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HIS MAJESTY'S GOVERNMENT
OF NEPAL

ASIAN DEVELOPMENT
BANK

DEPARTMENT OF WATER
SUPPLY AND SEWERAGE

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COMMUNITY WATER SUPPLY & SANITATION
PROGRAMME MID & FAR WESTERN
DEVELOPMENT REGIONS

SANITATION PROPOSAL

APRIL 1984

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ABBREVIATIONS

ADB	-	Asian Development Bank
A.E.	-	Assistant Engineer
CHL	-	Community Health Leader
CMA	-	Community Medical Auxiliary
CSM *	-	Community Sanitation Motivator
CST *	-	Community Sanitation Technician
CWSS	-	Community Water Supply & Sanitation
D.E.	-	Divisional Engineer
D.E.O.	-	District Education Office(r)
D.T.O.	-	District Technical Office
DWSS	-	Department of Water Supply and Sewerage
ESS	-	Environmental Sanitation Section
FP/MCH	-	Family Planning/Maternal and Child Health
HES	-	Health Education Section
HMG	-	His Majesty's Government
ICHSDP	-	Integrated Community Health Services Development Project
L.D.O.	-	Local Development Officer
MoH	-	Ministry of Health
MPLD	-	Ministry of Panchayat and Local Development
P(D)TC	-	Panchayat (Development) Training Centre
SFDP	-	Small Farmers Development Programme
SIC *	-	Sanitation-In-Charge
Su.E.	-	Superintending Engineer
WSSC *	-	Water Supply and Sanitation Committee
WSSB	-	Water Supply and Sewerage Board
WTC	-	Women Training Centre
CTA *	-	Chief Technical Advisor
PF/WS	-	Pourflush/Waterseal (latrine)

* = terms introduced by the Consultant

1. INTRODUCTION

1.1 Justification for Sanitation Study

The need for complementing the construction of water supply schemes with activities in sanitation has found increased recognition in recent years. Experience and observations about the impact of improved water supply on people's health have shown that health improvements do hardly materialize merely by the installation of piped water supplies or hand-pumps. Gradually, administrators, water supply and health field staff as well as consultants have become aware, that personal hygiene (which is related to the proper and conscious use of water) is a most decisive, complementary factor in bringing about health improvements.

In spite of increased awareness about the important complementary role of sanitation, efforts to promote and implement it effectively, i.e. with sufficient and suitable manpower, funding and back-up by government administrations, have so far often remained minimal, or are looked upon as secondary only to the engineering of water supplies by administrators and "technicians".

Sanitation has proved to be a task which is doubtlessly extremely delicate, difficult and often wearing for those who are charged with it. Success and effects are visible after many years of extension work and follow-up, only, making sanitation certainly less attractive than water supply engineering where the results of efforts are physically visible after relatively short time. Also, administrators and field personnel, while being well acquainted with routine procedures and "hard-fact" work of water supply, might be hesitant to engage in sanitation work as this is still very much a new field to all involved. Furthermore, sanitation field activities might not be amenable to routine procedures to the same extent as is water supply project work.

In recognizing the importance of sanitation and the need for having a built-in sanitation component and strategy at the onset of the planned Programme, the terms of reference (ToR) for the Consultant's services in the Programme preparation phase as formulated by Asian Development Bank, contain specific stipulations regarding sanitation. Also, as regards the ToR for the investigations and proposals to be made by the Consultant on institutional, managerial and financial aspects of the planned Programme, water supply and sanitation are treated throughout as integrated components (see Ref. 1.12).

Table 1.1 Common Communicable Water- and Excreta-Related Infections, Their Causes and Routes of Transmission

SOURCE OF DISEASE	ENGLISH	NEPALI	TRANSMISSION CAUSE (1)										TRANSMISSION CAUSE (2)		REMARKS
			LACK OF SUFFICIENT WATER OR INSUFFICIENT USE OF WATER FOR WASHING AND CLEANING; OR:										UNCONTROLLED EXCRETA DISPOSAL		
			CONSUMPTION OF CONTAMINATED WATER												
			MAIN TRANSMISSION ROUTES:												
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)			
			Excreta ↓ hand contact ↑ mouth	Excreta ↑ (hands) ↑ mouth	Excreta ↑ hands ↑ food or utensils ↑ mouth	Excreta ↑ domestic animal (dog) ↑ utensils ↑ food ↑ mouth	Infected skin ↑ unwashed (bed- clothes ↑ skin	Infected eyes ↑ flies or fingers ↑ eyes	Infected skin ↑ contact ↑ skin	Excreta ↓ soil ↑ skin	Excreta ↓ pig ↑ meal	Excreta ↓ soil ↑ flies ↑ food ↑ mouth			
(A) EXCRETA	a. Amoebic dysentery	Ragat masi, aun	x	(x)	x	(x)						x	D		
	b. Bacillary dysentery	" "	x	(x)	x	(x)						x	D		
	c. Giardiasis	Giardia	x	(x)	x	(x)						(x)	D		
	d. Pinworm	Churna	x	x	x	(x)						(x)			
	e. Hepatitis A	Kamalpitia	x	x	x	(x)									
	f. Cholera	Hajja	(x)	x	x								D		
	g. Typhoid fever	Myadi (typhoid) jaro	x	x	x							(x)	D		
	h. Paratyphoid fever	Paratyphoid	x	x	x							(x)	D		
	i. Polio	Bala pakshaghat	(x)	x	x	(x)									
	j. Hookworm	Ankuse juka								x					
	k. Roundworm (Ascariasis)	Juka										x			
	l. Whipworm (Trichuriasis)	Korre juka										x	D		
	m. Tapeworm	Phitte juka													
	n. Conjunctivitis	Akha paknu, " rato bayo					(x)	x							
(B) Skin or Eyes	o. Trachoma	Purano akhako rog, Akha phulo					(x)	x							
	p. Scabies	Luto					x								

x - Disease transmitted mainly by this (these) route(s)
 (x) - Disease sometimes also transmitted by this (these) route(s)
 } Prevalence uncertain
 D - Diarrhoea ("chhe:ne", "pakhala") is a common symptom of these diseases

1.2 Definition and Scope of Sanitation

"Sanitation" is often popularly viewed as a synonym for latrine construction. This notion frequently leads to deliberations about the priority of water supply vs. the priority of latrines. If viewed like that, water supply will and must naturally be given priority over latrines in most rural communities, except in very densely populated areas where uncontrolled defecation constitutes a major health hazard.

However, "sanitation" is to be understood to comprise all health- and hygiene-related activities (latrine promotion being but one of them), which are needed to bring about the intended health benefits of water supply schemes.

In a hierarchy of terms one may group 'water supply' and 'latrine construction' as sub-ordinate to 'sanitation', making water and latrines the two major tools with which villagers and field staff may endeavour to bring about improvements in health. Table 1.1, which shows a number of communicable diseases with high prevalency in Nepal and the various possible paths of their transmission, helps to illustrate this.

The Table shows that in many cases transmission of diseases takes place because of the lack of sufficient water or the insufficient use of water for washing hands, bathing, and washing of clothes, dishes and utensils. For the transmission of diseases water quantity matters much more than water quality in most environments of rural Nepal. Water thus becomes the necessary tool for proper or improved hygiene. It is, however, not a sufficient tool: furthermore, people have to become aware of the quantitative role of water for prevention of diseases, and gradually and consciously have to adapt to a new hygiene behaviour once supplied with "new" water close to their homes. To induce such changed behaviour and awareness is the most important task of sanitation work. Table 1.1 further illustrates the role of uncontrolled excreta disposal on the transmission of excreta-related diseases, and allows to make assumptions as to the potential health improvements by introducing latrines.

In summary, sanitation encompasses a wide field of activities, the most important of which are:

- Health information and creating awareness for excreta/water/disease relationships
- Promotion of improved personal and domestic hygiene

- Promotion of improved excreta disposal through latrines (including the aspects of convenience and privacy which are of particular relevance to women) and technical assistance for latrine construction.

All this is mainly centered around people, their culture, and social and physical environment. Successful sanitation work therefore requires a suitable "communicative" approach by programme field staff which is based on respect for the villagers' day-to-day problems and needs, and the particular socio-economic situation in project areas.

2. OBJECTIVES OF STUDY

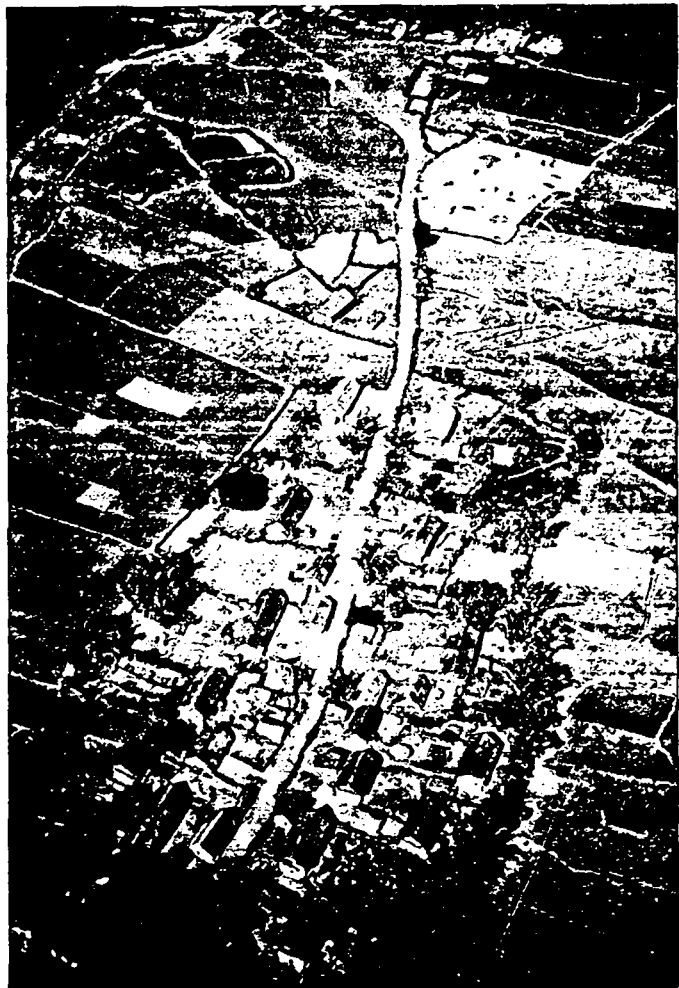
Based on the terms of reference formulated by ADB for the Consultant's services, and on the particular features of the envisaged Programme, the Consultant has defined the following major objectives of study:

- To appraise the basic cultural and socio-economic features of villages in the future Programme area; in particular, to appraise related differences between Terai and hill communities as regards existing sanitation "culture" and its possible role on future sanitation activities.
- To appraise existing latrine technology (both traditional and through development programmes) and its acceptance, and to discuss suitable alternate solutions for the proposed Programme.
- To appraise the present and outline the required future "software" component, i.e.
 - manpower requirements and institutional set-up
 - training input
 - community involvement and links with other institutions
 - communication support
- To determine the funding requirements (ADB, HMG, community contributions) for sanitation "software", i.e.
 - manpower
 - training and communication support activities
 as well as for sanitation "hardware", i.e.
 - construction material (incl. transport) for latrines and surface drainage/sullage disposal
- To appraise in particular and gain useful lessons from the ongoing DWSS-implemented Eight-Town Low-Cost Sanitation Programme.

THE VILLAGERS AND THEIR ENVIRONMENT...

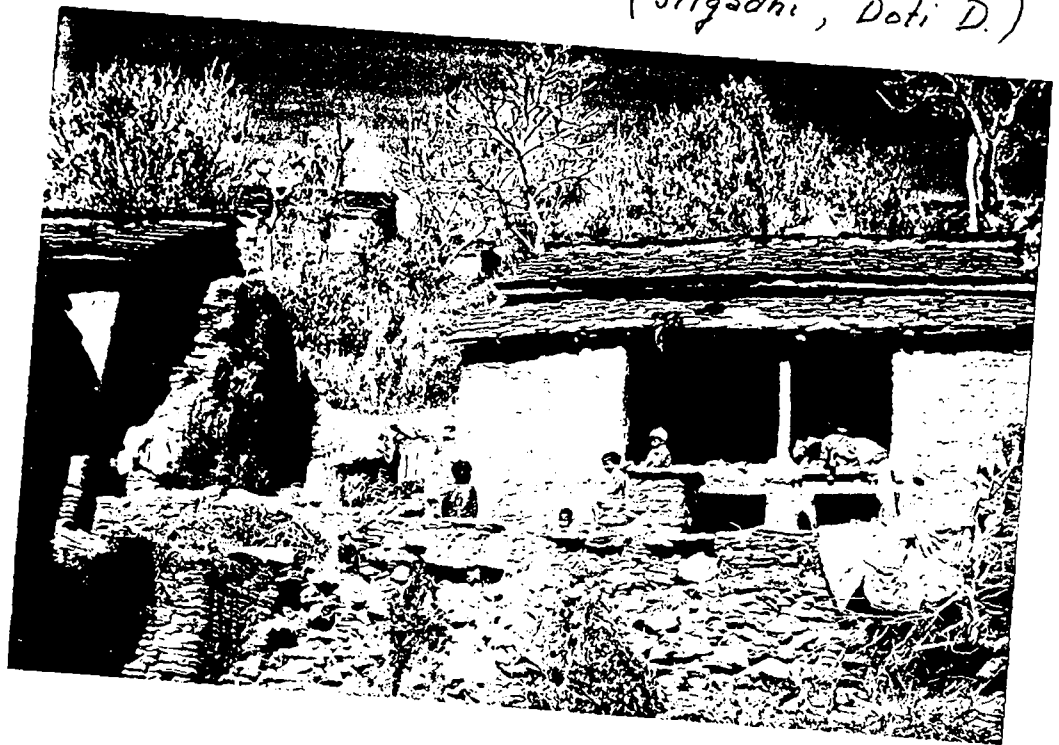


(Parena, Banke D.)



(a Terai village)

(Silgadhi, Doti D.)



... focuses for the planned
Programme's activities

3. SCOPE AND AREA OF SANITATION STUDY

3.1 Scope

In contrast to the water supply component for which the future Programme volume is fairly well predetermined, it was difficult and considered unfeasible trying to determine a representative physical "sanitation target" based on assessed needs within a relatively short period of time. Moreover, the Consultant is of the opinion that sanitation should be dealt with as a sector activity - going hand in hand with water supply work though - rather than in terms of latrine construction targets or achievements.

It was decided for these reasons to make a sanitation "type" survey at a selected number of project sites ear-marked for implementation in the Programme's initial phase. A basic distinction was made between Terai and hill areas, as it was expected that socio-cultural and -economic settings would differ mainly between these two geographical areas. To be included in the survey was an appraisal of ongoing sanitation activities in the future Programme area being implemented by other HMG agencies, notably MPLD, in order to learn from respective experiences.

With the close relationship between sanitation and other fields such as health in general, family planning, education, rural development, communication and training, attempts were made to appraise through contacts in the field as well as at the centre activities and experience of respective agencies.

3.2 Areas visited

Annex F contains listings and maps of the areas visited during the sanitation field survey.

4. METHODS OF STUDY

Informal methods of approach and discussions were used for the field study. Experience shows that formal methods - e.g. the use of household questionnaires - might not be liked by villagers who are usually not used to hold discussions with agency officials asking formal questions and seeking "framed" answers.

Discussions with (HMG) officials were usually held in a more structured way, posing questions in rather direct manner. Major points of discussions with both officials and villagers (of the latter usually after departing), were recorded as written notes. Photographs were made for easy illustration.

The following kind of persons and groups were contacted:

- Formal (Pradhan Panch, Upo-Pr. Panch) and informal village leaders
- Villagers (farmers, peasants, women, teachers, faith healers, water committee members¹)
- Officials (DWSS, MPLD, D.E.O., L.D.O; project officers, field staff, water supply maintenance workers¹, trainers and principals of training institutes).

¹in ongoing or completed MPLD CWSS-projects

5. GENERAL FINDINGS AND BACKGROUND

This main chapter provides the account of the sanitation reconnaissance survey made in selected places of Mid and Far Western Developing Regions in January and February, 1984. Besides, observations made by the Consultant in the rural sanitation section elsewhere in Nepal as well as background information collected from sector agencies or related documents are presented hereunder.

5.1 Sanitation, Diseases, Needs

5.1.1 A Hygiene Ritual

The Consultants' sanitation team members during their reconnaissance survey in the Programme area had staid in one village of Far Western Region for several days. One morning, during the team's morning wash at a village water tap, a young girl, carrying a "gagri" (water container), came to fetch water at the particular tap. She placed the "gagri" underneath the tap as soon as the team members had temporarily stopped making use of the running water. The "gagri" was about to be filled to the rim when one of the team's expatriate members very briefly wetted his tooth brush in the running water to then brush his teeth. This gesture, quite understandably, prompted the girl to remove the full "gagri" from underneath the running water and to empty it immediately and completely. She then placed the container again under the running water and let it fill to the rim. Before lifting it to carry it home, the girl, however, scooped into the container with unwashed hands to pour away some of the water which otherwise would have spilled over while she was walking home.

5.1.2 Guiding Questions

Those administrators, "technicians", social workers and communicators who plan and implement community water supply and sanitation programmes with the aim of contributing to the improvement of the beneficiaries' health, should keep posing questions of the following kind, while planning and implementing:

- What are people's beliefs and habits with respect to water, excreta and health?
- How, if at all, do potential beneficiaries (the villagers in this case) perceive the role of water and latrines for



PATTERNS OF WATER USAGE

are part of people's daily routine ...

. . . which has developed gradually and under the influence of environmental and social boundary conditions . . .



their health (and therefore general wellbeing), and how important are water and latrines to them relative to other basic needs?

- How can people's existing, positive but widely ritualized hygiene perceptions and behaviour be used to induce health improvements through new water schemes and methods of excreta disposal?

The following paragraphs are written and observations presented with these questions in mind.

5.1.3 Sanitation and Diseases

In general, people's hygiene-related situation and behaviour in the hills of Mid and Far Western Regions hardly differs from that in other parts of Nepal's hill areas: where villagers have to rely on traditional water sources which are often rather distant from villages and/or stop delivering water towards the end of the dry season, people fetch and use water to mainly satisfy physiological needs (drinking and food preparation). Insufficient water is left for washing hands, body, clothes and dishes frequently and thoroughly. Diarrheal and other gastrointestinal diseases are reported by villagers as being the prevailing diseases and cause of infant's and children's death in the area (beside measles as another major communicable, though not excreta-related disease). The period between April and June is always reported as peak period for the occurrence of gastrointestinal disturbances.

Tables 5.1 and 5.2 document statistically the health situation in Surkhet District as surveyed some years ago. The impact from excreta- and lack-of-hygiene-related diseases looms large.

Table 5.1 Percent Distribution of Conditions by Age Group as Reported for the 14-Day Period Preceding the Household Survey^{a,b}

CONDITIONS	AGE GROUP				
	0-4 yrs	5-14 yrs	15 + yrs	ALL	
Diarrhea/Dysentery*	39.6	16.7	6.8	15.9	
Other Gastrointestinal*	4.3	12.7	18.2	14.1	
Respiratory	8.3	9.5	11.6	10.5	
Fever	14.9	11.9	5.7	8.8	
Skin*	11.8	13.1	4.6	7.7	
Dyspnea/Wheezing	0.6	0.4	11.7	7.2	
Musculoskeletal	-	2.8	11.2	7.2	
Genitourinary	2.2	2.4	7.5	5.4	
Eye and Ear	5.6	9.9	3.0	4.8	
Measles and Other Specific Infectious Diseases	8.3	7.9	1.7	4.3	
General Complaints	-	3.2	6.3	4.3	
Accident/Injury	0.6	5.6	3.0	2.9	
Nutritional and Weakness	2.5	2.4	3.1	2.9	
Other and Unknown	1.2	1.6	5.4	3.8	
All	%	100	100	100	100
	No.	323	252	863	1438

* Conditions related mainly to personal hygiene and excreta disposal.

^a Ref. 2.1

^b Some ill persons reported more than one condition.

Table 5.2 Causes of Death Reported for District Hospital Inpatients - By Age Group (April 1977-December 1978)^a

CAUSES OF DEATH ^b	AGE GROUP					ALL	
	Below 1 yr.	1-4 yrs	5-14 yrs	15+yrs	No.	%	
Pneumonia/Bronchitis	1	5	1	6	13	19.1	
Other Infectious Disease	1	3	2	6	12	17.6	
Anemia	-	3	3	5	11	16.2	
Diarrhea/Dysentery	-	3	1	5	9	13.2	
Other Gastrointestinal	-	-	-	4	4	5.9	
Malnutrition	1	1	1	4	7	10.3	
Cardiovascular	-	-	1	4	5	7.4	
Accident/Injury	-	-	-	4	4	5.9	
Other	-	1	-	2	3	4.4	
Total	3	16	9	40	68	100	
Total Deaths	Male	2	3	2	14	21	42.9
	Female	0	9	4	15	28	57.1
	All	2	12	6	29	49	100

^a Ref. 2.1

^b Duplicated: For some persons more than one cause of death was mentioned.

These observations clearly show that scarcity and insufficient quantitative use of water are major causes of people's low status of health, and indicate in cohesion with the disease transmission chart presented in Chapter 1 that prevention of disease transmission will to a large extent be through provision of "much" water which will be perennially available near people's homes.

Water, if available, is the means "of choice" for anal cleansing after defecation. In the absence of water, people, particularly children, use any other suitable means such as stones, leaves, sticks. Doubtlessly, a person's (left) hand will be contaminated with fecal matter after anal cleansing. Cleansing norms prescribe that the hand be cleaned with water or soil after defecation. Though the majority of people, except probably small children, adheres to this rule, it must be assumed that the hand washing process is in most situations not rigorous enough to wash off or remove all fecal matter from the hand. It is then through contact with fecally contaminated hands that a large number of prominent diseases are transmitted either directly or via food, utensils or water.

The completion of improved water supply schemes (say with handpumps in the Terai or with reticulation systems in the hills) is in itself not a guarantor for improved hygiene and health; people will have to contribute by becoming aware of the relationship between excreta, water use and health, and by "amending" their hygiene-related habits.

Inhabitants of Terai villages, notably those who have more recently immigrated from hill areas, appear to have adopted improved standards of personal hygiene. Whether this is to be attributed to the relatively easy and disperse, year-round access to water (handpump- or bucket-extractable shallow groundwater), the warm climate (making bathing a rather pleasant undertaking), to behavioural aspects, or to a combination of these, would need to be investigated more closely.

Improvement of excreta disposal practices is considered an important adjunct to water supply in CWSS programmes. Tables 1.1 and 6.1. show that the construction and proper use of latrines might help mainly to reduce the incidence of worm infections and transmission of such diseases for which flies or domestic animals can act as transmitters. A careful look at existing practices of and boundary conditions for excreta disposal may guide the planner and "implementer" in making the programme culturally shound and giving the latrine component its proper role vis-à-vis water supply in reducing transmission of diseases.

In Terai villages most people of Terai origin do neither make use of latrines for defecation, nor do they feel any need for departing from their habit of open-air defecation in future. Reasons for not having and using latrines are:

- Many villages are typically clustered and densely populated leaving hardly any spare land for building household latrines. Often, a large proportion of a village's population are peasant farmers tilling other people's land and not owning (much) land themselves.
- Since people have been used to open field defecation for which they do not have to make any expenditure, there is very little motivation among Teraians to build individual household latrines.
- Terai men practising open field defecation and carrying a small jar ("lota") of water needed for ablution, do not mind others watching. Open-air defecation is an accepted sight.
- Experience with smelly latrines of others or elsewhere is acting as a deterrent.
- Children are reluctant to enter dark latrine cubicles and do not like to be covered from all sides while defecating. They therefore disfavour the use of latrines.
- During rainy seasons the water level in latrines rises quite high, causing splashing while defecating. Such an experience is a deterrent to others who may consider construction and use of latrines.

The manuring value of human excreta might be a further rationale for open defecation in fields, although this has, to the Consultant's knowledge, so far not been substantiated as playing a role in excreta disposal practices in the hills and Terai of Western Nepal.

In contrast to the majority of villagers of Terai origin, a large proportion of people who have immigrated from the hills have built ordinary pit latrines for their own use. The need for this has arisen because the immigrants' land (which may be used for defecation) is usually far away from the village, access to nearby fields might not be granted by the respective land owners, and the vastly deforested flat land does not provide any "shelter" and privacy for defecation (a situation which hill originals are not used to).

In hill villages, people traditionally and acceptedly practice open defecation, using fields, tree or shrub covered shady areas, dry stream beds or stream banks. Whereas land owners are usually able to defecate

close to their homes, peasant farmers or low-, occupational-caste people might be forced to go to relatively distant defecation grounds due to scarcity of land nearby their homes. The use of latrines is mostly unknown. There is no felt need for changing the inherited and socially accepted method of excreta disposal.

Impacts from open defecation might be rather minimal in villages with scattered settlement structure: the risk of others stepping into openly deposited excreta will be relatively small, and excreta might be sun-dried within a short period of time, making attraction to flies minimal. Improvement of personal hygiene by making proper use of supplied water might carry greater benefits than changing from "uncontrolled" to "controlled" excreta disposal. There remains, however, the possibility of domestic animals (say dogs, chicken) or pigs feeding on excreta and becoming potential disease transmitters. Such potential risks have to be carefully weighed against potential benefits accruing from say a hygiene education programme, which would center around the water rather than the latrines.

Though construction and use of latrines might bring about only limited health benefits, it might be or become a strongly felt need for women, to many of whom open-air defecation is associated with great inconvenience. Women may go out for defecation only in the early morning before dawn and at night after dusk, as they should not be seen by others during defecation. While experiencing diarrhea they might have "nowhere to go". In Kirtipur, a town in Kathmandu Valley, where a latrine construction programme had been started a few years ago, women reportedly are enthusiastic supporters for the above reasons (see also 5.5).

5.1.4 Sanitation vs. Other Needs

When asked as to their most pressing needs, villagers may typically list the following needs in this or similar order of priority:

1. Water supply
2. Irrigation (to be interpreted as being a means for alleviating existing food shortages)
3. School buildings and facilities
4. Communication facilities (bridges, all-weather links)
5. Firewood
6. Curative medicine through health posts.

Improved and perennial water supply is usually in great need, whereas the use of latrines is not felt as a need at all. It is further important to become aware that villagers usually have several pressing needs

and problems related to their basis of living, water supply being but one of them.

5.2 Sanitation at School

Of the schools visited in Programme area villages, very few have any kind of sanitary facilities; both water supply and latrines are usually lacking. When asked about the most pressing needs at school, teachers would cite proper school buildings and facilities as being of prime importance. Next to these basic needs usually ranks the need for water supply to the school premises. In places where schools are surrounded by vegetated land and are distant from people's homes, there is usually no genuinely felt need for latrines.

Health and hygiene are contained as a compulsory subject in the curricula of grade 1 to grade 10. For grades 4 to 10, specific school books on behavioural health education ("bebharik swasthyaya sikcha") have been produced. However, health and hygiene subjects are reportedly taught almost exclusively through books, i.e. without complementary practical activities. Also teachers do as yet not receive any kind of in-service training in subjects such as health education and sanitation.

Provision of water to the school premises must certainly be viewed as a top priority feature of any future CWSS scheme. This should ideally go hand-in-hand with increased health education activities at the schools (initiated and carried out e.g. with the support of the CWSS Programme).

5.3 Latrines and Drainage

5.3.1 Latrine Technology and Usage

Household (family) Latrines:

A large variety of household latrine types (basic designs, methods of construction) is at present being used, constructed and tried in Nepal. This reflects the great variation of environments and conditions in which people build and use latrines, and it further reflects differences in preference for and experience made with particular types of latrines in the many development programmes which comprise a sanitation/latrine construction component.

Table 5.3 is a listing of observed and reported types of latrines and latrine features having been or being applied in Nepal along with observed and reported particular advantages and/or disadvantages.

Table 5.3: Types of Latrines and Latrine Features; Advantages and Disadvantages

Types of latrines or particular features, as observed or reported	Particular advantages or disadvantages
Direct-under, single-pit latrines	<ul style="list-style-type: none"> - a type which in many places can be built exclusively with local¹ material - simplest type for construction and use - squatting place (slab) requires lasting structural stability; with local material structural stability is often doubted - risk of collapse of superstructure ? - children's fear of falling into pit - non-permanency of structure - excreta will be lost as potential fertilizer unless pit content will be dug out after required time
Offset latrine	<ul style="list-style-type: none"> - squatting place does not need to be structurally stable - no feeling of accumulated excreta underneath - chute difficult to construct from local material - water needed to keep chute clean - requires increased effort for keeping chute clean
Pourflush/waterseal latrines with alternate leaching pits	<ul style="list-style-type: none"> - decomposed excreta readily available as fertilizer (but religious/cultural objection?) - permanency of structure - flexibility in siting (e.g. squatting place inside building) - non-indigenous material required for pan and trap
Superstructure from matting and thatching	<ul style="list-style-type: none"> - not requiring strong foundation and heavy pit lining - easy to construct locally - may deteriorate fast or be blown away; frequent replacement might be required
Stone or brick masonry superstructure	<ul style="list-style-type: none"> - lasting, re-usable - heavy - construction requiring large inputs of material and labour - might be too dark inside to not make people afraid of using the latrine
Squatting slab from local material (bamboo, timber, stone slabs, planks)	<ul style="list-style-type: none"> - easy to build; reproducibility without outside assistance - may be difficult to keep clean - structural stability doubted at times
Ferrocement squatting slab	<ul style="list-style-type: none"> - requires non-indigenous material - dependant on outside technical assistance - structurally stable and lasting - easy to keep clean

¹ "local": used here to designate material available as indigenous village material

"VENTILATED" LATRINES



2 VENTILATED IMPROVED PIT (VIP) LATRINE ...



... with ferrocement squatting slab and
HDP vent pipe



(Pokhara, Nadipur)

Some of the advantages and disadvantages listed in the above table are typically valid only for the particular situation, i.e. dependent on the degree of awareness and felt need, community environment, defecation and hygiene habits, as well as other factors. Only very few characteristics are universally and objectively advantageous or disadvantageous. This leads to the conclusion that, except for some few basic requirements and guidelines which must be observed and which are briefly discussed below, promotion for latrine construction and acceptance essentially remains a trial and error process in which to find out acceptable types of latrine for the particular environment.

The suggestions given below are some of the very few more firm guidelines which might be listed as a synthesis of many experiences made and opinions formed among sanitation workers and users of latrines:

- Unless interiors of latrine buildings receive a minimum of day light (through openings in the walls or space between the walls and the roof), potential users, particularly children, are deterred from utilizing the latrine.
- A large proportion of latrine superstructures are being built too or much too small in height, rendering the use of the latrine cumbersome
- Timber, bamboo (cut at the appropriate time of the year) and stones are suitable materials to construct squatting slabs.
- Latrine buildings made from bamboo or straw matting or thatching usually need repair or reconstruction after one or two rainy periods. Families should therefore be encouraged to build stone or brick superstructures if feasible.
- Except for very deep pits, and very soft soils, pit lining with bamboo mats (round pits) appears to be as suitable as (but cheaper than) stone lining.
- Creating awareness among villagers for the need of sanitation and motivating to build and use latrines is often such a lengthy and difficult process that one might have to settle for very minimal standards of design and construction; even then, proper supervision by technical staff is very necessary in order to ensure that at least

the absolute minimum requirements will be fulfilled, which are a non-collapsing pit and squatting slab, and a superstructure with at least three walls, a door and a roof. Moreover, keeping the squatting area clean, and the door shut to render the interior reasonably dark and to reduce fly attraction, are the most important aspects of latrine operation. Anything less than that should not be advised as it would be detrimental to sanitation objectives and probably not meet the minimum health-related safety standards.

School Latrines:

With school latrines and school latrine construction programmes similar observations can be made as with household latrines: there is, as yet, no particular type of latrine which could or would have to be recommended for universal use in all school latrine construction programmes. The discussions centre around the following technical and non-technical aspects and observed phenomena:

- Drop-hole-type latrines preferable to pourflush/waterseal-type latrines
- Suitable sizing of squatting hole
- Number of units required to accommodate the needs of a particular number of pupils (it is e.g. observed that many pupils are, if at all, making use of the latrines for urination only, or when having diarrhea, and that they continue defecating either nearby their houses or elsewhere in open air).
- Often, school latrine cubicles are found having been locked by the teachers, making apparent that latrine use and maintenance is in some way or the other not under proper control
- The task of latrine cleaning is often assigned to the school "peon", or else, a person is hired exclusively for that task; where such a person is not found, maintenance and cleaning is then often not properly done or not done at all.

- The need for providing water to schools as an important prerequisite to latrines is obvious and repeatedly mentioned by all involved.
- Teachers' involvement in school sanitation, particularly in the proper operation and maintenance of latrines is usually marginal.
- Promotion among teachers and for inclusion of sanitation in school curricula (say, through special training/orientation) is therefore much needed. Experienced sanitation field workers (e.g. technicians) who are provided suitable communication aids, must be made available and assigned to this task.
- Most of the school latrines which have been built through government programmes in recent years, require non-indigenous construction material such as cement and reinforcement for squatting slabs. In MPLD' CWSS programme all school latrines are moreover fitted with screened vent pipes or venting chimneys for proper fly/mosquito and smell control. It is generally accepted that the use of non-local material for school latrines is justified, as they require greater sturdiness and assured ease of cleaning.

The fact that latrine construction programmes are trial and error "adventures" is illustrated by one rural sanitation programme where, reportedly, project personnel is seriously thinking of trying out open-cubicle (!) latrines at schools, hopefully making it easier for children to use the latrines. Of course, the important prerequisite must be that such a trial be very closely supervised, monitored and evaluated.

Latrine "Culture" in the Terai vs. in the Hills

There is a basic difference in excreta disposal practices in hill communities and in Terai villages many of which have experienced and still are experiencing a strong influx of immigrants from the hills: in the majority of hill villages, open-air defecation is the accepted method of excreta disposal. There, due to scattered settlement, it is usually easy for people to find a "safe" place for defecation, i.e. a place which is fairly free of other people's fresh excreta, and a place which allows for privacy (a factor of great importance to women).

In contrast to this, a substantial latrine "culture" has developed in those many places in the Terai where hill dwellers have immigrated in recent years due to overpopulation and natural-resource depletion in the hill communities. Latrines are built and used by the immigrants - the same persons who most probably did not make use of a latrine at their previous homes. Using latrines at their new homes in the Terai is dictated by the circumstance that their houses are usually far from their farm land (in case they are farmers), which would force them to use other people's land for defecation. Being either reluctant or not allowed to do this, and with the flat, open land not allowing for any privacy and natural cover, many immigrants have resorted to the construction and use of latrines. All the observed latrines appeared to be in frequent use, though some of them are also surrounded by heaps of excreta, probably from children being afraid or not advised to use the latrine, or from women who might object the use of latrine for fear (at night) or cultural reasons. The latrines are of simple design (pit-types) and method of construction. All are built exclusively from local material. The majority is unroofed. Commonly used construction materials are bricks (for superstructure, pit lining and/or flooring), wattle and clay (for walls), tiles (for roofing), jute bags (as "walls"), and timber and clay (for squatting slabs).

Reportedly, pits are 1.5-1.8 m ("one man") deep and usually become flooded during the rainy season, making defecation inconvenient because of splashing. Moreover, the flooding causes the decomposition process to slow down substantially, thereby reducing the rate of volume reduction and useful pit life.

The described phenomenon of the spontaneous development of a latrine "culture" in Terai communities makes one draw the conclusion that it is people's strongly felt need for latrines - induced by the specific environment - which most likely was the sparking point for their having changed the excreta disposal habits. Convenience, privacy and socio-economic boundary conditions appear to be the decisive factors, not health.

This leads one further to realize that, understandably, most hill dwellers will view methods of excreta disposal other than by open air defecation as strange and not related to particular, rational aspects, because the village environment will in most cases not force them to develop a felt need for latrine usage. This lack of felt need can indeed be clearly sensed in talking to the people in hill communities and making related observations. Other needs are usually felt to a much larger extent (see Chapter 5.1.4).

Teraian villages which are not experiencing social change through the wave of immigration and have remained closed societies with long established caste and ethnic structures have, in contrast, not abandoned open-air defecation. Many of them are peasant farmers without any land of their own, live in very densely built-up villages, and would therefore lack the space to build a latrine. Except for resorting to the use of public latrines, it would be irrational to propose or force construction and use of household latrines in such communities. Improved hygiene by means of increased water supply would be a much more important and successful way towards health improvement.

In the previously described Terai villages where immigrants have settled there might be substantial potential and need for a latrine improvement and expansion programme. The impression is gained that actual or potential users might be very receptive for technical assistance in improving the design and construction methods of latrines, particularly for coping with the high groundwater table.

5.3.2 Tapstand and Surface Water Drainage

Tapstand Drainage:

Experience and observations with both rural and urban systems, and in DWSS- as well as MPLD-constructed water supply schemes shows that tapstand drainage is in many cases not properly designed for or functioning. Reasons for this are manifold, among them:

- Its proper execution usually gets least attention and is often spared until the scheme is nearing completion when both villagers' and fields staff's enthusiasm has faded away.
- Compared to the supply of water, the proper disposal of drainage water seems less important to villagers and field staff.
- Often, finding proper places for disposal of tapstand wastewater is difficult, or would require shifting of tapstand locations, which in turn might create disputes among villagers.

Consequences of improper tapstand drainage are that the tapstand foundation may become damaged through ponded water directly or by cattle being attracted to the ponded water at the tapstand, that people make use of such ponded water, say for washing during times of crowding at

TAPSTAND DRAINAGE

(Pokhara)



... often treated as a second or third priority item



(Tharkughat, Lamjung D.)

the tap or when flow from the reservoir is intermittent, and that inconvenience is caused to the users.

Good tapstand drainage can be achieved, and is in fact often practiced, when villagers endeavour to build a cattle pond ("pokhari") or such a pond is existing and can receive the tapstand wastewater. Such solutions should be encouraged as water for cattle is usually in great need. The distance from tapstand is governed by the topography, the suitable location of the pond and a minimum distance to avoid cattle to damage the tapstand.

The disadvantage of newly established ponds might be an increased mosquito population in the surrounding areas. Mosquitoes travel long distances (kilometers); increasing the distances between tapstands and ponds will not have an effect. Experience must show whether the need for human food supply or (slightly?) increased health risks carry greater importance.

The use of drainage water for irrigating nearby fields or kitchen gardens is a practice often found in village water supply schemes. Being a sound technical solution, the question must be asked whether the benefits of such a solution accrue to a number of villagers or only to a very restricted number of (influential) people who have succeeded to site the tapstand in such a way that the benefit of using the drainage water will in fact accrue to them. Such one-sided advantages drawn from a system by individuals might lessen the interest and help of other villagers for maintaining the scheme.

In Gularya, District Headquarter of Bardiya District, a small town of 3 to 5000 inhabitants of primarily rural character visited by the Consultant's sanitation team, some of the tapstand drainage water is reportedly directed to a pond within the District Police Office's premises and used for aquaculture. This might be a technically feasible solution for other Terai communities, as well. However, careful observations and investigations would have to be done prior to implementation to establish the social feasibility of such a sub-project within the particular community.

Surface Water Drainage:

The drainage of surface water, i.e. of storm run off from public tapstands, poses a problem particularly in the urban and quasi-urban areas of the Terai. There, sloping of the terrain is minimal or nil, causing surface water to pond or, where drains are installed such as in the main

streets of larger towns, flow of water to be minimal due to low gradients of drains and lack of maintenance.

A high priority need for improved surface water management has been aired by the residents, stall and shop owners and the Pradhan Pancha of Rajapur (Bardiya D.), an important regional trade center in the Terai visited by the Consultant's sanitation team. It has a densely built-up and inhabited central bazaar area which lacks any kind of structured or engineered surface drainage system. All roads, alleys and footpaths are without hardened surface.

The definite need for drainage improvement as expressed by Rajapur community members can easily be conceived. Heavy pondage of water during monsoon is felt by them as a great nuisance. Doubtlessly, this is an area of activity in which DWSS (and WSSB) should become engaged in future.

A partially completed surface drainage system exists in Damauli, Tanahun D. Headquarters (Western Development Region, 45 km E of Pokhara), a town with a recently completed DWSS scheme.

At places, channels are covered by loosely laid concrete slabs, which permit entry of surface water. Reportedly, plans exist, to complete the presently existing drainage scheme to cover the whole bazaar area. Wastewater is stagnating due to blockage by solids and probably due to insufficient channel gradient. As in other towns such as Nepalganj, Pokhara, Kathmandu, drains consists of a rectangular-profile channel built from bricks and cement mortar plastering.

The Consultant recognizes that great technical difficulties of devising properly functioning surface water drainage exist in some of the country's urban and semi-urban areas. The problem is most eminent in the flat areas of the Terai. Compounding factors are:

- In flat areas, channel slopes must be minimal, in order to avoid deep excavation and deep drains, and to avoid the need for pumping into receiving water bodies. However,
- Minimum slopes easily leads to blockage by the many kinds of solids which find their way into the surface drains.
- There is apparent lack of regular maintenance and repair of drains (removal, collection and disposal of solids, periodical flushing).

That the latter restriction can be overcome, was made evident to the Consultant in Nepalganj, when, on the eve of the visit to Nepalganj by their Majesties, three-member-teams (employees of the town administration) dressed in overalls and equipped with simple but very appropriate equipment consisting of shovel, scoopers and hand-cart, efficiently cleaned the clogged and filthy drains of the main street.

Consultants to the World Bank for its fourth support package to WSSB covering water supply, sewerage, sanitation and surface water drainage in 20 urban communities, in their 1983-Project Background-Interim Report, briefly touch on aspects of surface water drainage (Ref. 1.8). According to their findings to the date of the report, there appear to exist ambiguities as regards share or splitting of responsibilities for road-side drainage between the Roads Department and WSSB/DWSS.

DWSS has recently prepared plans for surface water drainage systems for the towns of Mahendranagar (Far Western Region) and Ilam (Eastern Region).

Some indicative project features are:

- Ilam: - total project cost	NC 200,000
- Mahendranagar:	
• total project cost (1983)	NC 900,000
• drainage area	16 ha
• length of laterals (B = 30 cm)	960 m
• length of main (B = 50 cm)	600 m
• rect. channels in masonry covered with r.c.c. slabs 7.5 cm	
• cost per m of channel	NC 560

SURFACE WATER DRAINAGE — a great challenge



(Nepalgarh)

... technically, in water-logged areas of the Terai, and

... to devise systems which are compatible with the community's pattern of living and organisation



(Kirtipur)

5.4 Decade Plan on Sanitation

HMG's plan for the Decade sets the following policy and guidelines for rural and urban sanitation (Ref. 1.3).

<u>Rural</u>	<u>Urban</u>
- Excreta disposal to be exclusively by (household) latrines (i.e. no sewerage)	- Launching of low-cost sanitation programme with focus on excreta disposal by household latrines
- facilities to be little capital-intensive.	- government technical assistance and subsidy on essential parts of latrines
- health education and community participation major focuses	- sewerage in core areas of some six densely populated urban centres
- importance of primary health care in expanding on sanitation coverage	- no target for low-cost sanitation coverage
- focus on school sanitation (some 18,000 schools throughout the country)	

Countrywide coverage with proper excreta disposal facilities (latrines) in rural areas is aimed at according to the schedule in Table 5.4.

Table 5.4 Proposed Countrywide Latrine Construction Coverage for Rural Areas

	Rural population estimate (x 10 ⁶)				Proposed latrine coverage (%)			
	Terai	Mid-lands	Hills	Total	Terai	Mid-lands	Hills	Total
1980	5.0	6.8	1.4	13.2	0	0	0	0
1985	5.7	7.5	1.5	14.7	5	2	0	3
1990	6.4	8.3	1.7	16.4	20	10	2	13

It is clear from the policy set forth for rural and urban sanitation that the methods of choice for excreta disposal will have to be low-cost and unsewered disposal. For rural sanitation programmes the prime role of health education and the integration with related efforts and programmes such as primary health care (which further includes e.g. nutrition and family planning) is clearly emphasized and sets an important working guideline. Field implementation of sanitation thus means that training, follow-up, monitoring, evaluation and intensive communication will have to loom large if long-term success is to be established.

5.5 DWSS Sanitation Activities (Eight-Town Sanitation Programme)

DWSS, since fiscal year 1981/82 (2038/39), is implementing a low cost sanitation programme in eight (8) towns in the hills (Silgadhi, Birendranagar, Pokhara, Kirtipur, Ilam) and in the Terai (Mahendranagar, Bhairahawa, Janakpur). The Programme, so far, concentrated on the construction of latrines. A standard design for 5-, 10- and 15-user pour-flush/waterseal (PF/WS) latrines has been developed and is being used by the implementing offices (see Annex C for type design and method of construction).

The Eight-Town Programme is fully HMG-funded. The funds cover material subsidy for squatting pan and floor, as well as for pit cover construction (cement, reinforcement, binding wire, fiberglass/plastic pan/trap). The average subsidy amounts to about NC 1100 per latrine. Planning/advisory support for the Programme is provided by the Technical Advisory Group (TAG) of the UNDP Interregional Project INT/81/047 on Development and Implementation of Low-Cost Sanitation Investment Projects. TAG has recently submitted a jointly devised master plan proposing continuation and expansion of the Programme (see Ref.1.6). To date its budgetary provisions and latrine construction volumes have been as indicated below:

<u>Fiscal Year</u>	<u>no. of units constructed</u>	<u>Budget (NC)</u>
1981/82	250	1,080,000 (incl. minor sewerage)
1982/83	700	1,000,000
1983/84	1100	1,200,000

The long-term (up to 1990) plan calls for the following construction volumes and budgetary provisions (1983 cost basis) for subsidy to the Programme in the eight towns:

	<u>No. of units</u>	<u>Budgetary Require- ments (x 10³ NC)</u>
- Conversion of household bucket/pit latrines to PF/WS latrines	8,600	} 149,000
- Construction of new PF/WS household latrines	17,200	
- Construction of public latrines	300	
- Construction of school latrines	1,100	

The proposal is made that the cost of latrine construction be covered partly by subsidy (grant), partly by loan from DWSS and partly by the user's own contribution, and that loans be recovered by the town administrations in order to generate funds required for town sanitation work.

The Eight-Town Programme is being implemented by DWSS' central sanitation "cell" (Division) and the field Division Offices, the latter being in close contact with the respective town administrations (Nagar Panchayats). The division of responsibilities is as follows:

- Sanitation "Cell":

- overall planning, annual budget submission, budget allocation to Divisional Offices
- standard designs
- overall supervision

- Divisional Office:

- receiving scrutinised request list from Nagar Panchayat Office

- submitting yearly construction plans to Kathmandu
- receiving allocated funds through District Treasury
- procurement of material to be provided to users as a subsidy for construction of squatting structure (pan, trap, cement reinforcing bars) and pit covers
- supervision of latrine construction
- user instruction on use and maintenance
- submitting progress reports to Kathmandu (cc. to Regional Office)

- Nagar Panchayat (town administration):

- receiving applications for subsidy (material) and technical assistance
- scrutinization of applications and submitting request list to DWSS Divisional Office.

The DWSS sanitation cell's present staffing situation is as follows:

	<u>Posts sanctioned</u>	<u>Staff assigned</u>
- Divisional Engineer	1	1
- Assistant Engineer	2	-
- Overseer	6	1
- Supervisor (daily wage employment)	-	6
- Draftsman	1	1

At Divisional Office level, overall responsibility lies with the Divisional Engineer (D.E.). Construction management is done by an Assistant Engineer; supervisors are employed to assist in construction.

A study has been conducted in 1982 in Kirtipur to evaluate community response to the PF/WS latrine Programme and technical/managerial/oper-

ational aspects of the Programme (Ref. 1.2). The major conclusions derived from the study are outlined below:

- The properly chosen "software" approach (long and intensive communication and promotion at community level prior to programme start-up) had prepared the ground for wide acceptance of latrines (to date, up to 30% of all families have reportedly installed latrines).
- Needs and behaviour of town dwellers differ from those expected by government staff.
- Women's support is strong as the latrines render defecation particularly convenient to them.
- People's interest in latrines is centered more around convenience and prestige, rather than expected health benefits.
- Committed leadership was essential to the success.

From the Consultant's discussions with field staff, information gathered, and own observations in the towns of Silgadhi (Doti District, Far Western Region), Birendranagar (Mid Western Region), Pokhara (Western Region), and Kirtipur (Central Region) the following summarized account is given:

- The latrines are well constructed, and appear to be used and function well.
- Whereas some of the users properly clean the squatting pans others do not. For those who do not, lack of nearby water in sufficient quantity might be the major deterrent for properly and regularly cleaning the pan.
- The subsidized latrine construction programme in Pokhara, Birendranagar and Silgadhi has so far mainly favoured reasonably or quite well-off families. Except for the technical guidance provided by DWSS, these families might have been in a position to build a latrine purely from their own resources. This must not be harmful to the Programme, as other people's interest to build latrines might be roused by latrines built and used by the more well-offs. The Department should however deliberate what alternate subsidizing strategy and designs or methods of

construction could be devised in future to make the Programme beneficial to potential users of all socio-economic levels.

- Many owners of new PF/WS latrines have invested relatively large sums of money (several thousand rupees) into superstructure construction. Some have attached a separate shower room to the latrine, if a private water connection was available.
- Users contacted appeared to have no objection of having to empty the pits once the pit content will have properly decomposed. They confirm that they intend to use the content for fertilization/soil conditioning when time is due. However, with none of the latrines has this stage been reached yet.
- To date, users of PF/WS latrines built with DWSS support appear to be satisfied with the latrines' physical performance, as no complaints have as yet reached the respective offices.
- Observations as well as discussions with owners of recently built latrines reveal that in some families some of the members do apparently not make use of the latrine, but continue to defecate in "latrine alleys" or in fields instead. Their appear to exist definite cultural and behavioural rationales for this.
- It is observed that many latrine buildings, construction of which falls under the user's responsibility, end up being too small either in height or by inside dimensions. It is intended to develop drawings showing suitable alternate designs and methods of construction for latrine superstructures.
- Critical points for proper functioning of the latrines are the smoothness of the drain channel and its slope. The channel must be extremely smooth and free of anything which could hinder the transport of the flushed excreta. Also, the channel should if possible have a slope not less than 1:5.
- According to information gathered from users, 1-2 litres (a figure often cited in publications) appears to be

sufficient in most instances to allow for proper flushing. For proper pan cleaning, however, more water will be required.

- The Department might investigate and make pilot trials for including into the Programme the construction of other than PF/WS latrines (say VIP-type) for use in less densely built-up semi-urban and urban areas where sufficient land is available to shift pit latrine locations and where people do not have sufficient water for pour-flushing in close reach. Pit-type latrines may be economically attractive alternatives under specific circumstances.
- So far, the Programme was centered around latrine construction. As yet, health education and orientation of users (except for short explanations as to construction procedures and latrine usage) has not been given emphasis.
- The Department should not hesitate to take up this task, e.g. with the help of an experienced sociologist/anthropologist who has previously worked in this field.
- A programme/funding proposal for monitoring and evaluating socio-cultural aspects of low-cost sanitation has been drawn up recently (Ref. 1.9). UN-Habitat support is being sought for this. In addition to the proposed activities, contact with and support from the Health Education Section (Ministry of Health) should be sought to speed up inception of the health education/communication follow-up component.

5.6 DWSS Training Activities and Plans

Recently, a UNDP-funded/WHO-executed programme for in-service manpower development to the water supply and sanitation sector in Nepal has been devised and initiated (Ref. 1.1). It constitutes, at present, the major manpower development undertaking at the Department. The programme is the outcome of coordinating efforts among the "National Group" of sector agencies (DWSS, WSSB and MPLD) and the donors (UNICEF and WHO). Quantitative training requirements have been determined on the basis of sector policy deliberations and manpower requirement studies, among them a

recently concluded assessment on behalf of HMG and World Bank of sector manpower needs and shortcomings.

There exists at DWSS a training "cell" which is managed by a Divisional Engineer and embedded in the Department's supervision/maintenance/sanitation section which in turn is headed by a Superintending Engineer. The cell acts as a planning, liaison and management body mainly. It intends to contract out most of the training courses which are envisaged under the UNDP/WHO supported training programme to private firms or individuals. The UNDP/WHO supported programme has the following main features:

- Focus is on -sub-professional staff (plumbers, supervisors, technicians), and on field engineers and overseers.
- Field work related training shall be conducted in the regions; field staff, notably overseers and assistant engineers shall be trained to become trainers.
- Community involvement and health education are to be given proper emphasis in all training activities.
- The Department's training cell shall be supported to play a major role in training coordination in future.
- As part of the UNDP/WHO manpower development programme a three years (1984, 1985, 1986) training schedule has been set-up which will primarily serve the various needs of DWSS and WSSB¹. The events shall take place either at the centre or at regional or divisional level depending on the nature of the training. Training clients and focuses are:

Engineers : basic orientation; refresher

Overseers : " " "

Plumbers and Supervisors : consolidation, refresher

District Tech. Office Engineers and Overseers : To strengthen local decentralized government administrations

The initiated programme's curricula do as yet not put strong emphasis on the teaching and practicing of health education, latrine construction and village communication.

In addition to the above in-country in-service programme, UNDP/WHO since 1981 are sending overseers for B.E. studies to universities in India.

Further to the UNDP/WHO programme, an agreement has been drafted to investigate socio-cultural aspects of low-cost sanitation projects and to propose suitable monitoring and evaluation methodologies. The respective agreement is due to be signed by HMG and UN-Habitat. It would provide for an 18 months study of sanitation related problems and could produce useful inputs to the proposed ADB funded Programme (Ref. 1.9).

5.7 Extension Workers on Sanitation from Other HMG Agencies

5.7.1 The Water and Sanitation Technician (WST) of the Ministry of Panchayat and Local Development (MPLD)

The Consultant's sanitation team during its field study had visited a number of water supply and sanitation projects run by MPLD/UNICEF in Mid and Far Western Regions. It was observed that the Technicians employed by MPLD/UNICEF were entrusted to perform the sanitation activities along with the technical work on water supply schemes. Normally, a Technician

has to do all the water supply scheme work. He further guides and trains-on-the-job skilled and semi-skilled labourers in masonry work and instructs villagers about trench digging and laying of pipes. He is to perform himself setting out of structures as well as manual masonry and pipe fitting work. While living and working in a project area the WST is in close contact and manages work jointly with the project's water supply and sanitation committee (WSSC). Besides the duties related to water supply scheme construction he then has to create awareness among villagers to understand the importance of sanitation and the proper use of water and latrines. The WST can in fact be a very effective and reliable extension worker for preventive medicine and sanitation as he lives in intimate contact with the villagers over a long period of time. He has to assist school and health post staff to build institutional latrines. Sometimes, a latrine for the Panchayat office is also to be built for

¹MPLD with the support of UNICEF has previously developed field staff training programmes at Regional Directorate level.

use as well as for demonstration. The technician should liaise with the health post staff-in-charge to help in developing health and sanitation information activities. He also is to liaise with the teachers in the project area and may conduct sanitation classes by using suitable sanitation-related teaching aids. UNICEF, for this purpose has developed a school "sanitation kit" consisting of posters and a teacher's guide book.

On his arrival at the project area the WST in agreement with his host family should build a latrine out of local material for his own and his host family's use. He gives technical guidance and assistance to villagers who wish to build latrines out of local material.

Some of the more senior WST have meanwhile be trained further to take up specific and expanded tasks on health education and sanitation in villages and at schools.

5.7.2 Panchayat Based Family Planning and Health Worker (FP/MCH Project)

The District-Based FP/MCH Projects of the Ministry of Health employ village level extension workers for their extension work to villages. Generally, such workers are chosen from the local village. They are persons who are well respected by the villagers, and much acquainted with the area, the people, and the village's social environment. Much of the work on family planning and health care including sanitation is done by this kind of worker. People in the villages are provided important messages on birth control, personal health and hygiene, environmental sanitation, proper use of water etc. Villagers are also being motivated to construct and use latrines. Immunisation activity is also one of the functions of the Panchayat based family planning and health worker along with distribution of medicines and contraceptives. Such workers are trained by the FP/MCH Project before they are deployed to their respective fields of work.

5.8 Involvement of Other Agencies in Sanitation

The brief outline on sanitation activities of other programmes and agencies is meant to familiarize administrators and future Programme implementers with potential sources of relevant experience. Further to this, DWSS might want to seek active cooperation with a number of these agencies in the course of Programme implementation. A more extensive list of potential contact and support agencies is contained in Annex D.

Ministry of Panchayat and Local Development (MPLD)

MPLD is implementing a countrywide community water supply and sanitation (CWSS) programme since the early seventies. UNICEF provides technical assistance and material grants. Programme management at field level is through the Ministry's Regional Directorates, some of which have further delegated the tasks of scheme construction and extension work to CWSS Field Offices.

Sanitation activities have been initiated a number of years ago and have gradually received increased attention and the status of a fully integrated component. Major focuses in sanitation are:

- Familiarisation of subprofessional staff ("Water and Sanitation Technicians", WST) with health and hygiene education, latrine construction and communication in the water and sanitation basic training courses
- Upgrading of experienced WST to be employed as "Community Sanitation Workers" (CSW) having the task of introducing sanitation aspects to project villages during the project's initial phase, and to guide, monitor and follow-up village sanitation activities
- Liaison with teachers of project villages for the construction of latrines at schools and support to teachers in the development of school sanitation curricula
- Promotion of household latrine construction and use by villagers through WST and CSW

In devising training curricula and for village extension work in sanitation, support is provided by the Health Education Section (HES) of the Ministry of Health, and by UNICEF's Project Support Communication section.

MPLD-Regional Directorates, for their training activities in Mid and Far Western Regions, are closely cooperating with and making use of the training infrastructures of the Panchayat Development Training Centre (PDTC) in Nepalganj, the Women Training Centre (WTC) and the Community Medical Auxiliaries (CMA) Campus in Surkhet (see also below).

Important experiences made to date with the programme's sanitation component may be summarized as follows:

- (1) Unless sanitation is included in project site activities along with the work for the water scheme and from the very first village/agency contacts, gaining major interest by villagers for the matter of sanitation is rather difficult
- (2) Latrine design and construction has proven to be a trial and error process and should remain so for the time being, in order to allow for flexibility in adapting latrine technology to varying socio-cultural environments.

Training institutes (PDTC, WCT, CMA-Campus)

The PDTC in Nepalganj and the WTC and CMA-Campus in Surkhet, are three HMG training institutions which have provided growing support in recent years to MPLD's CWSS programme as well as to the UNICEF supported Terai shallow tube-well programme which is being implemented by DWSS and MPLD. A Women Training Centre has also been established in Dipayal in early 1984 for the Far Western Development Region. As in other parts of the country, most of these training institutions have established good manpower and facilities infrastructure and are interested to extend cooperation also to the DWSS rural water supply and sanitation Programme.

Health Education Section (HES)

The Health Education Section (which is part of the Ministry of Health's Department of Health Services) has an established record of extending health education support of various kinds to many HMG- and non-HMG agencies and programmes. Among them are DWSS (reportedly for the promotion of low-cost sanitation activities in Kirtipur), MPLD (for its Region-based CWSS programmes notably the technician trainings), Ministry of Education (for developing school health curricula in grades 1-10). HES activities and services are centered on:

- Conducting workshops and training programmes in health, and alternatively, provision of health education staff to cover the health (education) component of other agencies' training programmes
- Production of promotional and training material on health aspects
- Mass communication (e.g. radio messages) on health.

To carry out these tasks, HES is at present employing a total of 12 professional staff, among them health educators and health education technicians.

HES constitutes an important support agency for the implementation of the proposed Programme. Support could be conceived through receiving direct training and promotional material assistance, or alternatively, assistance to and close liaison with a health educator whom DWSS might think to employ in future.

Education for Rural Development in Seti Zone ("Seti Project")

The "Seti Project" is a programme dealing largely with non-formal, functional adult education in Doti and Bhajang Districts (Far Western Region). It has been initiated two years ago, runs under the Ministry of Education and receives support from UNESCO and UNICEF. The programme's plans of operation are periodically discussed and approved by the respective District Education Committees, and the activities carried out in cooperation with the District Education Offices. The programme centre is at Silgadhi, Doti District.

The functional education covers a large number of subjects, all related to the day-to-day life of villagers. Health and sanitation carry substantial importance, both in "theoretical" teaching as well as in practical work. Issues dealt with, are:

- Personal hygiene
- Environmental sanitation
- Construction and use of (pit) latrines
- Tapstand maintenance and sanitation
- Organic waste composting

Technical assistance (but no subsidy) is rendered to villagers wishing to construct household latrines. Preventive health activities are at times combined with curative efforts such as deworming campaigns which are used to get messages on sanitation across.

Further to the non-formal education activities the programme has a school support component, through which it provides subsidy for school building and tapstand construction. Teachers training curricula, too, cover health and sanitation issues, as well as practical latrine construction.

School reading material which is developed by the programme also contains sanitation "morals" and hidden messages.

In villages where adult education activities of the Seti Project and future DWSS work will be going on simultaneously, liaison between the two agencies for the promotion and follow-up of sanitation work might prove useful.

District level offices of line agencies (District Health Offices, District Education Offices, Family Planning/Mother and Child Health Programme)

Line agencies' District-level authorities such as D.H.O., D.E.O., FP/MCH are as well engaged in sanitation, though to a variable extent and as complementary activity.

Health-post staff, beside providing curative medicine at village level, are expected to perform extension work on preventive aspects such as health education, hygiene practice and latrine promotion. They are responsible to the District Health Inspector.

Similarly, District education authorities are the subsidizing and supervisory bodies for formal education at village schools. Both tasks relate to teaching activities as well as physical facilities such as school building construction which is to make provision for the installation of latrines.

FP/MCH programmes have apparently developed rather strong and effective extension and follow-up activities in a number of Districts. Sanitation being closely related to FP/MCH aspects, it is also included in the respective extension activities.

DWSS staff, in its future work for the proposed CWSS Programme may establish variable levels of contact and mutual support with the listed authorities, depending on the particular plans of operation and the assumed or expected mutual benefit of such coordination or cooperation.

6. RECOMMENDATIONS

6.1 Basic Concept and Approach

In going about sanitation one might think of two components, viz:

- "Software", which includes such aspects as promotion, communication, manpower development, follow-up of field activities, institutional set-up; and
- "Hardware", which focuses on the design, construction and operation of latrines and surface drainage or sullage disposal systems.

Experience shows that improvement in health does hardly or not come from construction of either water supply schemes or latrines alone and in an automatic manner. It might, however, be expected, that people's health status would in fact gradually improve, if the "hardware" of CWSS work is suitably complemented by health awareness and hygiene promotion work. Thus, the major tasks and issues in sanitation are, in decreasing order of relevance for the situation in most of Nepal's rural communities:

- 1- Orientation on how the "new" water contributes to improving health (i.e. by increased use for washing hands, clothes etc.)
- 2- Awareness - creating work among and orientation of project villagers as to the role of improper sanitation (hygiene to start with) for their health status.
- 3- To explain the usefulness of latrines in relation to the specific village environments as regards potential health benefits and convenience particularly for women.
- 4- To assist in latrine construction to people who feel the need for using such facilities.

Sanitation thus largely involves working with people and their attitudes beliefs and habits, understand these, and working towards gradual change where feasible and necessary.

Accordingly, the software component of sanitation (communication support, training, follow-up) must loom much larger than latrine construction in terms of importance at field work.

This emphasis could be somewhat though not markedly different in urban and semi-urban or other densely built up areas where open and uncontrolled excreta disposal tends to constitute a major health risk. There, helping to develop a "latrine culture" which is compatible with the community's situation and people's needs or helping to improve on existing latrine technology, will probably be of substantial importance besides focusing on health and hygiene education.

Table 6.1 illustrates with a scoring system the relative role of health improvement "tools" such as water quality, water availability (quantity), personal hygiene, excreta disposal (Ref. 2.4). The total score for each "tool" (being an average for many different types of environments worldwide, including urban and rural areas) may serve as a guide for priority setting in sanitation work in the framework of a water supply and sanitation programme of the proposed kind¹.

Sanitation, i.e. both its soft- and hardware components, must be looked at as an open ended process. Today, many programmes and agencies in Nepal have been carrying out sanitation work. Collectively, experience shows, that where it has been done over a long period of time (say 5-10 years) and with close follow-up and supervision, it is slowly showing effects with regard to people's awareness. Long-term approach and follow-up are the decisive factors. Besides this, sanitation development is best approached as a trial and error process, which allows both villagers and field staff to find out what "works best" under the specific circumstances. Therefore, e.g. for latrine construction, recommendation is not made for a best type of latrine, but rather for a range of types and designs to be selected from to suit the particular needs (see Chpt 6.4 and Annex C). Also, the list of the shown types is not exhaustive; still other designs and methods of construction should be tried where deemed necessary. There must be much room for proper experimentation, closely monitored and controlled though.

To carry out sanitation work calls for suitably trained extension staff, flexible strategies and procedures. Experience in Nepal shows that a suitably trained technical person living and working in a village may gradually develop a relationship of confidence with villagers on the

¹ In most rural environments of Nepal, the score "water availability" and "personal and domestic cleanliness" would have to be increased relative to the score for "excreta disposal" thereby reflecting the great importance of water, its quantitative use, and personal hygiene as health improvement tools.

YEAR - ROUND SUPPLY OF WATER NEAR
PEOPLE'S HOME . . .



. . . will help to
ease bathing and
washing



Table 6.1 Excreta and Water Related Infections and Their Control (after Ref. 2.4)

Infections	Importance of alternate control measures							Public health importance
	Water availability	Personal and domestic cleanliness	Excreta disposal	Food hygiene	Excreta treatment	Water quality	Drainage and sullage disposal	
Diarrhoeal diseases and enteric fevers								
Viral agents	3	3	2	2	1	2	0	3
Bacterial agents	3	3	2	3	1	3	0	3
Protozoal agents	3	3	2	2	1	1	0	2
Poliomyelitis and hepatitis A	3	3	2	1	1	1	0	3
Worms with no intermediate host								
Ascaris and Trichuris	1	1	3	2	2	0	1	2
Hookworms	1	1	3	1	2	0	0	3
Beef and pork tapeworms	0	0	3	3	3	0	0	2
Worms with intermediate aquatic stages								
Schistosomiasis	1	1	3	0	2	1	0	3
Guinea worm	0	0	0	0	0	3	0	2
Worms with two aquatic intermediate stages	0	0	2	3	2	0	0	1
Skin, eye and louse-borne infections	3	3	0	0	0	0	0	2
Infections spread by water-related insects								
Malaria	0	0	0	0	0	0	1	3
Yellow fever & dengue	0	0	0	0	0	0	1	3
Bancroftian filariasis	0	0	3	0	0	0	3	3
Total	18	18	25	17	15	11	6	
	36							

0 = no importance
1 = little importance
2 = moderate importance
3 = great importance

basis of which sanitation can then be promoted. Besides intensive basic training the technician needs regular and frequent support and encouragement, particularly because sanitation is usually not rewarded quickly, might take years to materialize and might therefore be a disappointing experience for the technician. Frequent visits to project villages by supervisory staff and periodically calling the field staff for refresher training is part of a strategy which focuses on such built-in follow-up.

6.2 Manpower and Training

6.2.1 DWSS Sanitation Manpower

Central Office Kathmandu:

The recently established "sanitation cell" at the Department's central office in Kathmandu (for its present set-up and functioning, see Chpt. 5.5), which is headed by a Divisional Engineer will continue to be the coordinating body and in this role do the country-wide planning, budgeting and budget allocation for the Eight-Town Sanitation Programme.

The Division's function for the proposed (rural) Programme shall also be to coordinate rural sanitation activities of this Programme with those of other existing or planned DWSS rural sanitation programmes (Eastern Region, to be started in 1984 with British Government aid; Western Region, in preparation). In addition, the Division will cater for the institution's "sanitation links" at the centre which are or will have to be established with other sector agencies, such as Ministry of Health and its sub-sections, MPLD, WHO, and UNICEF. Furthermore, the "Cell" will prepare the combined yearly sanitation budget of DWSS, and advise for budget allocation and disbursements.

To create awareness among people as to the role of sanitation for their well-being, to motivate and to promote, are by far the most important tasks in sanitation. All this can only be done or achieved on the basis of intensive and continued contacts between agency staff and beneficiaries. Therefore, a communicator (e.g. development sociologist or an anthropologist) needs to be employed at field level. The person's role is (1), to "extend" the concepts of sanitation to the villagers through proper channels and methods of communication, (2) understand and evaluate villagers' situation and needs, (3), (re-)orient the Programme accordingly, and help to make it socioculturally feasible, and (4),

impart the skills of communication to the field and grassroots staff (see also Appendix A, job descriptions).

The Sanitation Communicator (SC) for whom DWSS will have to create a new type of post, shall be employed at a level comparable to that of Assistant Engineers. He receives advice by an ADB-funded consultant communicator/sociologist.

At the Divisional Offices:

At each office, a "Sanitation-In-Charge" (SIC) will be assigned to the task of ensuring proper implementation of the planned sanitation activities at the project village and be the main sanitation trainer-in-charge at Divisional Office level. Also, the SIC will develop and regularly update a management information system (records of both "software" and "hardware" activities) for follow-up and monitoring (see also Annex A.). The SIC is an adequately experienced assistant engineer or, else, a junior assistant engineer who is much interested in doing sanitation work.

The SIC, being a "field" person, stays in close contact with the field staff (CST, primarily) by paying regular visits to the project sites. He has, on the other hand, close working relationship with the ADB-funded Technical Adviser(s) and the communicator(s) at the Regional Office.

At the project or village level, the Community Sanitation Technician (CST) will be the field staff who is in extended and intensive contact and communication with the villagers. He is therefore the agency's person who is most suited to create awareness, to promote and to assist construction. He works out of the Divisional Office and is assigned to a particular project for a substantial period of time. Day-to-day supervision is by the Assistant Engineer and Overseer at the site. A number of responsibilities regarding his work also lie with the SIC, others with the communicators at the Regional Office (see Appendix A.).

6.2.2 Involvement of Community

Casual involvement of a few Pancha officials or influential people in a water supply and sanitation scheme may not mean community participation in its real sense. Therefore, it is of utmost importance to try to involve the majority of people (including women and youths) from the beneficiary groups in the project or scheme from the very beginning. A community that is asked to involve itself in water supply and sanitation project work from the beginning has a greater likelihood of operating

and maintaining its installations than one where the scheme is implemented without genuine involvement of villagers. It shall be made compulsory that members of the community form a Water Supply and Sanitation Committee (WSSC) to assist the water supply and sanitation project technical staff by taking on some of the responsibilities of project implementation and assisting in village-agency liaison and cooperation. The Committee should take on the charge of orienting and motivating people on latrine construction and its proper use. Its function with respect to water supply shall be to maintain the scheme after it is handed over to the Committee.

One or two village volunteers who will work as Community Sanitation Motivator (CSM) shall be chosen by the beneficiary group. The CSM is to be a person who is respected by the majority of the villagers and who can take a lead in matters of sanitation. If suitable, the task of CSM may well be entrusted to, say, a person selected as water supply caretaker, a community health leader (CHL) or a faith healer ("dhami", "jhankri"), if such persons exist in the project area. CSM shall receive training through the Programme (see 6.2.6). Their specific tasks are listed in Annex A.2.

6.2.3 ADB-Funded Staff

ADB shall consider to post the following advisory staff with a strong role in the field of sanitation:

- 1 - A sociologist/anthropologist having experience in rural development work (desirably in the health/sanitation sector), whose function will be to advise on socioculturally feasible strategies and methodologies and to provide support in health education, communication, training, monitoring and follow-up. He will have a close working relationship with DWSS's sanitation communicator to be posted at the Regional Office.
- 2 - One (or more) water supply & sanitation field engineer(s) having extensive experience in the sector in developing areas, and being vested with the task of working close to field level and deliberating with implementing staff (technicians, overseers, engineers) and villagers on all aspects of field sanitation (notably latrine design and construction) work and related training activities.

Beside providing technical expertise in the field the role of ADB - funded manpower will be to:

- Carry out liaising functions between ADB and the implementing agency (DWSS) along routes of responsibilities to be jointly agreed upon
- Approve of major matters of Programme implementation
- Follow-up on the implementation of agreed upon Programme activities, strategies and procedures, and
- Deliberate with the Department's personnel-in-charge on necessary changes or amendments to the Programme.

6.2.4 Training and Follow-Up: Concepts and Institutional Set-Up

A comprehensive "training package" along with the necessary training capacities need to be developed in the course of the Programme for effective integration of the sanitation component. The proposed package is a combination of various types of activities, i.e.:

- Pre-service training
- In-service training
- Refresher/follow-up training
- Short orientation

with the venues either at a training "centre" or at the village.

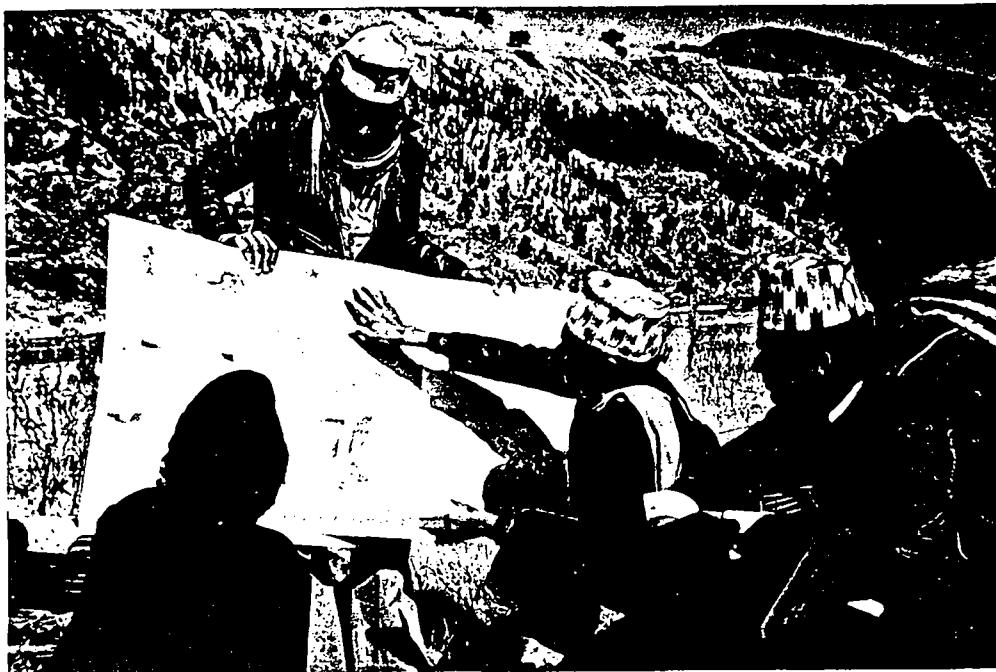
The core person for effective implementation of the sanitation component being the Community Sanitation Technician (CST), much of the training package is centered around developing his basic skills, and further strengthen them by follow-up refresher courses. This reflects the concept that a one-time training and then leaving the trained person on his own will not be effectful. It is through continued training, monitoring and evaluation which will center around (1), the field worker's person (2), the village environment, and (3) the Programme's long-term objective, that extension services such as the proposed sanitation component will become effective.

The scheme outlined hereafter is devised as a basic structure of required and useful training activities. It might have to be adopted or could be expanded in the course of the Programme, to respond to specific needs and experiences.

The DWSS Regional and Divisional Offices have as yet not developed training activities, neither pre-service nor in-service. It is, however, strongly felt that the majority of field work related training should in future fall under the responsibility of the Regional and Divisional Offices, whichever will be more suitable for the particular requirements. This will allow the direct involvement of DWSS field staff and

TRAINING

... can be done in many alternate ways and surroundings



their field experience in the training and follow-up. Decentralized training will have the advantage of being close to the field and the needs of beneficiaries, of much simplified logistics both for the organizing office and training participants, and of high cost effectiveness.

The roles of DWSS Central, Regional and Divisional Offices in planning and conducting training will be:

- for the central "training cell":
 - to do yearly planning and budgeting
 - to coordinate curricula development of Regional and Divisional offices
 - to do overall monitoring and evaluation of the Programme's training activities
 - to liaise with agencies as MoH and MPLD to receive necessary training support and to coordinate training efforts
 - to organize for the proposed trainers' training and local consultants' orientation

- for the Regional and Divisional offices:
 - to assign a training-in-charge (say an Assistant Engineer)
 - to develop (through its communication expertise) the required communication support inputs
 - to develop detailed curricula
 - to do detailed yearly planning and budgeting of proposed training activities, and submit to Central office
 - to arrange for selection of trainees, venue and involvement of instructors
 - to liaise with suitable local training institutions
 - to produce records and reports on all training activities, and submit these to the Central office
 - design and production of training and promotional material (charts, posters etc.) with the assistance of HES and other existing agencies.

Whereas under the recently initiated UNDP/WHO supported training programme of DWSS (see Ref. 1.1) DWSS involvement is restricted to overall management mainly, and all training courses are contracted out, the training package proposed for the ADB - funded Programme calls for a substantial involvement of DWSS field offices and their staff. Contracted training shall be minimized in order to allow for a substantial and direct feedback of field personnel's experience into the training activities.

The Consultant during his field reconnaissance tour and his previous work in the rural water supply & sanitation sector in Nepal, has familiarized himself with a number of HMG training institutions with which

coordination should be sought for carrying out the training programme (see also 5.8). These are among others:

- Panchayat Development Training Centre (Nepalganj)
- Women Training Centre (Dipayal; Surkhet)
- CMA - Campus Surkhet

All of these training institutions have developed substantial experience and have suitable supporting staff and facilities infrastructure for water supply and sanitation trainings.

Related to the training/follow-up component of the proposed Programme is the proposed study project on sociocultural aspects and on monitoring and evaluation of sanitation progress. A project agreement between HMG (DWSS, Ministry of Water Resources) and U.N. Centre for Human Settlements (Habitat) has reportedly been signed recently (see Ref. 1.9). Once under way, this project could both provide useful inputs to the proposed CWSS-Programme, and in turn receive important information from related field experience.

6.2.5 Training Scheme

Table 6.2 depicts the proposed training package, geared at developing the required manpower resources at village, agency and local consultants' level. Relating to it is a four-year training chart contained in chapter 7.2.

Table 6.2 : Training Programme: Types of Training, Duration, Participants, Instructors and Venue

	Type of Training	Approximate Duration	Participants	Organizing Body	Instructors	Venue	Kind of Training	Remarks
1.	Trainers' Training	2 weeks	1)Engineers 2)Sanitation-in-charges 3)Overseers	DWSS-Centre (Training Cell)	• Sociologist/Communicator • Teacher/Trainer • Health Educator • Sanitation Div. Engineer	Centre	In-Service	
2.	Community Sanitation Technician (CST) Basic Trg.	10 weeks	Test Pass or Army 1st Class Pass	DWSS-Region/Division	• Trainers • Sociologist/Communicator • Health Educator	Region/Division	Pre-Service	
3.	Community Sanitation Motivator Training	3-4 weeks	Local person(s) from the project area	"	"	"	Non-Service	
4.	WSS-Committee Members & Teachers Seminar/Workshop	3-4 days	Members from project area	"	" & CST	Project Area	Non-Service	Yearly or more frequently if required
5.	Project Village Orientation	2 days	Villagers from project area (not exceeding 25-30 people)	"	"	"	"	"
6.	CST Upgrading	4 weeks	CST basic trg. and practical passed	"	as in training No. 2	Region/Division	In-Service	Once after basic training
7.	CST Refresher Training	4 weeks	CST with upgrading passed and with field experience	DWSS-Region/Division	as in training No. 2	Region/Division	In-Service	Yearly
8.	Local Consultants' orientation	3 days	Local consultants' staff	DWSS-Centre (Training Cell)	• D.E. Sanitation • SIC • Health Educator • Sociologist/Communicator	Centre	-	Based on degree of involvement of local consultants

6.2.6 Curricula Outlines

1. Trainers' Training

Trainers' trainings will be conducted with the main objective of familiarizing region and division-level professional technical staff/instructors with the basic "soft- and hardware" aspects of rural sanitation. These instructors will be from among field-experienced assistant engineers and overseers, and be involved in training and orientation of CSTs, CSMs, WSSC members, teachers and villagers.

The major topics proposed are:

- Social and cultural aspects of rural water supply and sanitation
- Teaching techniques and communication skills
- Disease transmission, hygiene, sanitation
- Latrine design and construction (family and institutional latrines).

2. Community Sanitation Technician (CST) Basic Training

This training is aimed at imparting suitable candidates the basic practical and minimum theoretical knowledge required to perform the tasks of CSTs in the proposed Programme.

The training will concentrate on:

- Water supply scheme components
- Latrine types, designs, material, and methods of construction
- Skills in latrine construction, plumbing and masonry work
- Plan reading, draughting, setting out
- Disease, disease transmission; role of water supply and latrines for health improvements
- Principles and skills of communication and promotion; health education
- Monitoring and reporting

This training will have to be complemented by field practical training for one construction season under close supervision of experienced overseers and engineers.

To receive the CST-certificate, the candidates will then undergo the "upgrading" training (see 6. below).

3. Community Sanitation Motivator (CSM) Training

With this training, interested people from on-going-project areas are given the basic skills which will enable them to work as community sanitation motivators on voluntary basis in their own villages¹.

¹If Community Health Leaders (CHL) who are village volunteers working in the health/medical sector in their own villages have already been selected and trained in the project area, a feasible solution would be to let them take on the function of CSMs.

Major topics for this training include:

- Basic notions of communicable diseases and their ways of transmission
- Role of improved water supply and excreta disposal for people's health status
- Basic communication, motivation and latrine construction skills
- Role of CSM in assisting villagers and for village-agency liaison.

4. Water Supply and Sanitation Committee Members and Teachers Seminar/Workshop

This type of seminar/workshop will be conducted to familiarize WSSC members and teachers from project areas with the project, its nature, work, procedures and operation. All the members from each project will have to participate in the seminar/workshop which will be conducted at the project area. Trainers from the DWSS will go to the project area to conduct the programme which will be from 3-4 days as per schedule set up jointly by the training team at the divisional level in cooperation with the village representatives.

Topics for discussion and exercise in the seminar/workshop will be:

- Water supply and sanitation scheme and villagers' contribution
- People's participation and project life
- Mobilization of local resources
- Maintenance of water supply and sanitation installations
- Diseases, their transmission and control
- Relationship between water supply and sanitation
- Benefits from latrines and their proper use
- Population education and CWSS work
- School health education and sanitation activities

5. Project Villagers' Orientation

In order to let the majority of villagers know about the aims and objectives of a water supply and sanitation scheme in their village, a short orientation programme for two (2) days for 25-30 village men and women will be conducted immediately after the seminar/workshop for WSSC members. Trainers for this orientation programme will be the same as for WSSC members and teachers seminar/workshop.

The main objective of this orientation programme is to help the villagers understand the close relationship between water and sanitation and

the proper maintenance of the scheme in future.

Topics to be dealt with will be:

- Water supply and sanitation project procedures
- Community and agency roles and liaison
- Construction and proper use of latrines
- Personal and environmental hygiene
- Communicable diseases and their control

6. Community Sanitation Technician (CST) Upgrading Training

This training is thought as the final phase for the formation of CSTs after they have undergone initial basic training (see 2. above) and acquired field practice. They will receive the Technician certificate and be assigned a post from the Divisional Office. The training focus shall be on:

- Consolidation of "soft and hardware" skills
- Evaluation of field practical and experience made
- Relevant project administrative and accounting procedures

7. Community Sanitation Technician (CST) Refresher Training

As part of the field staff support and monitoring activities, a CST refresher course shall be conducted yearly or by-yearly. The general purpose of it is to receive feed-back from the Technicians' experience at grass-root level, to improve the "tools" for their work on the site, and to widen their knowledge to both sanitation- related as well as other community development fields. In particular, the major curricula topics will be:

- Refreshing and consolidating skills in construction (latrines, water supply) and communication
- Consolidation and expansion of knowledge on diseases and their prevention by water and excreta disposal
- Evaluation of the CST's experience in working with WSS-Committees, villagers, and other development workers; problem analysis
- Familiarization with Programme related topics (e.g. family planning, nutrition, etc.).

8. Local Consultants' Orientation

It is present common practice at DWSS to contract local consultants for preliminary and detailed surveying, to make layout and hydraulic designs, and to produce cost estimates of projects. Until now, these services have focused on and been restricted to water supply only. In order to have the sanitation component of all future projects integrated from

the initial steps of project preparation, local consultants need to receive orientation on relevant aspects of implementing sanitation jointly with water supply. The orientation will be on:

- DWSS manpower and village liaison bodies/persons involved in sanitation activities; their roles and tasks
- Approach for joint implementation of water supply and sanitation
- The respective role and tasks of the local consultants
- Methods of communication, socio-cultural aspects
- Discussion on excreta/water/hygiene/health/latrines relationships.

6.3 Sanitation Implementation Strategy and Institutional Set-Up

6.3.1 Integrating Water Supply and Sanitation

As is being outlined in Chapt. 1.2, the heavy investment which is provided for the construction of water supply schemes in Nepal and elsewhere is mainly justifiable by the prospect that improved water supply will enable people to use more water and thereby improve their personal hygiene. Though the supply of good quality water is an important factor in health, it is the increased quantitative use of supplied water for thoroughly washing hands after defecation, washing body, clothes and dishes which is thought to bring about decisive health improvements in rural Nepal.

Creating awareness among people for this outstanding role of water is considered to be one of the prime (but most difficult) tasks of sanitation. Without the awareness for the need of improved hygiene from the side of the beneficiaries of improved water supply, the health benefits of such schemes will hardly ever materialize.

Therefore, sanitation must go hand-in-hand with the implementation of water supply schemes, i.e. at the same time and at the same place. During the very first contacts between DWSS staff and villagers, orientation of villagers as to the role of the "new" water for improving their personal hygiene habits and their health has to be started. These kinds of activities must then be sustained and continued throughout the scheme implementation phase, though with changing means and methods.

In that sense, water supply may never stand by itself; in contrast, it must be considered as a complementing component to or tool of sanitation which is a more far-reaching step toward improved health.

The imperative for the joint and simultaneous undertaking of water supply scheme construction and sanitation activities leads to another imperative: that funding requirements and allocations needed for effective implementation of sanitation activities should not be curtailed to the (seeming) benefit of water supply. Quite to the contrary: a less effective and comprehensive sanitation component will diminish the potential benefit of improved water supplies¹.

6.3.2 Sanitation Implementation and Target Groups at Field Level

Below, a sequence of important steps is outlined, which is thought to represent a (or one out of several) feasible approach(es) of "doing" sanitation along with water supply. Though alternative routes might be suitable or might have to be chosen depending upon the specific circumstances, it is felt on the basis of experience gathered in Nepal to date that the major steps indicated here should possibly be included in suitable form and time.

- A- At the occasion of the (preliminary) survey team's first visit to a potential project village, village leaders and villagers, beside being introduced to the scope, nature and way of implementing the water supply project, should be involved in deliberations on sanitation by informal person-to-person or group discussions as well as in formal meetings.
- B- If survey and design is undertaken by a local consultant, his team must be accompanied to the village and project site by one or two staff members (say CST and overseer or assistant engineer) from the Divisional Office in order to ensure proper community orientation and contacting.
- C- At every following occasion of village-agency contact during the project's preparatory phase, sanitation shall be a subject of discussion at suitable times and occasions.

¹The separate outlining in this report of the proposed Programme's water supply and sanitation components does not imply separate implementation. It is merely based on factors of expediency as well as for the purpose of giving the reader a "package" presentation of proposed sanitation activities and enable easy judgement.

- D- While project design and estimates are being produced (either by DWSS staff or by local consultants), assurance must be made or advice given, that allowance is made for construction of institutional latrines at schools, health-posts etc.
- E- When implementation starts, the water supply and sanitation committee (WSSC) will be formed and take up work, part of which will be to give support to the various sanitation activities.
- F- The community sanitation technician (CST) will join the other technical staff (overseer, asst. engineer) in "settling" in at the project village. With the help and advice from the WSSC chairman and members, he will develop suitable sanitation-related activities (creating awareness, promotion, assistance for latrine construction calling for meeting, etc.). He will construct a latrine for his own and for his host family's use.
- G- Also he will endeavour that the project community selects a villager to be trained and then work as community sanitation motivator (CSM). In case a CHL lives in the area the task might already have been taken care of by him. The CHL could then receive support from the DWSS team and WSSC, and vice versa. Alternatively, the functions of caretaker and CSM might be combined if suitable.
- H- The sanitation-in-charge (SIC) and communicator (SC) will visit the project site, support the CST, and undertake sanitation related activities which will be geared to the particular village and project phase or situation.
- I- The CST, with the help of the WSSC and SIC or SC, will liaise with teachers and health post staff and develop joint activities, both soft- and hardware-type, if and when suitable (sanitation school curricula, latrine construction, personal hygiene practice etc.).
- J- Having received some basic training in water supply construction as well, the CST will also assist or supervise construction of the water scheme jointly with the plumber and supervisor.

- K- At the time of construction completion, the CST will once again thoroughly discuss with the WSSC the tasks of project maintenance and sanitation, as well as the reporting to the Divisional Office or nearest site office if need arises.
- L- The CST and SIC shall continue to visit the completed project community at regular and timely intervals, and the Divisional Office shall extend continued support (advice, technical assistance, major repairs of water scheme and institutional latrines as felt necessary, or demanded for by the community). The prime contact bodies/persons from village side are the Committee, the CSM or the water supply caretaker.
- M- The SIC shall endeavour to have demonstration/pilot latrines of variable design and method of construction built at close-to-Office villages or at the Office premises in the Programme's initial phase. Such easily monitorable latrines will provide useful experience and guidelines for expanded latrine construction in the Programme's later phase.

6.3.3. Institutional Set-Up

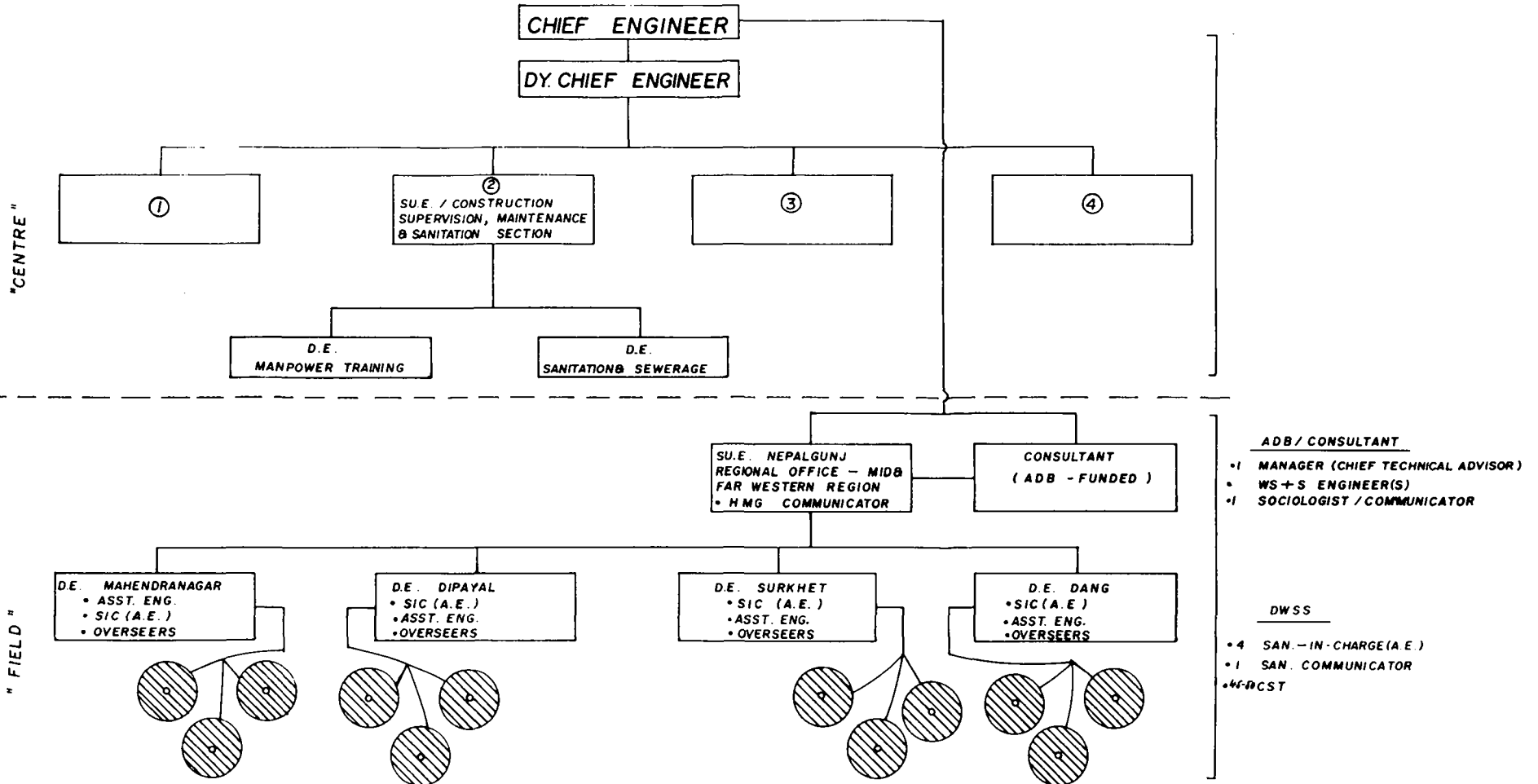
The chart depicted in Fig. 6.1 below shows the proposed lines of sanitation responsibilities and staffing pattern. Being largely based on the existing structure of DWSS, it proposes the creation of but two (2) new types of posts, i.e. one for the Community Sanitation Technician (CST) and one for the Sanitation Communicator (SC).

The number of CST-posts which will eventually have to be established must be commensurate with the long-term Programme and sanitation work volume. It is anticipated that between 45 and 50 CST will be required by the fourth (final) year of implementation.

In addition to the sanitation technician and communicator, each Divisional Office should assign one assistant engineer the function of Sanitation -in-charge (SIC). In Chapter 6.2.1. above a more detailed description of the various functions of staff with major sanitation involvement has been given and in Annex A a proposal for respective job descriptions is made.

FIG. 6.1

SANITATION INSTITUTIONAL CHART (BASED ON THE EXISTING STRUCTURE OF DWSS)



LEGEND

- ① S.U.E. SURVEY, DESIGN + PLANNING SECTION
- ③ ADMINISTRATIVE SECTION
- ④ FINANCIAL ADM. SECTION

- DWSS SITE STAFF (*ASS ENG., SUPERVISOR, OVERSEER, CST)
- COMMUNITY (*WS + S COMMITTEE, *CSM)

- S.U.E. :- SUPERINTENDING ENGINEER
- D.E. :- DIVISIONAL ENGINEER
- SIC :- SANITATION INCHARGE
- CST :- COMMUNITY SANITATION TECHNICIAN (DWSS)
- CSM :- COMMUNITY SANITATION MOTIVATOR (VILLAGE)

Beside the staff which will be working on sanitation full-time (sanitation-in-charge, CST, sanitation communicator), other members of staff, both at the centre and in the field, will be engaged in sanitation during part of their time, depending on their particular job assignment.

At present, DWSS is working in Mid and Far Western Regions through a Regional Office at Nepalganj and Divisional Offices at Mahendranagar, Dipayal, Birendranagar and Dang. The setting up of new Divisional Offices or the shifting of existing ones to new areas during the course of Programme implementation might be taken into consideration, depending on the location of project villages and transportation/communication links.

Fig. 6.1 shows only DWSS-internal lines of responsibilities and postings relating to sanitation. Defining the roles of the donor and donor funded manpower (consultant) will be a matter of joint deliberations and made compatible with ADB's and HMG's policies and objectives, as well as with the specific objectives of the Programme under consideration on the occasion of the setting up of the HMG/ADB agreement.

Similarly, funding, disbursement and expenditure control procedures shall be laid down in accord with policies jointly agreed upon by HMG and ADB. The specific requirements of and experience gained to date in the water supply and sanitation sector in the country, as well as the present and anticipated technical and managerial capacity of the Department should also be duly considered.

6.3.4. Inter-Agency-Links

The nature of the sanitation task, i.e. the combination of different kinds of "software" aspects (such as health education and communication) with "hardware" activities (latrine design and construction), makes it imperative that inter-agency links will be sought. The rationale for establishing active links is to make use of resources available "next-door" and of related experience. For specific aspects of sanitation, e.g. communicable disease transmission, health education and training skills, DWSS does not have the necessary expertise to train its staff.

It, therefore, shall make use of expertise available in other institutions.

In particular, a suitable selection of the following HMG institutions (central as well as in the "field") should become involved in the Programme:

HMG-institution	involvement in, provision of
• <u>Ministry of Health</u>	
- Health Education Section (HES)	• Training of DWSS field staff
- Integrated Community Health Services Development Project (ICHSDP)	• Development of training/promotional material (HES)
- District Health Offices (Health Inspectors)	• Coordination and mutual support in field work (health posts, CHLs)
• <u>Ministry of Education</u>	
- CMA-Campus (Surkhet)	• Training facilities & staff
- District Education Offices	• Coordination, support in school sanitation activities
• <u>Ministry of Panchayat and Local Development (MPLD)</u>	
- Panchayat Training Centres	• Training facilities & staff
- Women Training Centres	
- Regional Directorates (CWSS programme)	• Rural sanitation field experience
• <u>K-Bird (Surkhet)</u> ¹	
	• Coordination, mutual support, sharing experience
• <u>Rapti-IRDP</u> ¹ (Tulsipur)	
	• "
• <u>Mahakali-IRDP</u> ¹ (Patan)	
	• "
• <u>Seti Project</u> ² (Education for Rural Development in Seti Zone, Silgadhi)	
	• Coordination, mutual training and construction support

¹ under MPLD

² under Ministry of Education

Contacts and programming of joint actions will have to be made at appropriate levels, i.e. centrally at Ministry, Department or section level, and/or in the "field" (regional, district or local level), the latter, if necessary, upon appropriate instructions from the centre.

Where major support activities are sought from other institutions, such as provision of training staff and facilities, the coordinating actions must be initiated at an early stage in order to allow for the incorporation into yearly plans and budgets.

6.4 Excreta Disposal Technology and Population Coverage

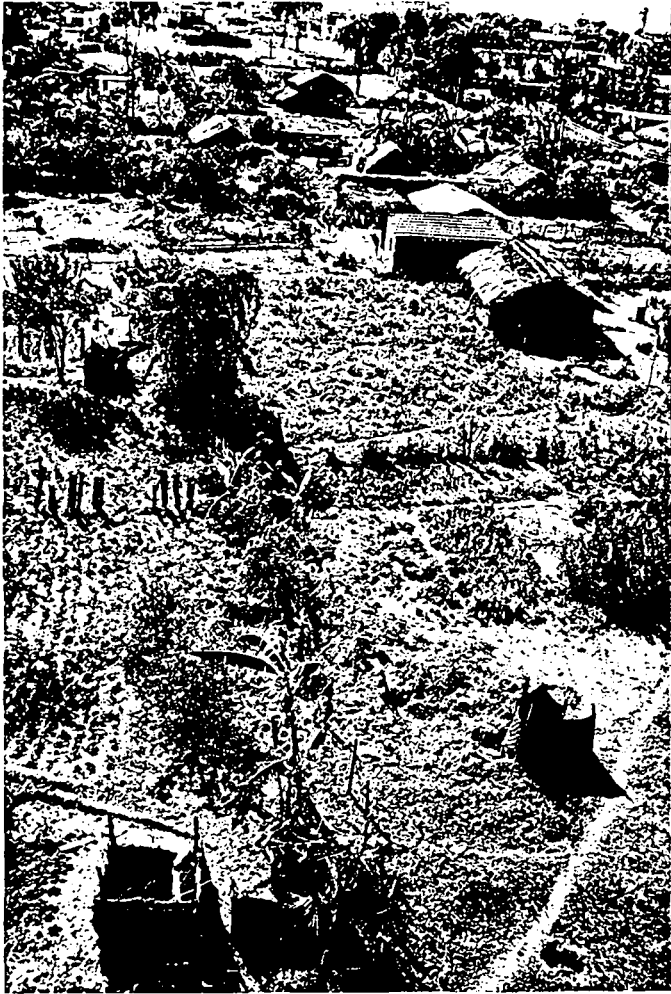
6.4.1 On The Choice of Systems and Technology.

The methods and technologies of choice for excreta disposal in the Programme under consideration must be both low-cost and on-site, i.e. unsewered for obvious economic and technological reasons. This limits the choice to the following systems:

- (Ventilated improved) pit latrine
- Pour-flush/waterseal latrine
- Offset pit latrine
- Double-vault alternating pit or composting latrine

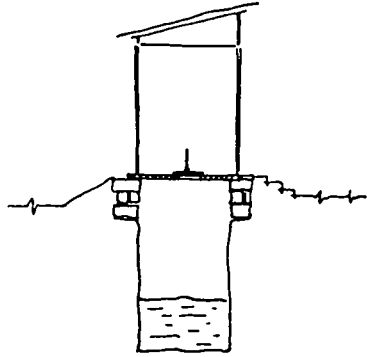
Experience made in sanitation/latrine programmes in Nepal and elsewhere, and the present low level or absence of felt need for improved excreta disposal, suggests that the introduction of double-vault alternating pit or composting latrines on a large scale in the Programme is not feasible at this stage. These systems require a relatively high degree of awareness and operating care, requirements which would not be met at present. However, with proper door-to-door orientation, liaison, follow-up and monitoring, its acceptance, operation and suitability might be tested in pilot areas in the course of Programme implementation. For this, such Terai villages might be suitable where hill people have immigrated, permanently settled and apparently developed a minimum standard "latrine culture". Also, in the Terai, double vault alternating/composting latrines might offer advantages, as they require relatively small receptacles and can be built above the groundwater table.

... trying to improve local LATRINE
"CULTURE" may
lead to ...



... new
monuments

Pit latrines:



The sanitation consultants, during their Programme area reconnaissance tour, and in their active sanitation work in Nepal's Western Development Region have come across and assisted construction of many different types of pit latrines. They vary in design as well as in the choice of material and method of construction as is documented in Chapt. 5.3. Those latrines which have been properly constructed and are properly used, be they constructed purely with local material or fitted with such non-indigenous items as e.g. ferrocement squatting slabs and plastic vent pipes, work well and offer a suitable method of excreta disposal.

The choice for a particular design and method of construction for pit latrines in the proposed Programme will be influenced mainly by the type of locally available material, the level of subsidy provided to make available material which otherwise is locally not available, the socio-economic conditions in project areas, and by the soil/groundwater conditions. For the latter, the difference is basically between Terai and hill areas. The question of subsidy used to provide non-indigenous material is a matter of basic Programme policy and is discussed more extensively in Chpt. 6.4.5. Guidelines for pit latrine design and construction are discussed and illustrated in Chpt. 6.4.3.

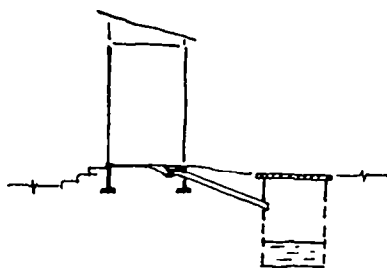
Advantages of pit latrines over other types of latrines are:

- They can in most situations be constructed from locally available material in rural areas and are therefore in the reach also of less well-off people;
- Construction of pit latrines with locally available material represents a reproducible technology and does therefore not require outside inputs except for initial guidance to impart knowledge and skill.

- Operation is simple and there is no risk of handling relatively fresh excreta containing large amounts of active pathogens (as might be the case in alternating pit or composting type latrines).
- It can function quite satisfactorily even if built to the simplest design standards (though, still, it must be constructed well and the squatting area kept clean).

Pour-Flush/Water-Seal (PF/WS) latrines:

PF/WS latrines with twin leaching pits as installed e.g. in the Eight-Town Sanitation Programme recently started by DWSS (see also Chpt. 5.5) offer the advantages of:



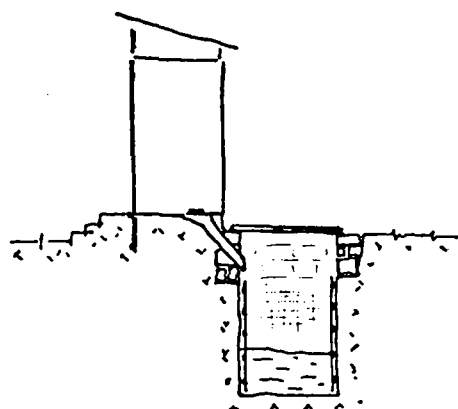
- being permanent structures not requiring shifting of the installation as is the case when single-pit latrines become filled up,
- the possibility of installing the squatting place inside buildings (a method of installation used in Kirtipur), thus being particularly suitable in densely built-up areas,
- requiring shallower depths of receiving pits than pit latrines, making them suitable in areas of high groundwater table or rocky underground.

In addition to the above, PF-latrines might be more readily accepted by users on cultural grounds, as the excreta are accumulated away from the place of defecation rather than underneath the squatting place as with pit latrines. The true role of this perception must be thoroughly evaluated during Programme implementation and dealt with on a case-to-case basis.

Potential latrine acceptors having previously seen or used PF-latrines or even cistern-flush toilets in urban areas might associate pit latrines with low status and therefore be reluctant to opt for construction and use of a pit latrine.

With PF-latrines, water must be available nearby all the time for performing the pour-flushing. The use of solid material such as stones or sticks, as is often practiced by children in rural areas, will cause blockage and require increased attention and maintenance.

Offset-pit latrines:



The few offset-pit latrines observed during the team's reconnaissance tour appeared to function well. They have the assumed cultural advantage of the PF-latrines (excreta not accumulating directly underneath the squatting place), do however, require construction material normally not found in villages (cement, pipe, or GI-sheet for the connecting chute). Water will be needed to pour-flush the excreta down the chute, and much attention is required to keep the chute clean. This type of latrine might be tried under special circumstances, or in pocket areas, may, however, not be suitable for immediate large scale application in the villages of the Programme area for the above reasons.

6.4.2 Should Latrine Constructions Be Subsidised ?

To beneficiaries construction of rural water supply schemes undertaken by both DWSS and MPLD is heavily subsidised (75 - 90 % in the case of MPLD, depending upon the kind of scheme and basis of calculation; fully subsidised in the case of DWSS). This subsidy is justified in its basic rationale by the fact that the construction of improved, piped water supply schemes involves the use of material such as pipes and cement which is neither available in the village nor affordable by the beneficiaries.

Should, therefore, the construction of family and institutional latrines also be heavily or fully subsidised?

An argument for subsidised family latrine construction (e.g. provision of ferrocement squatting slabs and of ventilation pipes) might be, that most villagers would otherwise not be in a position to construct a latrine for which non-indigenous material is required. It might further be argued that excreta disposal, as an important complementary measure to water supply for achieving health improvements needs to be subsidised as well.

Users of latrines who once have received subsidy for latrine construction from government are likely to seek again such subsidy when a new latrine is to be built or when something goes wrong with the existing system. It is, however, highly questionable whether the government will be able to respond to such demands in future, as excreta disposal takes place in a very disperse-type of infrastructure and therefore would represent an immense task in follow-up and logistics.

Also, as can be easily observed throughout the world (both developing and industrialised), subsidy systems, though often seemingly justified and used to get something going, prove to be detrimental to forces of self-initiation and self reliance, and limit reproduceability of products, structures, processes (such as latrines built with ferrocement squatting slabs, say). At times, however, subsidy with non-indigenous material or techniques might indeed be advantageous or decided for even where local material and technology would be available, as it might allow for easier construction, longer structural life, or be otherwise beneficial. Yet, subsidising development should generally be limited to components which are of fundamental need and can not be produced or developed from local resources (e.g. pipe material for water supply schemes).

From these arguments the question arises whether or not household (family) latrine construction should be subsidised to the user (as are water supply investments). Subsidy might lead to a relatively fast response and a quantitatively more rapid development of improved excreta disposal (in terms of construction, at least, not necessarily in terms of actual usage) because users are attracted by the subsidy. Non-subsidy will probably result in a slower quantitative response but is apt to give the people the feeling that it is their latrine and that it is a technology they can master and reproduce.

The Consultant, though thinking that both strategies have, under varying circumstances, its proper validity, suggests that family latrine construction in the proposed Programme remain essentially non-subsidised. Exceptions to this policy should be made where indicated by a high degree of need, such as for poor families in areas where pourflush latrine-

nes are required or where proper indigenous material such as timber, bamboo, stone plates are not available or not affordable, and non-indigenous material must therefore be used. In addition, a procedure might be thought of by which the DWSS project site office would sell prefabricated slabs and pipes at non- or only minimally subsidised prices to prospective users, who are sufficiently well-off and wish to buy latrine components which are otherwise not purchasable in the project area.

In contrast to family latrine construction, support to which should in general be limited to technical assistance, the consultant suggests that construction of institutional latrines for schools, health posts, Panchayat buildings etc. be subsidised. Such latrines require a somewhat more sophisticated design and method of construction (e.g. ferrocement squatting and cover slabs, vent pipes) because of expectedly heavy use, and lack of proper operating care and maintenance. Subsidy for institutional latrines should encompass:

- Squatting and pit cover slabs
- Ventilation pipes
- Timber for roofs and door frames
- Roofing material
- Skilled and semi-skilled labour

The non-subsidising of family latrines clearly restricts the system choice to pit latrines. Though exclusively built from local material, they can give satisfactory performance and be structurally and hygienically safe.

It is most imperative that latrine construction, even if simple in design and modest in material requirements, never be considered an amateur undertaking ! It therefore must always be closely and properly supervised and guided by skilled and experienced persons.

6.4.3 On Pit and PF/WS Latrine Designs and Methods of Construction

A respectable amount of experience in latrine technology (designs, methods and material for construction) has been accumulating in recent years worldwide, including Nepal. Practical experience gained in ongoing sanitation and latrine construction programmes (in Nepal: e.g. the DWSS' Eight-Town Low-Cost Sanitation and the MPLD/UNICEF CWSS Programmes), field research conducted on such aspects as fly/mosquito control in latrines, ventilation and recognition of cultural and behavioural factors have helped to establish useful technical guidelines for latrine construction and usage. They are:

For pit latrines:

- Use of straight ventilation pipes with interior diameters > 110-150 mm and extending well over the roof, thereby ensuring sufficient draft and attraction of flies and mosquitoes from the pit
- Vent pipe screening to ensure trapping of mosquitoes and flies trying to escape from the pit or to enter into the pit through the vent pipe
- Fitting of doors which should remain closed, or construction of latrines with doorless, spiral superstructures, to ensure that the interior of the latrine can be kept as dark as possible thereby preventing the attraction of flies and mosquitoes
- The use of squatting hole lids, particularly in latrines which are not equipped with a vent pipe in order to prevent access of flies and mosquitoes to the excreta inside the pit.

For pour-flush/water-seal latrines

- Proper trap design for minimum flush requirements and proper water-sealing for smell prevention
- Min. drain slopes, smooth drain surface and proper sizing and construction of leaching pits.

In practice, while some of these requirements can and should in fact always be met, others will often have to be dropped (e.g. installation of vent pipes in household latrines) due to local circumstances or other programme related reasons. A major deterrent to latrine usage is darkness inside the latrine building. This particularly makes children reluctant to enter latrines. They quite understandably prefer traditional open-air defecation over squatting inside a dark cubicle. Behavioural and cultural reasons thus require to allow for sufficient natural lighting in latrine buildings, a demand which is in contradiction to the "scientific" perception for lighting requirements inside latrines!

Experience of this kind gathered in recent years in latrine promotion and construction programmes in Nepal (e.g. in MPLD/UNICEF's programme and the Department's Eight-Town Programme as outlined in Chpts. 5.3 and

5.5) in combination with the above minimum technical requirements, form the basis for the suggested features of latrine design and construction given in Annex C. These should be considered as guidelines rather than as standards in order to leave room for specific experience to be made and give the future Programme staff scope for suggestions and modifications as deemed necessary for the particular and variable conditions likely to be found in the project villages.

A suitable approach might consist in having constructed in the Programme's early phase a number of demonstration or pilot latrines say at the Offices premises or close-to-Office villages. Thereby, latrines with variable designs and methods of construction could be tried and be easily and closely monitored by Office staff. Also, users' acceptance and suggestions could be assessed. The training curricula proposed herein would provide ample opportunities to have such pilot latrines, both household- and institutional-types, built by trainees (with the support of villagers if the units will be constructed in villages).

6.4.4 Latrines For Schools and Other Institutions

School children are considered an important "target group" in sanitation extension work because they will be the parents of tomorrow.

The major objective of future DWSS sanitation field staff liaising with schools, particularly teachers, in project villages, will be to support teachers in their health education activities. In addition, schools in all project villages should endeavour to build latrines with the support of the DWSS' water supply & sanitation Programme.

Although experience to date indicates that many school latrines built in recent years are as yet not heavily frequented the proposed DWSS Programme should nevertheless and definitely engage in school latrine construction in all project villages. As with all latrine installation work, it should be preceded, accompanied and followed-up by intense orientation, motivation and health education actions. Doubtlessly, with school sanitation, too, success will be slow and in small steps, only, as is expected with all sanitation endeavours. Programme staff must be prepared to develop solutions which by experience are both behaviourally and technically feasible for school environments. The design sketched out in Annex C is but one possible solution. A trial and error approach, very much the same as is applied in MPLD's programme must be chosen, i.e. strategies and designs must be used in flexible manner and might have to be periodically altered, depending on the particular circumstances.

For the majority of schools in the Programme area, pit-type latrines will have to be the system of choice, particularly because of their simple way of operation, and their being insensitive to use of anal cleansing material other than water, and to misuse by children.

In building school latrines, the community and DWSS should each make contributions in kind and labour. Villagers shall in principle be asked to provide stones, sand and voluntary labour, whereas DWSS will avail technical skill and guidance through the CST, mainly. DWSS shall also provide non-indigenous material needed for ferrocement slab construction and ventilation, i.e. cement, reinforcing steel, wire mesh and large diameter HDP-piping. Further to this, DWSS shall budget and pay for skilled and semi-skilled labourers.

Siting of pits and number of units provided will be governed by:

- Soil and underground conditions (ease of excavation)
- Structural criteria
- School children's traditional and changed defecation habits
- Teachers demanding a unit for themselves
- Relative number of boys and girls

Organisation for latrine maintenance and cleaning is an important, often the most crucial aspect for acceptance at schools. This must therefore be thoroughly and repeatedly discussed and followed-up with the headmaster and other teachers. It might prove to be the hardest point of school sanitation!

Water supply to schools must be provided by the respective water supply scheme. The tap should best be at close distance to the latrines. By that, children will get the opportunity of acquiring the habits of hand washing after defecation and personal hygiene upon guidance by teachers. Also, latrines can be easily kept clean if water is available nearby.

6.4.5 On Communal Latrines

Communal latrines provide collection of excreta of a large number of people at a central place. This can be of great advantage over individual household latrines, where space for building individual units is lacking (e.g. in densely built-up bazaar areas) or to provide a place for defecation to daily visitors, e.g. in towns or villages serving as trade or administrative centers.

In general, installation of communal latrines in rural areas in Nepal is supposedly not a promising undertaking. At present responsible administrative or political bodies, such as village panchayats, are not yet geared to operate and maintain infrastructure installations. Communal latrines would therefore rapidly deteriorate and be everything else but a good advertisement for improved excreta disposal by latrines.

The Consultant, in his reconnaissance tour has come across two places where the construction and use of communal latrines might nevertheless be part of an improved excreta disposal by package:

- Rajapur (Bardiya District), a small, partly urban town in the Terai, important trade centre and previous District headquarter
- Silgadhi, Doti District Headquarter, a one-street bazaar town, also with important trade functions, and with a DWSS Divisional Office.

A previously installed piped water supply (DWSS) provides water to Silgadhi, whereas the construction of an improved water scheme has just been started at Rajapur.

Both towns offer prospects that communal latrines might "work" (i.e. properly be cared for once in operation) as the Panchayat administration reportedly do already fulfill particular infrastructure operation tasks, though to a limited extent (sweeping of streets and trench cleaning, minor water system repairs). Also, in both places, there is a relatively strong and felt need for public latrines from stall owners (Rajapur), poor villagers without own land (Silgadhi), and from the town administrators who feel and express quite strongly the necessity for latrines to accommodate the defecation needs of daily visitors.

Programme staff might thus at least consider and in fact try such public latrines as a "pocket approach" in one or both of these towns or any other project area with similar environment. Such trials must, however, be prepared, implemented and followed-up with extreme care and in very close cooperation with the concerned town authorities. This should be considered and treated as a pilot undertaking and not be tried on a large scale in the beginning. Orientation, motivation and promotion would have to play a crucial role in this. Although success might take years to come through, it might materialise faster than in strictly rural communities, where there is no felt need as yet for the use of latrines and improved hygiene.

6.4.6 Groundwater Pollution Risk from Latrines

With all types of on-site excreta disposal systems, including pit and pour-flush latrines, a risk for groundwater pollution exists. Transmission of excreta-related diseases might take place if fecally contaminated groundwater is used for human consumption.

Terai communities are the major areas at risk in the future Programme area. There, groundwater rises up to or even higher than latrine pit bottoms in the rainy season. Ground water pollution by pathogenic organisms is thus likely to take place in the very immediate surrounding of latrine pits during the rainy season. What is the risk from such groundwater pollution?

Previously, 15 - 30 m has been postulated as the safe distance between groundwater withdrawal points (shallow wells) and excreta disposal installations such as latrines. Recent investigations, however, have shown that pathogens leaching from excreta-containing pits will be immobilized within and not travel further than approximately 1 m in the unsaturated zone above the groundwater table and in sandy/silty loam. Only if active pathogens enter the groundwater saturated zone is there a substantial risk of longer travel distance. The risk is particularly high where there is a groundwater gradient, either naturally or induced by groundwater withdrawal at a well.

Natural gradients of groundwater flow may assumingly be very small if not zero in most areas in the Terai. Also, areas of influence as defined by well drawdowns are likely to be very small (hand pumps or bucket withdrawal), with the exception of drawdowns of large schemes with motor pumped extraction of water. In the latter type of schemes, however, the utilized deep groundwater is likely to be confined or semi-confined and therefore not at risk by on-site sanitation.

With shallow hand pump or bucket withdrawal of groundwater unlikely to create large drawdowns, and with groundwater essentially not flowing, the risk of withdrawal of fecally contaminated groundwater becomes small. Relatively small distances between wells and latrines may therefore be tolerated.

To establish practical safety guidelines, investigations as to the impact on well water quality by latrines might be devised in the starting phase of the Programme making use of the recently established DWSS/UNICEF tubewell Programme.

6.4.7 Latrine Coverage and Construction Volume

Family Pit Latrines

As per ADB/HMG/Consultant tripartite deliberations 15 % of the population covered by the proposed Programme shall assumingly have built latrines by the end of the 4-year Programme period. This figure is in agreement with HMG's Decade rural sanitation target of approx. 14 %.

Based on a present Programme area (subprojects) population of approx. 86'000, the population 4 years hence might be assumed at 95'000 (10 % growth). Further assuming the average family to consist of seven (7) members, construction of 1500 latrines or so could be envisaged.

The above figure of 1500 family pit latrines to possibly be installed under the Programme shall, however, be considered as indicative at most, and not be used as a target figure! Good reasoning regarding the shared role of improved personal hygiene (induced by the quantitative use of water), and excreta disposal in bringing about health improvement, indicates that it is the first of these two components (increased water use) which, in the majority of Nepal's rural communities should be given highest priority in creating awareness and doing promotion. It is then in the more densely built-up settlements only where improved excreta disposal (i.e. latrine construction and usage) carries increased importance for health improvement. Usually, there, people's felt need and demand for latrines is already latent, though at a variable degree.

For these reasons, construction of household latrines can and should not be targeted on an overall Programme area population figure, but should be assisted on the basis of very specific needs and environments, and be properly timed within the Programme implementation period irrespective of what the set "target" might be. A reduced "target" figure of 750 latrines is therefore used for costing purposes. This is in accord with the experience that latrine acceptance in hill communities is a slow process, making it unlikely to achieve construction (and acceptance!) of 1500 latrines within a four-year period.

As family latrine construction shall be largely non-subsidized, its coverage does not bear on the financial cost of the Programme. A lump-sum allowance of \$ 10'000 will, however, be made to permit subsidy in special cases, such as for least well-off families in villages where suitable latrine construction material might not be available or not be available free of cost.

School and Other Institutional Pit Latrines

In each of the water supply schemes to be implemented under the proposed Programme latrines shall be constructed at institutions such as schools, health posts, Panchayat buildings. The number of units to be built depends on the enrollment of pupils, and the number of attendants or visitors.

It is assumed that the typical project scheme will require installation of five (5) institutional pit latrines (counted as single units).

Furthermore, allowance must be made to accommodate requests for institutional latrines, particularly schools, from villages where DWSS water supply projects are presently under construction. An average number of three (3) units for each of these projects is proposed. The total Programme volume for institutional latrine units will thus amount to:

- For new schemes under the Programme:

$$\begin{aligned} & (\text{no. of latrine units per scheme}) \times (\text{no. of schemes}) \\ & = 5 \times 60 = \underline{300} \end{aligned}$$

- For ongoing projects:¹

$$\begin{aligned} & (\text{no. of latrine units per scheme}) \times (\text{no. of ongoing} \\ & \text{schemes}^1) = 3 \times 15 = 45 \end{aligned}$$

- TOTAL during the 4-year Programme period:

$$= \underline{\underline{350 \text{ units approx.}}}$$

¹Presently (1983/84 construction season), 27 schemes are under construction. The assumption is made that once all 15 projects expected to still be under construction by 1985 (the starting year of the Programme) will have been completed, all rural water supply and sanitation activities in Mid and Far Western Regions will be carried out by the ADB-financed Programme.

Pour-flush/Waterseal Latrines (both for families and institutions)

In general, installation of pourflush latrines on a large scale in the Programme's predominantly rural type communities is not expected. Nevertheless, a lump-sum allowance of \$ 10'000 is proposed to accomodate special requirements which might have to be responded to in the course of the Programme, particularly for institutional latrine construction.

6.5 Surface Drainage and Sullage Disposal

6.5.1 Tapstand Drainage

Tapstand drainage has been discussed in Chpt. 5.3.2. Rationales for spending efforts to devise good technical and social solutions are:

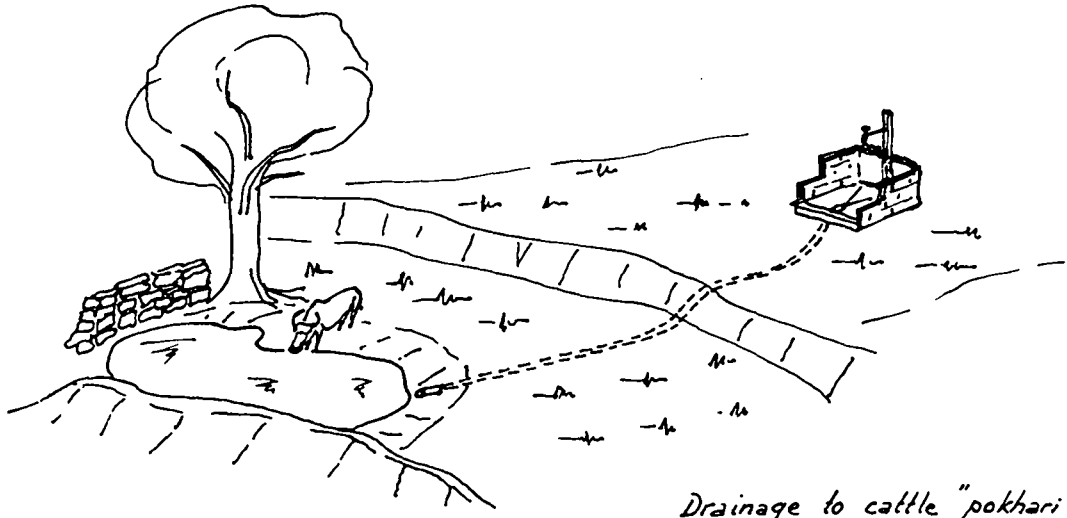
- Making productive use of tapstand wastewater (e.g. cattle ponds)
- Protecting the tapstand structure
- Avoiding unsanitary conditions and human use of ponded water
- Avoiding inconvenience to users.

Budgetary and material provisions for tapstand drainage must be contained in the water supply scheme's bill of quantities and cost estimate. Allowance must be given and flexibility maintained, that drainage arrangements can be made (or when necessary altered during project construction) according to the particular site conditions and requirements. This must also take into account relevant social aspects of the project village.

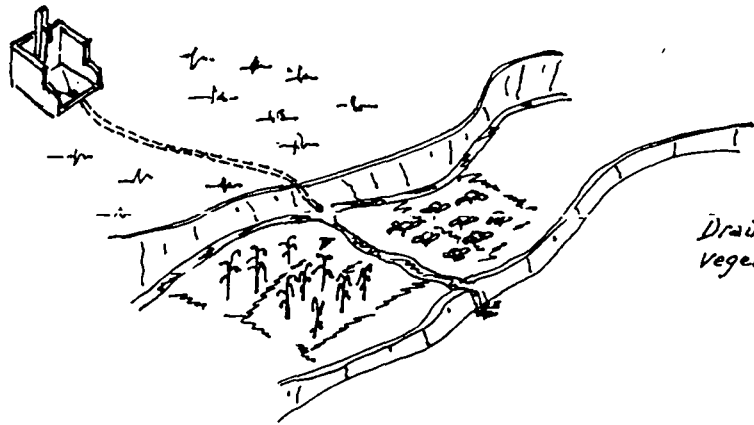
Some possible technical solutions to tapstand drainage are sketched below. They are:

- Drainage to a cattle "pokhari",
- Drainage into (vegetable) fields and
- Drainage by soakpits.

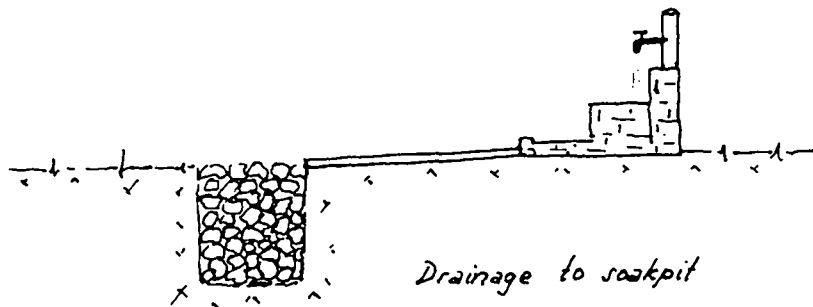
These solutions should not be considered exclusive, others (e.g. discharge into nearby streams, stream beds or gulleys; or drainage into a fish-holding pond) might be equally or more suitable in particular places.



Drainage to cattle "pokhari"



Drainage to vegetable field



Drainage to soakpit

6.5.2 Surface Water Drainage

In the absence of detailed topographic surveys, scrutinization of hydrological data, extensive engineering deliberations and study of community aspects (e.g. role of Panchayat administration in system maintenance), it is unfeasible at this stage of Programme formulation to propose particular solutions for design and construction of drainage systems in towns which may fall under the proposed Programme. However, a lump-sum allowance of \$ 75'000¹ is being budgeted for, to allow the conducting of a thorough survey, making relevant investigations and calculations, and possibly installing a small test scheme in a pilot area. Such a scheme would then have to be closely monitored and close involvement of the village or town Panchayat authorities be sought.

No budgetary provision is made for surface (storm-water) drainage in rural hill communities as the installation of actual schemes in such areas is neither necessary nor feasible.

6.6 Communication Support

Training can achieve its desired goal when appropriate training material is used for teaching along with lectures. Audio-visual aids are important means to give adequate support to verbal teaching. There are various media through which one can communicate to audiences or target groups effectively.

It is therefore necessary for trainers to develop appropriate communication material.

Apart from the purpose of training its own field staff DWSS has to prepare effective communication media for people of low literacy in the village to teach the importance and proper use of water and latrines. Posters, films, slide shows, charts, comics, role-play etc. are very effective means of communication. In the beginning, support can be borrowed from various agencies until communication support capabilities will be developed by the Department itself.

DWSS can even contract some street jugglers to incorporate the message on general health care, hygiene sanitation, latrines etc. in their regular shows. Of course, they should be taken to the same project areas where the training programmes are to be held.

¹(Thereof: HMG \$ 15,000; ADB \$ 60,000)

Equipment required in carrying out communication support activities at Central, Regional and Divisional level includes such items as projectors (overhead, slide, movie), cassette tape recorders, duplicating machines. Annex G contains a listing of suggested equipment and its requirement at centre and field offices.

Beside production of respective media, communication support encompasses the following essential tasks:

- Guiding the training courses for field staff and shaping them as practical "living learning" experience in communication
- Devising working principles for, and performing village orientation and assessment, continuous promotional assistance, monitoring and evaluation in DWSS project areas
- Evaluating villagers' and field staff's experiences and feeding them back into strategic and procedural concepts of the Programme
- Liaison with other agencies and programmes.

7. SANITATION IMPLEMENTATION PLAN

7.1 Yearly Project Volume and CST Requirements

The number of projects to be started each year under the proposed Programme is based on the following assumptions and guidelines:

- A total of 60 water supply & sanitation schemes would be constructed.
- Each project would take two (2) years to be completed.
- The project volume will increase each year, though at a decreasing rate.
- Upon completion of ongoing DWSS projects (say after the second year of the ADB - funded Programme), all new rural schemes taken up in Mid and Far Western Regions would be executed under the Programme.

In the Programme's initial years, the number of CST required and to be trained is based on the requirement of one (1) CST per project. It is expected that some experienced and competent CST would be capable of handling two projects simultaneously in the final phase of the Programme. The number of CST trained in the beginning must be high in order to rapidly build up the Programme's strength in sanitation. In the second and third year fewer CST should be trained, with the minimum number of trainees being not less than ten (10).

- As agreed during DWSS/ADB/ Consultant tripartite discussions, sanitation work shall also be extended to ongoing projects which have earlier been started by DWSS in the Programme area.

Projections for yearly scheme construction volumes and required CST postings are presented in Table 7.1.

Table 7.1 Yearly Number of Projects, CST Trained and Posted

Item	Fiscal year 1	Fiscal year 2	Fiscal year 3	Fiscal year 4	Total
1. Ongoing DWSS projects (1983/84: 27)	15	7	0	0	22
2. No. of ADB projects to be started	12	20	28	(28) ¹	60
3. No. of ADB projects carried over	-	12	20	28	60
4. Total No. of projects under construction	27	39	48	(56) ¹	
5. No. of CST trained	27	10	10	-	47
6. No. of posted CST	27	37	47	47	
7. No. of CST per project		1	1	.8	
8. No. of CST receiving upgrading training	-	20	15	12	47
9. No. of CST receiving refresher training	-	-	15	20	35 ²

¹ The assumption is made that the Programme funding would continue in to a second funding phase, and that, therefore, new projects may also be started in the final year of the first funding phase.

² Twelve (12) CST to receive refresher training in the first year of the assumed second funding phase.

7.2 Overall Training Plan

The following types of trainings, workshops and orientations will have to be conducted at regular intervals and as need arises during the Programme period (see also Table 6.2 in Chapt. 6.2.4):

- 1 - Trainers' training
- 2 - CST basic training
- 3 - CSM training
- 4 - WSSC seminar workshop
- 5 - Project villagers' orientation
- 6 - CST upgrading training
- 7 - CST refresher training
- 8 - Local consultants' orientation

All these training activities are needed and relevant to the objectives and way of implementation of the Programme. It is by their being implemented as a combined package that they will provide the desired effect for the Programme.

Basically, the scheduling of most training activities is dictated by the time and duration of rainy and construction seasons, respectively, and the anticipated availability of the trainers, some of whom are also involved in field survey and supervision work.

Table 7.2 below illustrates the proposed four-year programme training plan. Along with it go the following explanatory remarks:

- ad 1. Trainers' training
 - Participants: communicator, sanitation-in-charges and suitable number of ass. engineers and overseers needed for the Programme.

Table 7.2 Four - Year Training Chart

Srawan - 1
July - 15

Particulars	FY - 1				FY - 2				FY - 3				FY - 4				Remarks
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1. Trainer's Training	32								30								
2. CST basic Training	27				10				10								
3. C S M Training			24				40				56				56		TWO C.S.M. PER PROJECT
4. WSSC Seminar		120				200				280				280			AVG. OF 10 MEMBERS PER COMMITTEE
5. Villagers' Orientation		360				600				840				840			30 PARTICIPANTS PER PROJECT AREA
6. CST Upgrading				20				15				12					
7. CST Refresher											15					20	
8. Local Consult. Orientation			15			15				15				15			
Construction Period Rainy Season (Approx.)																	

FY - Fiscal Year

30

NO. OF TRAINEES
TRAINING ACTIVITY

- Bi-yearly implementation considered to be compatible with project implementation rate
- Best conducted during rainy season when site work is suspended
- ad 2. CST basic training
 - Needs to be conducted during rainy season (availability of trainers)
 - No. of participants commensurate with project construction schedule (see Table 7.1)
- ad 3. CSM training
 - To be conducted after start-up of project construction in order to allow selection of suitable persons
- ad 4. WSSC/teachers seminars
 - Needs to be conducted at each project site at the beginning of project implementation
 - An average number of ten (10) participants is assumed
- ad 5. Villagers' orientation
 - To be conducted at the village immediately after committee members' orientation and with their assistance
 - 30 villagers assumed to attend on an average
- ad 6. CST upgrading training
 - No. of participants to be based on No. of CST trainees
 - Training: end of construction season/beginning of rainy season

· ad 7. CST refresher training

- To be held with certified and reasonably experienced CST
- Timing: in later part of construction season

· ad 8. Local Consultants' Orientation

- Timing: in dry season, before launching of new projects surveys.

Care should be taken that sanitation-in-charges and other engineers and overseers trained as trainers should remain at the assigned posts for at least two (2) more years after having received training. This will help to assure the building up of staff, skills and competence and the required strength of the Programme.

In order to facilitate the timely and efficient implementation of the proposed training activities, it is imperative that the necessary immediate (yearly) funding requirements be determined early in the process, and that fund disbursements be received by the implementing office (Central, Regional or Divisional) well ahead of the particular training event. Experience from other donor-funded training activities suggests that donor funds for training be transferred directly from the donor to the respective office charged with the management of the particular training. By that the often lengthy disbursement process applied to funds which are received by Ministry of Finance can be shortened and Programme implementation be made more efficient and responsive to changing needs and situations.

7.3 Construction of Household (Family) Latrines

A total of 750 household latrines might assumingly be constructed by villagers during the Programme period (see Chapt. 6.4.7). This is a very tentative figure at most, as the villagers' response to

the promotion of latrines is difficult to forecast. It will supposedly be rather slow. Yearly construction volumes are projected as indicated below.

Year				Total
1	2	3	4	
100	150	200	300	750

7.4 Construction of Institutional Latrines

With the total number of institutional latrines being estimated at 350 units¹ for the four-year Programme period (see Chapt. 6.4.7), the following yearly construction volume is anticipated:

Year				Total
1	2	3	4	
30	70	110	140	350

7.5 Surface Drainage Study and Pilot Scheme

A thorough study including detailed topographical, community and institutional survey, as well as evaluation of alternative designs, construction methods and O + M organizational set-ups will be conducted in one of the Terai semi-urban areas (e.g. Rajapur). A pilot scheme shall be installed and followed-up to assess its technical, organizational/institutional, and user-related feasibility (see also Chapt. 6.5).

¹ A "unit" is equivalent to a single - pit latrine.

The study shall be carried out jointly by DWSS field office staff and a short-term, ADB-funded consultant; they will also devise the follow-up monitoring procedures. Pilot scheme construction will be done through the DWSS field office.

A lump sum of \$ 75,000 is envisaged.

7.6 ADB-Funded Staff and Facilities

ADB-funded personnel i.e. Chief Technical Advisor, Sociologist/Communicator and Technical Advisors (engineers), shall be posted throughout the four-year funding phase. This will require ADB-funding for 3-6 man-years/year, including respective facilities.

7.7 Sanitation Study Visits

In complementation of the training programme outlined in Chapt. 6.2.4 and 7.2, a minor sanitation study visit programme shall be devised. This is to allow for short study tours to places of interest in Nepal or nearby countries to acquaint field staff with rural sanitation activities and experiences made elsewhere. Such study tours shall be handled in a restrictive manner and apply to personnel which has been showing particular zeal and effort in sanitation field work.

Provision for study tours is made for the second, third and fourth Programme year with a yearly budget of \$ 3,000.- to be covered by the ADB-loan.

8. HMG, ADB AND COMMUNITY CONTRIBUTIONS

Funds required to carry out the Programme are itemized on the basis of the three-tier share among the involved communities, HMG (DWSS) and ADB, thereby reflecting the nature of the joint undertaking. The following sharing pattern for contribution of manpower, material, transport and training is proposed:

Community contributions:

- manpower:
 - Water supply and sanitation committee (WSSC)
 - Community sanitation motivator (CSM)
 - Villagers constructing family and institutional latrines
- material: misc. construction material required for latrines

HMG (DWSS) contributions:

- manpower:
 - employed:
 - Community sanitation technician (CST)
 - Sanitation-in-charge (SIC)
 - Sanitation communicator
 - paid for: Village skilled/ semi-skilled labourers
- material (including cost of transport):
 - timber, cement, roofing, reinforcement,
 - screen & misc. items for institutional latrine construction
 - construction tools
- housing and facilities for training

ADB - contributions:

- manpower: Technical Advisors (engineers & sociologist/
anthropologist)
- material for construction of institutional latrines
(including cost of transport):
 - cement
 - vent pipes
 - pans
- training:
 - trainees' per diem and transport
 - instructors
 - material (incl. communication equipment)

ANNEX A : JOB DESCRIPTIONS

A.1 Community Sanitation Technician (CST)

Individuals with 10 years of formal schooling (test pass) or Army First Class pass and a minimum age of 25-30 years are eligible for CST pre-service training.

Having received intensive basic training on sanitation, health education and water supply, the CST will mainly perform the following:

1. To construct a latrine with local material as demonstration and for his own use in the project village
2. To assist the community sanitation motivators (CSM) and work with them in creating awareness among people, educating them on sanitation and health, and making sure that the people will make the best use of water provided to improve personal and domestic hygiene
3. To guide and assist people in the project area technically on aspects of water system operation and maintenance and for constructing family latrines out of local material
4. To work with water supply & sanitation committee members and CSMS to mobilize the villagers for and assist them in institutional latrine construction in the project area
5. To liaise with and assist teachers in the project area in performing health education activities at schools
6. To work under the direct supervision of the overseer and assistant engineer assigned to the respective water supply and sanitation project
7. To liaise with other health related personnel in the project area who might be interested to engage in sanitation activities (health post staff, CHL, 'dhami/jhankri', or others).

THE BASIS OF VILLAGE-AGENCY COOPERATION..

... is mutual
respect...



... and the extension worker's effort to
understand the community's situation
and needs

A.2 Community Sanitation Motivator (CSM)

The CSM should be a local person from the CWSS project area who is enthusiastic, respectable, and capable of working as a barefoot motivator and communicator. After the training as CSM he will work in the project area as a volunteer prior to the construction of the project, during project implementation and after project completion. In particular, the CSM will:

1. Create an environment in which villagers develop the need for sanitation and the understanding for the use of improved water supply in bringing about improvement of personal hygiene and health.
2. Assist DWSS staff assigned to the project (the CST in particular) in promotional and educational activities on sanitation, and render assistance to families wishing to build latrines with locally available material
3. Assist the WSSC to receive people's voluntary labour contribution for institutional latrine construction, and give necessary guidance for the proper use and maintenance of latrines
4. Build a latrine with local material for his own and his family's use on returning from training
5. Develop close relationships with health post personnel, community health leaders (CHL) and/or panchayat-based health workers¹ if such persons are actively working in the project area.

A.3 Water Supply and Sanitation Committee (WSSC)

The WSSC is the formal body of villagers which represents the sub-communities served by the water supply & sanitation project. It is formed at the inception of the project and is vested with specific duties and responsibilities related to the implementation, operation and maintenance of the water supply scheme and to the development of sanitation activities. The WSSC is the liaison body of

¹FP/MCH Project staff

the villagers in dealing with the DWSS staff. Its membership is made up of an odd number of 7-13 elected men and women, and it constitutes itself.

Apart from the committee's duties on water supply, its major functions on sanitation will be:

1. To mobilize people's participation and, if necessary, raise funds for construction of institutional latrines
2. To call villagers for meetings to discuss about the importance and relevant issues of sanitation, thereby inculcating a sense of duty to keep the village clean and free from diseases and to come up with a decision on how to organize water supply system maintenance, and on latrine construction
3. To help villagers in acquiring technical guidance from CST and other DWSS staff in household latrine construction with local material
4. To select with the assistance of DWSS staff one or more suitable villagers to be trained as CSM
5. To be among the first to build and use latrines made with local material thereby serving as an example to other villagers.

A.4 Sanitation-In-Charge (SIC)

The Sanitation-in-Charge, an Assistant Engineer stationed at the Divisional Office, is responsible for smooth implementation of sanitation activities at project sites. He has to have a minimum of one year of experience as a site engineer prior to his assignment as SIC, and will be entrusted with the following tasks:

1. Assist in the selection of CST and CSM trainees, and arrange for the necessary relevant inputs to their basic, upgrading and refresher training curricula
2. Cater for construction and regular monitoring of pilot latrines of variable design and method of construction in close-to-Office villages or for the use at the Office premises.

3. Develop suitable designs and construction methods for family and institutional latrines
4. Visit the schemes regularly, and guide and support the site staff (the CST in particular) in their sanitation activities
5. Ensure that all water supply and sanitation scheme designs and estimates include the requirements for institutional latrines, and assist in the management of funds and material needed for latrine construction
6. Keep proper records of all latrines constructed under the Programme
7. Seek motivational and promotional support for sanitation activities from the HMG sanitation communicator at the Regional Office and his consultant counterpart
8. Produce quarterly progress and evaluation reports according to the instructions to be established by DWSS Sanitation Division
9. Involve himself in training activities at regional and divisional level.

A.5 Sanitation Divisional Engineer (DWSS-Kathmandu; established)

- As per the specifications of the Department

A.6 Water Supply and Sanitation Communicator

A master's degree holder in sociology, anthropology, education, or psychology with strong desire to work for and with the villagers at grass root level, will be a suitable person for the post. The communicator is responsible for inputs to the Programme which will provide technical staff with the non-technical skills needed for community liaison and promotion, and which will render Programme strategies and project designs socially feasible. The communicator's major duties include:

1. To do village-level motivational and promotional work in health, sanitation and water supply in cooperation with the

Committee (WSSC), the CSM and CST, from the very initial phase of project activities.

2. To design, produce, and pretest communication material and media required by Programme staff for community orientation, creating need for sanitation, and inducing behavioural change
3. To develop, in cooperation with technical staff, suitable strategies and procedures for scheme implementation, based on the socio-economic environment in the respective project villages and on villagers' water- and sanitation-related habits and beliefs
4. To design communication inputs to all types of training courses, and to carry out monitoring, follow-up, evaluation and feedback activities to bring about useful modifications for Programme implementation
5. To liaise with other HMG and non-HMG agencies actively involved in water supply and sanitation or related fields (e.g. Ministry of Health, MPLD/UNICEF, MPLD/K-Bird).

A.7 Water Supply and Sanitation Chief Technical Advisor (CTA; ADB-funded)

The CTA is a postgraduate engineer specialized in sanitary engineering¹ and bringing with him substantial professional experience. He must have worked at least three (3) years in the field of community water supply and sanitation in developing countries. In addition, he must have performed managerial tasks related to project or programme implementation in the water supply and sanitation sector. The CTA, being responsible to ADB, plans and manages the Programme activities jointly with the Regional Office's Superintending Engineer. His particular tasks are:

¹"Sanitary Engineering" is commonly understood to comprise both water supply and sanitation

1. Related to overall Programme management:

1.1

1.2

2. Related to water supply activities:

2.1

2.2

3. Related to sanitation activities:

3.1 To discuss with DWSS Headquarters yearly and long-term plans of action for sanitation. To deliberate on experiences gathered in the course of the Programme and to discuss suitable changes and amendments to strategies and procedures

3.2 To liaise with DWSS sanitation and training cells in Kathmandu, as well as with the sanitation field staff

3.3 To assist Programme staff in liaising with other agencies involved in sanitation activities such as Ministry of Health (HES, ESS) MPLD/UNICEF, MPLD/K-Bird, District level offices (DHO, DEO etc.)

3.4 To periodically visit project sites, monitor sanitation activities (including training) and ensure that these are carried out according to the sanitation plan of action.

A.8 Water Supply & Sanitation Technical Advisor (TA; ADB-funded)

The TA is a graduate or postgraduate civil engineer with at least five (5) years of professional experience, thereof a minimum of three (3) years in water supply and sanitation in developing countries. He needs to have a record of practical experience in construction work. His duties include:

1. Related to water supply:

1.1

1.2

2. Related to sanitation:

- 2.1 To regularly visit project sites through the Divisional Office to advise on technical aspects of latrine construction and on public health issues, to follow-up and evaluate training effectiveness, and to deliberate with D.E. and SIC on all matters of implementation at field level
- 2.2 To plan jointly with the D.E. Programme funds disbursements and material procurement at field level for sanitation training and latrine construction
- 2.3 To ensure that all project estimates make necessary provision for construction of institutional latrines
- 2.4 To report regularly to the CTA and propose, if necessary, on suitable modifications to the Programme.

ANNEX B : UNIT COST (1984) OF LATRINES, SANITATION
MANPOWER AND TRAINING

B.1 Latrines

B.1.1 Basic assumption

- Cost of "local material" (e.g. stones, bamboo, matting) is assumed to be inclusive of transport cost
- Cost of non-local material (e.g. cement, reinforcement, HDP vent pipes) is compounded by cost of transportation, which as an average for Mid and Far Western Regions is assumed to amount to:
 - NC 0.50 per kg for trucking to road head (say from Nepalganj or Dhangadhi)
 - NC 10 per kg for portering from road head to project site
- Transport cost will be borne by either DWSS or ADB, depending upon the particular item and whether it falls under DWSS or ADB procurement
- Opportunity cost of a villager's man-day are set at NC 25.

B.1.2 Family pit latrine

- Basis of calculation:
 - pit lining: stones to full depth
 - squatting slab: bamboo support and stone flooring (mud pointed)
 - latrine building: bamboo poles and matting (walls) and thatching (roof), or, alternatively, stone masonry, walls and matting for roof

- Labour: 5-8 days
- Opportunity cost of material and labour for family pit latrines are shown in Table B.1 below.

Table B.1: Opportunity Cost of Family Pit Latrines Made From Indigeneous Material

	Bamboo superstructure NC	Stone masonry superstructure NC
Material	570	440
Labour	125 (5 days)	250 (10 days)
Total	700	700
Thereof superstructure only	350	350

B.1.3 Institutional pit latrine

- Basis of calculation: Ref. 1.11 and assumptions for costing (B.1.1)
- Single-pit unit estimated at 40% of indicated cost of twin-pit latrine
- The sharing of cost between community, DWSS and ADB is based on the following division of contributions:
 - Community: 20%
(unskilled labour, stones, sand, aggregate)
 - DWSS: 45%
(roofing, reinforcement, timber, skilled and semi-skilled labour, misc. small material, transport)

- ADB: 35%
(cement, vent pipe, transport)

Table B.3 shows typical cost of material, labour and transport for two-unit type ventilated improved pit (VIP) latrines in the Programme's hill and Terai area, respectively. Differences of cost for construction in hills and Terai are mainly due to the differences in cost of transportation.

Table B.3: Unit Cost of Two-Unit VIP-Latrine

	Hills	Terai
Total, NC	10,200	6,300
Thereof:		
• community (20%):	2,000	1,300
• DWSS (45%):	4,600	2,800
• ADB (35%):	3,600	2,200
Thereof labour:		
• community	500	500
• DWSS (sk. labour)	900	900

B.1.4 Pourflush/waterseal latrine

- Basis of calculation: Ref. 1.6 and present costing in Eight-Town Sanitation Programme
- Towns representative for cost of construction in the Programme area: Birendranagar (midhill; 1 day

trucking of material); Silgadhi (hills; trucking and 2-3 days portering); Mahendranagar (Terai; no transportation needs)

- Estimated share of cost (based on Ref. 1.6 and present practice):

- User: 65%
(labour charges, bricks/stones, sand, aggregate, cement for superstructure if any)
- DWSS: 10%
(reinforcement, binding wire)
- Donor: 25%
(cement for substructure, pan and trap)

Table B.4 illustrates summary unit cost and shared contributions for PF/WS-latrines for three typical geographical locations.

Table B.4: Summary Unit Cost For 5- and 10-User Pourflush/Waterseal Latrines

	Birendranagar (Surkhet)		Doti (Silgadhi)		Mahendranagar	
	5-user	10-user	5-user	10-user	5-user	10-user
Total	NC 2,500	NC 3,100	NC 8,300	NC 9,400	NC 5,000	NC 5,600
Thereof sub-structure	1,700	2,300	6,800	7,900	3,800	4,400
Thereof:						
• User (65%)	1,620	2,010	5,400	6,100	3,250	3,640
• DWSS (10%)	260	310	820	950	500	560
• Donor (25%)	620	780	2,080	2,350	1,250	1,400

B.2 Sanitation Manpower

B.2.1 DWSS:

Only such staff is listed which will primarily or exclusively be performing sanitation tasks. Staff unit cost include basic salary; project remoteness, dearness, and food allowance; T.A./D.A. (travel and daily allowance during field work from assigned base office) commensurate with the person's assigned field activities.

	<u>Cost per man-year (NC)</u>
- From Regional Office Nepalganj:	
• water supply and sanitation communicator (B.A. or M.A.; gazetted III)	22,000
- From Divisional Offices:	
• sanitation-in-charge (Ass. Eng.; gazetted III)	22,000
- At project sites:	
• community sanitation technician (CST; non-gazetted III)	11,200

B.2.2 Community:

- Opportunity cost of community voluntary workers (WSS - Committee members, community sanitation motivator, dhami/jhankri):
NC 25 per man-day

B.2.3 ADB-funded:

ADB-funded expatriate staff cost comprises basic salary and allowances, travel to and from Nepal, insurance, equipment, and in-country orientation.

Cost per man-
year (US \$)

- Chief Technical Advisor
- Socioculture and communication Expert
(sociologist/anthropologist)
- Water supply & sanitation Engineer
(Technical Advisor)

B.3 Cost of Sanitation Training

Unit cost figures presented below are based on the UNDP/WHO supported sector training programme funding schedule (Ref. 1.1) and on cost experience gained from related training activities in MPLD's CWSS programme.

Cost indicated below include expenditures for:

- food/per diem for participants
- travel fares
- training material
- instructor's fees + per diems

All training activities shall be managed by the respective field offices (Regional or Divisional) except for trainer's training and local consultant's orientation, which will be organized centrally (DWSS Headquarters) and contracted out. Support from and coordination with existing HMG training institutions (P.T.C., W.T.C., C.M.A-Campus, etc.) will be sought. It is assumed for training costing purposes that use will be made of these institutions' facilities. A HMG kind-contribution is therefore being budgeted for separately (see Financial Plan).

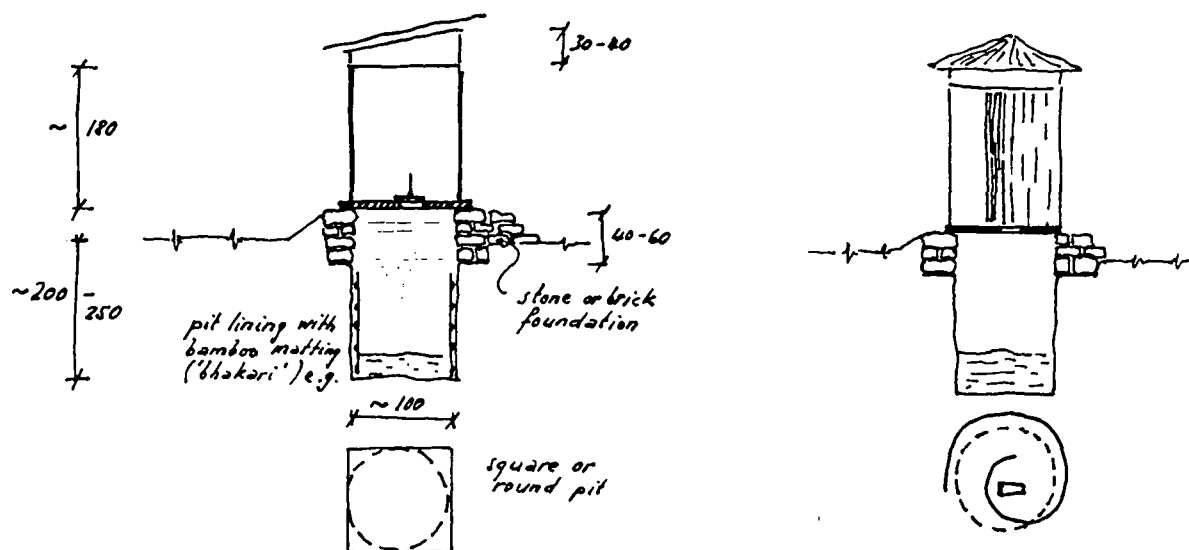
Table B.5 lists the summarized unit cost of the proposed types of training.

Table B.5: Unit Cost of Training

Type of training	Cost per participant man-day NC	Remarks
1. Trainers' Training	170	contracted out
2. CST Basic Training	55	run by Regional or Divisional Office
3. CSM Training	55	"
4. WS + S Committee Orientation	10	" } venue: project villages
5. Villagers' Orientation	10	" }
6. CST Upgrading Training	55	"
7. CST Refresher Training	55	"
8. Local Consultants' Orientation	170	contracted out

ANNEX C: ON LATRINE DESIGN AND CONSTRUCTION

C.1 Family Pit Latrines Made From Local Material



- Pit latrine with rectangular, door-fitted superstructure
- Pit latrine with spiral doorless superstructure
- Pit:
 - top 40-60 cm stone-lined for foundation and stability
 - pit lining in unstable soil from bottom with bamboo mats, dry stone or brick masonry
 - pit rectangular or circular
- Squatting slab:
 - large stone plates spanning the pit
 - flat stones with mud mortar on timber/bamboo support
 - wooden planks on timber/bamboo support
- Building:
 - bamboo/timber and matting or thatching
 - wattle and mud

a VIP LATRINE made
from local material ...



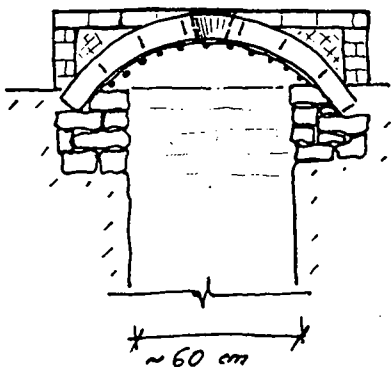
... with spiral, doorless
superstructure and ..



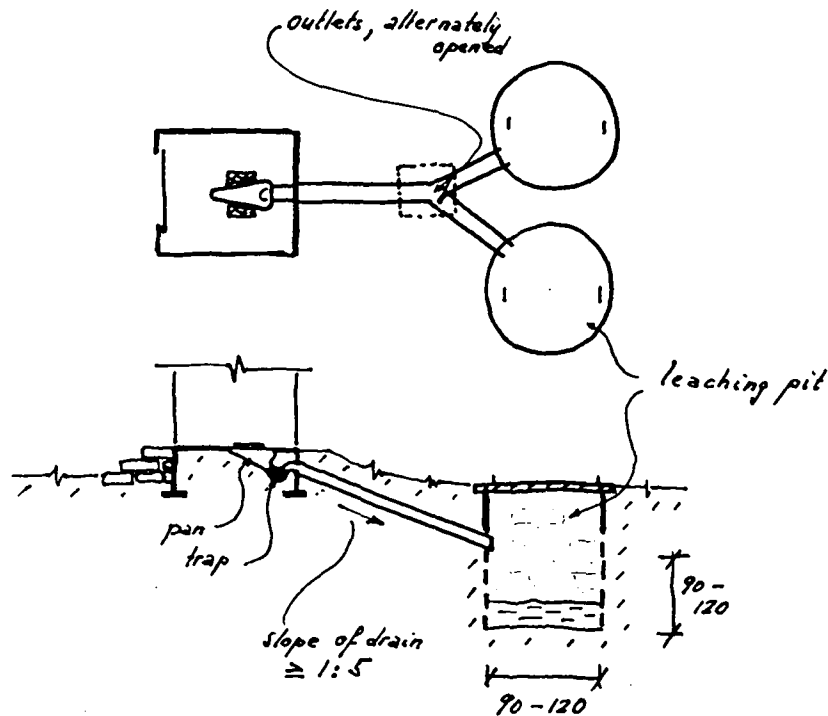
... bamboo vent pipe

- Latrine building:
 - bamboo/timber poles
 - matting ("chittra", "hanga")
 - thatching ("khar")
 - mud stone or brick masonry
 - wattle and mud
- Venting and lighting: through space between walls and roof
- Mound
- Lid
- Pits of the indicated size will take from 3-6 years to fill up if used by a 5-7 member-family (say 2-3 adults + 3-4 children), depending mainly on soil permeability and liquid content in the pit.
- The pit will have to be abandoned when full and a new latrine to be constructed; contents of the initially used pit may be used as soil conditioner and fertilizer after one (1) year, when it will have turned into humus and pathogenic organisms will have died-off or reduced to a "safe" number.

Alternate squatting "slab" design



- Brick arch
- Shuttering support from mats and bamboo
- Pit rectangular, say 60 x 150 cm or similar

C.2 Pour-Flush/Waterseal Latrines

- Offset, twin leaching pits for alternate filling, resting to decompose, and emptying
- Walls of pits partly in open, partly in closed stone/brick masonry
- Pit covers ferrocement or r.c.c. depending on expected load and potential impact
- Size of pits depending on number of users and permeability of surrounding soil
- Prefabricated pan + trap (fiberglass e.g.)
- Drain:
 - min. slope 1:5
 - brick or stone masonry with smooth cement coating
 - removable stone plate over junction to allow inspection
 - alternatively: inspection chamber with continuous invert
- Flushing requirement: 1-2 l if pan is properly installed and drain properly sloped and constructed; larger quantities required for thorough cleaning of pan.

a POUR FLUSH / WATERSEAL LATRINE . . .



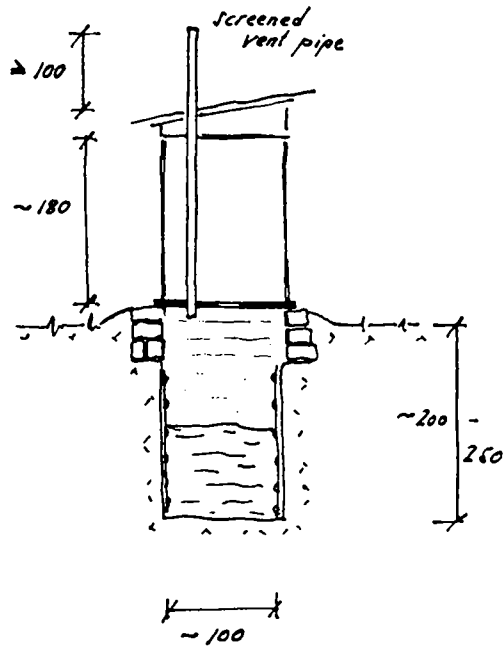
. . . with alternately operated twin
leaching pits

(Birendranagar)

C.3 Institutional Latrines

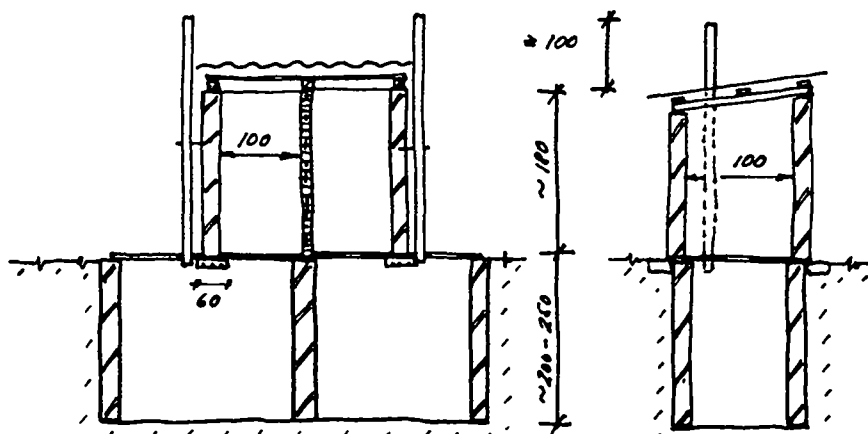
- Use at schools, health posts, Panchayat buildings, etc.

One-unit Type



- Poor-fitted superstructure
- Pit lined with mud stone or brick masonry, or bamboo matting
- Ferrocement squatting slab (cement mortar reinforced with wire mesh; 3-4 cm thick)
- HDP $\phi = 110$ mm vent pipe extending well over the roof and covered with mosquito screen
- Stone or brick superstructure
- Roof:
 - corr. galv. iron
 - thatching
 - stone plates or slates
- Capacity: approx. 20-30 users per day; 3-5 years life span

Two-unit type

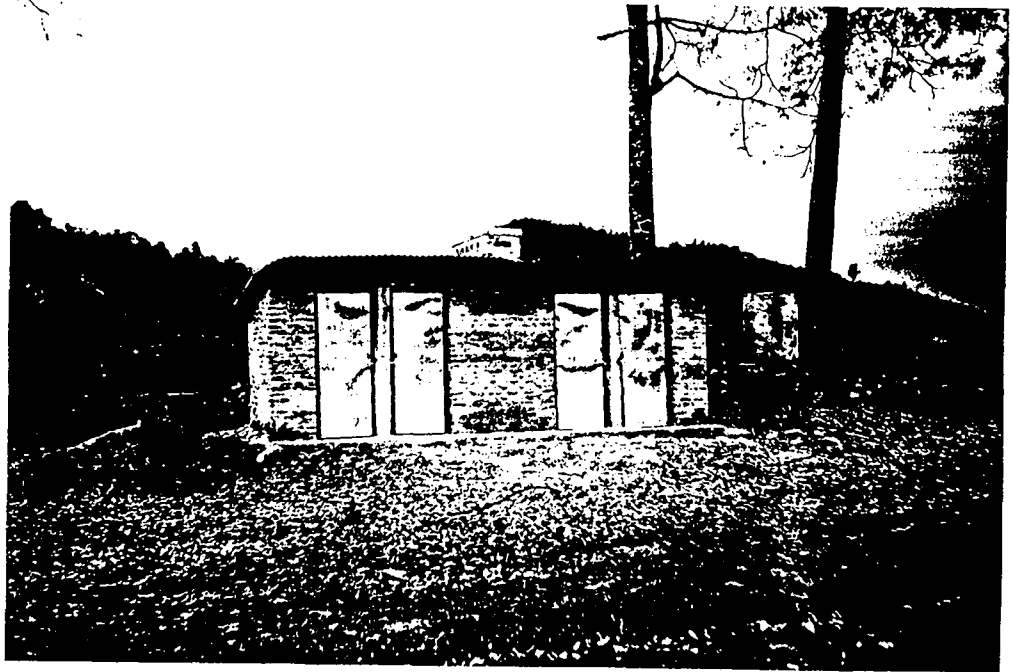


(measurements in cm)

(Ref. 1.11)

- Typical for schools (say 1 unit each for girls and boys)
- Pit(s) extending beyond building:
 - allows for pit emptying after decomposition of material and die-off of pathogens, and for later re-use of substructure
 - requires reinforced concrete beams for wall support
- Squatting and pit cover slabs from ferrocement
- Ventilation pipes > 110 mm, with mosquito screens
- Capacity: approx. 100 users per day; approx. 3 years life span.
- The latrines have to be abandoned when the pits become filled up, and new units will have to be constructed at a nearby place, with re-use of squatting and cover slabs, beams and material from the previously built superstructure.
- Though the shown two-unit latrine has a permanent pit structure and allows for pit emptying, its content, when filled up must be left to decompose and to become pathogenically innocuous for a period of one year. Only then may the content be used as a fertilizer/soil conditioner.
- Many other arrangements and construction methods are possible and might be tried during Programme implementation.
- At schools, extra one-unit latrines might be required for teachers.

a new SCHOOL LATRINE . . .



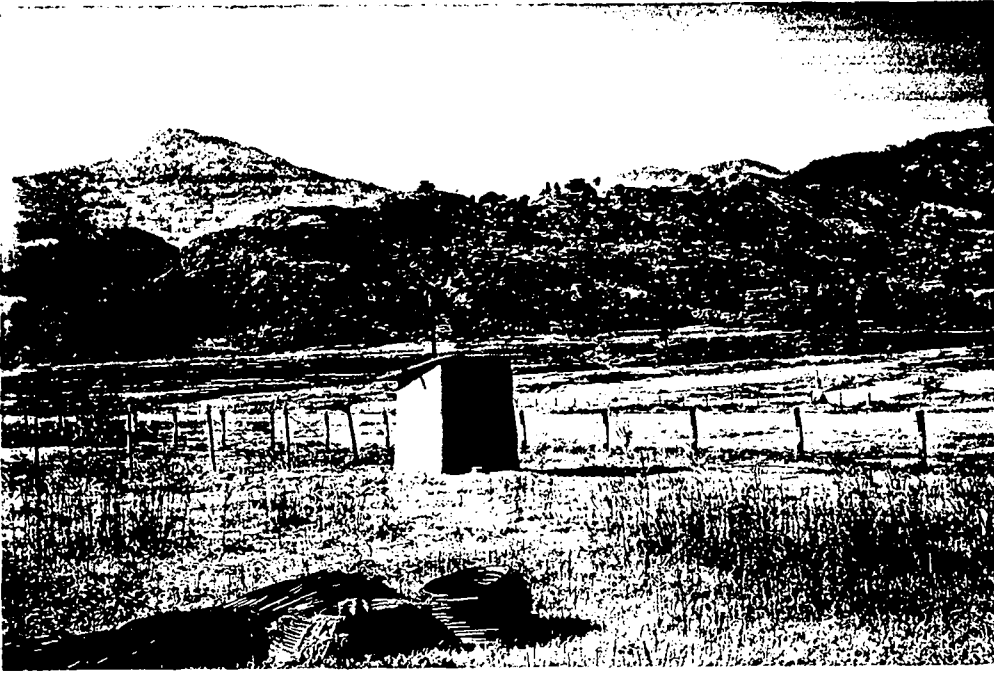
. . . with

- a single, chimney-ventilated pit,
- and bamboo-cement storage vessels which provide water for washing hands and cleaning the latrine

(Pokhara, Phulbari)

VIP LATRINE with stone
masonry superstructure

(Sanfe Bagar, Achham D.)

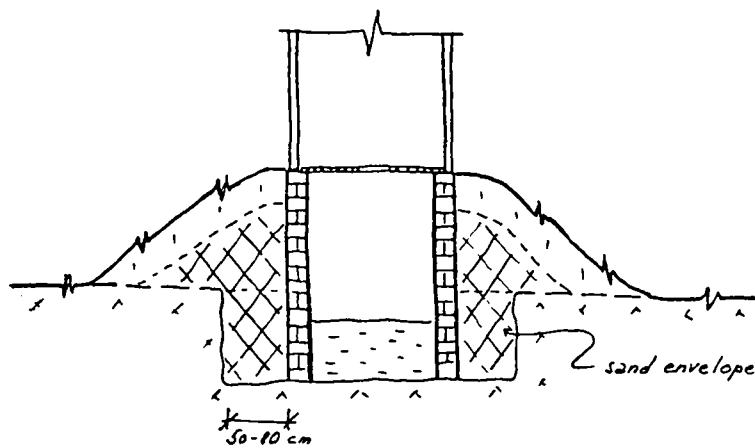
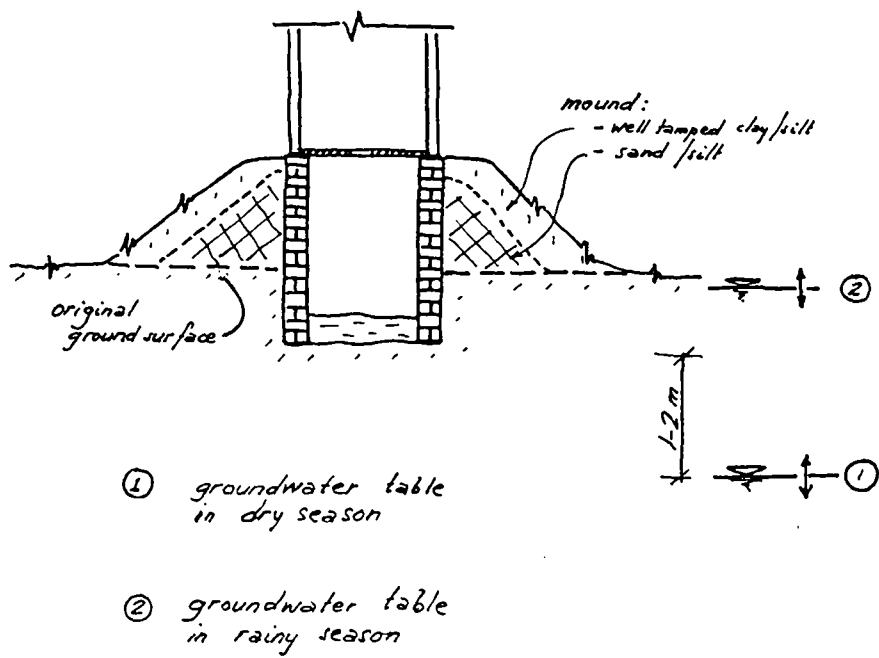


(Mastamandu, Achham D.)

Testing the ferrocement squatting slab
of a 2-unit VIP school latrine

C.4 On Latrine Construction in High Groundwater Table Areas

Pit Latrines



- Lined pit raised above original ground to avoid extensive flooding by groundwater during rainy season
- Disturbance by splashing during defecation will be nil or minimal
- Placing of such latrines nearby shallow wells must be avoided, with the safe distance and location depending on the water withdrawal rate at the well and direction of groundwater flow, if any
- Mound: gently sloped; inner packing sandy/silty where soil has high loam/clay content to enable easy percolation of surplus liquid from upper portion of pit; outer packing well tamped.
- Alternatively, placing of 50-80 cm of sand envelope also in lower portion of pit to allow for easy drainage of surplus liquid from the pit; alternative depends on availability of sand, say from a nearby river.

Pourflush/Waterseal Latrines

- Solution equivalent to method of construction for pit latrines in high groundwater
- Leaching pits raised above ground; pit bottom will be above the groundwater table during most of the year, and will be partly flooded by high groundwater only during a short period in the rainy season.
- Foundations of latrine building to be constructed from original ground level if the building is constructed from stones or bricks and thus heavy.

ANNEX D: CONTACT AND SUPPORT AGENCIESD.1 Agencies contacted

The following are agencies other than DWSS Offices contacted during the tour of the Consultant's Sanitation Team in Mid and Far Western Regions and in Kathmandu for discussions on water supply and sanitation, and related aspects of programme implementation.

	Agency	Contact Person	Address & Telephone No.
1	Panchayat Dev. Training Centre	Mr Kameshwar Jha (Principal)	Pan. Dev. Trg. Centre, Mahendranagar, Nepalganj - Banke Dist. Telephone No.: 275
2	Women Trg. Centre	Mr N.B. Khadka (Principal)	Women Training Centre, Dipayal, Doti Dist.
3	MPLD - Regional Directorate Far Western Region	Mr J.N. Regmi (Sect. Offr.)	MPLD - RD, Dipayal, Doti Dist.
4	Education for Rural Development in Seti Zone ("Seti Project")	Dr N. Bennett (Chief Techn. Adv.)	Education for Rural Development in Seti Zone, Silgadhi, Doti Dist.
5	District Education Office, Doti Dist.	Mr H.R. Lekhak (D.E.O.)	District Education Office, Silgadhi, Doti Dist.
6	Small Farmers Dev. Project (SFDP)	Mr R.D. Bhatta (Group Org.)	S.F.D.-Project, Mallo Kalena V.P., Doti Dist.
7	MPLD/UNICEF Field Office	Mr I. Davidson	MPLD/UNICEF Field Office, Sanfe Bagar, Achham Dist.
8	FP/MCH Project	Mr G.P. Pokhrel (Fam. Planning Officer)	FP/MCH Project, Mangalsen, Achham Dist.

Agency	Contact Person	Address & Telephone No.
9 Hospital/ Health Post	Mr D.B. Khadayat (Ag. Med. Officer)	Mangalsen, Achham Dist.
10 Dist. Panchayat Secretariate	Mr N. Poudel (L.D.O.)	District Panchayat Secretariate, Mangalsen, Achham Dist.
11 S.C.F. UK	Dr S. Delmonte (Chief)	Save the Children Fund (UK), Birendra-nagar, Surkhet Dist. Tel.No.: 256
12 K-BIRD Project	Mr Bill Hanneson (Chief Advisor)	Karnali-Bheri Integrated Rural Dev. Project, Birendra-nagar, Surkhet Dist. Tel. No.: 201
13 Women Trg. Centre Surkhet	Ms P. Upadhyaya (Principal)	Women Trg. Centre Birendra-nagar, Surkhet Dist. Tel. No.: 280/109
14 ICHSD Project	Mr Ram Bhandari (Trg. Officer)	Integrated Community Health Services Dev. Project, Birendra-nagar, Surkhet Dist. Tel. No.: 289
15 ICHSDP	Dr H.N. Uprety (Chief)	ICHSD Project Head Office, Kalikasthan, Kathmandu Tel. No.: 215068
16 SFD-Project	Mr B.P. Regmi (Group Org.)	S.F.D.-Project, Latikoili, Surkhet Dist.
17 Health Education Section	Mr C.B. Thapa (Chief)	Min. of Health, Health Education Section, Teku, Kathmandu, Tel. No.: 212413

Agency	Contact Person	Address & Telephone No.
18 UNICEF	Mr C. Glennie Mr R.B. Shrestha	UNICEF Water & Sanitation; Tel.No.: 214501 UNICEF Health Section Tel. No.: 215124 Lainchaur, P.O. Box 1187, Kathmandu
19 MPLD/WHO	Mr Kew Koshchasm (WHO Advisor)	MPLD, Sri Mahal Pulchowk, Lalitpur Tel. No.: 521021
20 CMA - Campus Dhankuta Liaison Office	Dr C.A. Swinton (Project Coord.)	CMA - Campus Dhankuta, Project Head Office, Dilli Bazaar, Kathmandu Tel. No.: 212735

D.2 Support agencies in Mid & Far Western Regions

The following are agency and programme field offices in Mid and Far Western Regions with which DWSS can seek cooperation and assistance on issues of joint interest.

Agency	Address	Tel. No.
1 Pan Dev. Trg. Centre	Mahendranagar, Nepalganj, Banki D., Bheri Zone	275
2 Women Trg. Centre	Birendra-nagar Surkhet Dist.	280
3 Integrated Community Health Services Dev. Project Trg. Centre	Birendra-nagar Surkhet Dist., Bheri Zone	289
4 Karnali - Bheri Integrated Rural Dev. Project	Birendra-nagar Surkhet Dist., Bheri Zone	201

	Agency	Address	Tel. No.
5	C.M.A. Campus	Birendra-nagar Surkhet Dist., Bheri Zone	
6	Family Planning/Maternal and Child Health Project, Regional Trg. Centre	Birendra-nagar Surkhet Dist.	156
7	Rapti Integrated Rural Development Project	Tulsipur - Dang Rapti Zone	
8	Women Training Centre	Dipayal, Doti Dist., Seti Zone	
9	MPLD - Regional Directorate	Dipayal, Doti Dist., Seti Zone	
10	Education for Rural Development in Seti Zone	("Seti Project") Silgadhi, Doti Dist., Seti Zone	
11	MPLD/UNICEF	Sanfe Bagar, Achham Dist., Seti Zone	
12	Mahakali Integrated Rural Development Project	Patan, Baitadi Dist., Mahakali Zone	

D.3 Support Agency Head Offices

Below is a list of agency and programme head offices in Kathmandu with which DWSS should seek contact, coordination and cooperation in developing its rural sanitation component.

	Agency	Address
1	Health Education Section	Ministry of Health, Health Education Section, Teku, Kathmandu Tel. No. 212413

Agency	Address
2 Integrated Community Health Services Development Project	Min. of Health, ICHSDP, Kalikasthan, Kathmandu Tel. No.: 215068
3 UNICEF Water & Sanitation Section	UNICEF, Lainchaur, P.O. Box 1187, Kathmandu
4 UNICEF Health Section	Tel. No.: 214581, 215124
5 Environmental Sanitation Section	Min. of Health, Teku Kathmandu
6 Central Pan. Trg. Centre	Narayan Bhawan, Jawalakhel, Lalitpur, Tel. No.: 521051, 522004

ANNEX E: LISTING OF COMMUNICATION AIDS AND EQUIPMENT

Item	Quantities required at			Total
	Center	Region	Division	
1. 16 mm movie projector	1	1	4	6
2. Slide projector	1	1	4	6
3. Projection screen	1	1	4	6
4. Overhead projector	1	1	4	6
5. Generator 1000 Watt	1	1	4	6
6. Cassette tape recorder	1	1	4	6
7. Duplicating machine (manual)	1	1	4	6
8. English typewriter (mechanical)	1	1	4	6
9. Nepali typewriter (mechanical)	1	1	4	6

ANNEX F SANITATION STUDY TEAM AND ITINERARYStudy Team

- . Martin Strauss (M.E.), Sanitation Engineer / Consultant
- . Man Bdr. Pun (M.A.), Sociologist / Consultant
- . Shiva P. Mohpal (B.E.), Assistant Engineer DWSS

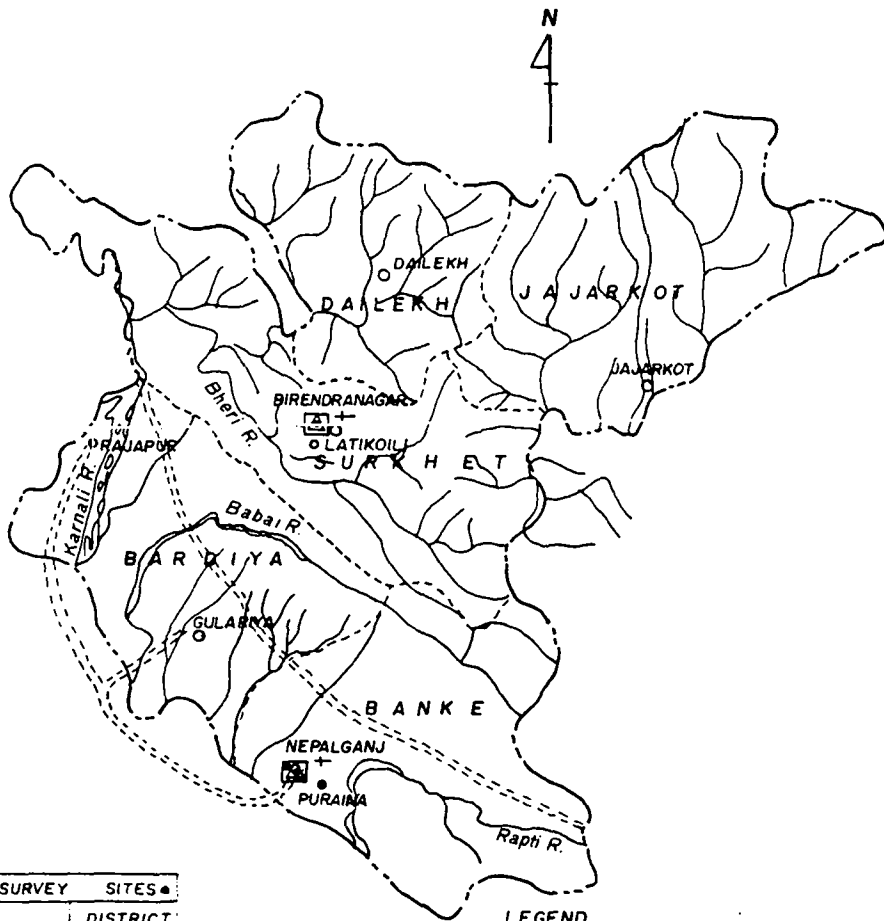
Itinerary (January 20 - February 16, 1984)

Date	Location	Major survey activities, contacts
January 20	Kathmandu - Nepalganj (NPG)	Su.E. Mid & Far West
21	NPG	Field survey planning and methodology
22+23	Gularia - Rajapur (Bardia District)	Sanitation + drainage survey
24	NPG	Review
25	Purena (Banke D.)	Village and school sanitation survey
26	NPG - Dipayal - Silgadhi (Doti D.)	MPLD Reg'l. Directorate, D.E. Silgadhi
27	Silgadhi	Eight-Town San. Progr., W.T.C., "Seti Project"
28	Mallo Kalena (Doti D.)	SFDP
29	Silgadhi	Pradhan Panch, D.E.O.
30	Silgadhi - Phulot - Sana Gaun (Doti D.)	
31	Sana Gaun - Sukulimati - Sanfe Bagar (Achham D.)	MPLD/UNICEF CWSS Field Office /Engineers
Feb 1	Sanfe Bagar; Mastamandu (Achham D.)	MPLD sanitation progr., village visit (MPLD CWSS project)
2	S. Bagar - Belpatta (Achham D.)	Technician sanitation class

Date	Location	Major survey activities, contacts
February 3	Belpatta - Junalikot - Jaygarh (Bhardadevi Panch.) (Achham D.)	School sanitation class, Pr. Panch, "jhankri"
4	Jaygarh - Timilsen - Mangalsen (Achham D.)	T'sen: U'Pr.Panch, "jhankri"
5	Mangalsen; M. - Belpatta	DWSS site engineer, C.D.O., L.D.O., D.E.O., FP/MCH; sanitation survey
6	Belpatta - Sanfe Bagar	Review
7	Sanfe Bagar - Shrikot (Achham D.)	Village survey, Pr. Panch
8	Shrikot - Gahil (Achham D.)	MPLD CWSS project Gahil
9	Gahil - Markun - Sanfe Bagar	M: MPLD scheme; latrine constr. activities
10	Sanfe Bagar - NPG	Review
11	NPG	Su.E.; urban drainage survey; review
12	NPG - Birendranagar (Surkhet D.)	D.E. Surkhet
13	B'nagar; Latikoili (Surkhet D.)	Save the Children Fund (UK); village survey/ SFDP Latikoili
14	Birendranagar; B'nagar - NPG	W.T.C., K-Bird, D.T.O., Eight-Town San. Progr.
15	NPG	Review; Su.E.
16	NPG - Kathmandu	

Fig. F.2 : SANITATION SURVEY BHERI ZONE

0 10 20 30 40 50 60 KM.

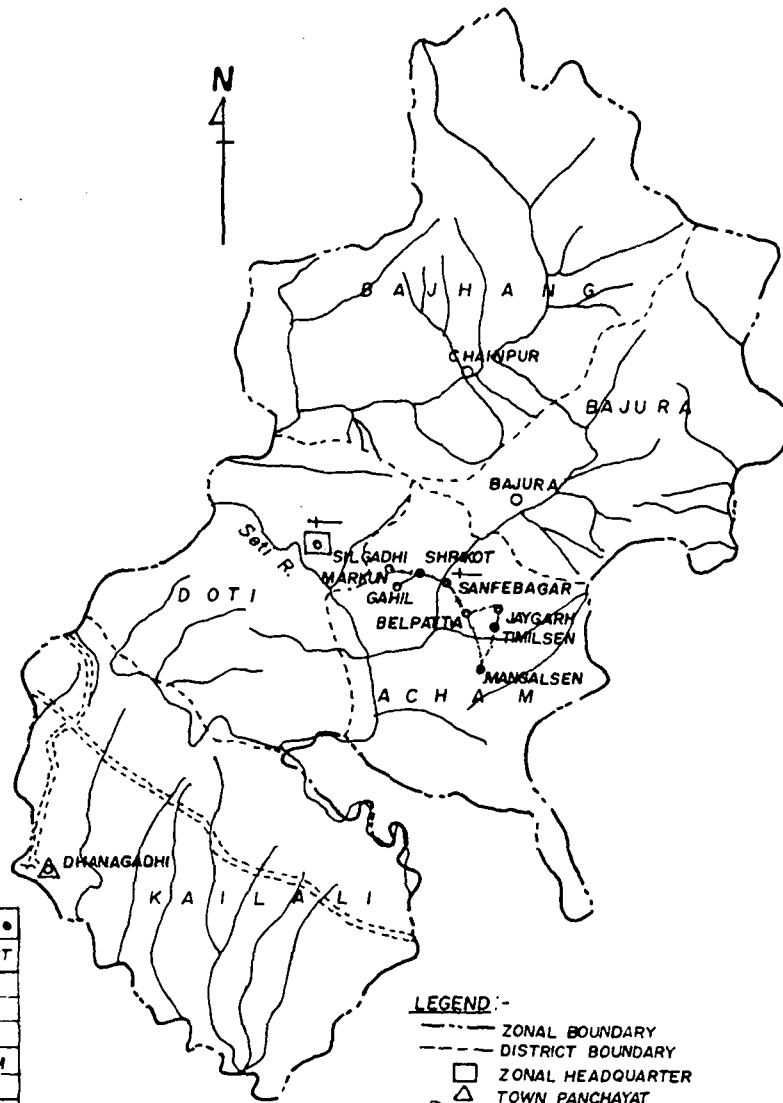
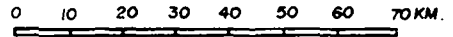


SANITATION SURVEY SITES		
S.NO	PLACE	DISTRICT
1	NEPALGUNJ	BANKE
2	PURAINA	"
3	GULARIA	BARDIA
4	RAJAPUR	"
5	BIRENDRANAGAR	SURKHET
6	LATIKOILI	"

LEGEND

- ZONAL BOUNDARY
- DISTRICT BOUNDARY
- ZONAL HEAD QUARTER
- DISTRICT HEAD QUARTER
- RIVER
- ROAD, TRACK
- AIRPORT
- REGIONAL DEVELOPMENT CENTER

Fig. F.3: SANITATION SURVEY SETI ZONE



SANITATION SURVEY SITES •		
S.NO	PLACE	DISTRICT
1	DOTI	DOTI
2	SILGADHI	"
3	MALLO KALENA	"
4	SANFEBAGAR	ACCHAM
5	BELPATA	"
6	JAYGARH	"
7	TIMILSEN	"
8	MANGALSEN	"
9	SRIKOT	"
10	SAHIL	"
11	MARKUN	"

- LEGEND:-**
- ZONAL BOUNDARY
 - - - DISTRICT BOUNDARY
 - ZONAL HEADQUARTER
 - △ TOWN PANCHAYAT
 - ~ RIVER
 - ==== ROAD, TRACK
 - ✚ AIR PORT
 - DISTRICT HEADQUARTER
 - FOOT TRAIL

ANNEX G: REFERENCESG.1 Guiding Documents

- 1.1 UNDP, Training of Manpower for Drinking Water & Sanitation Programme (Phase I), Project NEP/80/022, In-Country/In-Service Training Programme - Annex 1 to Project Document 1981 (1983?)
- 1.2 Development Research and Communication Group, Report on Evaluation Study of the Kirtipur Demonstration Project in Low-Cost Sanitation (1982; prepared for DWSS)
- 1.3 HMG-N, Summary of the Decade Plan for Nepal (1980)
- 1.4 Anon., Decade Activities in Nepal (1983?)
- 1.5 Thapa, C.B., Health Education Support Project for Water Supply and Sanitation Decade, 1981-1990 (undated; working paper/proposal)
- 1.6 Technical Advisory Group (UNDP Interregional Project Int./81/047), Master Plan Report on Low-Cost Waterseal Latrine Program in Eight Urban and Semi-Urban Communities (Dec. 1983; Draft Report; Vol. I+II)
- 1.7 Lotti, C. & Ass., Asian Development Bank Rural Water Supply & Sanitation Project - Nepal (Inception/Interim Report, Jan. 1984)
- 1.8 Proctor & Redfern International/East Consult (P) Ltd., Water Supply and Sewerage Studies, Nepal Nep./79/032, ("Fourth Project"), Project Background-Interim Report (Sept. 1983; prepared for World Bank, WSSB, UNDP)

- 1.9 U.N. Centre for Human Settlements (Habitat), Appropriate Standards and Technologies for Low-Cost Infrastructure in Nepal (1984; Draft Project Document, NEP/84/)
- 1.10 Asian Development Bank, Water Supply and Sanitation Sector Profile, Project Identification Study, Nepal (Dec. 1982)
- 1.11 MPLD/UNICEF, Estimate and Design For 2-Unit School Latrine (Kathmandu, 1982; Amended 12/1983)
- 1.12 Asian Development Bank, Terms of Reference for Consultant's Services, Water Supply and Sanitation Project (Nepal) (1983)
- 1.13 Lewis, W.J. et al., The Risk of Groundwater Pollution by On-Site Sanitation in Developing Countries - A Literature Review (Int. Reference Center for Wastes Disposal, 1982)

G.2 Further reading

- 2.1 Tribhuvan University (Inst. of Medicine), Surkhet District Community Health Survey (1978; Nepal/Canada Surkhet AHW Training Centre Project)
- 2.2 SA3-Social Analysis & Anthropology Associates (U.K.), Report on Visit to Nepal by Public Hygiene Specialist in Connection with a Sanitation/Health Education Component for the Eastern Nepal Water Scheme (Jan. 1983; prepared for O.D.A./DWSS)
- 2.3 Swates, E.J., Eastern Region Water Supplies Project Assessment of Training Needs (Dec. 1982; prepared for O.D.A./ DWSS)
- 2.4 Feachem R., Infections Related to Water and Excreta: The Health Dimension of the Decade (in: Water Supply and Sanitation in Developing Countries, Chapt. 3, 1983; Institution of Water Engineers & Scientists, London)

FINANCIAL PLAN: COSTING AND DISBURSEMENT

1. Basis of Calculation

- . Unit cost (1984) of sanitation manpower and training, and of latrines as per Annex B
- . Escalation factors as per Inception/Interim Report by Lotti & Ass., Jan. 1984:

	<u>Local cost</u>	<u>Foreign cost</u>
1985	+ 14 %	+ 7 %
1986	12	6
1987	10	6
1988	10	6

- . Assumed year of Programme inception: 1985
- . Cost indicated in 2. and 3. below are escalated from 1984 unit cost (Annex B) with the above factors for the years 1985, 1986, 1987, 1988, i.e. for the proposed Programme period.
- . Training programme and number of trainees as per Chpt. 6.2.4 and 7.2, respectively
- . Latrine construction volume and implementation schedule as per Chpts. 6.4.7, 7.3 and 7.4, respectively
- . Surface drainage requirements as per Chpt. 6.5
- . Staffing requirement HMG as per Chpts. 6.2.1 and Fig. 6.1
- . Assumed exchange rate: NC 15.65 = 1 US \$

2. FINANCIAL SUMMARY

2.1 Grand summary of escalated cost by items

	Contribution	FY 1		FY 2		FY 3		FY 4		Total	
		NC $\times 10^3$	$\$ \times 10^3$	NC $\times 10^3$	$\$ \times 10^3$	NC $\times 10^3$	$\$ \times 10^3$	NC $\times 10^3$	$\$ \times 10^3$	NC $\times 10^3$	$\$ \times 10^3$
01	<u>Manpower</u>										
01.1	• Community	31.4	2.0	60.6	3.9	94.5	6.0	147.1	9.4	333.6	21.3
01.2	• HMG	501.5	32.0	750.4	48.0	1,118.3	71.0	1,183.9	76.0	3,554.1	227.0
01.3	• ADB										
	Subtotal										
02	<u>Training</u>										
02.2	• HMG (kind)	118.4	7.6	138.8	8.9	219.5	14.0	202.2	12.9	678.9	43.4
02.3	• ADB	264.8	16.9	249.8	16.0	436.7	27.9	312.8	20.0	1,264.0	81.0
	Subtotal	383.2	24.5	388.6	25.0	656.2	42.0	515.0	33.0	1,942.9	125.0
03	<u>Construction material</u>										
03.1	• Community	81.6	5.2	154.4	9.9	238.9	15.3	375.0	24.0	849.9	54.3
03.2	• HMG	55.0	3.5	148.4	9.5	413.0	26.4	360.1	23.0	976.5	62.4
03.3	• ADB	57.1	3.6	157.6	10.1	273.9	17.5	385.2	24.6	874.4	55.8
	Subtotal	193.7	12.3	460.4	29.5	925.8	59.2	1,120.9	71.6	2,700.2	173.0
04	<u>Promotional equipm.</u>										
04.1	• HMG	75.0	4.8	20.0	1.3	30.0	1.9	35.0	2.2	160.0	10.2
04.2	• ADB	200.0	12.8	265.0	16.9	—	—	—	—	465.0	29.7
	Subtotal	275.0	17.6	285.0	18.2	30.0	1.9	35.0	2.2	625.0	39.9
<u>Grand total</u>											

2.2 Grand summary of escalated cost by contributor (\$ × 10³)

Item	FY 1				FY 2				FY 3				FY 4				Total			
	Comm.	HMG	ADB	TOT.	Comm.	HMG	ADB	TOT.	Comm.	HMG	ADB	TOT.	Comm.	HMG	ADB	TOT.	Comm.	HMG	ADB	TOTAL
01 Manpower	2.0	32.0			3.9	48.0			6.0	71.0			9.4	76.0			21.3	227.0		
02 Training	—	7.6	16.9	24.5	—	8.9	16.0	25.0	—	14.0	27.9	42.0	—	12.9	20.0	33.0	—	43.4	81.0	125.0
03 Constr'n. material	5.2	3.5	3.6	12.3	9.9	9.5	10.1	29.5	15.3	26.4	17.5	59.2	24.0	23.0	24.6	71.6	54.3	62.4	55.8	173.0
04 Promot'g. equipment	—	4.8	12.8	17.6	—	1.3	16.9	18.2	—	1.9	—	1.9	—	2.2	—	2.2	—	10.2	29.7	39.9
TOTAL	7.2	47.9			13.8	67.7			21.3	113.3			33.4	114.1			75.6	343.0		
%																				

01 Manpower

Contribution	FY 1		FY 2		FY 3		FY 4		Total	
	NC x 10 ³	# x 10 ³	NC x 10 ³	# x 10 ³	NC x 10 ³	# x 10 ³	NC x 10 ³	# x 10 ³	NC x 10 ³	# x 10 ³
01.1 <u>Community</u>										
• Institutional latrines	8.4	0.5	22.0	1.4	37.9	2.4	53.3	3.4	121.6	7.7
• Family latrines	23.0	1.5	38.6	2.5	56.6	3.6	93.8	6.0	212.0	13.5
Subtotal	31.4	2.0	60.6	3.9	94.5	6.0	147.1	9.4	333.6	21.3
01.2 <u>HMG</u>										
• Comm. San. Techn. (CST)	345.6	22.1	529.1	33.8	737.9	47.1	817.8	52.3	2,430.4	155.3
• San.-in-charge (SIC)	100.0	6.39	112.4	7.2	132.2	8.4	136.0	8.7	480.6	30.7
• San. Communicator (SC)	25.0	1.60	28.1	1.8	30.8	2.0	34.0	2.2	117.9	7.5
• Skilled labour	30.9	1.97	80.8	5.2	139.4	8.9	196.1	12.5	447.2	28.6
• Skilled l. surface drainage pilot scheme	—	—	—	—	78.0	5.0	—	—	78.0	5.0
Subtotal	501.5	32.0	750.4	48.0	1,118.3	71.0	1,183.9	76.0	3,554.1	227.0
01.3 <u>ADB</u>										
• Programme consultants	—	—	—	—	—	—	—	—	—	—
• Short-term cons. surface drainage	—	—	782.5	50.0	156.5	10.0	—	—	939.0	60.0
Subtotal	—	—	782.5	50.0	156.5	10.0	—	—	939.0	60.0
01 Total										

FY - Fiscal year

02 Training

	Contribution	FY 1		FY 2		FY 3		FY 4		Total	
		NC × 10 ³	\$ × 10 ³	NC × 10 ³	\$ × 10 ³	NC × 10 ³	\$ × 10 ³	NC × 10 ³	\$ × 10 ³	NC × 10 ³	\$ × 10 ³
02.1	<u>Community</u>	—		—		—		—		—	
02.2	<u>HMG</u>										
	• Facilities (kind)	118.4	7.6	138.8	8.9	219.5	14.0	202.2	12.9	678.9	43.4
02.3	<u>ADB</u>										
	• P. diem, trainers, travel, visits	264.8	16.9	249.8	16.0	436.7	27.9	312.8	20.0	1,264.0	81.0
02.	Total	383.2	24.5	388.6	25.0	656.2	42.0	515.0	33.0	1,942.9	125.0

03 Construction material

	Contribution	FY1		FY2		FY3		FY4		Total	
		NC x 10 ³	\$ x 10 ³	NC x 10 ³	\$ x 10 ³	NC x 10 ³	\$ x 10 ³	NC x 10 ³	\$ x 10 ³	NC x 10 ³	\$ x 10 ³
03.1	<u>Community</u>										
	• Institutional latrines	18.6	1.2	48.6	3.1	83.9	5.4	118.0	7.5	269.1	17.2
	• Family latrines	63.0	4.0	105.8	6.8	155.0	9.9	257.0	16.4	580.8	37.1
	Subtotal	81.6	5.2	154.4	9.9	238.9	15.3	375.0	24.0	849.9	54.3
03.2	<u>HMG</u>										
	• Institutional latrines	48.0	3.1	125.4	8.0	216.5	13.8	304.6	19.5	694.5	44.4
	• Special subsidy for family latrines	5.0	0.3	15.0	1.0	25.0	1.6	33.5	2.1	78.5	5.0
	• Special subsidy for PF/WS latrines	2.0	0.1	8.0	0.5	15.0	1.0	22.0	1.4	47.0	3.0
	• Surface drainage pilot scheme	—	—	—	—	156.5	10.0	—	—	156.5	10.0
	Subtotal	55.0	3.5	148.4	9.5	413.0	26.4	360.1	23.0	976.5	62.4
03.3	<u>ADB</u>										
	• Institutional latrines	47.4	3.0	123.9	7.9	213.8	13.7	300.8	19.2	685.9	43.8
	• Special subsidy for family latrines	5.0	0.3	15.0	1.0	25.0	1.6	33.5	2.1	78.5	5.0
	• Special subsidy for PF/WS latrines	4.7	0.3	18.7	1.2	35.1	2.2	51.5	3.3	110.0	7.0
	Subtotal	57.1	3.6	157.6	10.1	273.9	17.5	385.8	24.6	874.4	55.8
03	<u>Total</u>	193.7	12.3	460.4	29.5	925.8	59.2	1,120.9	71.6	2,700.8	173.0

FY - Fiscal year

04 Promotional aids and equipment

	Contribution	FY 1		FY 2		FY 3		FY 4		Total	
		NC x 10 ³	\$ x 10 ³	NC x 10 ³	\$ x 10 ³	NC x 10 ³	\$ x 10 ³	NC x 10 ³	\$ x 10 ³	NC x 10 ³	\$ x 10 ³
04.1	<u>Community</u>	—		—		—		—		—	
04.2	<u>HMG</u>										
	• Rep. typewriters	60.0	3.8	—		—		—		60.0	3.8
	• Printing, stationary, etc.	15.0	1.0	20.0	1.3	30.0	1.9	35.0	2.2	100.0	6.4
	Subtotal	75.0	4.8	20.0	1.3	30.0	1.9	35.0	2.2	160.0	10.2
04.3	<u>ADB</u>										
	• Equipment	200.0	12.8	265.0	16.9	—		—		465.0	29.7
04	Total	275.0	17.6	285.0	18.2	30.0	1.9	35.0	2.2	625.0	39.9

3. Costing Details

01. Manpower

01.1 Community

a. Institutional Latrine Construction

- . Unit equivalent cost 1985 of unskilled manpower for institutional VIP - latrine.

- 2 - unit latrine	:	NC	570
- 1 - unit latrine	:		<u>280</u>

- . No. of 1 - unit latrines to be built under the programme (See Chpts. 6.4 and 7.3):

Year				Total
1	2	3	4	
30	70	110	140	350

- . Yearly escalated cost:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
8400	22,000	37,900	53,300	121,600

b. Family latrine construction

- . Unit manpower cost 1985; average of bamboo and stone superstructure):

NC 230

- . No. of units anticipated to be built during programme period:

Year				Total
1	2	3	4	
no. 100	150	200	300	750

. Yearly Escalated Cost:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
23,000	38,600	56,600	93,800	218,000

C. Total yearly escalated cost of community man power
(construction of latrines):

Year				Total
1	2	3	4	

0.1.2

HMG

a. CST

. No. of CST employed:

Year				
	1	2	3	4
No.	27	37	47	47

. Yearly unit employment cost:

Year			
1	2	3	4
NC	NC	NC	NC
12,8000	14,300.	15,700	17,400

. Yearly escalated employment cost:

Year				Total
NC	NC	NC	NC	
345,600	529,100	737,900	817,800	2,430,000

b. Sanitation - in - charge (SIC, Ass. Eng.)

- . No. of posts :4
- . Yearly unit employment cost :

Year			
1	2	3	4
NC	NC	NC	NC
25,000	28,100	30,800	34,000

- . Yearly escalated employment cost:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
100,000	112,400	132,200	136,000	480,600

c. Sanitation Communicator (SC)

- . No. of posts : 1
- . Yearly unit employment cost : as for SI (above)
- . Yearly escalated employment cost :

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
25,000	28,100	30,800	34,000	117,900

d. Skilled labour:

- . No. of 1 - unit latrines to be built under the programme:

Year				Total
1	2	3	4	
30	70	110	140	350

- . Unit skilled labour cost (1985): 1,030.-
- . Yearly escalated skilled labour cost:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
30,900	80,800	139,400	196,100	447,200

- e. Lump sum Contribution to Special Surface drainage study cum pilot scheme (labour) (See Chpt. 6.5 and 7.4):

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
-	-	78,000	-	78,000 ¹

(¹ equivalent to \$ 5000 HMG - manpower share of a total of \$ 75,000)

- f. Total Yearly escalated HMG manpower Cost:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
501,500	750,400	1118,300	1183,900	3,554,100

01.3 ADB

US \$

- a. Programme (long - term) consultants:

- . Chief Technical Advisor
- . Sociologist / anthropologist
- . Technical Advisors

Total for 4 years:

- b. Short - term Consultant:

Lump sum contribution for special surface drainage study cum pilot scheme

Year				Total
1	2	3	4	
NC	NC	NC	NC	1
-	782,800	156,500	-	959,000

(¹ equivalent to \$ 60,000 ADB share of a total of \$ 75,000)

c. Total yearly cost of ADB - funded manpower:

0.2 <u>Training</u>	1	2	3	4	Total
	NC	NC	NC	NC	NC
02.2 <u>HMG</u>					

- Unit cost (1985) of participant man - day facilities: NC 28.-
- Yearly participant man - days :

Year			
1	2	3	4
4,22700	4,42500	6,37300	5,30900

- Yearly escalated equivalent cost:

Year				Total
NC	NC	NC	NC	NC
118400	138300	219500	202200	678900

02.3 ADB - funded

- Yearly escalated cost on basis of participant mandays by type of training and unit cost per manday:

Year				Total
1	2	3	4	
264,800	249,800	436,700	312,800	1,264,000

Escalated Cost of Training

Year		1			2			3			4			Total	
Training	Duration [days]	No. of Part.	Unit Cost NC	Total Cost NC	No. of Part.	Unit Cost NC	Total Cost NC	No. of Part.	Unit Cost NC	Total Cost NC	No. of Part.	Unit Cost NC	Total Cost NC	Year 1 - 4	
														no. of mandays	NC
1.	14	30	194	81480				30	239	100380				840	181860
2.	70	27	63	119070	10	71	49700	10	77	53900				3370	222670
3.	28	24	63	42340	40	71	79520	56	77	120740	56	86	134880	4928	377450
4.	4	120	11	5280	200	12	9600	280	14	15680	280	15	16800	3520	47360
5.	2	360	11	7920	600	12	14400	840	14	23520	840	15	25200	5280	71040
6.	28				20	71	39760	15	77	32340	12	86	28900	1316	101000
7.	28							15	77	32340	20	86	48160	980	81500
8.	3	15	194	8730	15	217	9770	15	239	10760	15	264	11880	180.	41140
Study visit				—			46950			46950			46980	-	140850
Total:				264800			249800			436700			312800	20414	1,264,000

0.3 Construction material

0.3.1 Community

a. Institutional latrine construction

- . Unit equivalent cost (1985) of community - contributed material (weighted average for construction in hills and Terai):

- 2 - unit latrine:	NC	1,550.-
- 1 - unit latrine:		<u>620.-</u>

- . No. of 1 - unit latrines to be built under the programme (Chpts. 6. 4 and 7.3):

Year				Total
1	2	3	4	
30	70	110	140	350

- . Yearly escalated cost of community contributed material:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
18,600.0	48,600.-	83,900.-	118,000.-	269,100.-

b. Family Latrine Construction:

- . Unit material cost (1985; average of bamboo and stone superstructure):

NC 630.-

- . No. of units anticipated to be built during programme period:

Year				Total
1	2	3	4	
100	150	200	300	750

. Escalated cost of material:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
63,000	105,800	155,000	257,000	580,800

C. Total Yearly escalated cost of community - contributed material:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
81,600	154,400	238,900	375,000	849,900

03.2 HMG

a. Institutional Latrine Construction

. Unit material cost (1985) of HMG contributed material
(weighted average for construction in hills and Terai).

- 2 unit latrine : NC 4,000
- 1 unit latrine : 1,600

. No. of 1 - unit latrines to be built under the Programme
(Chapts. 6.4 and 7.3):

Year				Total
1	2	3	4	
30	70	110	140	350

. Yearly escalated cost of HMG - contributed material:

Year				Total
1	2	3	4	
48,000	125,400	216,500	304,600	694,500

b. Lump Sum Contribution for Special Family pit latrine subsidy:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
5,000	15,000	25,000	33,500	78,500 ¹

(¹equivalent to \$ 5,000.- HMG share of a total of \$ 10,000.-).

c. Lump sum contribution for special pourflush / waterseal latrine subsidy:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
2000	8000	15000	22000	47000 ¹

(¹equivalent to \$ 9,000.- HMG share of a total of \$ 10,000.-)

d. Lump Sum contribution for special surface drainage study cum Pilot scheme (material + transport):

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
-	-	156,500	-	156,500

(¹ equivalent to \$ 10,000.- HMG ^{material} share of a total of \$ 75,000.-).

Total Yearly escalated HMG material cost:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
55,000.-	148,400	413,000	360,100	976,500

0.3.3 ADB

a. Institutional latrine construction

- Unit equivalent cost (1985) of ADB - contributed material (weighted average for construction in hills and Terai):

- 2 unit latrine	:	NC	3,950
- 1 - unit latrine	:		<u>1,880</u>

- No. of 1 - unit latrines to be built:

Year				Total
1	2	3	4	
30	70	110	140	350

- Yearly escalated cost of ADB - contributed material:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
47400	123900	213800	300800	685900

b. Lump Sum Contribution for Special Family pit latrine subsidy:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
5000	15000	25000	23500	78500 ¹

(¹ equivalent to \$ 5,000.- ADB - share of a total of \$ 10,000.-)

c. Lump sum contribution for special pourflush / waterseal latrine subsidy:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
4700	18700	35100	51500	110000 ¹

(¹ equivalent to \$ 7000.- ADB - share of a total of \$ 10,000.-)

d. Total Yearly escalated ADB material cost:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
57100	157600	273900	385800	874400

04. Promotional Saids and equipment

04.2 HMG

- . 6 Nepali manual / typewriter (20") , to be provided in starting year: NC 60,000
- . Misc. items (stationary, printing, etc.) NC 100,000
- . Yearly escalated cost:

Year				Total
1	2	3	4	
60,000				160,000
<u>15,000</u>				
75,000	20,000	30,000	35,000	

04.3 ADB

. To be procured in 1st and 2nd year:

		<u>NC</u>
-	6 16 mm movie projectors :	120,000
-	6 Slide projectors:	36,000
-	6 Projection Screen:	15,000
-	6 Overhead projector:	36,000
-	6 Generator 1000 W:	72,000
-	6 Cassette tape recorder:	36,000
-	6 Manual duplicating machines:	90,000
-	6 Manual English typewriter 20"	60,000
Total:		<u>465,000</u>

. Yearly cost of ADB - provided promotional aids and equipment:

Year				Total
1	2	3	4	
NC	NC	NC	NC	NC
200,000	265,000	-	-	465,000

SANITATION COST FEATURES

. Cost of sanitation component, per scheme:

Ongoing schemes: 15
 New schemes: 60

 Total No. of schemes: 75

- Total cost of sanitation component:
 - Cost of sanitation per scheme:

. Cost of sanitation component, per design capita:

- Total cost of sanitation component:
 - Design capita (sanitation):
 - Cost per capita:

. Percentage-wise overall contributions by Communities/HMG/ADB:

Item	Communities %	HMG %	ADB %	Total %
. Manpower				100
. Training	--	35	65	100
. Constr. material	31	36	32	100
. Prom'l. equipment	--	26	74	100
Overall				100

. Overall ADB investment into sanitation component (excluding consultant manpower): \$ 167,000