family Toilet Facilities given at Empang Atas Village was 309, which consisted of 306 family toilets and 3 repaired family toilets.

FACILITIES AID FROM NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Type of development and repair aids for Clean Water Facilities at Empang Atas Village come from Health Office, UNICEF, constructed by the community aside of from NTB ES&WS Project itself. In general facilities constructed by the community and Health Office and from UNICEF are traditional well and several pump well, while Clean Water Facilities constructed by NTB ES&WS are pipeline of Clean Water Facilities and repair of one traditional well.

Development aid for Clean Water Facilities from NTB ES&WS at Empang Atas Village consist of rehabilitation and development of new traditional well and development of clean water system

piping with house connection and public hydrant. Clean Water Facilities piping at Empang Atas Village is fully managed by PDAM. Development of Clean Water Facilities was started in 1995/1996.

Clean Water Facilities piping from NTB ES&WS Project at Empang Atas Village represents piping system managed by PDAM Empang region. In this system water source utilized is "BUAS" spring located at Jotang village area (located in the northern part of Empang Atas Village.Water debit of this spring is 10 l/second and is used to serve 4 villages which cover Jotang village, Empang Atas Village,Empang Bawah Village, and Labuan Botong Village. This system was planned to serve water need for 10,000 people.

Transmission and distribution system of clean water piping is as follows:

1. Water source is "BUAS" Spring. To reach this spring needs 2-3 hours of walking from the border of Jotang village in the direction of the hill. This spring is protected and the debit is relatively not influenced by season. Around 3 or 4 months ago (August 1998) there was leak in the spring protection facilities, so that the debit decreased down to half of the original debit. Yet after it was repaired (by adding dam facilities) water debit returned to the original figure (10 l/second).
2. Furthermore water from this spring is transmitted to reservoir through 5" pipe made of metal (iron). Generally this pipe transmission is constructed along the bank of Buas river. In some locations it can be seen that the transmission pipe had been replaced by pvc pipe because they are already damage and caused leaks. Reasons for damage pipes are usually they are hit by fallen trees.
3. Reservoir in Jotang village has a capacity of 200 m3. At the time of observation the reservoir was full with water. The condition of the reservoir is good, no damages observed. Reservoir of Jotang village can be reached in 30 minutes by foot from Jotang village.
4. Water from the reservoir is directly distributed to 4 villages through piping system. As an illustration, the geographical positions of the four villages , i.e. Jotang Village, Empang Atas village, Empang Bawah village, and Labuan Botong village (from the relatively high area to the lowest area from sea level)
5. In every village served, water from distribution pipe is channeled to the community through public hydrant and house connections.

Total number of house connection subscribers served by this piping system is 978, while the number of public hydrant is 12 units, with the following breakdown:

a. Jotang Village : 267 house connections & 4 public hydrants
b. Empang Atas Village : 332 house connections & public hydrants
c. Empang Bawah Village : 275 house connections & 4 public hydrants, and
d. Labuan Botong Village : 104 house connections.

Of the four public hydrant aids in Empang Atas Village, 2 units are not in function anymore by PDAM, one unit is damage, and only one unit which is still in operation and utilized by the community.

House connection installation cost was Rp.200,000. Generally this cost covers installation cost, pipe, water meter and tap, yet it is not including installation and purchasing cost of additional pipe. House connection is carried out by PDAM. In this case the community directly apply to PDAM to get house connection.

FAMILY TOILET FACILITIES

Development aid for defecating facilities in Empang Atas Village was only in form of family toilet (*jaga*) and no aid for group toilet facilities (jamak). Development of toilets was carried out in 1995/1996. The number of family toilets aid in Empang Atas Village was 309, consists of 306 units new toilets and 3 rehabilitated ones.

Distribution of Family Toilets in Empang Atas Village is as follows:

a. Ponong Hamlet : 67 units
b. Awo Hamlet : 85 units
c. Kemboja Hamlet : 62 units, and
d. Pemantu Hamlet : 95 units

Family Toilet was given to able families and wanted to have their own toilet. The community was very interested considering that they needed it very much and also they considered that the construction of the toilet from NTB ES&WS Project was quite simple. Parts of the toilets are:

a. Closet
b. "cubluk"
c. Floor
d. water tank
e. Wall and roof.

PROJECT SOCIALIZATION

Socialization of NTB ES&WS Project was started by holding a meeting at Village Office conducted by representatives of NTB ES&WS Project, village apparatus, as well as related agencies. Participants of the meeting consisted of PKK ladies, management of LKMD, and village public figures, head of the Hamlet and several representatives of the community. Topics discussed were: introduction to NTB ES&WS Project, environmental health and sanitation, as well as financing problem and facility development.

Several further meetings followed, which in general discussed environmental health and sanitation, toilet development technique. Aside of that maintenance and operation of Clean Water Facilities and Family Toilet were also discussed.

Before the implementation of the construction of the facilities, field training was given at Empang Atas Village for three days for the construction of Family Toilet, including construction of "cubluk" and installation of closet from NTB ES&WS .This training was attended by community figures, LKMD management, and several representatives of the community. Training was given by a technical officer (TO) frm NTB ES&WS.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING-PDAM)

In preparation/planning stage of Clean Water Facilities Project of NTB ES&WS at Empang Atas Village, the roles of PDAM together with the staff of NTB ES&WS , head of the village and intellectual party were very important, especially in deciding which village will get the aid project of Clean Water Facilities; type/ technology of the facilities to be constructed; schedule and time of implementation, amount of community contribution, as well as socialization of NTB ES&WS Project.

Decision about manager of Clean Water Facilities (in this case manager of public hydrant) was made through the decree of the Regent about Manager of Clean Water Facilities.

In preparation stage of Clean Water Facilities project, the community in general was not involved in the decision making. In planning the construction of Clean Water Facilities at Empang Atas Village, most were planned by PDAM, Public Works Cipta Karya, NTB ES&WS and several other related government agencies. After the main piping network was constructed, PFDAM then offered the community to have house connection. Decision who would get house connection was made by the community themselves, based on the result of discussion of ladies and gentlemen groups. It was not clear how the location of public hydrants was decided.

FAMILY TOILET FACILITIES

Like Clean Water Facilities constructed by NTB ES&WS, decision about the village which will get toilet facilities aid was decided based on Decree of Regent. Generally NTB ES&WS staff was involved a lot in various decisions related to: type/technology of toilet facilities to be constructed, as well as schedule of the implementation and the amount of contribution which must be prepared by the community of Empang Atas Village. Village apparatus has a role in socializing the project and deciding the participants of training.

The decision to decide who will get family toilet aid, was discussed in gentlemen and ladies groups, and then discussed with local village apparatus. Aid was given as equal as possible at every hamlet to the community which is able to provide certain amount of fund, manpower, and construction material so that the Family Toilet could be constructed properly. Note: aid from NTB ES&WS was only as stimulant.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING – PDAM)

In development stage of Clean Water Facilities (piping) at Empang Atas Village the community as well as village apparatus were completely not involved. Development of the facilities was carried out by PUCK. Nevertheless, for the development of public hydrant some of the community were involved as unskilled worker under the supervision of PUCK technical officers. Involvement of the community in the development of public hydrant facilities can be seen from the cost estimates for the development of the facilities as follows:

Cost Estimates For the Construction of NTB ES&WS Public Hydrant of Empang Atas Village 1995/1996

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material (based on requirements of NTB ES&WS Project for 1 unit of Public Hydrant							500,000	
Construction Cost								
Unskilled Workers	Manhour			35				262500
TOTAL							500,000	262500
							66%	34%

FAMILY TOILET FACILITIES

In the development stage of Family Toilet Facilities, the community was involved directly. Generally Family Toilet was constructed by the future owner of the Family Toilet assisted by several neighbors or craftmen specially paid to do the construction under supervision of NTB ES&WS technical officers.

Involvement of the community in the construction of Family Toilet Facilities can also be seen from cost estimates for the construction Family Toilet as follows:

Cost Estimates for the Construction of NTB ES&WS Family Toilet of Empang Atas Village 95/96

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack	sack	2	6	13,5000	13,500	27,000	81,000
Red Brick		Unit		1000		100		100,000
Sand		M3		3		3,000		9,000
Rocks		M3		3		3,000		9,000
PVC Pipe 4"	M		3		2,000		6,000	
Closet	Unit		1		15,000		15,000	
Door/Roof		Unit		1		130,500		130,500
Construction Cost								
Manpower		Manhour		20		7,500		150,000
TOTAL							48,000	479,500
							9%	91%

HANDOVER OF FACILITIES

Either for Clean Water Facilities or environmental sanitation facilities, there wereno hand-over of the facilities from the Project to the community or the village, either symbolically or mass. Aside of that there were no legal written proof related to the hand-over.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES (PIPING – PDAM)

Generally piping Clean Water Facilities constructed represents house connection where every connection unit is only used by one household (family). Public hydrant which is still functioning is used by 12 families – this public hydrant is located at RT03 Ponong Hamlet. Operation and maintenance of house connection facilities is the responsibility of the related owner of the facilities. For public hydrant, operation and maintenance of the facilities is carried out by someone who is not receiving any payment. His task is to collect claims from the community and pays the invoices to PDAM. Amount of invoice depends on average total invoices of PDAM divided equally to the whole households using the water for every month. If there is excess of

payment from the community, usually it becomes the right of the collector. No transparent report to the users of the public hydrant. So far there is no repair to the public hydrant.

Public hydrant which are still in function (at RT03) is equipped with 5 taps and a water flow meter. No waste water disposal facilities available, so waste water directly flows to the road (dirt road), creating water pool on the road which can become source of diseases.

The average amount of claim of PDAM for house connection at Empang Atas Village is Rp.8,400.-/month/household (result of transect). Based on the prevailing water tariff, the average water consumption of house connection is 14 m^3/month/household. For public hydrant, with average payment of Rp. 2,500.-/month for 12 Families, the average claim of PDAM is Rp.30,000.-/month/public hydrant with average consumption of 44 m3/month/public hydrant or 4 m^3/month/household-calculation based on transect data.

Tariff Structure And Cost of PDAM Clean Water – Decree of Regent of Sumbawa No.284/1998

Customer's Group		Tariff according to level of consumption		
		1-10 m^3	11-20 m^3	> 20 m^3
Group I	Public Hydrant	Rp. 300	Rp. 300	Rp. 300
Group II	Household	Rp. 300	Rp. 400	Rp. 600
Flow meter	0.50*	Rp. 2,750 (Rp.2,000 + Rp.750)		
	0.75*	Rp.3,750 (Rp. 3,000 + Rp.750)		

FAMILY TOILET FACILITIES

In general the family toilets facilities constructed with the aid of NTB ES&WS is used by 1 household (family), nevertheless there is a small number which are used by several families living close to each other. For common toilets no charge is effected. In general conditions of Family Toilets are still relatively good – none damage yet. Based omn interview with the people, if something happened, big or small damage on the Family Toilet used by one families or by several families, the cost for repair shall be borne by the owner of the toilet.

Maintenance of Family Toilet facilities and the environmental cleanliness is the responsibility of the owner of the toilet, even though several families use the toilet.

PROJECT TYPE	: B-Type-Piping Clean Water System
VILLAGE #4	: SAKURU
SUB-DISTRICT	: MONTA
DISTRICT	: BIMA (WEST NUSA TENGGARA)

GENERAL DESCRIPTION

Sakuru Village is located 9 Km to the South of the capital of Bima District with an area of 1,310 Ha. Sakuru Village is located on the regional road network connecting Sakuru Village with Bima town. Residences of the populations are grouping on the southern and northern parts of the existing regional road network. Southern region is steep hilly while the northern part is relatively flat.

The number of population of Sakuru Village in 1996 was 2972 people with number of families of 704. From the total productive age people(age 15 years or more), 56% didn't have formal education, 15% graduated from elementary school, and the rest 29% have had junior high school and high school. Most of the people are farmers.

Sakuru Village consists of 4 (four) hamlets which consist of 12 RT (Neighborhood Associtation), i.e.:

a. Hamlet 1: RT01, RT02, RT03 and RT07
b. Hamlet 2: RT04, RT05, and RT06
c. Hamlet 3: RT08, RT09, and RT10
d. Hamlet 4: RT11, and RT12

CLASSIFICATION OF LIVING STANDARD

Around 61% of the population of Sakuru Village are included in poor people category. In general characteristics of poor people among others are as follows: land ownership less than 0.25 Ha/family, means of subsistence: farm workers, craftman or sand collector, stage house with plaited bamboo wall and own no cattle..

CLASSIFICATION OF LIVING STANDARD OF SAKURU VILLAGE COMMUNITY

	RICH	MEDIUM	POOR
House	Permanent house - brick wall - tile/zinc roof - teak wood wall - area 7x 9 m2 - cement, ceramic floor Stage house w/ 12-16 pillars	Permanent house - teak /mitan wood wall - tile/zinc roof - wooden stairs - wooden floor - area 4 x 7 m2 Stage house with 9 pillars	Semi permanent house - Plaited bamboo/ wooden wall - Thatch/tile roof - bamboo/dirt floor - area 3 x 6 m2 Stage house w/ 6 pillars
Furniture	Sofa and corner chair Color TV & Parabola, Sound System Refrigerator; Fan Cupboard (Rp. 500 - 700 thousand).	Plastic chairs BW TV Cupboard (Rp.100-300 thousand) Radio	Rattan chairs/ wooden plank chairs Bamboo couch Pandanus mat

	RICH	MEDIUM	POOR
Land ownership	1 - 3 Ha/Family	0.25 -1 Ha/Family	< 0.25 Ha/Family
Cattle Ownership	Cow (10– 20) heads/family Buffalo (2-10) heads/family	Cow (2 - 8) heads/family Buffalo	
Means of sub-sistence	Landowner Farmers Business-man	Civil Servant, farmers Coach driver	Farm worker, sand collector, craftman
Other facilities	4-wheel or 2-wheel vehicle Own tractor Own Motored Pump	2-wheel vehicle Own coach Own Bicycle	
	17 %	22%	61%

WATER SUPPLY AND ITS UTILIZATION

In general Clean Water Facilities used by the people of Sakuru Village before the existence of NTB ES&WS Project for domestic needs were river and traditional wells (well without wall or brick wall); aside of that a little number of people (generally rich people) used well with hand pump or electric motor pump. River here means spring which appears during rainy season.

Water from the river , dug-wells and hand pump/electric motor pump wells was used by the community for domestic needs (drinking, cooking, bathing and washing), and non-domestic needs (watering plants etc.). For non-domestic needs in particular there were people who used water from paddy field.

After the implementation of NTB ES&WS Project several changes occurred in the utilization of clean water from every existing water source. Clean Water Facilities aid from NTB ES&WS Project was piping Clean Water Facilities (in form of house connection) and dug-wells (dug-well with wall/improvement of traditional wells). Clean water from piping house connection (PDAM tap) and improved traditional wells are generally used for various domestic needs and non domestic needs.

After aid facilities from NTB ES&WS Project water source from pipeline (house connection) and improved traditional wells become main water source for the people for drinking and cooking, clean water sources which are used a lot by the community are facilities from NTB ES&WS project aid, wells with stone wall, and a little number of people utilized water from the river and water from pump well.

People who could not be served by the facilities constructed by NTB ES&WS project, used the closest dug-well or aid facilities belonging to the closest neighbor for their domestic needs.

Generally water from paddy field was used for bathing cattles (buffalo), while in dry seaon, rich people usually utilized water from handpump to water plants in the paddy field.

Most people in the four hamlets could not be served by piping clean water system considering that in general people in this region were included in the low income category, that they could not afford to pay for the house connection This region in general received NTB ES&WS project aid in form of 5 units of rehabilitated dug-wells.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Sakuru Village

	ES&SW SR		ES&WS SGL		River		Stone SGL		Paddy Field		Dirt SGL		Electric SPT	
	B	A	B	A	B	A	B	A	B	A	B5	A	B	A
Drink/Cook		5		5	5		5	3			5		2	2
Wash/Bath		5		5	5	3	5	5			5		2	2
Non Domestic		5		5	5	5	5		1	1	5	1	2	2

Note:
ES&WS SR : house connection piping (NTB ES&WS Project)
ES&WS SGL : improved traditional well (NTB ES&WS Project)-
Stone SGL · dug-well with stone wall (traditional)
Dirt SGL . dug-well without wall (traditional)
Electric SPT : dug-well with hand-pump/electric pump.
B : Before NTB ES&WS Project
A · After NTB ES&WS Project.

CHANGE IN THE PATTERN OF THE UTILIZATION OF DEFECATING FACILITIES

In general before NTB ES&WS Project, the people of Sakuru Village defecated at the river, paddy field/farm, or near the house. After aid toilet came from the project, most of the people do their defecating activities at toilet, yet there are still some people who defecate around the house or at the farm.

People who use the river as defecating facilities feel that it is more convenient and easy to reach. When they (father, mother and children) happened to be in the farm or paddy field, whey would defecate around it Defecating in the stage house are still done, especially by members of the family who are sick, usually only for urinating.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Sakuru Village

	River		Farm/Field		Paddy Field		On the House		Edge of the house		Toilet	
	B	A	B	A	B	A	B	A	B	A	B5	A
Father	6				5		3	5	4			6
Mother	6				5		3	5	4			6
Children	5		6	5	3		2	4	4			6
Baby	3		4		2		5	4	6	6		5

From observation, at Sakuru Village there were no group toilet aid, toilet aid given was family toilet. 50% of the people of Sakuru village could be served by family toilets from NTB ES&WS Project.

FACILITIES AID FROM NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Development aids for Clean Water Facilities at Sakuru Village consist of rehabilitation and construction of new dug-well and development of piping Clean Water system with house connection.

Piping clean water system at Sakuru Village was fully managed by PDAM. The construction of Clean Water Facilities was started in 1995/1996.

Piping Clean Water Facilities in Sakuru Village represents part of SAKURU system. In this SAKURU system, villages served are Tenga village, Baralau village, Samili village, and Sakuru village itself. Total number of customers served by this system was 477 customers, where 456 customers were house connections. Distribution of customers in each village is as follows:

a. Tenga village : 42 customers (38 household customers)
b. Baralau village : 92 customers (87 household customers)
c. Samili village : 245 customers (234 household customers)
d. Sakuru village : 98 customers (97 household customers)

Debit of clean water source in this SAKURU system was 12.5 l/second. Then the clean water from this source is channeled to 4 reservoirs (Tenga reservoir, Baralau reservoir, Samili reservoir, and Sakuru reservoir) which each served their village.

Installation cost of house connection varied between Rp. 125,000 to Rp. 400,000. Generally this cost covered installation cost, pipe, flowmeter and water taps. Contractor carrying out house connection came from PDAM. In this case the community directly applied to PDAM for house connection.

FAMILY TOILET FACILITIES

Development aid for defecating facilities in Sakuru Village was only in form of family toilet (*jaga*) and no aid for group toilet facilities (jamak). Development of toilets was carried out in 1994/1995. The number of family toilets aid in Sakuru Village was around 290. Family toilet was given to capable people and would like to have their own toilet. The community was very much interested , since they really needed it and also because the construction of aid toilet of NTB ES&WS Project was considered simple. Parts of the toilets are:

a. Closet
b. "cubluk"
c. Floor
d. water tank
e. Wall and roof.

PROJECT SOCIALIZATION

Socialization of NTB ES&WS Project was started by holding a meeting at Village Office conducted by representatives of NTB ES&WS Project, village apparatus, as well as related agencies. Participants of the meeting consisted of PKK ladies, management of LKMD, and village public figures, head of the Hamlet and several representatives of the community. Topics discussed were: introduction to NTB ES&WS Project, environmental health and sanitation, as well as financing problem and facility development.

Several further meetings followed, which in general discussed environmental health and sanitation, toilet development technique.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING-PDAM)

In preparation/planning stage of Clean Water Facilities Project of NTB ES&WS at Sakuru Village, PDAM had a very important role, particularly in deciding the village which would get the project aid for Clean Water Facilities; type/technology of facilities to be constructed; schedule and time of the implementation; determining customers of house connection; and tertiary piping network (for house connection). Project socialization was carried out by a group of people which were included in the elite group (sub-district level).

In preparation stage of Clean Water Facilities project, the community in general was not involved in the decision making. According to the community, many suggestions from the community about the construction of Clean Water Facilities were turned down by PDAM. In planning the construction of Clean Water Facilities at Empang Atas Village, most activities were planned by PDAM, Public Works Cipta Karya, NTB ES&WS and several other related government agencies. After the main piping network was constructed, PDAM then offered the community to have house connection. And usually only people who were capable to pay for the house connection would have the access to this house connection.

FAMILY TOILET FACILITIES

In the preparation/planning stage of family toilet project from NTB ES&WS in Sakuru village, NTB ES&WS staff involved a lot in various activities of decision making, such as: deciding the village will get the aid of family toilet facilities; type/technology of family toilet facilities to be constructed, as well as schedule and time of the implementation. Village apparatus (head of village and LKMD) had a role in deciding the amount of community contribution and in deciding the participants of training.

The decision to decide who will get family toilet aid, was discussed in gentlemen and ladies groups, and then discussed with local village apparatus. Aid was given as equal as possible for every RT/hamlet, and the main requirement was the capability of the candidate to provide a certain amount of fund, manpower, and construction material so that the Family Toilet could be constructed properly. Note: aid from NTB ES&WS was only as stimulant.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING – PDAM)

In development stage of Clean Water Facilities (piping) at Sakuru Village the community as well as village apparatus were completely not involved. Development of the facilities was carried out by PUCK and the contractor.

It should be noted, that in the development of dug-well from NTB ES&WS (in this study not evaluated), the community was involved from digging up to construction activities of the well and its supporting facilities with technical assistance from NTB ES&WS technical employee. From cost estimates of the development of dug-well, contribution of the community and the amount of NTB ES&WS aid can be seen as follows:

Cost Estimates For the Construction of NTB ES&WS Dug-well of Sakuru Village 1996/1997

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	Sack		12		7,500		90,000	
Concrete ring	Unit		20		7,500		150,000	
Sand		M^3		7		3,000		21,000
Rocks		M^3		3		3,000		9,000
Pulley	Unit		1		15,000		15,000	
Construction Cost								
Man Worker		Manhour		49				245,000
Woman Worker		Manhour		21				63,000
TOTAL							255,000	338,000
							43%	57%

FAMILY TOILET FACILITIES

In the development stage of Family Toilet Facilities, the community was involved directly. Generally Family Toilet was constructed by the future owner of the Family Toilet assisted by several neighbors or craftman specially paid to do the construction under supervision of NTB ES&WS technical officers.

Involvement of the community in the construction of Family Toilet Facilities can also be seen from cost estimates for the construction Family Toilet as follows:

Cost Estimates for the Construction of NTB ES&WS Family Toilet of Sakuru Village 96/97

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack	sack	2	3	7,5000	7,500	15,000	22,500
Red Brick		Unit		500		60		30,000
Sand		M^3		3		3,000		9,000
Rocks		M^3		3		3,000		9,000
PVC Pipe 4"	M		1		6,875		6,875	
Closet	Unit		1		15,000		15,000	
Iron	Unit		1		3,500		3,500	
Construction Cost								
Manpower		Manhour		14		5,000		70,000
TOTAL							40,375	140,500
							22%	78%

HANDOVER OF FACILITIES

Either for Clean Water Facilities or environmental sanitation facilities, there wereno hand-over of the facilities from the Project to the community or the village, either symbolically or mass. Aside of that there were no legal written proof related to the hand-over of facilities.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES (PIPING – PDAM)

Generally piping Clean Water Facilities constructed represents house connection where every connection unit is only used by one household (family). Therefore operation and maintenance of house connection facilities is directly managed by the owner of the facilities which in this case is also the user. There is practically no maintenance cost of the facilities , because the existing facilities are relatively new. House connection cost varied between Rp. 125,000 - Rp. 400,000. In average PDAM water bill in Sakuru village is Rp. 5,691/month/household with average water consumption of 14 m^3/month/family.

FAMILY TOILET FACILITIES

In general the family toilets facilities constructed with the aid of NTB ES&WS is used by 1 household (family), nevertheless there is a small number which are used by several families living close to each other. For common toilets no charge is effected. In general conditions of Family Toilets are still relatively good – none damage yet. Based on interview with the people,if something happened, big or small damage on the Family Toilet used by one family or by several families, the cost for repair shall be fully borne by the owner of the toilet.

Maintenance of Family Toilet facilities and the environmental cleanliness is the responsibility of the owner of the toilet, even though several families use the toilet.

PROJECT TYPE	: B-Type-Piping Clean Water System
VILLAGE #5	: SAMILI - NDORA Hamlet
SUB-DISTRICT	: WOHA
DISTRICT	: BIMA (WEST NUSA TENGGARA)

GENERAL DESCRIPTION

Samili village is located on the regional road network connecting Samili village and the Capital of Bima (Raba) District. Residences of the population are grouping on the southern and northern part of the existing regional road network. The southern region is hilly with steep hills, while the northern region is relatively flat. The area of Samili village is 290 Ha with number of population 4,604 people, consist of 890 families.

Samili village consists of 6 (six) hamlets, i.e.

a. Rangajao village b. Cako village c. Santula village
d. Rasa Bau village e. Ndora village f. Sigih village

CLASSIFICATION OF LIVING STANDARD

Around 54% of the population of Samili Village are included in poor people category. In general characteristics of poor people are among others as follows: living in a house with palited bamboo or stage house with 6 pillars, owns no land and big cattle, income less than one million Rupiah per family per year, and in general means of subsistence are farm workers and leasor farmers. Proportion of rich people in Samili village reaches only 5%.

Classification of Living Standard of Samili Village Community

	RICH	MEDIUM	POOR
House	House with wooden plank wall Stage House with 12-16 pillars Permanent House with 6 rooms	House with wooden plank wall Stage House with 9 pillars Permanent house with 3 rooms	House with bamboo plaited wall
Furniture	Bed; corner chair; cupboard, buffet (Rp. 500,000) Color TV; Parabola; Video; Sound System, Refrigerator, Telephone	Bed, plastic chairs, Cupboard; buffet (Rp. 150,000).	Bed, cupboard; Buffet (Rp.50,000)
Land ownership	> 4 Ha/Family	0.1 - 3 Ha/Family	Own no land.
Cattle Ownership	> 5 heads of cows or buffalo per family	1 – 4 heads of cows or buffalo/family	Does not own big cattle (only birds).
Level of Income	Rp. 2.5-5 million/family	Rp. 1-2.4 million/family	Rp. 500,000-Rp.900.000
Means of sub-Sistence	Land Owner Farmers con-curently employee; businessman/merchant; landowner farmer.	Employee; coachman; Land Owner farmers; merchant; land leasor	Farm worker; farmer land leasor
Other facilities	2-wheel and 4-wheel vehicle.	Own coach Bocycle	
	5 %	41%	54%

WATER SUPPLY AND ITS UTILIZATION

In general Clean Water Facilities used by Samili Village before the existence of NTB ES&WS Project for domestic needs were traditional wells (stone well without wall), while for non domestic needs they generally stagnant water around paddy field and riverr.

For drinking and cooking in particular, there were some families which used clean water from pump well. Quality of river water is relatively not quite adequate, so almost nobody in Samili village using water frim the river for drinking and cooking.

For washing and bathing, aside of traditional well a small number of the community also used clean water from water pool from river bank, pump well and river. Pump well is generall spread in several locations, i.e. RT05, RT10 and RT11.

After the implementation of NTB ES&WS Project several changes occurred in the utilization of clean water from every existing water source. Clean Water Facilities aid from NTB ES&WS Project was piping Clean Water Facilities in form of house connection and public hydrant. Generally water from PDAM (house connection and public hydrant) was used for domestic needs, while for non-domestic needs they used river water. Utilization of water from traditional well for domestic needs was relatively negligible., they generally had switched to PDAM water.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Samili Village

	ES&SW SR		Improved SGL		River		Trad. SGL		Paddy Field		Pump SGL		Public Hydrant	
	B	A	B	A	B	A	B	A	B	A	B5	A	B	A
Drink/Cook		4		1			10				1			5
Wash/Bath		3		2	3		10				1			5
Non Domestic		2		1	4	5			7					3

Note:
ES&WS SR : house connection piping (NTB ES&WS Project)
Improved SGL : rehabilitated dug-well - concrete well with pulley
River : water pool at riverbank, shallow well at riverbank, river
Traditional SGL : dug-well with stone or dirt wall
Paddy field : water pool at the edge of paddy field.
Pump well : hand-pump/electric pump dug-well - generally from UNICEF
B : Before NTB ES&WS Project
A : After NTB ES&WS Project.

CHANGE IN THE PATTERN OF THE UTILIZATION OF DEFECATING FACILITIES

Generally before NTB ES&WS Project aid, adult people of Samili Village (father, mother and children) defecate at the river, and a small number at farm/field, paddy field. Residential area in Samili village was located in general around the river, therefore many people utilized it for defecating. Under five year old children usually defecate around the house or on stage house.

After NTB ES&WS Project, there were signinficant changes , i.e. less and less people using river as defecating facilities and on the other hand, more and more people using family toilet for defecating.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Samili Village

	River		Farm/Field		Paddy field		On the Stage House		Edge of the House		Toilet	
	B	A	B	A	B	A	B	A	B	A	B	A
Father	9	4	2	1								10
Mother	10	4	1	1								10
Children	10	7	1	1								3
Baby							6	2	5	2		3

For Samili village there was no project aid for group toilet (jamak), only for family toilets a total of 296 units.

FACILITIES AID FROM NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Before the Clean Water Facilities project aid NTB ES&WS , there were already several hand pumps in Samili village, which represented the aid from the Health Serevices. Several of these facilities are still functioning and utilized by the community up to this moment.

Clean Water Facilities project aid in Samili village consisted of construction of piping network with house connections and public hydrants (6 units) distributed in 6 hamlets. Clean water piping system in Samili village is fully managed by PDAM. Construction of Clean Water Facilities was statrted in 1995/1996.

Clean Water Facilities piping at Samili Village represents part of SAKURU system. In this SAKURU system, villages served are Tenga village, Baralau village, Samili village, and Sakuru village itself. Total number of customers served by this system is 477 customers, with 455 house connections.

Distribution of customers in each village is as follows:

a. Tenga village: 42 customers (38 house connection customers)
b. Baralau village: 92 customers (87 house connection customers)
c. Samili village: 245 customers (234 house connection customers)
d. Sakuru village: 98 customers (97 house connection customers)

Debit of clean water source at SAKURU system was 12.5 l/second. This clean water is then channeled to 4 reservoirs (Tenga resrvoir, Baralau resrvoir, Samili resrvoir, and Sakuru resrvoir) which each serves their village.

Installation cost of house connection was Rp. 110,000 paid in instalments foe 10 months. Generally this cost covered installation cost, pipe, flowmeter and water taps. Contractor carrying

out house connection came from PDAM. In this case the community directly applied to PDAM for house connection.

Distribution of public hydrant in Sakuru village is as follows:
a. Rangajao hamlet : public hydrant 4 (HU-4) - 28 Families
a. Cako hamlet : public hydrant 2 (HU-2) - 34 Families
c. Santula hamlet : public hydrant 5 (HU-5) - 29 Families
d. Rasabau hamlet : public hydrant 3 (HU-3) - 23 Families
e. Ndora hamlet : public hydrant 1 (HU-1) - 27 Families
f. Sigih hamlet : public hydrant 6 (HU-6) - Not functioning anymore.

FAMILY TOILET FACILITIES

Before project aid from NTB ES&WS , there were in Samili village already some family toilets constructed by the community.

Development aid for defecating facilities in Sami;i Village was only in form of family toilet (*jaga*) and no aid for group toilet facilities (jamak). Development of toilets was carried out in 1995/1996. The number of family toilets aid in Samili Village was 295.
Parts of the toilets are:

a. Closet
b. "cubluk"
c. Floor
d. water tank
e. Wall and roof.

PROJECT SOCIALIZATION

Socialization of NTB ES&WS Project was started by holding a meeting at Village Office. Conductor was NTB ES&WS (represented by community facilitator), village apparatus, and several related agencies (among others health office). Participants were: village apparatus (head of village, LKMD, LMD, community figures, and Head of hamlet), PKK and several representatives of the community. Activities were carried out in one day meeting. Topics discussed were: a) introduction to NTB ES&WS Project, b) environmental health and sanitation, c) discussion about option of technology (house connection vs public hydrant vs dug-well), as well as deciding the location of public facilities and financing of facility development.

Then several routine meetings followed, held once a month. Conductor was community facilitator of NTB ES&WS, village apparatus and muspika (local Leaders Council). Participants: representatives of village groups, in this case there were three community groups, as well as PKK ladies (other ladies were not active because they were busy farming). These activities were carried out in one day. Topics discussed: a) objection of project and what the community wanted, b) environmental health and sanitation, c) general description of toilet technical construction, d) deciding the location of public hydrant and registration of candidates for house connection, as well as e) responsibility of the community in managing and maintaining public facilities .

Aside of the above meetings, field training was also conducted. Field training on groups (representatives of groups) and was conducted only once. Conductor was: NTB ES&WS (represented by community facilitator and technical employee). Participants were: the

community, especially men and representatives of each froup. Material demonstrated were: a) installation of closet and b) making cement mix, installation of stone as well as earth digging.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING-PDAM)

In preparation/planning stage of Clean Water Facilities Project of NTB ES&WS at Samili Village, the roles of PDAM together with head of the village were very important, especially in deciding which village will get the aid project aid; socialization of the projecty; type/ technology of the facilities to be constructed; schedule and time of implementation, manager of Clean Water Facilities; as well as piping network planning. In deciding the location, head village through negotiation proposed Samili village as project location to Sub-district based on the existing condition of the related village.

In preparation stage of Clean Water Facilities project, the community in general was not involved in the decision making. In planning the construction of Clean Water Facilities at Empang Atas Village, most activites were planned by PDAM, Public Works Cipta Karya, NTB ES&WS and several other related government agencies. After the main piping network was constructed, PDAM then offered the community to have house connection. Decision who would get house connection was made by the community themselves, based on the result of discussion of ladies and gentlemen groups. It was not clear how the location of public hydrants was decided.

In deciding the number and location og public hydrant, the community proposed the location and distribution of facilities and through village negotiation (village apparatus, NTB ES&WS employee, as well as PDAM), agreement was reached where and how many public hydrants for one hamlet.
Deciding the manager of Clean Water Facilities 9in this case manager of public hydrant) was made based on Decree of Regent about Manager of Clean Water Facilities. In deciding the manager of facilities in Samili village, first there was proposal from the community about who should be the manager. After village negotiation it was decided that: manager of public hydrant consisted of 3 men, which consist of; one chairman, one secretary and one treasurer. In reality there was only one man and it was head of the hamlet.

FAMILY TOILET FACILITIES

In the preparation/planning stage of family toilet project of NTB ES&WS in Samili village, NTB ES&WS staff involved a lot in various activities of decision making such as: type/technology of family toilet to be costructed, amount of community contribution, schedule and time of implementation, as well as deciding the location of family toilet. In deciding the location of family toilet, the community especially men took part in providing input. Decision about the location was made based on meeting of groups which eac consists of 10 men (representing 10 Families.

The main requirement for deciding Families which will receive family toilet aid was the capability of the candidate to provide a certain amount of fund, manpower and construction material so that the family toilet could be constructed properly. Note: iad from NTB ES&WS was only as stimulant. For the decision about participants of training, the role of head of village was very important.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING – PDAM)

In development stage of Clean Water Facilities (piping) at Samili Village the community as well as village apparatus were completely not involved. Development of the facilities was carried out by PUCK and its contractor.

Cost for house connection was Rp. 110,000.- per connection which could be paid in installation for 11 months, with amount of installments of Rp. 11,000/month.

FAMILY TOILET FACILITIES

In the development stage of Family Toilet Facilities, the community was involved directly. Generally Family Toilet was constructed by the future owner of the Family Toilet assisted by several neighbors or craftmen specially paid to do the construction under supervision of NTB ES&WS technical officers. Nevertheless not all family toilets were constructed under the supervision of NTB ES&WS technical officers.

Involvement of the community in the construction of Family Toilet Facilities can also be seen from cost estimates for the construction Family Toilet as follows:

Cost Estimates for the Construction of NTB ES&WS Family Toilet
Samili Village 95/96

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack	sack	2	4	7,500	7,500	15,000	30,000
Red Brick		Unit		1,400		50		70,000
Sand		M^3		3		3,000		9,000
Rocks		M^3		3		3,000		9,000
PVC Pipe 4"	M		1		6,875		6,875	
Closet	Unit		1		15,000		15,000	
Construction Cost								
Manpower		Manhour		14		5,000		70,000
TOTAL							36,875	188,000
							15%	84%

HANDOVER OF FACILITIES

Either for Clean Water Facilities or environmental sanitation facilities, there wereno hand-over of the facilities from the Project to the community or the village, either symbolically or mass. Aside of that there were no legal written proof related to the hand-over.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES (PIPING – PDAM)

Generally piping Clean Water Facilities constructed represents house connection where every connection unit is only used by one household (family). Therefore operation and maintenance of house connection facilities is directly managed by the owner of the facilities, which in this case is also the user.

Maintenance cost of the facilities was practically not, because the facilities were still relatively new. House connection cost was Rp. 110,000. Average PDAM water bill at Samili village is Rp. 5,100/month/household with average water consumption of 13 m^3/month/household. For public hydrant, average consumption for each household can be seen in the following table

Hamlet	Public Hydran	Customer (Families)	Est.Avg.Bill (Rp.) per Families	Est.Total Bill (Rp.)	Est.Total Consumption (M^3)	Est. Water Consumption Per Families
Rangajao Hamlet	HU-4	28	2,000	56,000	87 m^3/HU	3.0 m^3
Cako Hamlet	HU-2	29	1,500	43,500	66 m^3/HU	2.0 m^3
Santula Hamlet	HU-5	23	2,000	46,000	70 m^3/HU	3.0 m^3
Rasabau Hamlet	HU-3	34	2,000	68,000	107 m^3/HU	3.0 m^3
Ndora Hamlet	HU-1	27	2,000	54,000	84 m^3/HU	3.0 m^3
Sigih Hamlet	HU-6	0	-	0		
		141		253,000		

Note
Calculation based on tariff structure and charge cost prevailing in Samili village

For public hydrant, with average payment between Rp. 1,500.- - Rp. 2,000.-/household for 23 - 34 Families, the average bill for PDAM water is Rp. 43,000.- - Rp. 68,000/ month/public hydrant with average water consumption of 66 m^3 - 107 m^3/month/public hydrant or 2 m^3 - 3 m^3/month/household - calaculation based on transect data.

HU1 (Ndora Hamlet)

Every month every family is charged between Rp. 1,500.- - Rp. 2,000.-/Family/month for clean water consumption. Some is used to pay PDAM water bill and if there is some balance, it is saved by the manager for unexpected costs. The number of Families using this HU1 is 27 Families. So far problems had occurred 3 times on the water tap and 5 times on flowmeter, which each costed Rp.7,500.-/problem and Rp.20,000.-/problem
Cost to fulfill the needs for the damages among others came from the balance of monthly contribution plus incidental contribution from the community. Repair was carried out by the manager of the public hydrant. The manager received no salary/wage. No transparent financial report available, only through verbal communication at the time of monthly bill to every user of public hydrant.

HU2 (Cako Hamlet)

Every month every family is charged Rp. 2,000.-/Family/month. Some is used to pay PDAM water bill and if there is some balance, it is saved by the manager for unexpected costs. The number of Families using this HU2 is 34 Families. So far problems had occurred 3 times on the tap and twice on water flowmeter, which each costed Rp.7,500.-/froblem, and Rp.20,000.-/problem.

Cost to fulfill the needs for the damages among others came from the balance of monthly contribution plus incidental contribution from the community. Repair was carried out by the manager of the public hydrant. The manager received no salary/wage. No transparent financial report available, only through verbal communication at the time of monthly bill to every user of public hydrant.

HU3 (Rasabao Hamlet)

Every month every family is charge between Rp. 1,500.- - Rp. 2,000.-/Family/month for clean water consumption, depending on the amount of PDAM water bill. Some is used to pay PDAM water bill and if there is some balance, it is saved by the manager for unexpected costs. The number of Families using this HU3 is 23 Families. So far problems had occurred 4 times on the tap and 5 times on water flowmeter, which each costed Rp.7,500.- /problem, and Rp.20,000.- problem.

Cost to fulfill the needs for the damages among others came from the balance of monthly contribution plus incidental contribution from the community. Repair was carried out by the manager of the public hydrant. The manager received no salary/wage. No transparent financial report available, only through verbal communication at the time of monthly bill to every user of public hydrant.

HU4 (Rangajao Hamlet)

Every month every family is charge between Rp. 1,500.- - Rp. 2,000.-/Family/month for clean water consumption, depending on the amount of PDAM bill. Some is used to pay PDAM water bill, salary of the manager and if there is some balance, it is saved by the manager for unexpected costs. The number of Families using this HU4 is 28 Families. So far problems had occurred 3 times on the tap and once on water flowmeter, which each costed Rp.7,500.-/problem, and Rp.20,000.-/problem.

Cost to fulfill the needs for the damages among others came from the balance of monthly contribution plus incidental contribution from the community. Repair was carried out by the manager of the public hydrant. The treasurer receives honorary salary of Rp. 5,000.-/month. No transparent financial report available, only through verbal communication at the time of monthly bill to every user of public hydrant.

HU5 (Sentula Hamlet)

Every month every family is charge Rp. 1,000.-/Family/month for clean water consumption, depending on the amount of PDAM water bill. Some is used to pay PDAM water bill, salary of

manager and if there is some balance, it is saved by the manager for unexpected costs. The number of Families using this HU5 is 29 Families.

So far several problems had occurred and repaired, such as:

a. Making dirty disposal ditch and repair of floor (in the direction of the river, a length of 20 m) needed total cost of Rp. 129,000.- (Rp. 65,000 + Rp. 2,000 x 32)
b. Moving water pipe (carried out by PDAM), which needed Rp. 35,000.-

Cost to fulfill the needs for the damages among others came from the balance of monthly contribution plus incidental contribution from the community. Repair was carried out by the manager of the public hydrant. The manager received no salary/wage. No transparent financial report available, only through verbal communication at the time of monthly bill to every user of public hydrant.

HU6 (Sigih Hamlet)

Not used anymore by PDAM. Up to this moment the hydrant is still on its location.

FAMILY TOILET FACILITIES

In general the family toilets facilities constructed with the aid of NTB ES&WS is used by 1 household (family). For common toilets no charge is effected. In general conditions of Family Toilets are still relatively good – none damage yet. Based omn interview with the people, if something happened, big or small damage on the Family Toilet, the cost for repair shall be borne by the owner of the toilet.

Maintenance of Family Toilet facilities and the environmental cleanliness is the responsibility of the owner of the toilet.

Ranger

PROJECT TYPE	: Type - C Non-piping Clean Water Facilities
VILLAGE #6	: BANGGO
SUB-DISTRICT	: KEMPO
DISTRICT	: D O M P U (WEST NUSA TENGGARA)

GENERAL DESCRIPTION

PHYSICAL CONDITION

Banggo village is located 25 km to the South of Dompu Town. Banggo village is located on the regional network connecting Bima Town with Sumbawa Besar Town, passing through Dompu town. Residential area is found along the existing regional road.

Number of population of Banggo village is 2,646 people with 589 Families. From the total number of productive people (age 15 years or more), 52% don't have formal education, 31% graduated from elementary school only, and the remaining 17% had junior school and high school education. Most of the population are farmers.

Banggo village consists of 3 (three) hamlets, i.e.:

a. Mpongge Hamlet
b. Ta'a Paju Hamlet, and
c. Anamina Hamlet.

CLASSIFICATION OF LIVING STANDARD

35% of the population of Banggo village are included in poor people category. Generally characteristics of poo people are as follows: land ownership less than 1 Ha, means of sussistence as farm workers, landowner farmer, honey seeker in the forest, stage house and own less than 5 heads of cattle.

Classification of Living Standard of Banggo Village Community

	RICH	MEDIUM	POOR
House	Stage House with 12 pillars -Permanent building 5 x 9 m^2	Stage House with 9 pillars -Permanent building 4x6m2	Stage House w/ 6 pillars
Furniture	Parabola; TV 20"; Sound System; refrigerator; Motorcycle; Cupboard (Rp. 300,000) and Sofa/Buffet (Rp. 300,000).	BW TV 14"; Simple sound system; Radio; bicycle; Cupboard (Rp. 50,000); Buffet (Rp. 50,000); Plastic Chairs.	Pocket radio, mat.
Land ownership	Paddy field 2- 5 Ha/Family Farm 0.5-1 Ha/Families Field 1-2 Ha/Families	Paddy field 0.5-1.9 Ha/Family Farm 0-0.5 Ha/Families Field < 1 Ha/Families	Paddy field 0-0.5 Ha/Family Farm: none Field : < 1 Ha/ Families
Cattle Ownership	Cow: 10-20 heads Buffalo: 5-10 heads Horse: 3-5 heads Goat: 5-10 heads	Cow: 5-9 heads Buffalo: 2-4 heads Horse: 1-2 heads Goat: 2-4 heads	Cow: < 5 heads Buffalo: 0-1 heads Horse: none Goat: < 2 heads
Means of sub-	Paddy field Owner Farmers	Paddy field Owner Farmers	Farm worker;

	RICH	MEDIUM	POOR
Sistence	& Civil Servant	Farm worker, and retailer	Landowner farmer; Honey seeker in the forest
Education of children	Up to university	Up to high school	Up to Elementary school, some up to junior high.
Get credit	- get facility - credit value: millions	- rather difficult to get facility - Credit value: max. Rp.50,000	Difficult to get credit
Environmental and housing sanitation	- House always clean - Sweeping twice a day.	- House relatively clean - Sweeping once a day	- House relatively not too clean. - Sweeping once a week.
Bathing method	Using soap and toothpaste	Using soap (sometimes)	Using washing soap.
	6 %	59%	35%

WATER SUPPLY AND ITS UTILIZATION

In general water source for Bango Village before the existence of NTB ES&WS Project was the river, traditional dug-wells and springs which can be found aroungf the river. For drinking and cooking needs, generally water sources which were used a lot by the community were the river and springs around the river, while for washing and bathing , the community generally used water from the river and springs around them.
But for non domestic needs generally they used dug-well and water pools around the paddy field – for bathing their cattle.
After the implementation of NTB ES&WS Project several changes occurred in the pattern of utilization of clean water: for drinking and cooking as well as for bathing and washing people generally use water from the rehabilitated well by the project as ell as well from other aids. Nevertheless there were no changes in the pattern of utilization of water for non-domestic needs.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Banggo Village

	Spring Reservoir		ES&WS SGL		River		Stone SGL		Paddy Field		Rive Spring		Electric SPT	
	B	A	B	A	B	A	B	A	B	A	B5	A	B	A
Drink/Cook	3		2	5	6	2	3	5			5	1	1	5
Wash/Bath	4	3	1	5	7	2	4	5			5	4	1	5
Non Domestic			1	3			3	3	2	2			1	3

Note:
ES&WS SGL : rehabilitated dug-well (NTB ES&WS Project)
River : river and river-well at river bank.
Stone SGL : dug-well with stone wall (traditional)
River spring : spring around the river
Spring reservoir : spring pond
Electric SPT : hand-pump/electric pump well
B : Before NTB ES&WS Project
A : After NTB ES&WS Project.

CHANGE IN THE PATTERN OF THE UTILIZATION OF DEFECATING FACILITIES

Generally before NTB ES&WS Project aid, people of Banggo Village defecate at the river, stage house and around the house. After NTB ES&WS Project, there is a little change in their defecation behavior, i.e. many people defecate at the toilet (toilet from project aid) yet not much changes in the pattern of the utilization of water, stage house and around the house as defecating facilities.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Banggo Village

	River		Farm/Field		Paddy field		On the Stage House		Edge of the House		Toilet	
	B	A	B	A	B	A	B	A	B	A	B	A
Father	10	7	7	6	7	6	8	5	8	4	1	10
Mother	10	6					7	4	8	3	1	10
Children	8	7	8	7	8	7	8	7	8	7	1	10
Baby	3	2	4	3	6	4	10	6	9	6	1	6

FACILITIES AID FROM NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Development aid of Clean Water Facilities in Banggo Village was the development of 29 units of dug-wells (non traditional). Development was carried out in 1995/1996. Dug-wells from NTB ES&WS project were distributed as follows.

a. Mpongge hamlet : 19 units
b. Ta'a Paju Hamlet : 8 units and
c. Anamina Hamlet : 2 units.

The average depth of dug-well in Banggo village reaches more than 10 merters. Average depth of well in every hamlet is: a) Mpongge hamlet – 7 meter; b) Ta'a Paju hamlet – 5 meter; and c) Anamina hamlet – more than 10 meter. In general every dug-well was used by more than 5 families.

FAMILY TOILET FACILITIES

Development aid for defecating facilities in Banggo Village was only in form of family toilet (*jaga*) and no aid for group toilet facilities (jamak). Development of toilets was carried out in 1995/1996. The number of family toilets aid in Banggo Village was around 144 units. Family Toilet was given to rich people and wanted to have their own toilet. The community was very much interested considering that they needed it very much and also the construction of the Toilet aid was considered quite simple.

Parts of the toilets are:

a. Closet
b. "cubluk"
c. Floor
d. water tank
e. Wall and roof.

PROJECT SOCIALIZATION

Socialization of NTB ES&WS Project was started with guidance at Village Office. Guidance was given by NTB ES&WS project staff , while the participants at the time were among others: Head of Hamlet, Chairman of RT, Chairman of RW, management of LKMD, Community figures, as well as PKK ladies with total around 30 people. The guidance took place in one day. Topics discussed in the meeting were: introduction to the project (which covers: finance and material aid, flanking by project technical staff) and environmental health.

Then several routine meetings followed, held once a month. In this meeting staff of NTB ES&WS Project carried out discussion with groups in the village. In general every group had 10 people. Topics discussed were tasks and responsibilities of groups in operating and managing dug-well facilities.

Aside of that, field practice was carried out, which contained guidance for: a) well digging; b) concrete mixing; c) method of installing closet; and other guidance.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING-PDAM)

In preparation/planning stage of Clean Water Facilities Project of NTB ES&WS at Banggo Village, the roles of NTB ES&WS employee and LKMD were very dominant, aside of the role of community figures in the related village. Management of LKMD prticipated in giving input in deciding the village for the location of project aid , socialization of NTB ES&WS Project to the village community and in deciding schedule and time of implementation of facilities construction. While NTB ES&WS employee had the role in deciding type of technology to be applied and the location of the facilities. Community figures had the role in assisting in socializing the project together with LKMD.

Generally the community was not involved directly in the preparation and planning of the Clean Water Facilities project. LKMD was also involved in various preparation activities, such as: who should participate in the training conducted by NTB ES&WS staff, as well as who should construct the Clean Water Facilities. Like the involvement of LKMD, NTB ES&WS employee also involved in various activities, such as: amount and form of contribution of the community in the development of Clean Water Facilities and together with LKMD decided participants of training.

FAMILY TOILET FACILITIES

In the preparation/planning stage of family toilet project of NTB ES&WS in Banggo village, the roles of LKMD and NTB ES&WS staff involved were very big, while the role of the community was relatively none.

Like in preparation and planning stage, LKMD had quite a significant role , particularly in deciding village for the location of project aid, socialization of the project,

Project implementation schedule, participants of training, as well as who shall carry out the construction of the Family Toilet facilities.

On the other hand, NTB ES&WS staff also had a role in deciding type of technology of the Family Toilet to be constructed, location of the toilet, amount and form of contribution of the community in the construction of the toilet facilities, participants of the training , as well as deciding who will get the Family Toilet.
In deciding who will get the Family Toilet, NTB ES&WS staff negotiate with village apparatus and the community The main requirement for deciding Families which will receive family toilet aid was the capability of the candidate to provide a certain amount of fund, manpower and construction material so that the family toilet could be constructed properly.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING – PDAM)

Development stage of Clean Water Facilities at Banggo Village which was in form of rehabilitation of dug-well, was carried out by local community with supervision from NTB ES&WS employees. The community carried out together the digging up to construction of the well with its supporting accessories
From cost estimates for the development of this dug-well, contribution of the community can be seen as follows:

Cost Estimates for the Construction of NTB ES&WS Dug-well of Banggo Village 95/96

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contribution	Project	Contribution	Project	Contribution	Project	Contribution
Material								
Cement	sack	sack	12	3	13,500	13,500	162,000	40,500
Red Brick		Unit		2,000		50		100,000
Sand		M3		2		5,000		10,000
Rocks		M3		1.5		5,000		7,500
Iron bars	Unit		1		5,000		5,000	
Pulley	Unit		1		5,000		5,000	
Construction Cost								
Manpower		Manhour		150		2,500		375,000
TOTAL							172,000	533,000
							24%	76%

FAMILY TOILET FACILITIES

In the development stage of Family Toilet Facilities, the community was involved directly. Generally Family Toilet was constructed by the future owner of the Family Toilet assisted by several close neighbors under supervision of NTB ES&WS technical officers.

Involvement of the community in the construction of Family Toilet Facilities can also be seen from cost estimates for the construction Family Toilet as follows:

Cost Estimates for the Construction of NTB ES&WS Family Toilet
For Banggo Village 95/96

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack	sack	2	2	13,500	13,500	27,000	27,000
Red Brick		Unit		1,000		50		50,000
Sand		M3		0.5		5,000		2,500
Rocks		M3		0.5		5,000		2,500
PVC Pipe 4"	M		1		2,000		2,000	
Closet	Unit		1		15,000		15,000	
Others		Unit		1		104,000		104,000
Construction Cost								
Manpower		Manhour		14		2,500		35,000
TOTAL							44,000	221,000
							17%	83%

HANDOVER OF FACILITIES

Either for Clean Water Facilities or environmental sanitation facilities, there wereno hand-over of the facilities from the Project to the community or the village, either symbolically or mass. Aside of that there were no legal written proof related to the hand-over.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES (REHABILITATED DUG-WELL)

Generally dug-well facilities constructed in NTB ES&WS Project was used by more than 5 one families. Operation and maintenance of dug-well facilities in Banggo Village was the responsibility of the owner of the facilities. From the survey itwas found out that up to now the facilities had never been broken down and the community had never repaired the facilities, therefore it was not known yet who would do the repair if the facilities breaks down and how about the cost. Type of maintenance which is generally carried out among others: keeping the facilities and its environment clean. The community around the facilities which also use the facilities, takes part in keeping the facilities clean using water (such as: washing, bathing etc.) each at their own house. No contribution for the maintenance of the existing facilities. hydrant is still on its location.

FAMILY TOILET FACILITIES

In general the family toilets facilities constructed with the aid of NTB ES&WS is used by 1 household (family). In general the conditions of Family Toilets at Banggo village are not quite good. In general the toilets are not given proper wall and roof, some are even without wall and roof, so that they can only be used during the night. Maintenance of toilets facilities and the surrounding environment is the responsibility of the owner of the toilet.

On the other hand, NTB ES&WS staff also had a role in deciding type of technology of the Family Toilet to be constructed, location of the toilet, amount and form of contribution of the community in the construction of the toilet facilities, participants of the training , as well as deciding who will get the Family Toilet.
In deciding who will get the Family Toilet, NTB ES&WS staff negotiate with village apparatus and the community. The main requirement for deciding Families which will receive family toilet aid was the capability of the candidate to provide a certain amount of fund, manpower and construction material so that the family toilet could be constructed properly.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING – PDAM)

Development stage of Clean Water Facilities at Banggo Village which was in form of rehabilitation of dug-well, was carried out by local community with supervision from NTB ES&WS employees. The community carried out together the digging up to construction of the well with its supporting accessories.
From cost estimates for the development of this dug-well, contribution of the community can be seen as follows:

Cost Estimates for the Construction of NTB ES&WS Dug-well of Banggo Village 95/96

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contribution	Project	Contribution	Project	Contribution	Project	Contribution
Material								
Cement	sack	sack	12	3	13,500	13,500	162,000	40,500
Red Brick		Unit		2,000		50		100,000
Sand		M3		2		5,000		10,000
Rocks		M3		1 5		5,000		7,500
Iron bars	Unit		1		5,000		5,000	
Pulley	Unit		1		5,000		5,000	
Construction Cost								
Manpower		Manhour		150		2,500		375,000
TOTAL							172,000	533,000
							24%	76%

FAMILY TOILET FACILITIES

In the development stage of Family Toilet Facilities, the community was involved directly. Generally Family Toilet was constructed by the future owner of the Family Toilet assisted by several close neighbors under supervision of NTB ES&WS technical officers.

Involvement of the community in the construction of Family Toilet Facilities can also be seen from cost estimates for the construction Family Toilet as follows:

Cost Estimates for the Construction of NTB ES&WS Family Toilet
For Banggo Village 95/96

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack	sack	2	2	13,500	13,500	27,000	27,000
Red Brick		Unit		1,000		50		50,000
Sand		M3		0.5		5,000		2,500
Rocks		M3		0.5		5,000		2,500
PVC Pipe 4"	M		1		2,000		2,000	
Closet	Unit		1		15,000		15,000	
Others		Unit		1		104,000		104,000
Construction Cost								
Manpower		Manhour		14		2,500		35,000
TOTAL							44,000	221,000
							17%	83%

HANDOVER OF FACILITIES

Either for Clean Water Facilities or environmental sanitation facilities, there wereno hand-over of the facilities from the Project to the community or the village, either symbolically or mass. Aside of that there were no legal written proof related to the hand-over.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES (REHABILITATED DUG-WELL)

Generally dug-well facilities constructed in NTB ES&WS Project was used by more than 5 one families. Operation and maintenance of dug-well facilities in Banggo Village was the responsibility of the owner of the facilities. From the survey itwas found out that up to now the facilities had never been broken down and the community had never repaired the facilities, therefore it was not known yet who would do the repair if the facilities breaks down and how about the cost. Type of maintenance which is generally carried out among others: keeping the facilities and its environment clean. The community around the facilities which also use the facilities, takes part in keeping the facilities clean using water (such as: washing, bathing etc.) each at their own house. No contribution for the maintenance of the existing facilities. hydrant is still on its location.

FAMILY TOILET FACILITIES

In general the family toilets facilities constructed with the aid of NTB ES&WS is used by 1 household (family). In general the conditions of Family Toilets at Banggo village are not quite good. In general the toilets are not given proper wall and roof, some are even without wall and roof, so that they can only be used during the night. Maintenance of toilets facilities and the surrounding environment is the responsibility of the owner of the toilet.

Kayangan

PROJECT TYPE	: NON-PIPED - C (DUG-WELL)
HAMLET	: SEDUTAN
VILLAGE #7	: KAYANGAN
SUB-DISTRICT	: GANGGA
DISTRICT	: WEST LOMBOK

GENERAL DESCRIPTION

PHYSICAL CONDITION

NTB ES&WS Project for SGL system at Kayangan Village covers four hamlets. To evaluate the project one hamlet was chosen, i.e. Sidutan Hamlet. This hamlet has a distance of 30 km from the capital of West Lombok District. The hamlet has an area of ± 100 ha with borders of the hamlet as follows:

Northern border	: Java Sea	Western border	: Beraringan River
Southern border	: Lendang Batu Hamlet	Eastern border	: Sidutan River

DEMOGRAPHY

Number of population of Sidutan Hamlet is 541 people which consist of 246 men and 295 women, with number of households of 141 families. Main means of subsistence are farm worker (50%), farmer (25%), and fisherman (25%). Based on level of education, 60% of the population had elementary school education.

RESIDENTIAL AREA

Residential area of Sidutan is divided in groups, separated by state road. Sidutan has 2 mosques, one mushalla, Elementary School and office of head of hamlet.

CLASSIFICATION OF LIVING STANDARD

73% of the population of Sidutan community are poor people with general characteristics as follows: owns no land, highest education of children is only junior high school, and occupation as workers and *ojek* driver.

CLASSIFICATION OF LIVING STANDARD OF SIDUTAN HAMLET KAYANGAN VILLAGE

ITEM	RICH	MEDIUM	POOR
Land Ownership	- paddy field 2 ha - farm 2 ha	- paddy field 25 acres	Owns no land.
Cattle Ownership	± 8 heads	± 2 heads	none
Children Education	- high school and university - some are civil servants	highest: high school	highest: junior high school
Occupation	- civil servant - agricultural produce business - tile business - trading	- farmer - farm worker	- farm worker & fisherman - *ojek* driver - transport worker
Food Supply	1 month	3 days	only for one day
FREQUENCY	8 %	19%	73%

CHANGE IN THE PATTERN OF THE UTILIZATION OF FACILITIES

CLEAN WATER FACILITIES (SAB)

BEFORE THE PROJECT

The community used Sidutan River, Beraringan River, old privately owned well, and well in the river for water sources. The utilization of and river well are usually for drinking and cooking, while the river is for bathing and washing.

There are several traditional s in Sidutan, but not all of them can be used for drinking water. In Sidutan they believe there is water border which separates water quality for . to the north of water line/border has good quality, i.e. clear, without sedimentation, and it tastes cool. According to local people the taste of water is better if it is cool, not cooked. Though the dug-well is located in remote area. While dug-well to the south of water border smells of fish oil and tastes rather bitter, even though the location is far from the sea.

The community has difficulties in getting clean water, because to make dug-well they must dig > 10 m, while the distance to the river is 200 - 500 m. Ten years ago, there was clean water facilities piping project from CARE NTB for Sidutan. But now, the clean water facilities cannot be used anymore because of sabotage on the spring and pipeline along the road, so that the water could not flow to Sidutan.

AFTER THE PROJECT

No big changes in the utilization of Clean Water Facilities. Changes are limited topeople living close to the ES&WS dug-well with water which is not brackish.

The community uses dug-well, river well and river as Clean Water Facilities. The community utilizes dug-well especially in rainy season and can only be used by several families. In dry season dug-wells become dry, except dug-wells in the northern part which still have a little water. During rainy season dug-wells cannot be used as drinking water because the water tastes

brackish. For bathing and washing the river is still used, because dug-well alone is not enough, and river water is still clean and clear. River well is used as Clean Water Facilities for drinking and cooking because the water can be easily acquired, tates good; only by digging sand at the edge of the river, clean and clear water can be acquired; and dug-well water is only a little, and mostly tastes brackish.

ES&WS dug-wells could not function to the maximum because:

- Dug-wells only have water during rainy season, and even that, the quantity is very limited, so that it is only enough for cooking of several families.
- depth of dug-well of + 15 m is still not enough to get water. Since dug-well is already deep enough, the people do not dare and capable (in cost) to make dug-well deeper.
- Dug-well is only used for cooking and is not used for drinking, because of the brackish taste, except if it is boiled for making tea and coffee.

ES&WS dug-well becomes dry because it is not deep enough, because the construction of the well was carried out during rainy season, in haste for fear of heavy rain and the danger of the wall to cave in. Since the dug-well was not dug to the proper depth, its function is only as rain water collector.

Water in dug-well can only be found in early dawn, with limited quantity So the people must fight to get water. In the early stage of development, it was agreed that ES&WS dug-well shall only be used to get water, not to be used for bathing and washing. At the location of dug-well it is not used for bathing and washing.

In Sidutan there is a tradition to buy water from children with the price of Rp. 100.- per bucket or Rp. 1500 per tank. Women buy water especially if they are busy in the paddy field/farm during planting time or harvest time. Children in Islamic school are obliged to fill the tank of the mosque. The water is taken from the river.

Change in the utilization of Clean Water Facilities before and after NTB ES&WS Project can be seen in the following table.

CHANGE IN THE UTILIZATION OF CLEAN WATER FACILITIES IN SIDUTAN HAMLET (Based on Pocket Voting)

	ES&WS DUG-WELL				T RADITIONAL DUG-WELL				RIVER			
	DRY SEASON		RAINY SEASON		DRY SEASON		RAINY SEASON		DRY SEASON		RAINY SEASON	
	B	A	B	A	B	A	B	A	B	A	B	A
Drink/food				2	8	8	17	15	9	9		
Wash&bath									17	17	17	17
Non domestic									17	17	17	17

Note:
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

FAMILY TOILET FACILITIES

BEFORE THE PROJECT

Defecating facilities used by the community are beach, river, farm, and paddy field. Facilities used by the community depends on the conditions, distance and time.

AFTER THE PROJECT

No big difference in the utilization of defecating facilities in Sidutan. Family toiletswhich had been constructed, almost 80% could not be used because of the limited water. Even water for cooking and drinking was difficult to get, let alone for family toilet. And the 20% family toilets generally were used only during rainy season, while in dry season they were not used. Except family toilets located near dug-well.

After the project, the community still utilize river, farm, beach, paddy field, and yard for defecating facilities. Generally river is used by father, mother and children as defecating facilities. Their reasons are because water for family toilet is not enough, family toilet was broken, house close to the river, and can be carried out before bathing in the river. Backyard of the house is used by baby as defecating facilities because the shit is eaten up by dogs, and it is practical because it is directly thrown into disposal area.

Changes in the utilization of defecating facilities before and after NTB ES&WS Project can be seen in the following table.

CHANGE IN THE UTILIZATION OF DEFECATING FACILITIES IN SIDUTAN HAMLET
(Based on Pocket Voting)

	JAGA		RIVER		BEACH		PADDY FIELD		FARM		YARD	
	B	A	B	A	B	A	B	A	B	A	B	A
Father		1	8	8	5	4	1	1				
Mother		2	10	8	1	1			1	1		
Children			3	3	1	1					4	4
Baby			2	2							9	9

Note:
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

FACILITIES AID FROM NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Sidutan Hamlet received aid in form of 5 new dug-wells. The balance of cement for the construction of the five dug-wells, family toilet and SPAL was collected and used for the rehabilitation of a dug-well. The construction of the rehabilitated dug-well was at the same time as the construction of the new dug-wells, i.e. the construction of wall, washing floor, SPAL, and additional from 12 m to 13 m. One dug-well served 10-15 families. Construction of dug-well was carried out without DED and ES&WS officers and no technical supervision. Dug-well was constructed on the knowledge of craftmen only.

FAMILY TOILET FACILITIES

Sidutan Hamlet received aid in form of 50 units of family toilets (jaga) and 150 m of SPAL in 1994. Toilet aid was given to those who were able to construct it..

PROJECT SOCIALIZATION

Project socialization was not carried out properly, because ES&WS employees mostly had contact with head of the hamlet and not the community. Information given ina meeting attended only by men, because they had more spare time then women and there was opinion that it was not suitable for women to attend a meeting together with men..

PREPARATION/PLANNING OF NTB ES&WS PROJECT

In planning stage decisions were made about location, type of facilities, level of services, schedule of development, development. and management of the facilities . In this stage head of the hamlet dominated the decisions. The meeting was more an announcement of decisions than discussion to get an agreement.

Information about the project stopped at the level of head of hamlet and ES&WS officers. The community was not involved in the various pre-construction activities. The plan prepared by head of hamlet and ES&WS officers for Clean Water Facilities covered the construction of dug-wells (SGL) and Bathing and Washing Facilities (MC), as well as Defecating Facilities in form of family toilets and SPAL (Waste Water Disposal Facilities). According to the plan each dug-well to be constructed would get a subsidy of 40 sacks of cement, bricks, digging cost, and fabrication of "decker". But in reality, each dug-well received only 11 sacks of cement in stages. And if head of hamlet and ES&WS officers found out that not all of the cement was used, the balance was reclaimed to be sold.

ES&WS officers established a group of four people volunteers which consisted of women and men. Those volunteers received technical training for Clean Water Facilities and PLP. In reality those volunteers did not function much. The group was functioning only during construction, i.e. as supervisors without any technical supervision from ES&WS officers. Construction of dug-wells and family toilets relied only on the skill of the craftmen. This facts had causeddisputes at the time of accountability because there was no control from pre-construction period to post construction period.

CLEAN WATER FACILITIES

Dug-well allocations were distributed to:

- neighborhood group
- has land and willing to use it for the location of public dug-well
- a new dug-well is placed at the mosque and will only be used for the mosque

One dug-well was protested because the location was close to a river, so that the community around the well would be close to two Clean Water Facilities, while other communites were far from Clean Water Facilities.

FAMILY TOILET FACILITIES

Distribution of family toilets was not transparent and no conformation between plan and reality. Community which received the family toilets was not as the listing.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Contributions of the community in the development of this project was in form of manpower, material, food, as well as wage of craftmen for digging and construction of dug-well. The community contributed Rp.5000/family. The amount of contributions varied, depending on the number of families served, because the cost was equally divided for every dug-well. Except landowner who was usually charged with relatively more contribution, even though the well was public well. Landowner must bear the food for craftmen. From construction cost estimates of dug-well as given in Table 4, contribution of the community was 62% of project value. The contribution did not include food for craftment and manpower contribution from the people.

In development stage, digging labor and construction craftment which were most involved in the development. Dug-well development was carried out without technical supervision from ES&WS officers. The consequence of no technical guidance was different dug-wells, some diameter of < 80 cm, and did not fulfill the specifications, especially during dry season. General specification of dug-well was open wall with or without washing floor and waste water disposal ditch.

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS DUG-WELL SIDUTAN HAMLET 1993/1994

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		11		6000		66000	
Sand		M3		2		2000		4000
Brick		Unit		200		25		5000
Rocks		M3		1		5000		5000
Pulley		Set		1		15000		15000
Construction Cost								
Skilled Workers		Mandays				80000		80000
TOTAL							66000	109000
							38%	62%

FAMILY TOILET FACILITIES

Development of family toilets did not consider the availability of water for washing oneself and cleaning the closet. No DED as the base of the development of family toilet. In general the family

toilet was constructed by craftmen only based on their knowledge without technical supervision. Contribution of the community in the construction was 74% of project value, as can be seen in the following table.

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS FAMILY TOILET SIDUTAN HAMLET 1993/1994

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	Sack		2		6000		12000	
Sand		M3		2		2000		4000
Brick		Unit		200		30		6000
Closet	Unit		1		5000		5000	
Pipe	M		1		1000		1000	
Construction Cost								
Skilled Workers		Mandays						40000
TOTAL							18000	50000
							26%	74%

COST ESTIMATES FOR THE CONSTRUCT-ION OF ES&WS WASTE WATER DISPOSAL FACILITIES OF SIDUTAN HAMLET 1993/1994	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		8		6000		48000	
Sand		M3		10		2000		20000
Rocks		M3		10		5000		50000
Construction Cost								
Skilled Workers		Mandays		5		5000		25000
TOTAL							48000	95000
							34%	66%

HANDOVER OF FACILITIES

There were no official hand-over of material and ownership of the facilities. People who construct the facilities took the material from the house of head of hamlet without any official written receipt.

Ownership of land and facilities in Sidutan became very important, since there was fight for water between the owner and the public. Land of the location of the dug-well was private land, except dug-well at the mosque, which was on donated land. The facilities belong to the public except rehabilitated dug-well which was private dug-well.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES

Dug-well did not function properly. During dry season it was dry and during rainy season there was only a little water. The community did not dare to dig the dug-well deeper, because the diameter was small, and they feared of the wall to cave in, and the depth of the well was already > 15 m. Well which had ever been deepened was in RT1 The wage of worker to make a well with depth > 15 m was twice the normal wage, because of the high risk, among others, lack of oxygen in the well and the possibility of toxic gas. All well had been cleaned from mud.

The wall of Dug-well in RT2 had already caved in. Formerly the depth of the well was 12.5 m, now it is 10.5 m because the wall sank when they cleaned the well, the mud was put to the side, so the "decker" broke.

Generally Landowner was more responsible for O&M. Other users didn't care very much, because of the low sense of belonging. O&M cost was usually used for buying spare parts of the well, such as bucket, rope and pulley. Aside of that , also to pay wage of worker for cleaning mud from the well, so that the water can be clean. Cleaning of mud was carried out by special worker, since people didn't dare to go into the well.

The amount of O&M cost was equal to income, because in Sidutan there was no O&M contribution. If something was damage, the O&M cost was borne by landowner and sometimes it was equally divided among users with voluntary contribution.

INCOME AND EXPENSES FOR O&M OF CLEAN WATER FACILITIES OF SIDUTAN HAMLET

	1996	1997	1998
EXPENDITURES			
Spare parts	50000	50000	75000
Repair cost		20000	40000
INCOME			
Voluntary Contribution	50000	70000	115000

FAMILY TOILET FACILITIES

In general family toilets were not used. In Sidutan one family toilet was used by one family. No contribution for O&M of family toilets. Closet for family toilets in Sidutan was made of thin ceramic and was easily broken. Some closets cracked and were patched using cement by the owner.


Lape

PROJECT TYPE	: C-Type-Non-Piping Clean Water System (Dug-well)
VILLAGE #8	: L A P E (Batu Peraga Hamlet)
SUB-DISTRICT	: LAPE LOPOK
DISTRICT	: SUMBAWA (WEST NUSA TENGGARA)

GENERAL DESCRIPTION

Lape Village is located 30 Km to the East of the capital of Sumbawa (Sumbawa Besar) District with an area of 67,000 Ha. Lape Village is located on the regional road network connecting Sumbawa Besar Town with Dompu and Bima towns The whole area gets the service of electricity.

The number of population of Lape Village is 4,554 people with number of families of 1,107. From the total population, 18% graduated from elementary school, and the rest had had education in Junior high school, high school and up to bachelor level. Most of the people are farmers.

Lape Village consists of 5 (five) hamlets which, i.e.:
a. Lape Atas Hamlet
b. Lape Bawah Hamlet
c. Karato Hamlet
d. Unter Malang Hamlet

CLASSIFICATION OF LIVING STANDARD

Around 61% of the population of Lape Village are included in poor people category. In general characteristics of poor people among others are as follows: land ownership less than 0.25 Ha/family, means of subsistence: farm workers, craftman or sand collector, stage house with plaited bamboo wall and own no cattle.

CLASSIFICATION OF LIVING STANDARD OF SAKURU VILLAGE COMMUNITY

	RICH	MEDIUM	POOR
House	Stage house with 18 pillars - tile roof - ceramic floor - concrete pillar	Stage house with 12 Pillars - tile/zinc roof - cement floor - wooden pillar	Stage house with 9 Pillars - Thatch roof - dirt or plank/bamboo floor - wooden/bamboo pillar
Furniture	Corner Sofa, Parabola, Sound System, Color TV Lamp decoration	Plastic sofa, Sound System, Color TV	Rattan chairs, BW TV, Radio
Land ownership	2 - 10 Ha/Family	1 - 2 Ha/Family	< 1 Ha/Family
Cattle Ownership	Buffalo 30-300 heads/family	5 - 29 heads/family	< 5 heads/family
Income	Rp.1 - Rp.10 million/Month	Rp.500,000-Rp.900,000/Mo	< 500,000
Means of sub-sistence	Landowner Farmers Business-man	Civil Servant, ABRI Landowner farmers	Farm worker, Leasor farmer
Other facilities	4-wheel vehicle	2-wheel vehicle	Bicycle
	17 %	49%	34%

WATER SUPPLY AND ITS UTILIZATION

In general Clean Water Facilities used by the people of Lape Village before the existence of NTB ES&WS Project for domestic needs were river and traditional dug- wells. People who lived far from dug-well used water from the river, even though the quality of river water was not as good as other sources, such as dug-well and pump well. Before the aid from NTB ES&WS there was aid from UNICEF in form of several pump wells.

For non-domestic needs the community used water from the river, paddy field and dug-well. River water was used by the community to bathe their cattle.

After the implementation of NTB ES&WS Project several changes occurred in the utilization of clean water from every existing water source. Clean Water Facilities aid from NTB ES&WS Project in Batu Peraga Hamlet was in form of 6 dug-wells with wall and washing floor. After project aid from NTB ES&WS there was also aid from PDAM in form of house connection (44 units) and public hydrant.

For domestic needs (washing and cooking, bathing and washing) generally the community of Batu Peraga Hamlet used water from improved dug-wells (from NTB ES&WS project and the community) and pump wells from UNICEF. Some members of the community who had house connection and close to public hydrant used water from that source for domestic needs.

For non domestic needs in particular, not much changes were noticed, the community still use water from the river and paddy field.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Batu eraga Hamlet Lape Village

	PDAM SR		Improved SGL		River		Trad. SGL		Paddy Field		HU PDAM		UNICEF SPT	
	B	A	B	A	B	A	B	A	B	A	B5	A	B	A
Drink/Cook		2	4	8	6	3	5					1	3	7
Wash/Bath		2	2	8	5	3	3						2	6
Non Domestic			1		2	3	1		3	4				

Note:
PDAM SR : house connection piping from PDAM
Improved SGL : improved dug-well from NTB ES&WS Project or other aid.
Traditional SGL : dug-well with stone or dirt wall (traditional)
HU PDAM : public hydrant piping from PDAM
UNICEF SPT : hand-pump well - UNICEF aid.
River : river, ditches along the river
Paddy field : Ditches at the edge of paddy field
B : Before NTB ES&WS Project
A : After NTB ES&WS Project.

CHANGE IN THE PATTERN OF THE UTILIZATION OF DEFECATING FACILITIES

In general before NTB ES&WS Project, the people of Batu Peraga Hamlet defecated at the river, near the house or in the stage house. Generally the ones defecating near the house are children and babies. This is because they generally are not aware about the importance to defecate at a proper place. Generally people use stage house as defecating facilities for sick members of the family. and usually it is only for urinating.

Some people defecate in the paddy field, farm and field. They usually do this because they don't have the defecating facilities or because they happened to be there to work when nature calls.

After aid toilet from NTB ES&WS project, there were changes in the utilization of defecating facilities - especially to adults. Children generally still use river as defecating facilities , while babies still use yard around the house.. Even though there was family toilet aid, some of the people who cannot be served by the family toilet still have to utilize river as defecating facilities.

Change in the Pattern of the Utilization of Clean Water Based on Its Source at Batu Peraga Hamlet Lape Village

	River		Farm/Field		Paddy Field		On the House		Edge of the house		Toilet	
	B	A	B	A	B	A	B	A	B	A	B	A
Father	6	3	5	1	2	2	3	1			1	6
Mother	6	3	5		2	2	3	1			1	6
Children	4	5	1	1	2	1	3	1	6			1
Baby					2		3	2	6	6		

FACILITIES AID FROM NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Development aid for Clean Water Facilities at Lape Village consists of construction of piping Clean Water Facilities and construction of dug-well. In this study evaluation is carried on non piped Clean Water Facilities only (rehabilitated dug-well).

Development aid for Clean Water Facilities from NTB ES&WS at Batu Peraga Hamlet consists of development of new dug-well with wall and washing floor. Development of Clean Water Facilities was started in 1993. Development aid for NTB ES&WS dug-well in form of development of 7 units of dug-wells, some of which were utilized b y 1 Families, while some others were utilized by several Families. Number of Families utilizing dug-wells are as follows (see transect sheet):

a. SGL-1 : Utilized by 20 Families
b. SGL-2 : Utilized by 20 Families
c. SGL-3 : Utilized by 15 Families
a. SGL-4 : Utilized by 4 Families
a. SGL-5, 6, 7. : Each utilized by one Family

FAMILY TOILET FACILITIES

Development aid for defecating facilities in Batu Peraga Hamlet was only in form of family toilet (*jaga*) and no aid for group toilet facilities (jamak). Development of toilets was carried out in 1993. The number of family toilets aid in this Village was 22 units. Family toilet constructed in Batu Peraga Hamlet was not made of fiber glass as in other locations, but the design was the same.(designed by NTB ES&WS).

Family Toilet was given to able families and wanted to have their own toilet. Parts of the toilets are:

a. Closet
b. "cubluk"
c. Floor
d. water tank
e. Wall and roof.

From the result of observation in this hamlet some toilets use 1 "cubluk" (2 or 3 toilets with one "cubluk"). Of the 22 units of toilets in NTB ES&WS only 8 units which are still in function. The rest are not in function anymore, generally because of construction failure (the toilet collapsed).

PROJECT SOCIALIZATION

Socialization of NTB ES&WS Project was started by giving guidance at Village Office conducted by representatives of NTB ES&WS Project and head of. Participants of the guidance meeting among others were Head of Hamlet, Head of RT, Chairman of RW, community figures, as well as PKK and Posyandu ladies. Topics discussed were: a) environmental health and sanitation; b) method of maintenance of sanitation facilities; as well as c) introduction to NTB ES&WS Project including institutional, financing and implementation problems. Guidance was given in one day.

Then training was given by employee from Health Office with topics about sanitation and health for one day. Participants of this training were the same as the participants of guidance meeting.

In Batu Peraga Hamlet no field training was conducted for the construction of Clean Water Facilities and sanitation facilities.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING-PDAM)

In preparation/planning stage of Clean Water Facilities Project of NTB ES&WS at Lape Village NTB ES&WS staff as well as Muspika had a very important role in decision making. Muspika was involved in proposing village for project location and socialization of NTB ES&WS project to the community of Lape Village.

NTB ES&WS staff was involved in the following activities: a) deciding type of technology to be applied; b) location of dug-well; c) Project implementation schedule together with the community (man groups and ladies groups); and d) deciding type and amount of contribution of

the community in the construction of Clean Water Facilities. Headof Lape Village had a role in deciding who should participate in training.

FAMILY TOILET FACILITIES

In the preparation/planning stage of family toilet project from NTB ES&WS in Lape village, NTB ES&WS staff involved a lot in various activities of decision making, such as: a) deciding type of technology to be applied; b) location of dug-well; c) Project implementation schedule together with the community (man groups and ladies groups); and d) deciding type and amount of contribution of the community in the construction of family toilet.
Muspika was involved in proposing village for project location and socialization of NTB ES&WS project to the community. Like in preparation and planning of Clean Water Facilities project, head of village had a role in deciding participants of training.

LKMD was the party which was involved in deciding who should receive Family Toilet, based on negotiation.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES (PIPING – PDAM)

In development stage of dug-well Clean Water Facilities, Batu Peraga Hamlet community was directly involved with supervision from NTB ES&WS technical staff from digging up to the construction activities of well and its supporting facilities. From the cost estimates for dug-well construction we can see community contribution and the amount of NTB ES&WS aid as follows:

Cost Estimates For the Construction of NTB ES&WS Dug-well of Batu Peraga Hamlet Lape Village 1993

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	Sack	Sack	6	10	7,500		45,000	75,000
Red brick		Unit		1500		50		75,000
Sand		M3		3		5,000		15,000
Iron bars	Unit		1.5		5,000		7,500	
Rocks		M3		3		5,000		15,000
Pulley	Unit		1		5,000		5,000	
Construction Cost								
Man Worker		Manhour		140		2,500		350,000
TOTAL							57,500	530,000
							10%	90%

FAMILY TOILET FACILITIES

In the development stage of Family Toilet Facilities, the community was involved directly. Generally Family Toilet was constructed by the future owner of the Family Toilet assisted by several neighbors or craftmen specially paid to do the construction under supervision of NTB ES&WS technical officers.

Involvement of the community in the construction of Family Toilet Facilities can also be seen from cost estimates for the construction Family Toilet as follows:

Cost Estimates for the Construction of NTB ES&WS Family Toilet
Batu Peraga Hamlet of Lape Village 1993

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack	sack	2	6	7,500	7,500	15,000	45,000
Red Brick		Unit		1,000		50		50,000
Sand		M3		3		5,000		15,000
Rocks		M3		1		5,000		5,000
PVC Pipe 4"	M		1		2,000		2,000	
Closet	Unit		1		15,000		15,000	
Other*		Unit		1		56,000		56,000
Construction Cost								
Manpower		Manhour		140		2,500		35,000
TOTAL							32,000	206,000
							13%	87%

HANDOVER OF FACILITIES

Either for Clean Water Facilities or environmental sanitation facilities, there wereno hand-over of the facilities from the Project to the community or the village, either symbolically or mass. Aside of that there were no legal written proof related to the hand-over of facilities.

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES (PIPING – PDAM)

Some of the dug-well facilities constructed in NTB ES&WS Project were only utilized by one family, and some were used by more than ten families. Operation and maintenance of Clean Water Facilities was generally common responsibility of the whole Clean Water Facilities users. In several locations (see transect) there were wells which were not in function (because in dry season it is dry) and had been repaired by way of digging. The digging was carried out by the landowner and a number of other families using the dug-well.

FAMILY TOILET FACILITIES

In general the family toilets facilities constructed with the aid of NTB ES&WS is used by 1 household (family).The condition of Family Toilets in Batu Peraga Hamlet was generally not adequate, and some were even broken and could not be used. Operation and maintenance of Family Toilet was the responsibility of each family utilizing it.

Lenek Laug

PROJECT TYPE	: NON-PIPED - C (DUG-WELL)
VILLAGE #9	: LENEK LAUQ
SUB-DISTRICT	: AIKMEL
DISTRICT	: EAST LOMBOK

GENERAL DESCRIPTION

PHYSICAL CONDITION

Lenek Lauq Village is located 16 km from the capital of East Lombok District. The village is located 250 m above sea level with rainfall of 100 mm/year. Administrative borders of the village are as follows:

Northern border	: Lenek Village	Eastern border	: Bg. Dayung/Suralaya
Southern border	: Korleko Village	Western border	: Kalijaga Village

DEMOGRAPHY

NTB ES&WS Project in Lenek Lauq Village covers four hamlets with number of population of 3486 people which consists of 885 Families. From that number 58% represents productive age people. Hamlet with most people is Sukamandi hamlet, i.e. 1175 people, and hamlet with least people is Joret Buangka Hamlet, i.e. 481 people.

RESIDENTIAL AREA

Residential area of Lenek Lauq Village is divided in groups per hamlet with high enough housing density. The high density of housing is not accompanied by organizing the housing area, road network, and environment. Visually the residential area looks dirty. Houses which are close to each other don't have a clear directional orientation, no arrangement of alleys, placement of cow's and goat's stalls in the middle of dense housing, and utilization of ditch in front of houses as defecating facilities , all of these show no good environmental arrangement yet.

CLASSIFICATION OF LIVING STANDARD

70% of the population of Lenek Lauq Village are poor people with general characteristics as follows: land just enough for a house, in general farm workers, education of children is only elementary school, and food supply is only for 2-3 days..

CLASSIFICATION OF LIVING STANDARD OF LENEK LAUQ VILLAGE

ITEM	RICH	MEDIUM	POOR
Land Ownership	- paddy field ± 1 ha - farm + 0.5 ha	- paddy field ± 25 - 30 acres	- just enough for a house - in general farm worker
Cattle Ownership	Cows 5-6 heads	- hens 2-3 heads - goat 3-4 heads	Hen 1 head
Children Education	High school	Junior high school	Elementary school
House	- permanent house - brick wall - tile roof - glass window - ceramic floor - spacious yard	- semi permanent house - plaited bamboo wall - tile roof - wooden window - cement floor - narrow yard	- modest house - wall and pillar made of bamboo - thatch/coconut leave roof - without windows
Food Supply	3 months of rice	1 month of rice	2 - 3 days
FREQUENCY	5 %	25%	70%

CHANGE IN THE PATTERN OF THE UTILIZATION OF FACILITIES

CLEAN WATER FACILITIES

BEFORE THE PROJECT

The community used the following Clean Water Facilities: traditional dug-well without wall, river well, and irrigation channel. For drinking and cooking they use traditional dug-well , river well and spring. Reliable Clean Water Facilities for drinking and cooking is spring because it is the only source of clean water which is easy to get with abundant quantity, while dug-well dug-wells are still limited in number and the water is also limited. For bathing and washing theyused river and irrigation channel, sources which had been used traditionally for all activities.

The number of traditional dug-wells in the four hamlets is 87 for 885 Families which means one dug-well served 10 Families. Water in dug-well was not influenced very much by season. Enough water is always available the whole year around for various needs. Lenek Lauq Village represents water region and has no difficulties in getting water.

AFTER THE PROJECT

Clean Water Facilities after the project are new dug-well, rehabilitated dug-well using wall and floor. Several dug-wells are equipped with ES&WS Bathing and Washing Facilities. Additional dug-wells from 87 to 113 dug-wells do not automatically change the utilization of river and irrigation channel be the community. Wells, river wells, irrigation channel and waterspouts are still used for drinking, cooking, bathing and washing.

Dug-wells are mainly used for cooking and drinking. Bathing and washing are carried out at Bathing and Washing Facilities (MC). So dug-wells which are not equipped with MC are usually used for cooking and drinking only,

No big changes in the utilization of Clean Water Facilities. Changes are limited topeople living close to the ES&WS dug-well with water which is not brackish. People prefer to bath and wash

at mushalla because they are to lazy to draw water from a dug-well, MC has a closed area, and separate room for men and women. Water at mushalla comes from a spring through community constructed pipeline.

Change in the utilization of Clean Water Facilities before and after NTB ES&WS Project can be seen in the following table.

CHANGE IN THE UTILIZATION OF CLEAN WATER FACILITIES IN LENEK LAUQ VILLAGE
(Based on Pocket Voting)

	ES&WS DUG-WELL		TRAD. DUG-WELL		SPT		RIVER WELL		RIVER		SPRING	
	B	A	B	A	B	A	B	A	B	A	B	A
Drink/food		8	3			5	2		10	2	8	5
Wash&bath		5	2			3	5	5	5		3	
Non domestic		3				5			4	8		

Note:
B : Before NTB ES&WS Project
A · After NTB ES&WS Project

FAMILY TOILET FACILITIES

BEFORE THE PROJECT

Defecating facilities used by the community are farm, paddy field, river, irrigation channel, yard, and ditch in front of the house. Children use the ditch in from of the house as defecating facilities. the ditch is filled with water from the irrigation channel for the farm.

AFTER THE PROJECT

± 75% of ES&WS Family Toilets are not used by the community, because of difficulties of changing from their traditional Defecating Facilities, i.e. farm, ditch, river and paddy field. According to the community, they have tried to use Family Toilets, but failed. Finally they returned to their traditional Defecating Facilities in the ditch, paddy field and farm. So in Lenek Lauq Village family toilets cannot be used in an optimum way, not because of difficulties in getting water.

The community uses paddy field for defecating facilities because they are working in the paddy field, number of family toilets is limited, and the location is rather hidden. Farm is used as defecating facilities only during the night and used by children for its convenience. Ditch is used as defecating facilities because it is close from the house and practical, since water is flowing there, so it is always clean. River is used by father and mother as defecating facilities for its convenience, and they don't like to use family toilets of their neighbors.

Changes in the utilization of defecating facilities before and after NTB ES&WS Project can be seen in the following table.

CHANGE IN THE UTILIZATION OF DEFECATING FACILITIES IN LENEK LAUQ VILLAGE
(Based on Pocket Voting)

	JAGA		YARD		RIVER		FARM		DITCH/ PADDY FIELD	
	B	A	B	A	B	A	B	A	B	A
Father		5			8	8	5	3	8	8
Mother		5			8	8	6	5	8	8
Children		2	5	3			6	6	5	4
Baby			10	10						

Note:
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

FACILITIES AID FROM NTB ES&WS PROJECT

Facilities aid from NTB ES&WS Project covers only 4 hamlets at Lenek Lauq Village. with breakdown as in the following table.

NUMBER OF CLEAN WATER FACILITIES AND DEFECATING FACILITIES FROM NTB ES&WS PROJECT IN LENEK LAUQ VILLAGE 1994/1995
(Based of Pocket Voting)

NO.	HAMLET	NO. OF PEOPLE	NO. OF FAMILIES	NEW DUG-WELL	REHAB. DUG-WELL	MC	JAGA
1	Dasan Lendang	1014	251	11	9	10	45
2	Sukamandi	1175	291	15	24	6	35
3	Dasan Dobol	816	180	-	24	3	30
4	Joret Buangka	481	163	-	30	3	46
	TOTAL	3486	885	26	87	22	156

PROJECT SOCIALIZATION

Project socialization was not carried out too much, because ES&WS employees' only concern is achieving project target, without considering future continuation. Not much socialization for dug-well caused no problem, but for family toilets caused problems because people were forced to use family toilets without good initial socialization, so the utilization was only 25%. Aside of that there was no environmental sanitation guidance.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

Project information was given to head of village and LKMD which later on forwarded to head of hamlets. The information is about requirement of a project implementation and type of technology. Meeting conducted involved only men, since women are too busy with their household works.

ES&WS employee mostly contacted head of hamlets. Head of Village delegated decision makings in hamlet level to head of hamlet. In Lenek Lauq Village there was no volunteers, so ES&WS must handle all programs alone. In every hamlet several groups were established which will control construction process of dug-wells. Every group has the task to coordinate development in its hamlet and supervise construction of several dug-wells, MC and family toilets.

CLEAN WATER FACILITIES

Priority of subsidy was given to rehabilitation of dug-well, then to new dug-well. Distribution of new dug-wells was especially given to groups which had not been served by dug-well yet. Generally the location of dug-well was at the land of prosperous and medium families who own land and willing to give contribution in money, material, food, wage of worker more compared to other families.

ES&WS employee decided type of facilities and location of facilities was decided based on survey, and was decided later, to be agreed in groups' discussion.

FAMILY TOILET FACILITIES

Development of family toilets was carried out in target system, i.e. all family toilets must be distributed and developed in the decided project period. Distribution was decided by group leader. The community was somewhat forced by group leader to accept and construct the family toilet, because in the beginning very seldom people registered to have and construct a family toilet. The result was, the family toilet was not utilized properly. This condition among others because of not enough socialization about the utilization of family toilet in the beginning of the project. Some closets which were not used, was taken out and kept at Puskesmas (public clinic) and was only given to family who really wants to use it.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Contributions of the community to this project was in form of:

- Cash money
  Especially used for paying craftmen, collected from every family which will be served by the ES&WS dug-well. The amount of the voluntary contribution is different for each family, depending on their social status. Landowner usually contributes more compared to the others. Contribution for dug-well was 61% and for MC 63% of project value.
- Manpower
  The community contributed manpower to carry sand from the river and transport material. For several dug-wells sand was not bought.
- Food and cigarettes.
  Landowner contributed more. Cost for food and cigarettes was not included in cost estimates because according to them it is difficult to calculate.

Construction of dug-wells and MC was carried out by contractor based on given drawing. Structure of all dug-wells is almost the same, i.e. with wall and without roof, with washing floor made of cement, using pulley, and with SPAL (Waste Water Disposal Facilities) of the well.

In Sukamandi hamlet and Dasan Dobol hamlet bacteriological test, physical test and chemical test on the water of dug-wells were once conducted by Health Office. Based on physical test and chemical test, it was found out that water from the dug-wells fulfilled the requirements, while bacteriological test showed that the water was contaminated by e-colli bactery. Many dug-wells were located in front of houses close to irrigation channel, which was used by the community as Defecating Facilities, so the e-colli contamination might well be caused by ditch water sweeping into the dug-well. Therefore every three months every dug-well in Lenek Lauq Village was given chlorine to kill bactery. But it was often refused by the owner of the dug-well because it smells like carcass. Chlorine was added to prevent diarrhea especially during rainy season.

In Dasan Lendang the balance of cement for the competition of dug-well, MC and family toilet was used to construct Waste Water Disposal Facilities , complete with concrete bridge on top.

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS DUG-WELL IN LENEK LAUQ VILLAGE 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		11		7500		82500	
Sand		M^3		4		3000		12000
Brick		Unit		1500		40		60000
Pulley	Set		1		15000		15000	
Construction Cost								
Skilled Worker (dig)		Mandays				40000		40000
Skilled Workers (structure)		Mandays				40000		40000
TOTAL							97500	152000
							39%	61%

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS REHABILITATED DUG-WELL LENEK LAUQ VILLAGE 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		7		7500		52500	
Sand		M^3		2		3000		6000
Brick		Unit		1000		40		40000
Construction Cost								
Skilled Worker		Mandays				40000		40000
TOTAL							52500	86000
							38%	62%

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS BATHING & WASHING FACILITIES IN LENEK LAUQ VILLAGE 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		10		7500		75000	
Sand		M^3		3		3000		9000
Brick		Unit		1500		40		48000
Rocks		m^3		2		5000		10000
Pipe	M		4		2500		10000	
Construction Cost								
Unskilled Worker		Mandays		10		8000		80000
TOTAL							85000	147000
							37%	63%

FAMILY TOILET FACILITIES

Facilities given by the project among others 2 sacks of cement, closet, and pipe. While cost for sand, bricks as well as wages of workers were contributed by the owner of the facilities. Contribution of the community for the development of this family toilet was 64% of project value. Price estimates for the development of this family toilet represents average cost for the building of family toilet with closet, water basin, floor, septic tank, without wall. In general family toilet was already equipped with wall, either half wall or full wall made of plaited coconut leaves, sacks or brick wall. Some family toilets in the house of rich people were already equipped with bathroom with full wall and tile roof.

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS FAMILY TOILET IN LENEK LAUQ VILLAGE 1994/1995

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		2		7500		15000	
Sand		M^3		0.25		3000		750
Brick		Unit		200		40		8000
Closet	Unit		1		7500		7500	
Pipe	M		2		2500		5000	
Construction Cost								
Skilled Workers		Mandays		5		8000		40000
TOTAL							27500	48750
							36%	64%

HANDOVER OF FACILITIES

For the Clean Water Facilities and Family Toilet given to the community there were no official and written hand-over. Hand-over was only carried out orally, in form of hand-over of material, and not hand-over of facilities .

Status of ownership of Clean Water Facilities and PLP can be seen in the above table.

NO.		LAND	FACILITIES
1	rehabilitated dug-well	private	Private
2	new dug-well	private	Public
3	MC	private/public	Public
4	Family Toilet	private	Private

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

In Lenek Lauq Village there was no contribution for Clean Water Facilities and PLP. O&M cost is usually borne by the owner of the facilities &/ landowner.

CLEAN WATER FACILITIES

For O&M cost there was no monthly contribution. Cost for replacement of spare-parts , wage of worker for cleaning the mud in the dug-well, and to dig the dug-well deeper, was fulfilled by voluntary contribution of all Families served. Small damage cost is usually borne by the landowner. For big costs, such as wage of worker to dig the well deeper, voluntary contribution was collected according to the ability of the user of the well. Replacement of spare-parts are in form of replacement of bucket, rope and pulley. For rehabilitated dug-well which was private dug-well and not equipped with MC, damage seldom occurred, since the dug-well was only for cooking and drinking and used only by several families. Digging dug-well deeper in Sukandi Hamlet is carried out in dry season.

The amount of O&M cost spent for one village can be seen in the following table.

INCOME AND EXPENSES FOR O&M OF CLEAN WATER FACILITIES OF LENEK LAUQ VILLAGE

	1996	1997	1998
EXPENDITURES			
Spare parts	300000	400000	500000
Repair cost			500000
INCOME			
Voluntary Contribution	300000	40000	1000000

FAMILY TOILET FACILITIES

Only 25% of family toilets constructed were functioning. Damages occurred on several family toilets, i.e. leaks of septic tank. No contribution for O&M of family toilets. Responsibility of O&M rested on the owner of the facilities , even though some family toilets were used by several families.

PROJECT TYPE	: NON-PIPED - C (DUG-WELL)
VILLAGE #10	: TEBABAN
SUB-DISTRICT	: SUKAMULYA
DISTRICT	: EAST LOMBOK

GENERAL DESCRIPTION

PHYSICAL CONDITION

Tebaban Village is located only 6 km from the capital of East Lombok District. The village consists of 8 hamlets, i.e. Tebaban Daya, Tebaban Barat, Tebaban Timur, Tebaban Saung, Getab, Kopong, Pao Lombok Barat, and Pao Lomobok Timur.

The village is located 400 m above sea level with low land topography. The village has rainfall of 100 mm/year with average temperature of 24°C. Administrative borders of Tebaban Village are as follows:

Northern border : Suralaya Village
Western border : Anjani Village
Southern border : Sukamulya Village
Western border : Kerongkong Village

DEMOGRAPHY

Number of population of Tebaban Village is 7684 people which cover 1728 Families. The highest number of people is found at Pao Lombok Barat Hamlet, i.e. 1478 people and the lowest at Pao Lombok Timur Hamlet, i.e. 733 people. Main means of subsistence are farming and farm workers. Children at Tebaban (up to 7 years old) generally prefer to be naked. They only use clothings when they go to school and sarong when they are reciting Quran. The condition make them susceptible to stomach and skin diseases, because they play in the river, ditch and farm.

RESIDENTIAL AREA

Residential area of Tebaban Village has is group pattern which are separated rather far from each other. One residential group which is separatd rather far becomes one hamlet. Groups are separated by farms/paddy fields. Visually the residential area looks dirty, because it is not well organized. Housing density in one group is quite high, dominated by temporary houses. The number of temorary houses is 801 units, semi permanent 438 units and permanent houses are 267 units.

Level of environmental cleanliness is low, which can be seen from:

- cow and goat stalls are found in the dense housing area
- the habit of children defecating in ditches in front of their house. The ditch, aside of as defecating facilities , is also used for washing plates.
- garbages near dug-wells.

CLASSIFICATION OF LIVING STANDARD

Most of the people are of medium class, with general characteristics as follows: land ownership 0.2 - 0.5 ha, children education up to high school, occupation farmers and collector of produces, own motorcycles, semi permanent houses, and have food supply for up to 6 months. Classification of living standard of the people can be seen in the following table.

CLASSIFICATION OF LIVING STANDARD OF TEBABAN VILLAGE

ITEM	RICH	MEDIUM	POOR
Land Ownership	> 0.8 ha	0.2 - 0.5 ha	< 0.2 ha
Children Education	University graduates/ D3	High school	Elementary school/ Junior High School
Farmer's status	landowner farmer	Leasor farmer	farm worker
Business status	Dispatcher of produces	collector of produces	broker
Vehicle	car	motorcycle	bicycle/on foot
House	- permanent house	- semi permanent house - plaited bamboo wall - tile roof	coconut leave roof
Number of dependents	± 5 people	± 8 people	± 10 people
Food Supply	no need to buy rice/ food (enough for 1 year)	sometimes has to buy (supply of 6 months)	buy every day
FREQUENCY	10%	60%	30%

CHANGE IN THE PATTERN OF THE UTILIZATION OF FACILITIES

CLEAN WATER FACILITIES

BEFORE THE PROJECT

The community used the following Clean Water Facilities: traditional dug-well, spring & river. There are rich people who use electric motor driven pump.

AFTER THE PROJECT

At the beginning of the competition of ES&WS dug-wells each dug-well had the level of service for 10 Families/Dug-well , now it is < 10 Families/Dug-well, because many families had constructed their own private well. After ES&WS project was completed many members of the community constructed their own new dug-well. Formerly it was seldom done not because they didn't have technical capability and it was difficult to get fund for it, but more because of economic incapability to finance the competition of dug-well. Now with the increasing living standard of the community because of the success in the agricultural sector, many private SGL (dug-well) + MC (bath & wash) + Jet pump are constructed.

Clean Water Facilities used by the community are rehabilitated dug-well from ES&WS. There are several locations of ES&WS which were moved, because the land was used for the construction of new houses. ES&WS dug-wells are used for drinking, cooking, bathing, washing and non-domestic activities. Clean Water Facilities before the project such as springand

river are still used. Springs are still used especially for drinking and cooking because it is the tradition of the community which they have done for generations and the water is available in abundant quantity. While river is used for bathing, washing and non domestic act because it is close to to paddy field area, public facilities and spacious.

Utilization of dug-wells is mainly for drinking and cooking, while bathing and washing are carried out at MC of the mosque/mushalla. This is not because of short of water, but because:

- MC is already provided at the mosque/mushalla which is close to their house. Water at the MC comes from community constructed piping system.
- washing floor of dug-well is too narrow for facilitating bathing and washing activities for the public. The floor of several dug-wells are already broken/cracked, so it is not possible anymore to be used for washing.
- MC has spacious area and closed, while dug-well is open, so that women and men are embarrassed to take bath in open area.
- they don't have to waste energy to draw water because water is directly channeled to MC through pipe from the spring. At MC it is more convenient because they only have to turn the tap and water will flow. At dug-wells they have to draw water firs from the well.
- women can also do other activities such as bathing, washing, bathing children, and directly pray at the mushalla.

Change in the utilization of Clean Water Facilities before and after NTB ES&WS Project can be seen in the following table.

CHANGE IN THE UTILIZATION OF CLEAN WATER FACILITIES IN TEBABAN VILLAGE (Based on Pocket Voting)

	ES&WS DUG-WELL		SPT WELL		SPRING		TRAD. DUG-WELL		POND/ RIVER		ELECTRIC PUMP	
	B	A	B	A	B	A	B	A	B	A	B	A
Drink/food	2	5		3	7	7	8	5	3	1	1	1
Wash&bath		6		2	7	5	2	2	5	3	1	1
Non domestic		3				3			1	1		

Note.
SPT Well : Unicef project, most of them are broken now.
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

FAMILY TOILET FACILITIES

BEFORE THE PROJECT

Defecating facilities used by the community are farm, ditch and paddy field. The community uses the ditch as defecating facilities because of tradition, directly washed away, easy for the children, and the water is available even though not much; and paddy field is used ad defecating facilities because of tradition, paddy field is close to the house, while working in the paddy field, easy for cleaning, and water is also available. Children and babies also use farm and yard as defecating facilities because it is easy for the parents to clean and children are not used to other defecating facilities yet.

AFTER THE PROJECT

The community uses family toilets, but farm, ditch, and paddy field are still used. Utilization of the constructed family toilets is only ± 25%. Family toilets are most used at Tebaban Barat (25-50%), while in other hamlets the utilization is less than 25%. For Tebaban Saung and Kopong the condition was caused by difficulties to get water. While in other hamlets the condition was not caused by water, but because of:

- not enough socialization at the beginning of the project.
- people are not used to toilet, because according to them it is too much works if they have to draw water for cleaning themselves and flushing the closet.
- no deep sense of environmental health and sanitation, so that they use the ditch in front of their house as defecating facilities (especially children).
- high density of buildings, so that people who want to construct family toilet with narrow housing are will have difficulties to get space for septic tank.

Changes in the utilization of defecating facilities before and after NTB ES&WS Project can be seen in the following table.

CHANGE IN THE UTILIZATION OF DEFECATING FACILITIES IN TEBABAN VILLAGE
(Based on Pocket Voting)

	ES&WS JAGA		DITCH/ PADDY FIELD		FARM/ YARD		WATER CHANNEL		HOUSE YARD	
	B	A	B	A	B	A	B	A	B	A
Father	2	4	7	7			4	4		
Mother	1	2	7	7			5	5		
Children			7	6	4	4	2	2		
Baby					3	3			7	7

Note:
B : Before NTB ES&WS Project
A : After NTB ES&WS Project

FACILITIES AID FROM NTB ES&WS PROJECT

Facilities aid from NTB ES&WS Project carried out in Tebaban Village in 1993/1994 with breakdown as given in the following table.

NUMBER OF CLEAN WATER FACILITIES AND DEFECATING FACILITIES FROM NTB ES&WS PROJECT IN TEBABAN VILLAGE 1993/1994

NO.	HAMLET	NO. OF PEOPLE	NEW DUG-WELL	REHAB. DUG-WELL	MC	JAGA	SPAL
1	Tebaban Daya	837	6	-	-	5	-
2	Tebaban Barat	1005	3	2	-	5	-
3	Tebaban Timur	1252	-	7	2	4	-
4	Tebaban Saung	453	2	-	2	10	-
5	Getap	1048	2	-		-	-
6	Kopong	878	10	-	10	25	-
7	Pao Lombok Barat	1478	-	-	-	-	1
8	Pao Lombok Timur	733	-	-	-	5	-
	TOTAL	7684	23	9	14	54	1

Information about Clean Water Facilities and family toilet are not accurate, because there were no records of the project and no data about who received the facilities. Data given here are only based on the memory of the community.

CLEAN WATER FACILITIES

New dug-wells generally were given to rich and medium community, which owned land and were willing to contribute in the development of the dug-well. Dug-well rehabilitation was carried out on private traditional dug-wells. MC constructed represented public facilities next to dug-well. Form of MC varied, depending on the material acquired from the project.

FAMILY TOILET FACILITIES

Family Toilets were distributed to rich and medium families which owned land and had the ability to contribute in form of money or material. Ownership of land as the requirement of family toilet distribution was very important in Tebaban, because of the dense housing area, with narrow distance between houses and the narrow yard.

Distribution of family toilets was not open to the community. Families receiving family toilet has relation only with head of village and ES&WS employee.

PROJECT SOCIALIZATION

Not enough socialization at the beginning of the project and not involving the community during the process of the project had caused low sense of belonging on the Clean Water Facilities and Defecating Facilities. This caused the level of utilization and maintenance of the facilities was low.

PREPARATION/PLANNING OF NTB ES&WS PROJECT

Information was only at head of village and ES&WS employee level, so the community was not involved in the process. Head of village and ES&WS employee had big role during preparation process up to the implementation, which could be seen among others in assigning ES&WS cadres, assigning of people who would receive the dug-well and family toilet, as well as supervision of the project during competition were not transparent.

Location and distribution of Clean Water Facilities and Defecating Facilities were not transparent to the community. Only people who were known to the head of village and ES&WS employee could get dug-well and family toilet. Head of hamlets were not involved actively in the process and their authority was by-passed, even though the implementation of the project was at hamlet level. Head of hamlet had only the task to receive material and approve the location of Clean Water Facilities to be constructed. While location of Defecating Facilities was not known to head of hamlet.

Training carried out in form of environmental sanitation training and Clean Water Facilities technical training. No training for PLP.

CLEAN WATER FACILITIES

Allocation of dug-wells were usually to the house of rich/medium people, because:

- they knew the head of village and ES&WS employee well
- availability of land for the location of dug-well. This was because housing in Tebaban was very dense and the land for a house is narrow.
- willingness to contribute short of material, wages of workers and food cost for workers.

FAMILY TOILET FACILITIES

Family toilets were given to people who are close to head of village and ES&WS employee. Family toilets were given to families which are willing to construct the family toilet by themselves, especially spending money for wages of workers and to buy bricks.

DEVELOPMENT OF NTB ES&WS PROJECT

CLEAN WATER FACILITIES

Tebaban represents water region with depth of dug-well 3 - 5 m, except in Tebaban Saung and Kopong which have the the depth of 15 m.

Design of dug-well was not uniform, especially on wall. Some dug-wells use decker, brick &/ stone with diameter of dug-well ± 80 cm. This was because there was no standard design given by ES&WS employee. Construction was fully handed over to the owner of the land or owner of the dug-well. Then the owner handed over the construction to the craftmen. General design of dug-well was with wall, open without roof, washing floor made of cement, and waste water disposal ditch.

Contribution was requested from Families which would be served by the dug-well which were gathered in Pokmair. Contribution of the community was in form of:

- Cash money
  Especially used for paying craftmen, collected from every family which will be served by the ES&WS dug-well. The amount of the voluntary contribution is different for each family, depending on their social status. Landowner usually contributes more compared to the others.
- Manpower
  The community contributed manpower to carry sand from the river and transport material. For several dug-wells sand was not bought.
- Food and cigarettes.
  Landowner contributed more. Cost for food and cigarettes was not included in cost estimates because according to them it is difficult to calculate.

Different designs caused different cost estimates. Cost estimates given here were taken from average value for the whole village, without consumption cost for workers. In general for the competition of dug-well and MC, the contribution of the community was 55% of project value.

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS DUG-WELL IN TEBABAN VILLAGE 1993/1994

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		4		6000		24000	
Sand		M3		3				
Brick	Unit		100		25		2500	
Pulley	Unit		1		10000		10000	
Construction Cost								
Skilled Worker		Mandays		10		5000		50000
TOTAL							36500	50000
							42%	58%

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS BATHING & WASHING FACILITIES IN TEBABAN VILLAGE 1993/1994

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		8		6000		48000	
Sand		M^3		3		2500		7500
Brick	Unit		400		25		10000	
Rocks		m^3		1		5000		5000
Construction Cost								
Skilled Worker		Mandays		10		5000		50000
TOTAL							58000	62500
							48%	52%

FAMILY TOILET FACILITIES

Cement was used to make the decker of septic tank, basin and floor. There was difference in quantities of material between plan and implementation and between users. Form of dug-well also varied, from family toilet with half wall, without roof, with wall of plaited coconut leaves roof, sack or brick. There were some dug-well which became one with private bathing and washing facilities, with brick wall and tile roof, especially those located at rich families.

COST ESTIMATES FOR THE CONSTRUCTION OF NTB ES&WS FAMILY TOILET IN TEBABAN VILLAGE 1993/1994

	Volume unit		Volume		Unit Price		Total Cost	
	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution	Project	Contri-bution
Material								
Cement	sack		1		6000		6000	
Brick		Unit		200		25		5000
Closet	Unit		1		7000		7000	
Pipe	M		2		5000		10000	
Construction Cost								
Skilled Workers		Mandays		4		5000		20000
TOTAL							23000	25000
							48%	52%

HANDOVER OF FACILITIES

There were no official and written hand-over, either for material, use of land for public use, or ownership of facilities. Status of land and facilities ownership can be seen in Table 8.

No obligation for ES&WS dug-wells to be used by the public, even though at the time of socialization of the project it was emphasized that dug-wells receiving aid from ES&WS should be able to serve public needs for Clean Water Facilities. Some dug-wells were located inside the house, so the public were reluctant to take water from them.

STATUS OF OWNERSHIP OF LAND AND CLEAN WATER FACILITIES & PLP

NO.		LAND	FACILITIES
1	rehabilitated dug-well	private	Private
2	new dug-well	private	Public
3	MC	private/public	Public
4	Family Toilet	private	Private
5	SPAL	public	Public

OPERATION AND MAINTENANCE OF NTB ES&WS FACILITIES

CLEAN WATER FACILITIES

Depth od dug-wells in Tebaban Saung Hamlet and Kopong Hamlet were 7 - 15 m and every dry season thery were deepened & cleaned from mud 0.5 m. Generally O&M was carried out by the owner of the facilities .

In Tebaban Village dug-well water test was carried out by Health Office employee and not by ES&WS employee. The test was bacteriological test. Community of Tebaban Village didn't know about the test. Once a year dug-wells in Tebaban Village are given chlorine to kill bactery.

At the beginning of the construction of ES&WS dug-wells, for every dug-well Pokmair (Water User Group) was established for 10 Families. After the construction of the dug-well was completed the Pokmair didn't work. In Tebaban Village there was no monthly contribution. O&M cost was charged to the users by voluntary contribution. The voluntary contribution was collected at the time of replacement of spare parts. At several dug-wells O&M cost was charged to the landowner. It depends on agreement between the community and ownership status of the dug-well.

INCOME AND EXPENSES FOR O&M OF CLEAN WATER FACILITIES OF TEBABAN VILLAGE

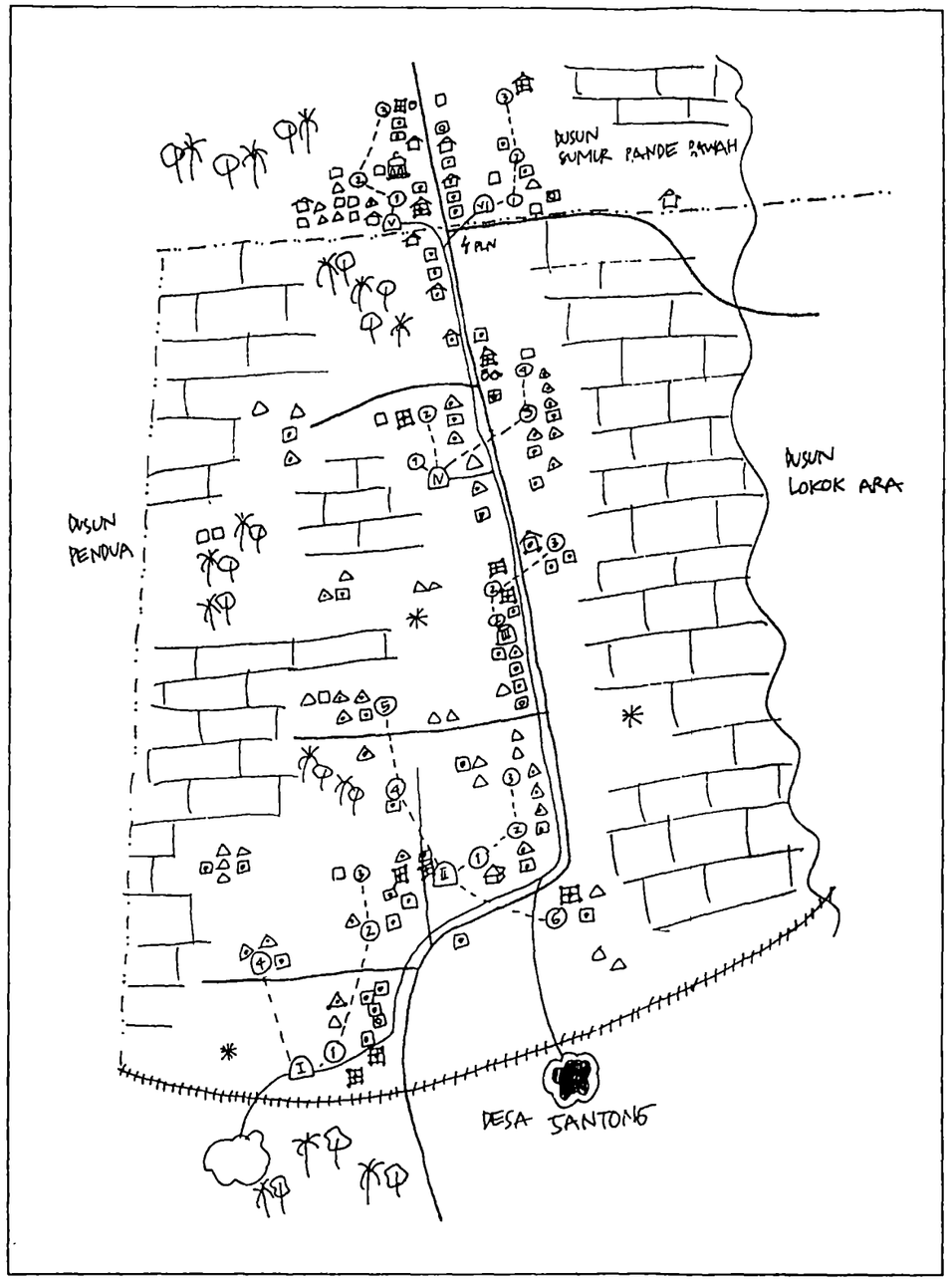
	1996	1997	1998
EXPENDITURES			
Spare parts	300000	300000	400000
INCOME			
Voluntary Contribution	300000	30000	400000

O&M cost was used to replace damaged spare-parts, among others, bucket, rope and pulley. The amount of O&M cost spent dependent on number of families using the dug-well. The more users, the more often the spare-parts must be replaced. In average the replacements are 2-3 times/year especially for bucket. Price of one set of bucket was Rp.10,000 - Rp. 15,000.

FAMILY TOILET FACILITIES

Only 25% of family toilets constructed were functioning. In general the ones in use were properly maintained. Responsibility of O&M rested on the owner of the facilities. Some family toilets were used by more than 2 families.

Village : Sesait
Hamlet : Sumur Pande



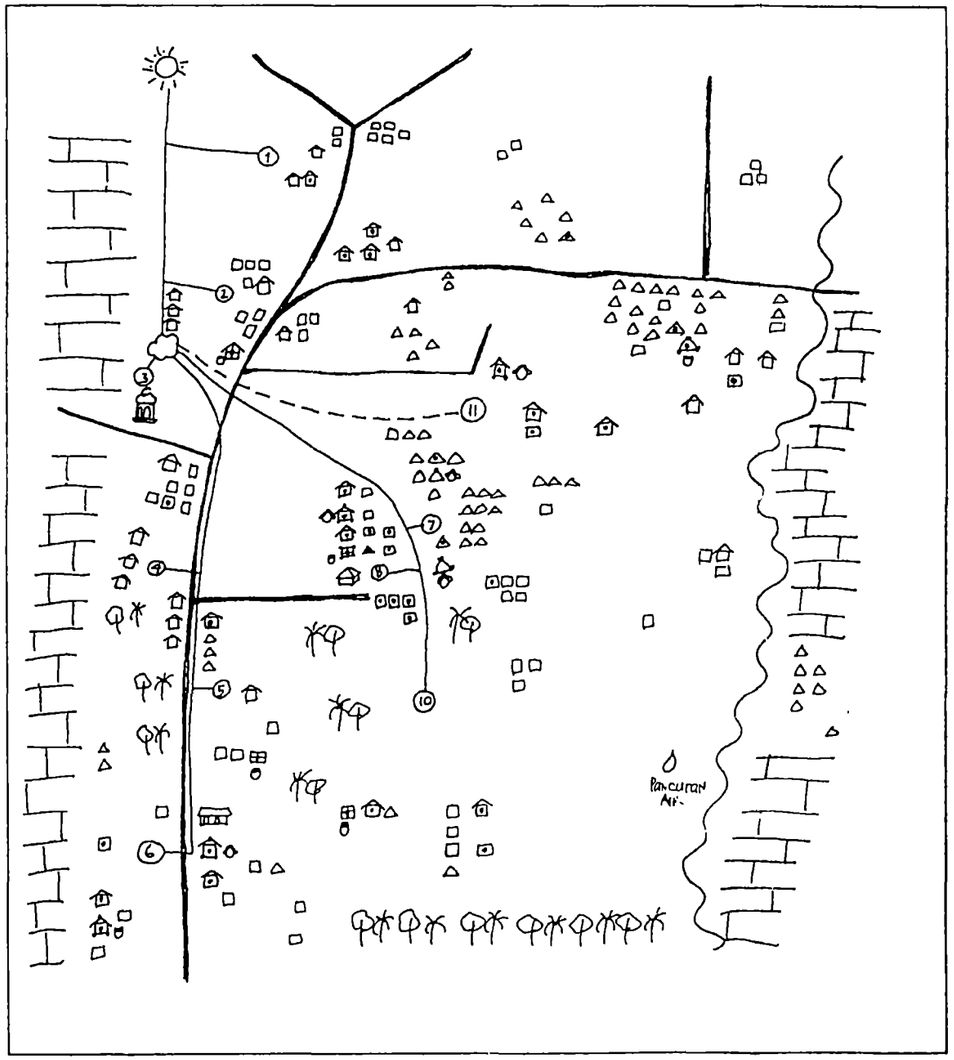
LEGENDA

- JALAN DESA
- BAK INDUK
- BAK TAMBAHAN (swadaya)
- BPT / BAK PEMBAGI
- KRAN UMUM
- PIPA PRIMER
- PIPA SEKUNDER
- KELUARGA KAYA
- KELUARGA MENENGAH
- KELUARGA MISKIN
- RUMAH PENGURUS KELOMPOK
- RUMAH PESERTA PELATIHAN
- RUMAH DG JAGA ESWS
- RUMAH DG JAGA BUKAN ESWS
- MATA AIR LAIN
- MESJID
- MUSHALLA
- KANTOR PLN
- KEBUN
- SAWAH
- KALI
- BATAS DUSUN
- BATAS DESA

LEGENDA

- JALAN DESA
- MATA AIR
- PIPA AIR ESWS
- PIPA AIR SWADAYA
- KRAN UMUM
- BAK DISTRIBUSI
- KELUARGA KAYA
- KELUARGA MENENGAH
- KELUARGA MISKIN
- RUMAH PENGURUS POKMAIR
- RUMAH PESERTA PELATIHAN
- RUMAH DENGAN JAGA ESWS
- MESJID
- SEKOLAH
- MUSHALLA
- PANCURAN AIR
- KEBUN
- SAWAH
- KALI
- LAKI-LAKI
- PEREMPUAN

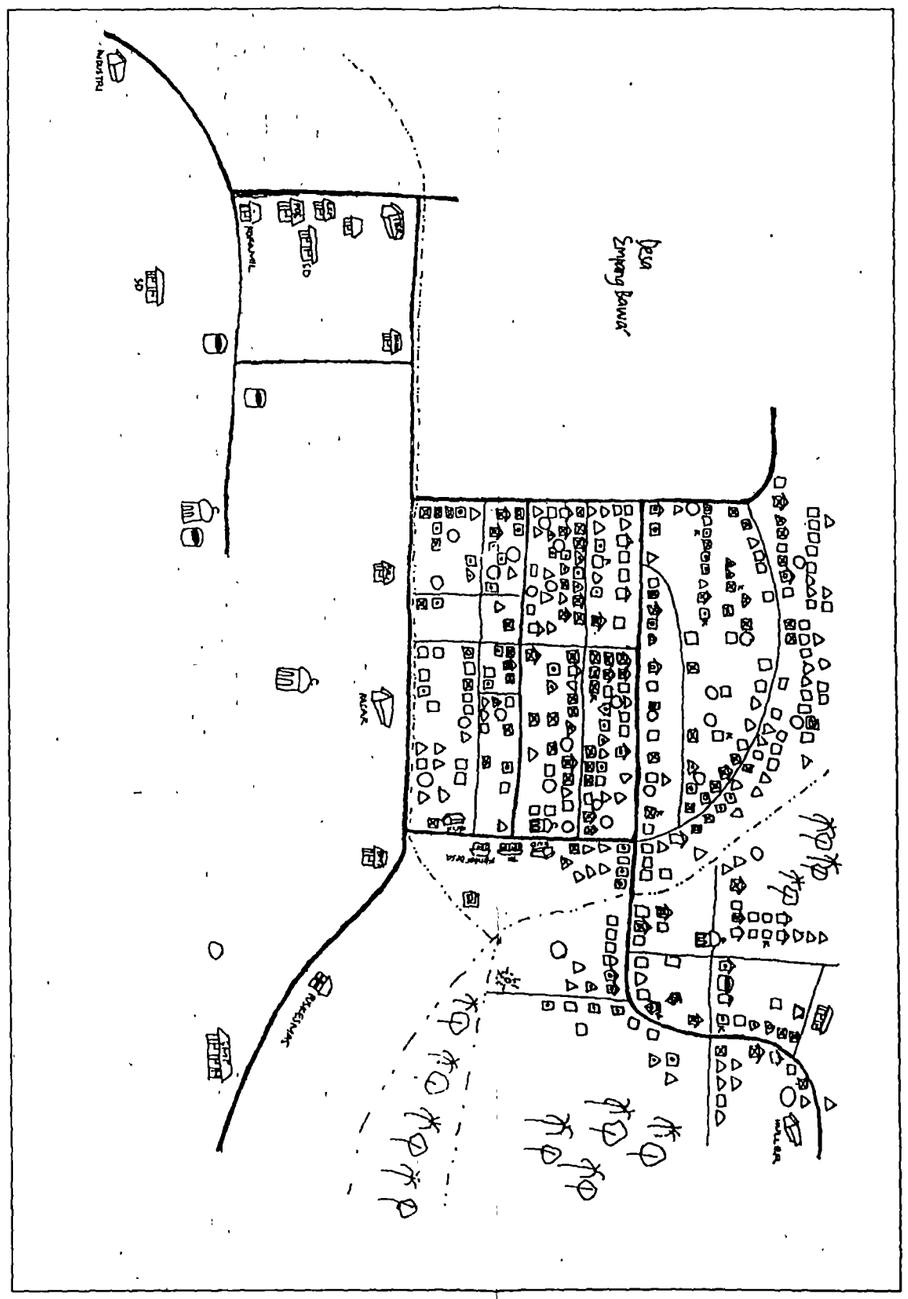
Village : Teratak
Hamlet : Ketangge



LEGENDA

- JALAN ASPAL
- JALAN DESA
- SUNGAI
- KEBUN
- MESJID
- SEKOLAH
- KUD, PASAR, TERMINAL, INDUSTRI
- KANTOR (Pos, KUA, Koramil, Puskesmas, Desa, BRI)
- KELUARGA KAYA
- KELUARGA MENENGAH
- KELUARGA MISKIN
- RUMAH DG JAGA ESWS
- RUMAH DG JAGA BUKAN ESWS
- RUMAH DG SAMBUNGAN AIR PDAM ESWS
- K RUMAH KADER
- SUMUR, NON ESWS
- HYDRAN UMUM ESWS
- MCK UMUM

Village : Empang Atas
Hamlet : Ponong

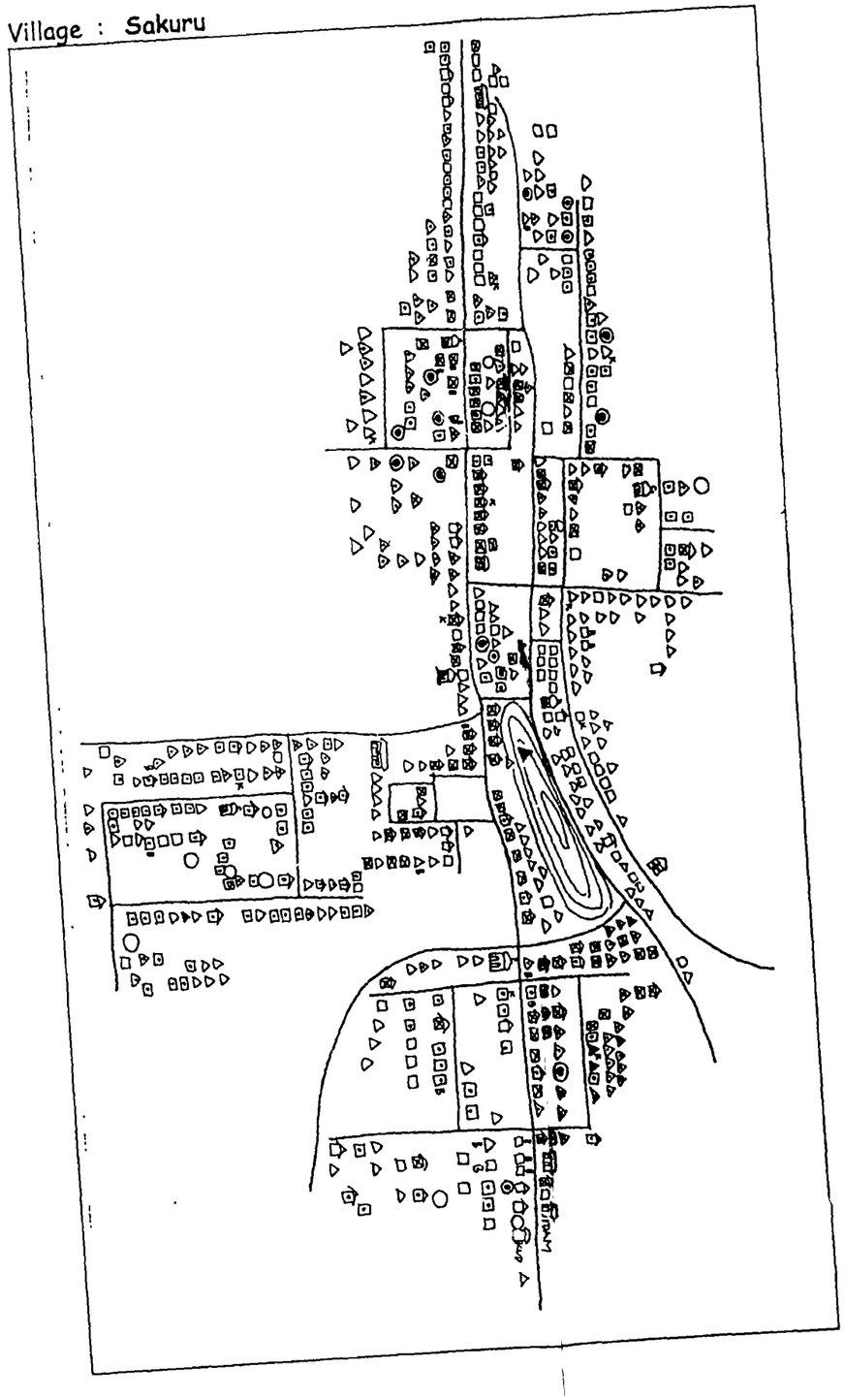


LEGENDA .

———	JALAN RAYA
	BUKIT
	SEKOLAH
	KANTOR (Kantor Desa, PDAM, KUD)
	KELUARGA KAYA
□	KELUARGA MENENGAH
△	KELUARGA MISKIN
⊡	RUMAH DG JAGA
⊠	RUMAH DG FASILITAS PDAM
□K	RUMAH KADER
□B	RUMAH YG DAPAT KREDIT BMT
◉	SUMUR NON ESWS
	SUMUR BANTUAN ESWS
	MC UMUM
	MESJID

NTB - ESWS

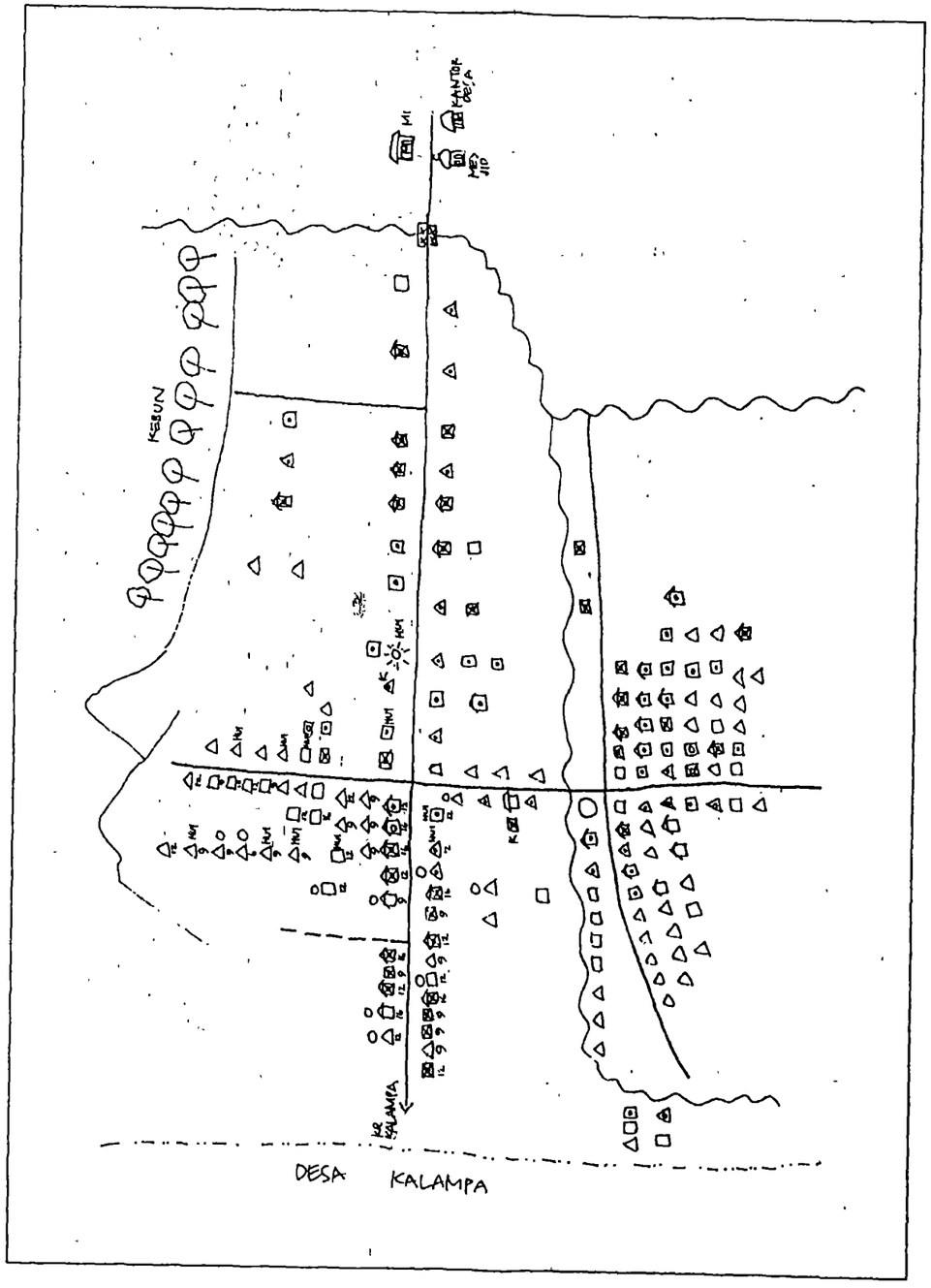
Village : Sakuru



Village : **Samili**
Hamlet : **Rangajao**

LEGENDA

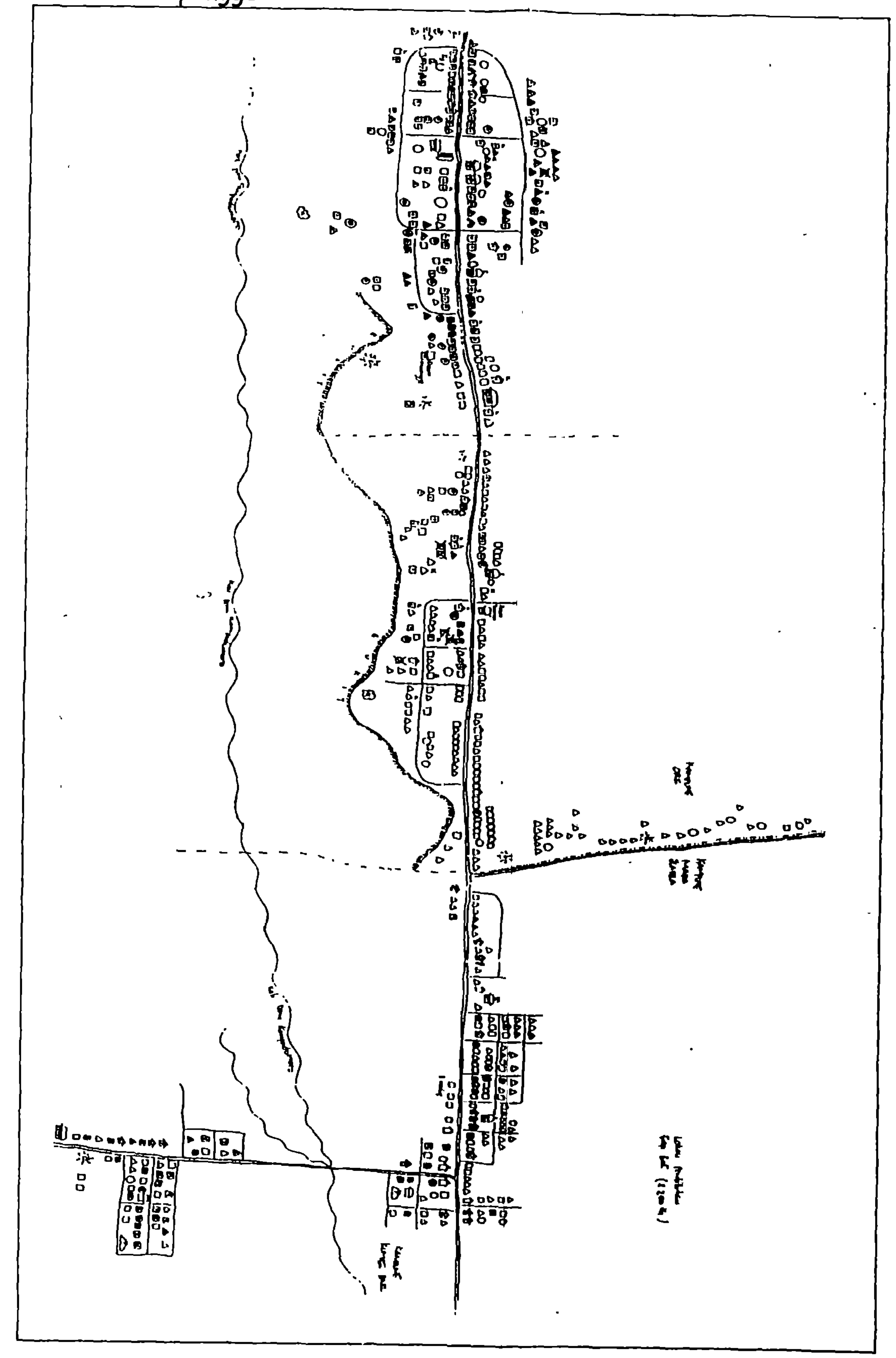
———	JALAN DESA
⌒⌒	BUKIT
ϕϕϕϕ	KEBUN
	MESJID
	SEKOLAH
	KANTOR DESA
	HIDRAN UMUM
○	SUMUR
⌂	KELUARGA KAYA
□	KELUARGA MENENGAH
△	KELUARGA MISKIN
⊡	KELUARGA DG JAGA TERPAKAI
⊡	KELUARGA DG JAGA RUSAK
□K	RUMAH KADER
~~	KALI
–·–·–	BATAS DESA



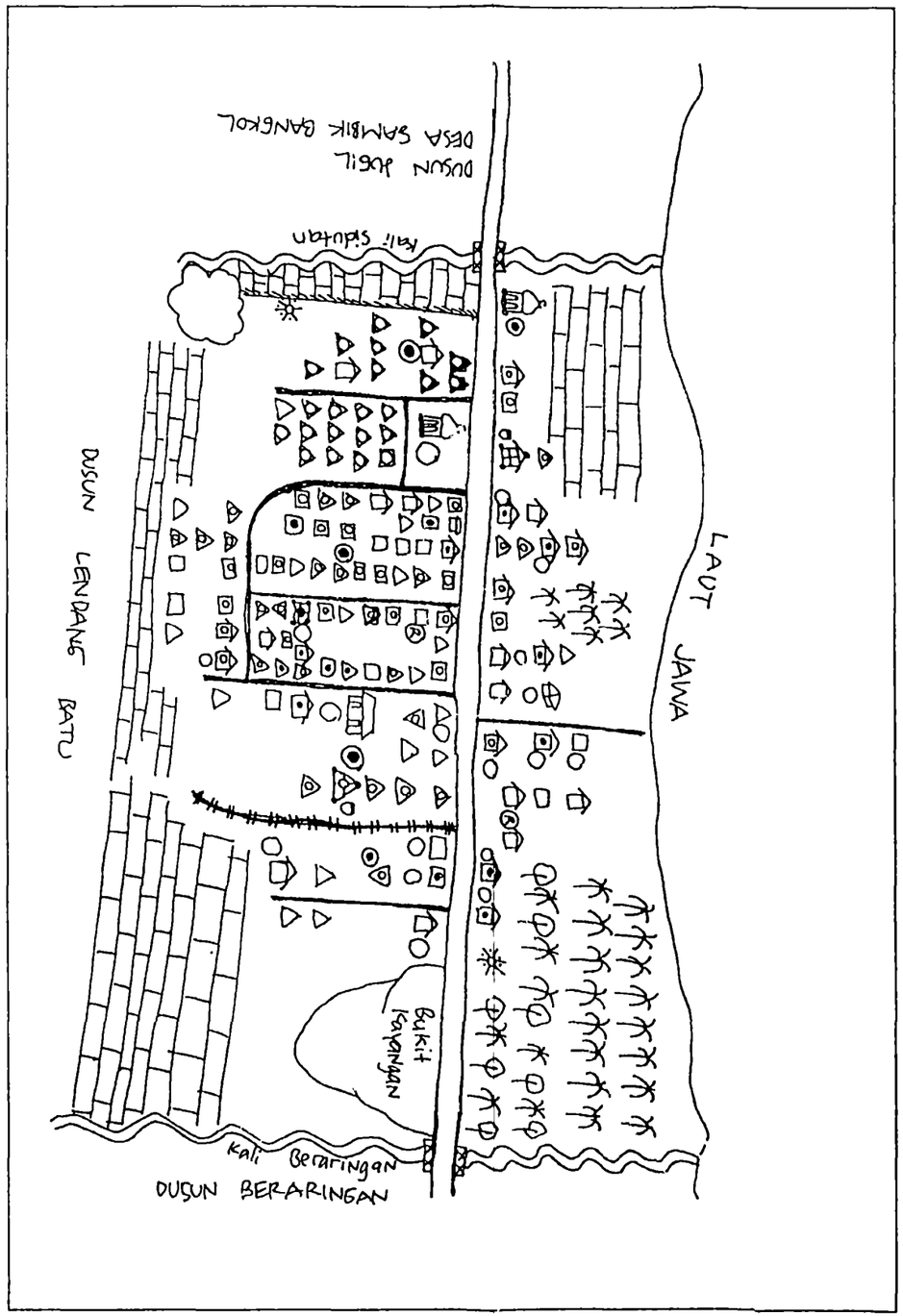
LEGENDA

- JALAN DESA
- JALAN KAMPUNG
- MESJID
- SEKOLAH
- KANTOR (Desa, Dusun, Puskesmas), BANJAR
- PURA
- KELUARGA MAMPU
- KELUARGA MENENGAH
- KELUARGA MISKIN
- RUMAH DG JAGA TERPAKAI
- RUMAH DG JAGA RUSAK
- SUMUR ESWS
- SUMUR BUKAN ESWS
- SUMUR RUSAK
- MCK UMUM
- RUMAH KADER
- RUMAH DG POMPA TANGAN
- MATA AIR
- BUKIT
- KALI / SUNGAI
- KUBURAN UMUM
- BATAS DUSUN

NTB - ESWS
Village : Banggo
Hamlet : Mpongge



Village : **Kayangan**
Hamlet : **Sidutan**



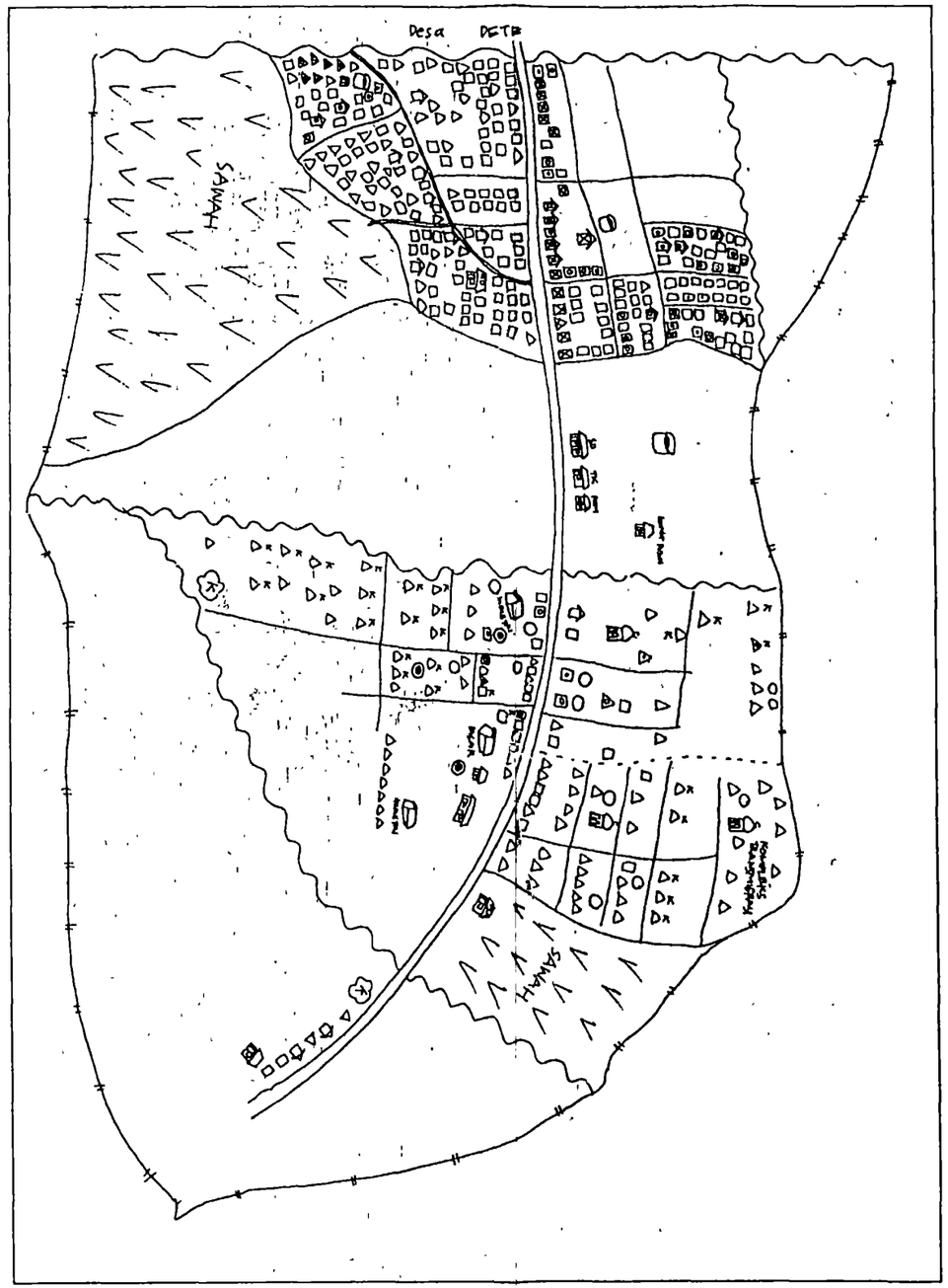
LEGENDA

- JALAN NEGARA
- JALAN DESA
- MESJID
- MUSHALLA
- SEKOLAH
- KANTOR KEPALA DUSUN
- RUMAH KELUARGA KAYA
- RUMAH KELUARGA MENENGAH
- RUMAH KELUARGA MISKIN
- SGL ESWS
- SGL REHAB ESWS
- SGL BUKAN ESWS
- RUMAH DG JAGA TIDAK BERFUNGSI / RUSAK
- RUMAH DG JAGA BERFUNGSI
- RUMAH PENGURUS KELOMPOK
- RUMAH PESERTA PELATIHAN
- LAKI - LAKI
- KUBURAN UMUM
- JEMBATAN
- KALI
- BUKIT
- TEBING
- RAWA - RAWA KERING
- SAWAH
- KEBUN

LEGENDA

- JALAN NEGARA
- JALAN DESA
- BATAS DESA
- SUNGAI
- SAWAH
- MESJID
- SEKOLAH
- PASAR / INDUSTRI
- KANTOR (Desa , DUSUN , Puskesmas)
- KUBURAN UMUM
- KELUARGA KAYA
- KELUARGA MENENGAH
- KELUARGA MISKIN
- RUMAH DENGAN JAGA ESWS
- RUMAH DENGAN JAGA BUKAN ESWS
- RUMAH DENGAN SAMBUNGAN PDAM
- HYDRAN UMUM
- SUMUR BANTUAN ESWS
- SUMUR BUKAN ESWS

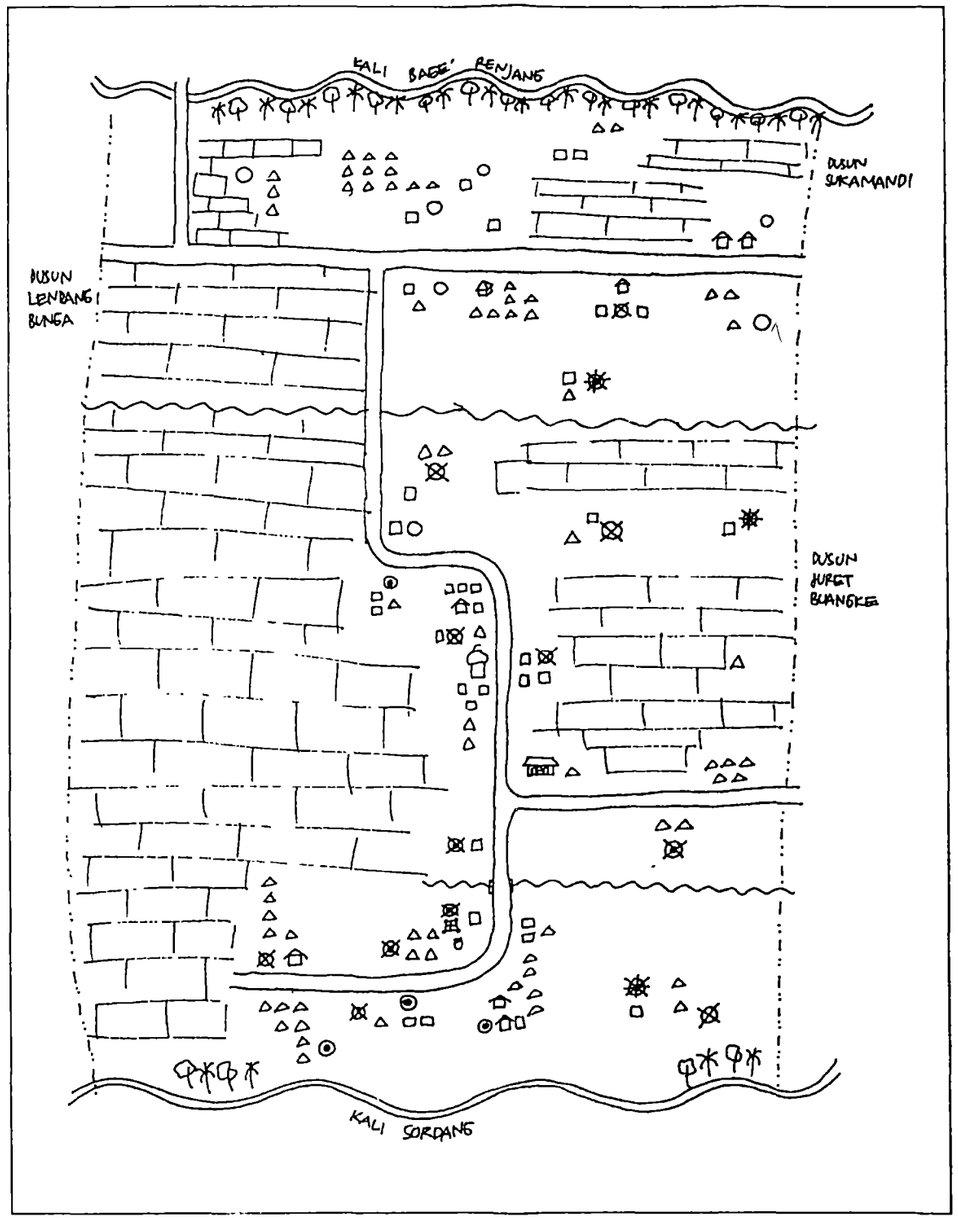
Village : Lape
Hamlet : Batu Peraga



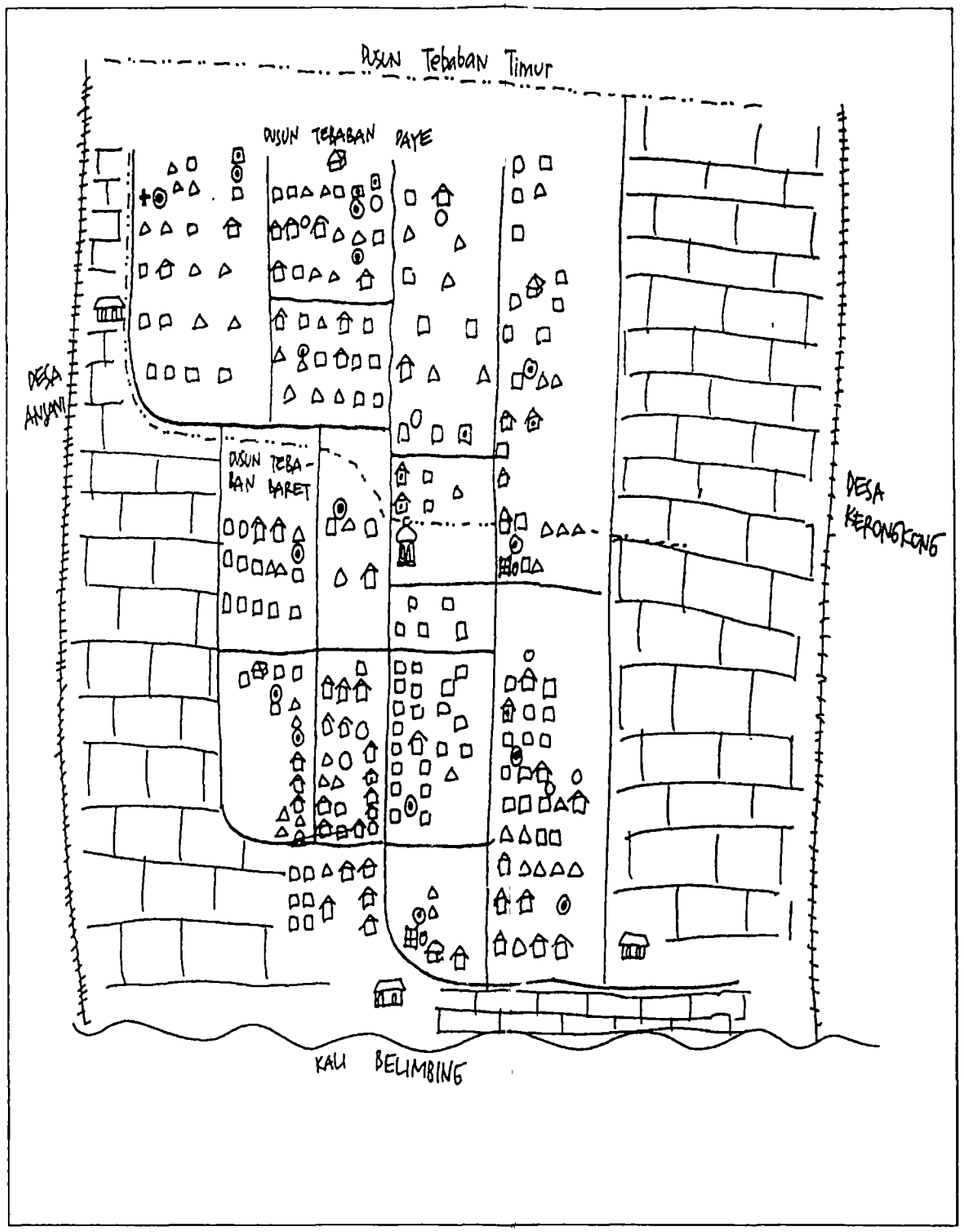
LEGENDA

- JALAN DESA
- BATAS DUSUN
- KALI
- PARIT
- KEBUN
- SAWAH
- MESJID
- MUSHALLA
- RUMAH KELUARGA KAYA
- RUMAH KELUARGA MENENGAH
- RUMAH KELUARGA MISKIN
- SEKOLAH
- RUMAH PENGURUS KELOMPOK
- RUMAH PESERTA PELATIHAN
- SUMUR BANTUAN ESWS
- SUMUR BUKAN ESWS
- RUMAH / SUMUR DENGAN JEDING BANTUAN ESWS
- SUMUR DENGAN JEDING BUKAN ESWS

Village : Lenek Lauq



Village : **Tebaban**
Hamlet : **Tebaban Barat + Tebaban Timur**



LEGENDA

- JALAN DESA
- SEKOLAH
- MESJID
- MUSHALLA
- PUSKESMAS PEMBANTU
- KELUARGA KAYA
- KELUARGA MENENGAH
- KELUARGA MISKIN
- RUMAH DENGAN JAGA
- RUMAH PENGURUS KELOMPOK
- RUMAH PESERTA PELATIHAN
- LAKI - LAKI
- PEREMPUAN
- KALI
- BATAS DUSUN
- BATAS DESA
- SUMUR BANTUAN ESWS
- SUMUR SWADAYA
- SAWAH

FREQUENCIES OF HYGIENE BEHAVIOR CLASSIFICATION BY MEN'S GROUP

Province	Good for health	Code	F	Not Relevant for health	Code	F	Bad for Health	Code	F
NTB	Bayi tidur dengan keranda	1	5	Bayi tidur dengan keranda	1	1	Mengambil air untuk BAB	2	5
	Mengambil air untuk BAB	2	1	Mengambil air untuk BAB	2	1	Kotoran anak-anak langsung dibuang ke Jamban	4	6
	Jamban jauh dari rumah	3	2	Jamban jauh dari rumah	3	5	Makanan di atas meja tidak tertutup	7	9
	Kotoran anak-anak langsung dibuang ke Jamban	4	4	Kotoran anak-anak langsung dibuang ke Jamban	4	1	Berwudlu dari air kendi	8	1
	Menyapu lantai rumah	5	7	Menyapu lantai rumah	5	1	Berwudlu dari air kendi	11	9
	Air minum dari ceret tertutup	6	6	Berwudlu dari air kendi	8	5	Berwudlu dari air kendi	13	7
	Makanan di atas meja tidak tertutup	7	2	Mencuci sayur mayur & buah-buahan	10	1	Membersihkan anak sebahis BAB di kamar mandi	14	2
	Berwudlu dari air kendi	8	3	Berwudlu dari air kendi	11	1	Pencemaran air sungai oleh Jamban di kali	15	6
	Mencuci tangan dari pancuran	9	7	Mencuci kaki sebelum masuk rumah panggung	12	2	Mencuci pakaian dengan air pancuran	16	2
	Mencuci sayur mayur & buah-buahan	10	6	Berwudlu dari air kendi	13	2	Minum air mentah langsung dari gentong	19	6
	Mencuci kaki sebelum masuk rumah panggung	12	4	Membersihkan anak sebahis BAB di kamar mandi	14	2	Gentong air tidak tertutup tetapi di dalam rumah	20	9
	Membersihkan anak sebahis BAB dgn pancuran	13	1	Pencemaran air sungai oleh Jamban di kali	15	3	Jamban di atas kolam - BAB dimakan ikan	21	2
	Membersihkan anak sebahis BAB di kamar mandi	14	6	Mencuci pakaian dengan air pancuran	16	5	Makanan di atas meja ditutup dengan tutup saji	22	1
	Mencuci pakaian dengan air pancuran	16	2	Mengambil air untuk BAB di Jamban	17	2	Timba menjadi kotor karena jatuh ke tanah	23	9
	Mengambil air untuk BAB di Jamban	17	5	Mencuci tangan dengan pancuran	18	5	Anak-anak makan di lantai / tanah	24	8
	Mencuci tangan dengan pancuran	18	1	Minum air mentah langsung dari gentong	19	2	Kotoran BAB ditinggal di halaman	25	9
	Minum air mentah langsung dari gentong	19	3	Gentong air tidak tertutup tetapi di dalam rumah	20	1	Air limbah rumah tangga dibuang ke sungai	26	8
	Gentong air tidak tertutup tetapi di dalam rumah	20	1	Jamban di atas kolam - BAB dimakan ikan	21	5	Air kali yang kotor	28	5
	Jamban di atas kolam - BAB dimakan ikan	21	1	Anak-anak makan di lantai / tanah	24	1	Mandi di kamar mandi yang tertutup	29	2
	Makanan di atas meja ditutup dengan tutup saji	22	7	Air limbah rumah tangga dibuang ke sungai	26	1	BAB di sungai	32	7
	Anak-anak makan di lantai / tanah	24	2	Minum air tetapi kebersihan belum terjamin	27	5			
	Minum air tetapi kebersihan belum terjamin	27	3	Air kali yang kotor	28	3			
	Mandi di kamar mandi yang tertutup	29	4	Mandi di kamar mandi yang tertutup	29	1			
	Sebelum makan mencuci tangan dengan kobokan	30	6	Sebelum makan mencuci tangan dengan kobokan	30	1			
	Gentong tempat air ditutup	31	7	Gentong tempat air ditutup	31	1			
	BAB di sungai	32	2						

FREQUENCIES OF HYGIENE BEHAVIOR CLASSIFICATION BY WOMEN'S GROUP

Province	Good for health	Code	F	Not Relevant for health	Code	F	Bad for Health	Code	F
NTB	Bayi tidur dengan keranda	1	9	Bayi tidur dengan keranda	1	1	Mengambil air untuk BAB	2	3
	Mengambil air untuk BAB	2	2	Mengambil air untuk BAB	2	2	Jamban jauh dari rumah	3	1
	Jamban jauh dari rumah	3	8	Jamban jauh dari rumah	3	1	Kotoran anak-anak langsung dibuang ke Jamban	4	2
	Kotoran anak-anak langsung dibuang ke Jamban	4	8	Air minum dari ceret tertutup	6	2		7	10
	Menyapu lantai rumah	5	10	Berwudlu dari air kendi	8	3	Mencuci sayur mayur & buah-buahan	10	1
	Air minum dari ceret tertutup	6	8	Mencuci tangan dari pancuran	9	1	Berwudlu dari air kendi	11	9
	Berwudlu dari air kendi	8	7	Mencuci sayur mayur & buah-buahan	10	1	Mencuci kaki sebelum masuk rumah panggung	12	2
	Mencuci tangan dari pancuran	9	9	Berwudlu dari air kendi	11	1	Berwudlu dari air kendi	13	4
	Mencuci sayur mayur & buah-buahan	10	9	Mencuci kaki sebelum masuk rumah panggung	12	3	Membersihkan anak sebahis BAB di kamar mandi	14	1
	Mencuci kaki sebelum masuk rumah panggung	12	5	Berwudlu dari air kendi	13	4	Pencemaran air sungai oleh Jamban di kali	15	3
	Membersihkan anak sebahis BAB dgn pancuran	13	2	Membersihkan anak sebahis BAB di kamar mandi	14	1	Mencuci pakaian dengan air pancuran	16	2
	Membersihkan anak sebahis BAB di kamar mandi	14	8	Pencemaran air sungai oleh Jamban di kali	15	4	Mencuci tangan dengan pancuran	18	1
	Mencuci pakaian dengan air pancuran	16	6	Mencuci pakaian dengan air pancuran	16	2	Minum air mentah langsung dari gentong	19	6
	Mengambil air untuk BAB di Jamban	17	10	Mencuci tangan dengan pancuran	18	6	Gentong air tidak tertutup tetapi di dalam rumah	20	7
	Mencuci tangan dengan pancuran	18	3	Minum air mentah langsung dari gentong	19	3	Jamban di atas kolam - BAB dimakan ikan	21	4
	Makanan di atas meja ditutup dengan tutup saji	22	10	Gentong air tidak tertutup tetapi di dalam rumah	20	3	Makanan di atas meja ditutup dengan tutup saji	22	1
	Minum air tetapi kebersihan belum terjamin	27	4	Jamban di atas kolam - BAB dimakan ikan	21	2	Timba menjadi kotor karena jatuh ke tanah	23	10
	Mandi di kamar mandi yang tertutup	29	7	Anak-anak makan di lantai / tanah	24	2	Anak-anak makan di lantai / tanah	24	8
	Sebelum makan mencuci tangan dengan kobokan	30	2	Air limbah rumah tangga dibuang ke sungai	26	2	Kotoran BAB ditinggal di halaman	25	10
	Gentong tempat air ditutup	31	10	Minum air tetapi kebersihan belum terjamin	27	5	Air limbah rumah tangga dibuang ke sungai	26	8
				Air kali yang kotor	28	3	Air kali yang kotor	28	5
				Mandi di kamar mandi yang tertutup	29	2	Sebelum makan mencuci tangan dengan kobokan	30	5
				Sebelum makan mencuci tangan dengan kobokan	30	3	BAB di sungai	32	7
				Gentong tempat air ditutup	31	1			
				BAB di sungai	32	1			

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