

BOLGATANGA COMMUNITY WATER AND SANITATION
PILOT PROJECT
(UNDP/WORLD BANK/GWSC)

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REPORT ON
RURAL LATRINES DEMAND SURVEY
AND
DELIVERY STRATEGIES

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SUMMARY AND RECOMMENDATIONS

Objectives of Survey

As per the expanded terms of reference received on arrival in Bolgatanga, the consultant set out with three main objectives.

- . To assess the need and demand for latrines in the project area
- . To assess levels of affordability of latrines and
- . To work conclusions from the above survey into an appropriate latrine design that meet the economics and socio-cultural situation in the project area.

Activities Carried Out

Activities carried out on this survey(from 9-25 August 1988) included

- (i) Basic demand and affordability Assessment: through questionnaire administration, and key informant interviews.
- (ii) Field visits, participant observation and institutional contacts: to assess roles, institutional strengths and possibilities of collaboration.
- (iii) Resources survey: local construction materials availability, manpower and skills assessment.
- (iv) Input of survey into appropriate latrine designs
- (v) Organization of seminar on district sanitation strategy for project team and district council environmental health staff.
- (vi) Initiation of two demonstration compound latrines with improved design modifications

Survey Organization

The accomplishment of such tasks as detailed above proved quite challenging due to the short period of the consultancy and the scattered nature of settlements and their distribution in the project area. The incorporation of elements that allowed the survey to be used as a sensitization activity for the pilot project both in pump communities within the project area and also in policy circles within the district administration and noted cooperant institutions and agencies presented more interesting challenges.



Twelve extension officers together with the project staff were involved in the survey which took place between the 15 - 18 August 1988 (4 days). The survey covered the whole project area and affected close to 180 compounds (40 out of 50 pump communities representing about 18 % of the estimated number of compounds). This was augmented by extensive field visits, quality control in questionnaire administration, institutional contacts and field work associated with the pretesting of design innovations two with local masons.

Findings from Survey

Existing Sanitation Facilities

There are visibly no facilities for excreta disposal in rural Frafra (Bolgatanga) district. Estimated coverage is rated at 3.34% for the 87% of the district population that could be described as rural. Defecation takes place mostly at farm fringes around rural compounds. Preliminary estimates for total coverage in the project area (estimated population 15,000) is 1,000 compound latrine units. These are calculated at 15 persons per compound and offer delivery rates of 55 and 30 units per month at 3-year and 5-year scenarios respectively, that is, allowing for only six months per year installation.

Preference and demand for latrines

Preference for used of latrine was rated high by respondents but this is based on a conception for privacy and convenience as against health notions which are at best vaguely expressed. Willingness for the installation of compound latrines is also rated high. This impression should not be taken on a simplistic note as a optimistic evaluation of respondents real demand but as an encouraging challenge that can best be sustained by a social marketing campaign strategy based on privacy and convenience at the onset of the dry season during which respondents indicated will be ready for latrine installation. A regulated phasing approach with built-in annual evaluation procedures will be fundamental in dealing with noted anthropological concerns and in-grained attitudinal and behavioural patterns that could not have been unearthed with the short survey period.

Affordability

Income is seasonal in the project area. The dominant response from respondents on the ability to contribute one bag of cement should be considered an important yardstick in affordability evaluation. Compound contributions could therefore be timed against the harvest season in October/November. Whilst one takes an optimistic view on the affordability by compounds of one bag of cement, subjective evaluation of rural needs and



priorities in the project area, however suggests a financial strategy based on a credit scheme particularly to cover the payment of local masons in the initial stages.

Socio cultural Issues and existing latrine designs

Anal cleansing material range from leaves, twigs to even small stones. Taboos related to latrines and faeces are non-existent. The faeces of lactating children are however considered harmless except only when the child is ill. Shared usage by men, women and children is considered acceptable. Notions of privacy violations in shared usage by men and women carried by a minority of respondents were largely found to have been influenced by operational separation of male and female compartments in public aqua-privies in Bolgatanga and other towns. Reuse of pit content is also not rejected.

Notions of improper management of town communal latrines are fresh in the minds of rural people in the project area. Issues like odours, flies nuisance and wet floors were referred to. This impression is confirmed by most respondents wishing that the latrine be located outside the compound and not as part of internal compound arrangement. This should therefore be an important component of the delivery strategy to demonstrate design improvements that will curtail such fears. Impressions on the few inspected unvented mozambique slab type latrines in the project area vary from encouraging to neglect. A survey of extensive coverage in an adjoining village confirmed this impression. Those with well maintained superstructure have higher utilization rates whilst those with collapsed roofs are virtually neglected. Out of the 20 slabs installed in this village, 10 were inspected; 5 were in good working conditions and 5 others (3 belonging to the local clinic) had collapsed walls and therefore not being used.

One other observation is that they were all sited some distance away from compounds (50-150 m) and therefore limits their use at night. All had ill-fitting covers or no cover at all and unvented thus encouraging fly breeding and odours. The odour and fly breeding conditions are however far better around the inspected compounds than the other compounds where indiscriminate defecation is practised. Quality of slab construction was however good but not standard (made to fit already dug pits of between 0.8 - 1.0 m diameter).

Village Organization and Support Groups

Most villages are organized through sectional chiefs and in some cases the local political committee (CDR). The most significant finding were the existence of pumpmen and community water organizers (CWO's) in all the villages. Contact with external agencies are restricted on a regular basis to the GWSC



pump maintenance crew and occasional church groups and the primary health care immunization teams. Two popular women groups exist in the project area i.e. the Avutobisi and Nyarega "Ananore" groups. The former is based on pottery and the latter on basket and straw hat weaving. Both use songs in their work and the former has already a song which is being popularised through the local Bolgatanga radio.

Even though the work of the Presby Sisters Mobile Clinic and to some extent also the Catholic Sisters all fall outside the project area, the excellent network of health workers and village clinics and their on-going latrine promotion programme presents food for thought in delivery strategies. The Presby Sisters have about 120 latrines of the mozambique slab type to its credit since 1987 in some 15 towns in the district. 20 of such latrines are concentrated in one village Gowrie which the consultant visited. Ventilation and relocation at some of these by the project could be a step in the right direction in respect of institutional collaboration and boosting of confidence in compound latrine installation during the expansion phase of the project.

Institutional and Resources Appraisal

The formal institutions ie. the District Council and the Ministry of Health, from their staff strength, quality and orientation are incapable of leading the latrine promotion and installation campaign. The focus of implementation should therefore rest with the pilot project's multi-disciplinary team and the team's ability to collaborate with the formal institutions when the need be.

A more practical approach would be the reliance on the in-house team, the two local masons identified (Apana Anafu and Adonga Apana), collaboration with the local women groups and the Presby and Catholic Sisters' Mobile Clinic system in the district. The training centre of the Presby's and the adjacent latrine demonstration in Bolgatanga and their network of mobile clinics (now rural health centres) should be considered a very important entry point for promotional and training effort for the pilot project.

The District Council could however still be relied upon for regular allocation of cement at government prices but the bulk of cement purchases will be through the open market in Bolgatanga. The non availability of reinforcing steel rods and mesh of required sizes, makes any reliance on it unrealistic quite apart from the fact that it more than doubles the cost of the latrine when assessed as an option in the latrine design. Relatively good quality sand and aggregates abound in the project area. local building practice is also adequate and functional but will require minimal supervision from local masons.



Achievement of Consultancy

1. Survey and sensitization of some 180 compound on the latrine compound of the Bolgatanga Community Water and Sanitation Project.
2. Sensitization of cooperant agencies, 15 extension workers and project staff in the district on latrine installation strategies.
3. Organisation of planning seminar on district sanitation strategy for eight (8) district council environment health staff.
4. Initiation, informal training and supervision of two (2) masons on techniques of ventilating the Mozambique slab type latrine. Areas covered were foundation improvements, slab casting techniques, quality control, slab installation and orientation of superstructure.
5. Utilization of survey results in the design of two (2) appropriate latrine model one of which was pretested as part of (4) above.

Recommended Delivery Strategies

Proposed Latrine Design

Based on a criteria of cost, material availability in the local markets, the maximum utilization of locally available construction material, integration of local building forms and practices and skill profile available in the district and project area, the ventilated mozambique unreinforced slab type latrine is recommended in comparison to generic reinforced VIP slab types. This option could be standardized to 1.2m dia slabs, 75mm thick and 150mm crown height.

Pit dimensions will be limited to 1.0m dia and 2.0m depth to ensure ease of construction, mitigate risk of ground water pollution and allow easy access to decomposed material for soil conditioning during relocation fallow period of 2 years. Wall material with a monolithic vent pipe of 200mm internal dia will be mud in doorless coil construction or square if a sun-dried adobe bricks are utilized both of which are locally practised. An overlap is provided at the entrance for enhanced privacy. The basic unit is designed for 10-15 users (average compound size in the project area) and 2-3 years relocation period.



Philosophy

A five point strategy is recommended

- . Scale or phasing approach (manageable size at a time) with in-built structured evaluation.
- . Social marketing based on privacy, ownership and convenience with health as an indirect benefit which should be taken up through research messages on user attitude changes or coupled to the Water Education for Health Project. Radio talks and campaign for the 'Yeri Bangida' (compound latrine), promotion through songs, drama and role play by the noted women groups as well as school and market demonstration units is considered part of the strategy.
- . Cost recovery and household participation with a credit scheme option phased in as a financial strategy (repayment at harvest season)
- . Human resource development through training of 'bare foot' rural artisans
- . Institutional collaboration - support for district council and the Presby and Catholic mobile clinic network and collaboration with the department of Community Development and the Ministry of Health under the Water Health Integration Programme.

Programming

Programming for latrine installation is deemed to be complementary to the main project objective of instituting community management of maintenance of hand pumps and as such should be dovetailed appropriately. A five year scenario (1989-1994) is recommended for complete coverage of the project area but overlapping in the third year into an expanded phase throughout the Frafra district. Programming should follow the suggested phases next page. (Targets only for project area)

A program target of 50 % coverage within the pilot project duration is earmarked.

Demonstration Phase: Target: 30 Latrines Budget:c285,000
(OCT 88 - APR 89)

- Activities : . Concentration in Zaare but responding to demands in other areas (5 latrines for each of the 6 VLOM pump communities)
- . Demand stimulation contacts after installation of VLOM pumps



- . Compound, market and school demonstration units
- . Training of 5 local masons
- . Packaged Training for installation of latrines in homes of 15 extension workers
- . Support for Presby Mobile Clinic activities
- . Evaluation of demand

Consolidation Phase: Target: 170 Latrines Budget: c1,615,000
(OCT 89 - APR 90)

- Activities: . Expansion to cover project area
- . Social marketing campaign poster design and user education
 - . Mapping out of all WUP Phase I latrines
 - . Evaluation of results

Expansion Phase: Target 300 Latrines Budget: c2,850,000
(OCT 90 - APR 91)

- Activities: . Expansion to cover all Frafra district
- . Training of more masons
 - . Social promotion campaign
 - . Anti-Bilharzia campaign in Vea area
 - . Relocation and ventilation of WUP and Presby mobile clinic latrines
 - . Evaluation of impact

Maintenance Phase: Target 500 Latrines Budget: c4,750,000
(OCT 91 - APR 94)

- Activities: . Relocation of filled pits
- . Mass campaign

Total Programme: Target: 1000 Latrines Budget: c9,500,000



Financing and Financing Plan:* Summary of Costs

<u>Item</u>	<u>Amount(c) m</u>	
	C	\$
. Basic materials cost for 1000 latrines	2.00	-
. cost of services of masons	1.00	-
. Training of- local masons(10 No)	0.10	-
- Animators(10 No per yr)	0.30	-
. Promotional activities- Education materials	0.30	-
. Basic tooling and moulds provision	0.10	-
. Personnel and transport cost(3 yrs)	0.50	10.0
. Evaluations	<u>0.20</u>	<u>10.0</u>
Sub-Total	4.50	20.0
 Total	<u>c 9.50 m</u>	

* Financial Strategy

The financial strategy would be based on cost recovery on the latrine slab and the services of the mason with a recovery rate of two harvest seasons. An optional scenario will be an incentive to the beneficiaries for the project to absorb the mason's charges if payment is made on installation of latrine slab.

* Financing Plan

	Amount(c m)	%
Community(Beneficiaries) Contribution	3.00	31.6
Project Contribution	5.00	52.6
Expected District Council Contribution	<u>1.50</u>	<u>15.8</u>
Total	<u>9.50</u>	<u>100.0</u>

OUTSTANDING ISSUES:

1. Project Leader

.Follow-up on permanent secondment of Health and Sanitation Specialist. His divided role on the project and the Regional Ministry of Health will affect programme implementation.

.Follow-up on District council's commitments to the project ie. Budgetary(cash)contribution and regular cement allocation as promised by PNDC district secretary.



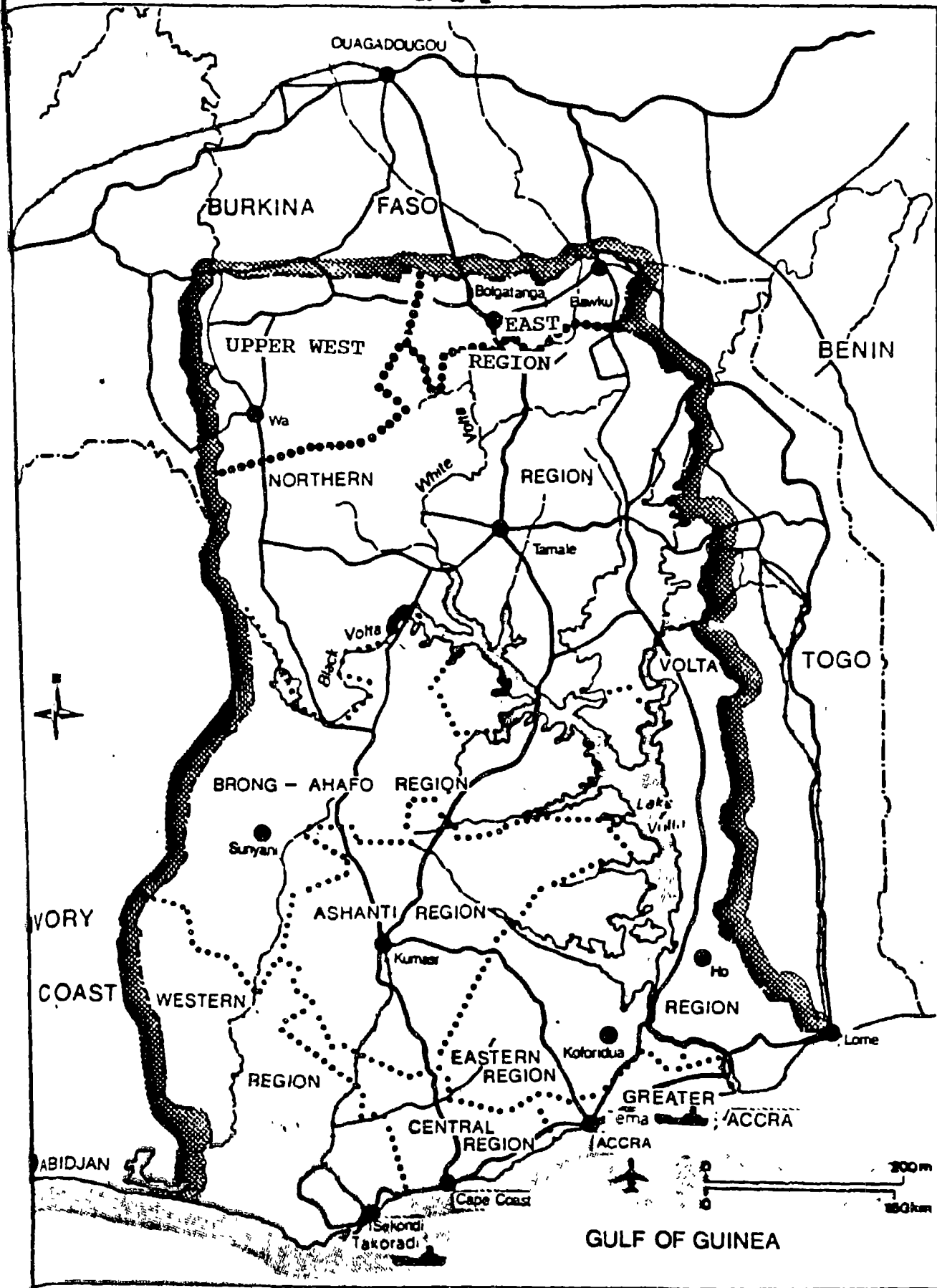
.Follow-up on the clarification latrine promotion strategy with the Water Utilization Project and Water Education for Health project team leader. This is to avoid conflicting emphasis and messages content during promotional work by the two complimentary project. Whilst the pilot project is emphasizing latrines, the others are emphasizing "covering up of faeces" as part of their diarrhoea campaign.

2. Health and Sanitation Specialist

.Review of Sanitation plan and time Schedules as discussed
.Detailing of Demonstration Phase programme together project team
.Follow-up on two demonstration latrines initiated during the period of the consultancy.



GHANA



Map of Ghana



1.0 INTRODUCTION

1.1 Background

The tragedy of long treks for water of doubtful quality is a reality of the past for most rural people in the Upper West and East regions of Ghana. Close to 1.0 million people benefitted from potable water supply through about 2500 handpumped boreholes with the assistance of the Canadian government between 1974 and 1978. Subsequently these handpumps have been maintained for a little over a decade from centralised maintenance units also with the support of CIDA.

Back up user education through two phases of the Water Utilization Project (WUP) has strengthened and stabilized these supplies with some remarkable success. To date 90% maintenance performance rate has been achieved. Flexible user-rate collection methods have also ensured about 90% handpump tariff collection in comparison to the 3000 wells project in Southern Ghana which is struggling with under 50% rates collection and about the same percentage in pump maintenance performance. The education package which is absent in the Southern Ghana project is moving from strength to strength; under two related campaigns, the Water Education for Health and Water Health Integrated Programmes and a massive health and user education effort is about to be launched in the Upper Regions.

The question of how long donors can support and sustain these endeavour mentioned above remains to be answered. The futility of basing these laudable programmes on centralized maintenance of handpumps has also been recognized. Lack of complementarity still plagues the situation as sanitation is consistently kept out of water programmes.

On the international scene, there is a growing agreement on the strategy for the future. This is found in the five-point strategy contained in the "ABIDJAN STATEMENT" on rural water and sanitation development and is summarized by the preamble to the statement as follows:

"Lasting health and economic benefits for the rural and urban-fringe population of Africa can be achieved through increased community management of water supply and sanitation systems based on proven low-cost technologies. African Governments and donors are urged to identify and commit adequate resource and provide all necessary support for the direct involvement of communities in choosing, managing and paying for their water and sanitation system".

This call, has on the Ghanaian sector scene found expression in its endorsement at the recent Water and Sanitation Conference



(Accra, 1987) and forms the back-bone of the World Bank/UNDP intervention in the Bolgatanga Community Water and Sanitation Project. The demonstration or pilot project, in the nutshell seeks to demonstrate concretely community involvement in the operation and management of water supply and sanitation systems - handpumps and home latrine with the necessary back-up in health and user education.

The demonstration project which is limited to 50 pump communities of estimated population 15,000 whilst seeking to refine implementation strategies that can be replicated on a national scale for the delivery of water supply and sanitation services to low-income people will also have an essential human resource development and training to strengthen institutions and respond to the local manpower including community members (particularly women) and extension workers needed for delivery of services using low-cost systems.

1.2 Terms of Reference

The consultant was charged in Bolgatanga, to assist the project staff to design the sanitation component of the Community Water Supply and Sanitation Project. Activities were to include a survey in a selection of communities in the demonstration area designed to;

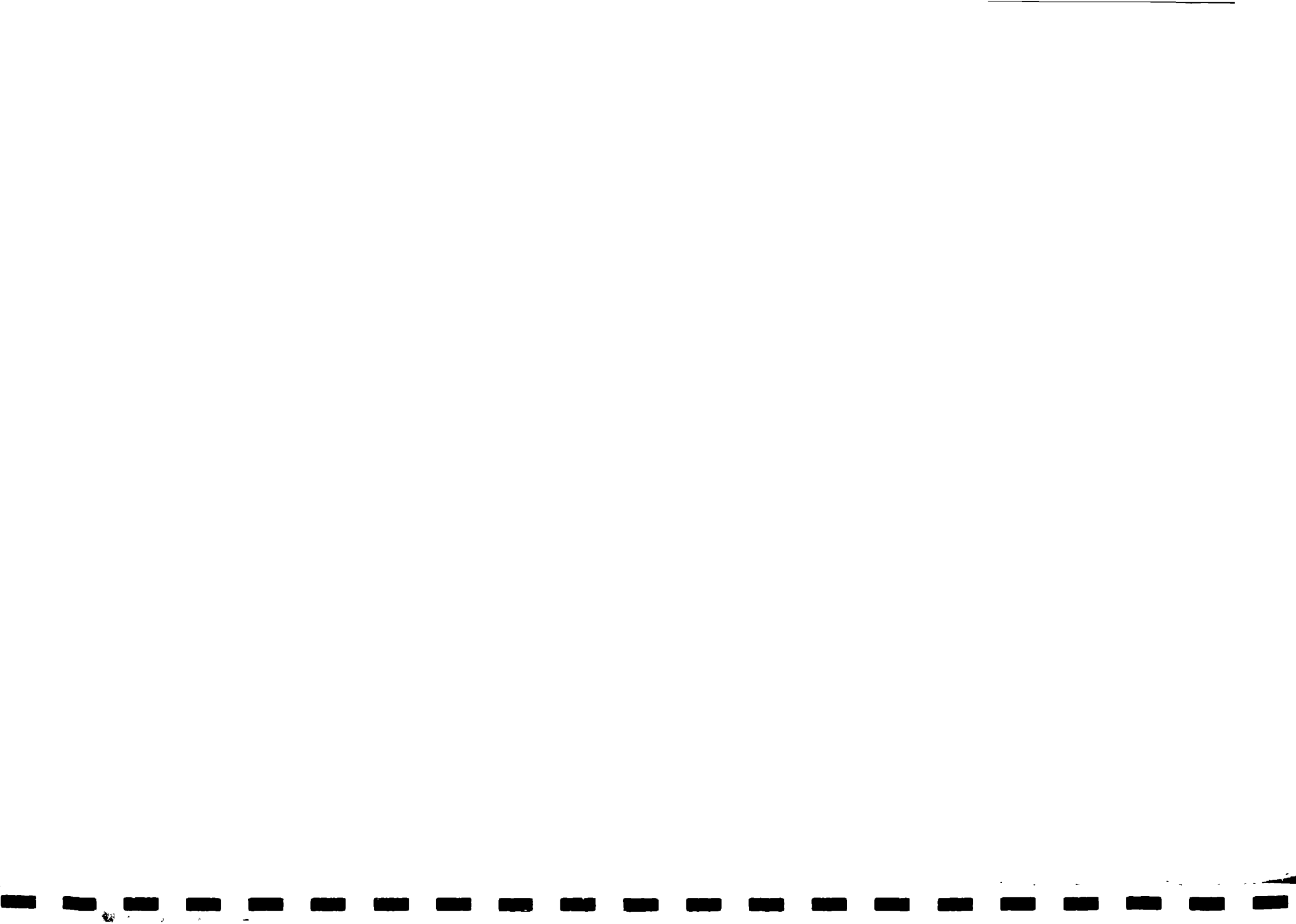
- i) determine the existing excreta disposal facilities and practices;
- ii) assess household user preference of latrines (willingness/ability to pay); and
- iii) solicit user preference of latrine design.

The consultant was then to prepare a summary report and based on this information prepare a preliminary latrine design that takes into account user preferences and is compatible with the amount of money households can spend on latrines. In general the design was to minimize cost and maximize local construction materials.

1.3 Content and Scope of Report

This report in reference to objectives set out above, basically covers an account of the consultant's work within the period 8-26 August 1988. Support for all activities was provided by the project team notably the team leader Mr. G. Yanore, the health and sanitation specialist, Mr. D. Kpanja, the World Bank/UNDP advisor Mr. B. Joshi, the women organizer Madam Dora Abaah and the community development specialist, Mr. S. Anankum.

A summary report and recommendations is provided together with an introduction and three main sections. An overview of the district and project environment is covered in section 2.0, this



is followed by details of the latrine demand and affordability survey in section 3.0 - a summary is provided in sub-section 3.3.

The proposed latrine design are discussed and evaluated in section 4.0. An outline of the sanitation component and delivery strategies is presented as part of the summary and recommendations.



2.0 PROJECT ENVIRONMENT

2.1 The Bolgatanga Community Water and Sanitation Project

The demonstration project which is funded by CIDA/UNDP but executed by the World Bank, was designed to fit within the Water Health Integrated Program (WHIP) currently on-going in the Upper West and East regions. The project coverage is estimated at 15,000 people living in 50 pump community where selected VLOM pumps (Afridev, Volanta and Nira 85) will be installed for testing. The health component will be nearly the same as used throughout the Upper Regions but two important elements will be introduced: village based management of the water supply and a sanitation component. The primary objective of the demonstration project will be to develop a strategy for transferring responsibility for maintaining hand pumps to individual communities. The main activities include;

- 1) collecting, keeping accounts and saving money to pay for spare parts and repairs and to eventually replace the current pump;
- 2) training village repairers and area mechanics to make repairs; and
- 3) establishing a spare parts distribution system.

The second objective will be to implement the health education programme agreed to in principle under the WHIP programme and includes a strategy for promoting household latrines. To be successful, women in each community must play a leading role in their water supply including taking the lead role in water committees, making all normal handpump repairs, and learning about better health care, hygiene, sanitation and nutrition for themselves and their families.

The demonstration project is designed to be implemented by a team of technical and community development specialists, together with a small group of extension workers and artisans. The core team consists of a team leader and specialists in training and community organization, health, hand pumps and sanitation. The core team at the time of this consultancy had been about two months on the project. Extension workers will be women from local communities each responsible for community development and health education at 6 to 8 pump sites. One team of artisans will be responsible for installing hand pumps and training community members to repair them and a second team will be responsible for installing demonstration latrines.

The core team of specialists will be responsible for designing and implementing the demonstration project. To assist



them, training will be given, consultants will be made available, and the resources of the World Bank/UNDP Decade Program can be drawn on, but ultimate responsibility for the project rests with the core team. The core team will be expected to work closely with one another, with staff of WHIP, and the proposed network training centre for water and wastes management at UST in Kumasi. While members of the core team will specialize in training/ community organization, health, handpump maintenance or sanitation, each is expected to learn to work in all other areas. In addition, members of the core team will be expected to spend significant amount of time working in participating communities.

The survey is therefore in pursuance of the second objective of the project which is to ensure complementarity in water supply provisions through the installation of home latrines. For a clearer understanding of the project environment the general profile of the Frafra (Bolgatanga) district is hereby presented below. This is followed by observations on the sanitation situation in the district.

2.2 Frafra (Bolgatanga) District Profile

Physical Geography

The Frafra district (FDC) is one of the 4 districts which make up the Upper East Region of Ghana. It is the third largest district and has Bolgatanga as its capital and also the regional capital. The FDC lies between lat. 10 30'N and 11 60'N and longitudes 0 31'W and 1 05'W (see fig.1 and 2) and covers an area of 1904 sq kilometres.

The district lies on the sudan savanna belt, characterized by short trees, often widely spaced with more or less continuous carpet of grass which gets as high as 1.2m in the wet seasons. Rainfall in the district is limited to one season - from April to October and is very irregular. Dry spells in June or July are frequent, whilst the peak rainfall normally occurs in August or September. Average yearly rainfall varies from 900 to 1,050 mm. The dry-season which starts from November to March, is characterized by dry North East Trade Winds called the Harmattan. Temperature range from 26-29 deg C throughout the year with the lowest relative humidity occurring during the Harmattan season. Coarse textured soils prevail in the district and in some areas these are deep and well drained.

Population and Settlement Pattern

The FDC has a population of about 240,000 (projected from 1984 census) and a density of 120 people sq. km. A striking characteristics of the population distribution and settlement hierarchy in the district is that apart from Bolgatanga, (with 32,500 inhabitants) the rest of the surrounding communities which



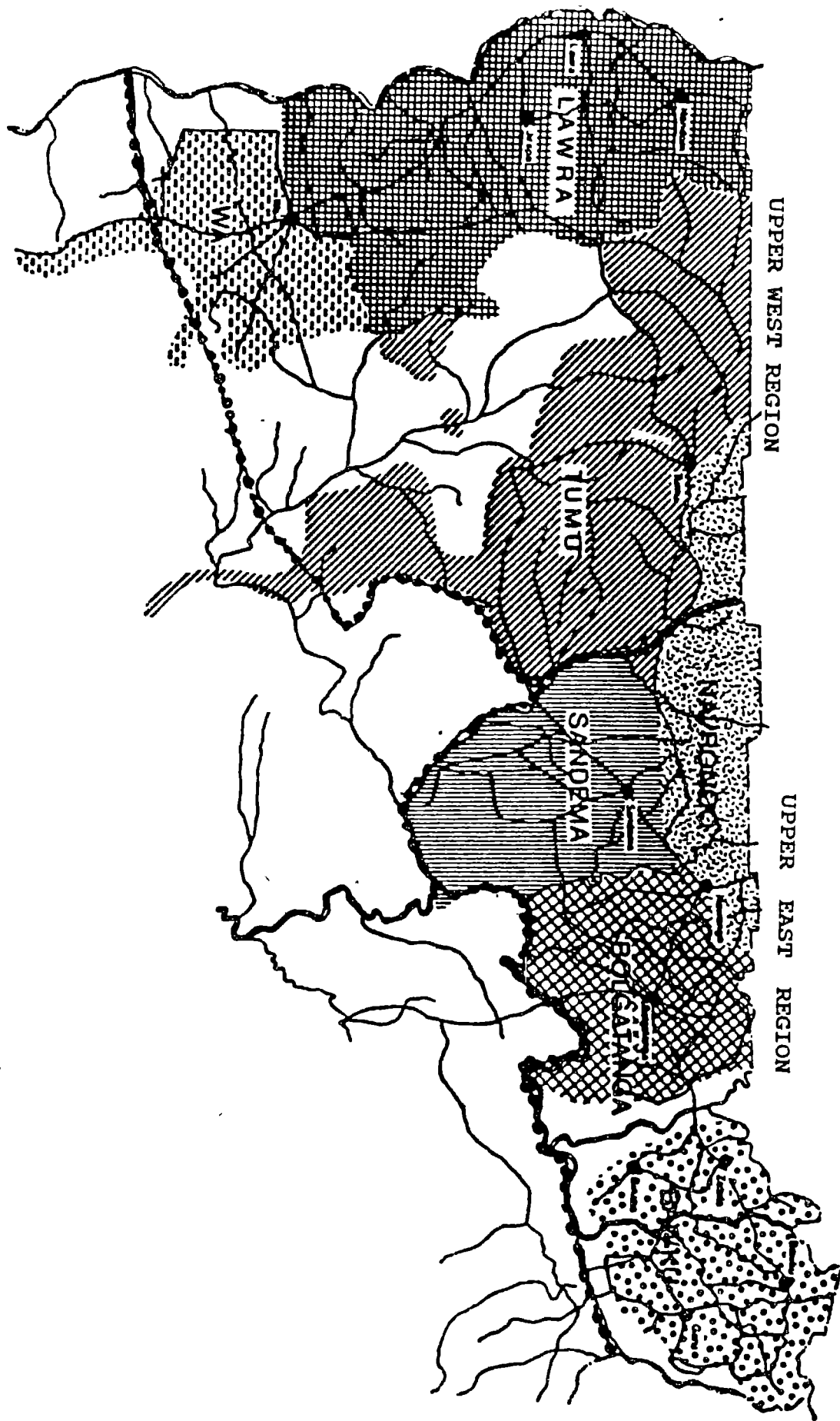


Fig. 2 : District Map of Upper East and Upper West Regions



includes the six major towns (Bongo, Tongo, Nangodi, Sekoti, Zuarungu and Pawlugu), are rural without any marked variation in size, population and function. All Frafra district is shaped by scattered compounds (mud and thatched roofed) around which intensive mixed crop farming is practised. The area is thus marked with seasonal diversity; all green with the compounds overshadowed by the tall millet plants and dry and solitary scatter of compounds in the dry season. 86% of the district is rural. The growth rate of population measured in 1984 over 1970 population is 2.0% for the district and 4.0% for the capital Bolga.

The district is ethnically homogeneous with 3 main dialectical variation i.e. the Talang, Grunne and Nab with not easily distinguishable differences, and therefore practically all called the Frafras. The people fall under 6 main traditional division, the Bolgatanga, Tongo, Nangodi, Bongo, Sekoti and Zuarungu divisions each headed by a divisional chief of equal status.

Socio-Economic Characteristics

Bolgatanga is the heart of all administration, commerce and finance both for the district and the Upper East Region, with a high urbanization tendency and the centralization or concentration of most of the basic infrastructural facility and social facility and social services.

Economy

However the economy is characterized by a relatively large agricultural sector which is mostly on the subsistence level. The Vea irrigation has been the only major public undertaking aimed at increasing agric production in the district. Cereal production (millet, guinea corn), maize, groundnuts and animal rearing are the main agricultural activities. Irregular income patterns exist due to the vagaries of the weather. Extension services through the Upper Region Agric Development Project (URADEP) coupled with the supply of farm inputs such as fertilizer at Farmers Services centres have also been attempts to stabilize farmers incomes.

The manufacturing sector is dominated by a number of small scale agro-based factories notably the Pwalugu Tomato Factory, GIHOC Meat Product Factory at Zuarungu the Rice Mills and the Ghana Seed Company. There has been new additional beginnings in the quarry business and furniture production but these are still not significant. Formal employment is therefore sought mostly in government administrative offices and utility establishments like GWSC, Electricity Corporation (Now VRA), PWD, Highway Authority and the Ministries of Health and Agriculture. Marketing and retailing is however significant and involves a fair proportion



of the districts female population. The district's potential however lies in its rich cottage industrial base of straw weaving, leather works, blacksmithing, pottery and local textile weaving.

Administration

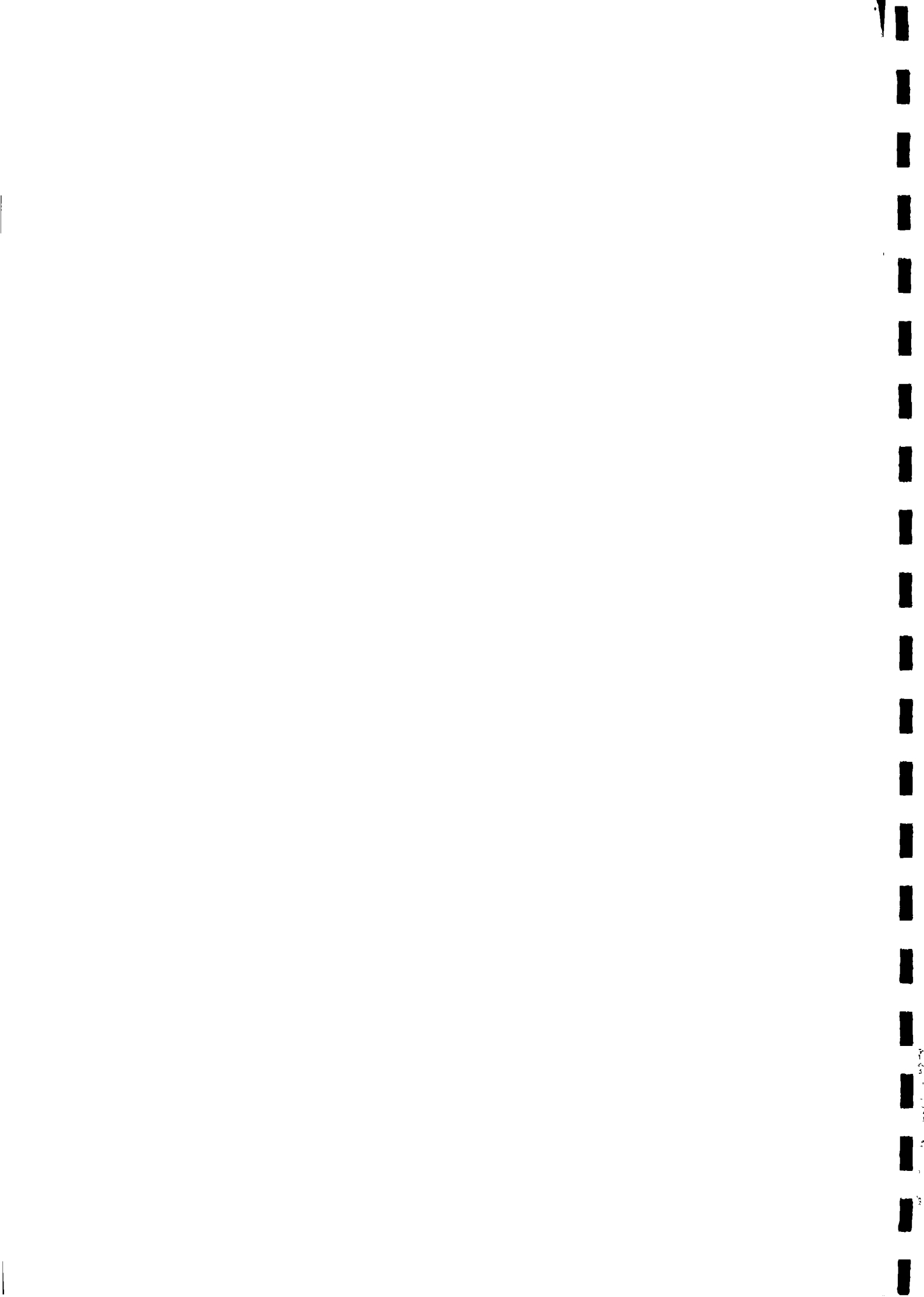
Frafra district is governed by a district council through an Interim Management Committee (IMC) which is made up of two-thirds central government appointees and a third from the 6 traditional area councils. The Frafra district council area is now partitioned into two new administrative district i.e. the Frafra District Council and Bongo District Council. The latter takes about a third of the area and population. But for practical purposes this report will refer to the two districts as the Frafra District Council (FDC).

Health

.Whilst the urban centre (Bolgatanga) enjoys a concentration of medical facilities ranging from licensed pharmacy/ chemical shops, clinics (5 government and 2 private) and hospital (government) and all doctors, the rest of the district is left with one or two health posts and a number of Mobile Clinic operated mostly by the Presbyterian and Catholic Sisters. In this wise, close to all the rural population ie. 87 % of the district has limited access to formal or government medical facilities.(see fig.3-Map of geographical spread of health services)

Although reliable data on the health status of people in the district is largely unavailable, there is no doubt that the health status is poor. Significant indicators of the district's health status include:

- . A high infant mortality rate, estimated at 170 deaths per 1,000 per 1,000 live births;
- . The persistence of guinea worm after the hand pumps have been installed for more than a decade especially in the Tongo area;
- . One child in six aged 5-15 infected with schistosomiasis (bilharzia). The incidence is high in settlements bordering the Vea Irrigation scheme ;
- . A high incidence of malaria, especially in the wet season;
- . A high incidence of diarrhoea in young children;
- . Significant seasonality of disease with health status lowest in the wet season.



Traditional practices of dealing with health problems are arbitrary. Helpful treatments include the practice of treating malaria with water boiled with bark from the Neem tree and treating food poisoning by drinking water with shavings of charcoal. Harmful treatments are the practice of giving enemas for diarrhoea and force-feeding a baby by smothering its mouth with water while blocking its nose.

Education

	<u>1st Cycle</u>		<u>2nd Cycle</u>		Tech.	T/Train.
	Primary	Middle	Sec.			
Comm/Vocat.						
FDC	61	20	3	1	-	2
UER	216	79	8	2	2	5

Spatial distribution - 90% of education facilities in Bolgatanga all 2nd cycle schools and 90% of Primary and Middle Schools.

Road Network

Frafra District Council has 102 km of primary roads representing 85% of total primary roads in the Region. There is a fair linkage through a network of primary roads to other important settlements like Pwalugu, Sumbrungo, Winkongo and Nangodi to Bolgatanga and Tongo, Bongo, Yorogo by secondary roads. All other settlements are linked by third class dirt roads and a labyrinth of footpaths.

Water Supply

Only Bolgatanga is served by a reliable piped network of 1.3 million gallons per day capacity. This system supply 90% of Bolgatanga. Rural people are served through bore holes fitted with hand pumps installed under the CIDA supported Upper Region Water Supply Project (URWSP) between 1974-1978. Coverage is estimated at 85 %.

2.3 Existing Sanitation Situation

2.3.1 Institutional Responsibilities and Strength

Environmental sanitation comes under legal domain of the District Council and functions associated with its role includes:

- i) To establish, instal, build and maintain public latrines, urinals, and wash houses;



ii) To establish, maintain and carry out conservancy services for the removal of night-soil and refuse from any building or public places and for the destruction and disposal of such night-soil and refuse;

iii) To prevent the pollution of water in any river, stream or water course etc. and to prevent the destruction of such water bodies; and

iv) Enforcing measures to ensure public hygiene and public health (which include food hygiene, slaughter house and cemetery inspections as well as street and drain cleansing).

In the case of the Frafra District Council these functions through a mix of factors; weak policy support, low financial and resource input, more importantly the lack of technical expertise have reduced the effectiveness to operations focus on Bolgatanga and a few towns like Bongo and Tongo. These activities are carried out through the council's Environmental Health department. An impression of the state of the Council's institutional responsibilities and potential performance is easily captured from the staff strength and equipment stock below

TABLE 1: Staff Strength for Environmental Sanitation

Supervisory Staff (Health Supt./Works Foreman)	2
Health Inspectors	5
Health Inspection Assistants	18
Conservancy	23
General (Labourers, Sweepers, etc.)	40
Masons	2
Carpenters	3
Steel-bender	1
Total:	94

TABLE 2: Equipment Stock for Environmental Health Management

Cesspool Emptier	1
Tractor	1
Wheelbarrows	12
Rakes	6
Cutlasses	18
Pick Axes	4
Shovels	10
Slashing Hooks	35

It is no wonder that the performance of Environmental Sanitation is reduced to the state as described under Urban Sanitation below.



Rural sanitation does not seem to appear in the books of the Council as no resources are allocated to it and therefore, is largely left currently to the promotional work of the Presbyterian Sisters Mobile Clinic system throughout the district (see map - fig.3). A recent latrine construction workshop organized by UNICEF for the district council and other allied institutions e.g. Department of Community Development seems not to have helped much since it was not backed by any delivery programme or strategy. Only one landlord has so far converted his bucket latrine into a K-VIP latrine and the Council itself is in the process of converting a water closet/septic tank facility into a K-VIP latrine. Progress is however slow.

2.3.2 Urban Sanitation

In the absence of any organized documentation on coverage levels in the FDC, a quantified description of Urban sanitation is difficult to estimate. However, from the district council's point of view, urban sanitation if even kept within the narrow confines of human excreta management relates to that of Bolgatanga and the six major rural towns Bongo, Nangodi, Tongo and Zuarungu. For purposes of definition only Bolgatanga can be described as urban (ie. with population greater than 5000). The estimated coverage pattern is depicted below;

TABLE 3: Urban Excreta Disposal Facilities and Coverage

System	Bolga	Pop. Covered	%
Septic tanks (w/c)	800	5,000	15.4
Public Aqua-Privies	28	10,080	31.0
Bucket latrines (Domestic)	315	6,300	19.4
Total Population Covered	-	21,380	65.8
%age Practising free range	-	11,120	34.2
Total Population (urban)		32,500	100.0

Even though the existing installed capacity of 28 public privies (of about 390 drop-holes) if optimally utilized could have ensured 60 % coverage, poor siting and inadequate management have led to a situation of overuse at some sites whilst others are barely used. A 50 % utilization rate was therefore applied in the above estimation. Water closet based systems are concentrated in fairly large government bungalows and offices. The free range practice goes on even in the town centre, in uncompleted buildings, on rubbish heaps and anywhere there is some vegetation cover.

The whole apparatus of the FDC works for urban sanitation. Excreta from the septic tanks and public privies are transferred by two cesspool emptiers operating at an average of 4-5 trips a day and 10 gallons of diesel per day and at 500.00 user rate.



One belongs to the FDC - in very poor operating conditions and the other belongs to the Ministry of Health. These deliver excreta to disposal trenches at a site 10 kms out of town. The bucket latrines is transferred by 13 conservancy labourers as head loads to disposal ditches on the periphery of the town at a user rate of 500.00 per month. Management of the public privies is by some 33 conservancy and general labourers. Dislodging is free of charge.

Management and supervision in terms of quality and quantity leaves much to be desired and is bottom heavy resulting in poor operational performance; overflowing septic tank, lack of maintenance of public latrines, poor general hygienic disposal of excreta and indiscriminate defecation. This is coupled with the breakdown of the sanitary site concept (three-quarter acre plot with public privy and refuse transfer station). With only one hardly mobile tractor for conveyance of refuse to dumping grounds, refuse has been allowed to accumulate, crowding in on the public privies and managed by occasional racking and open burning with its attendant smoke nuisance.

All sanitary sites are virtually choked with refuse. Market transfer stations sullage drainage and the conditions of street drains are no better and the refuse dumps are fast turning out to be the most popularly spots for indiscriminate defecation by children. The aesthetic effect of general sanitation in the central parts of Bolgatanga is particularly unnerving and carry with it seemingly potential epidemic connotations. From the resource figures given (manpower and equipment) in the preceding paragraphs coupled with the FDC's managerial style and institutional structures, the situation is bound to get worse in the near future if no resource injection and some heavy doses of lateral thinking are not brought to bear on the district's sanitation management.

2.3.3 Rural Sanitation

In the absence of any resource input in terms of men, material, money and management (the 4 m's) in rural sanitation, a cursory look at the rural compounds and settlement structure presents some ecological sanitary balance which is relatively better than the urban situation described above. Estimated coverage pattern is given in the table below:



TABLE 4: Rural Excreta Disposal Facilities and Coverage

System	Bongo	Tongo/Others	Pop. Covered	%
Septic tank (w/c)	10	4	70	0.03
Public Aqua Privies	8	9	6,120	2.95
Bucket (domestic)	-	-	-	-
Mozambique Slab (pit)	10	140	750	0.36
Total Pop. Covered	-	-	6,940	3.34
Pop. Practising Free range	-	-	200,560	96.66
Total Rural Population	-	-	207,500	100.00

There are visibly no facilities for proper excreta disposal. People generally defecate on the fringe areas of their farms which on the basis of lineage segmentation, land settlement patterns and farming practices happen to be immediate surroundings of their compounds.

The obvious consequence is that in the dry season even though the temperature effect ensures a fast drying process and somewhat fast decay, the situation is prone to a lack of privacy. The rural settlements are at this time of the year bare of vegetation and the ground harden to such an extent that most faeces are left uncovered with soil. In the raining season the tall millet stalks provide an excellent cover for defecation thus ensuring some measure of privacy but in the night people cannot go very far and thus defecate very near to their compound. The wet conditions enhances the rather offensive odour situation and fly and mammal contact around the compound.

Refuse management is through a culturally interesting system of composting on a 1.5 - 2.0 m diameter plot about 2.0 m from the gate of the house locally called "Tampugre". All wastes (mostly cellulose material), household sweepings, ashes from kitchen etc. are dumped in a controlled fashion and moved off to vegetable farms before the planting season. The same happening to cow dung which is also heaped in the cattle kraal and something composted with straw and also moved to farm plots as soil conditioning material. Sullage water is also drained from compound bathrooms into vegetable plots or into the bush. Compound storm water is however drained through the cattle kraal. This practice in the rainy season produces puddles in the kraal and generates very messy conditions such as fly breeding and odours.

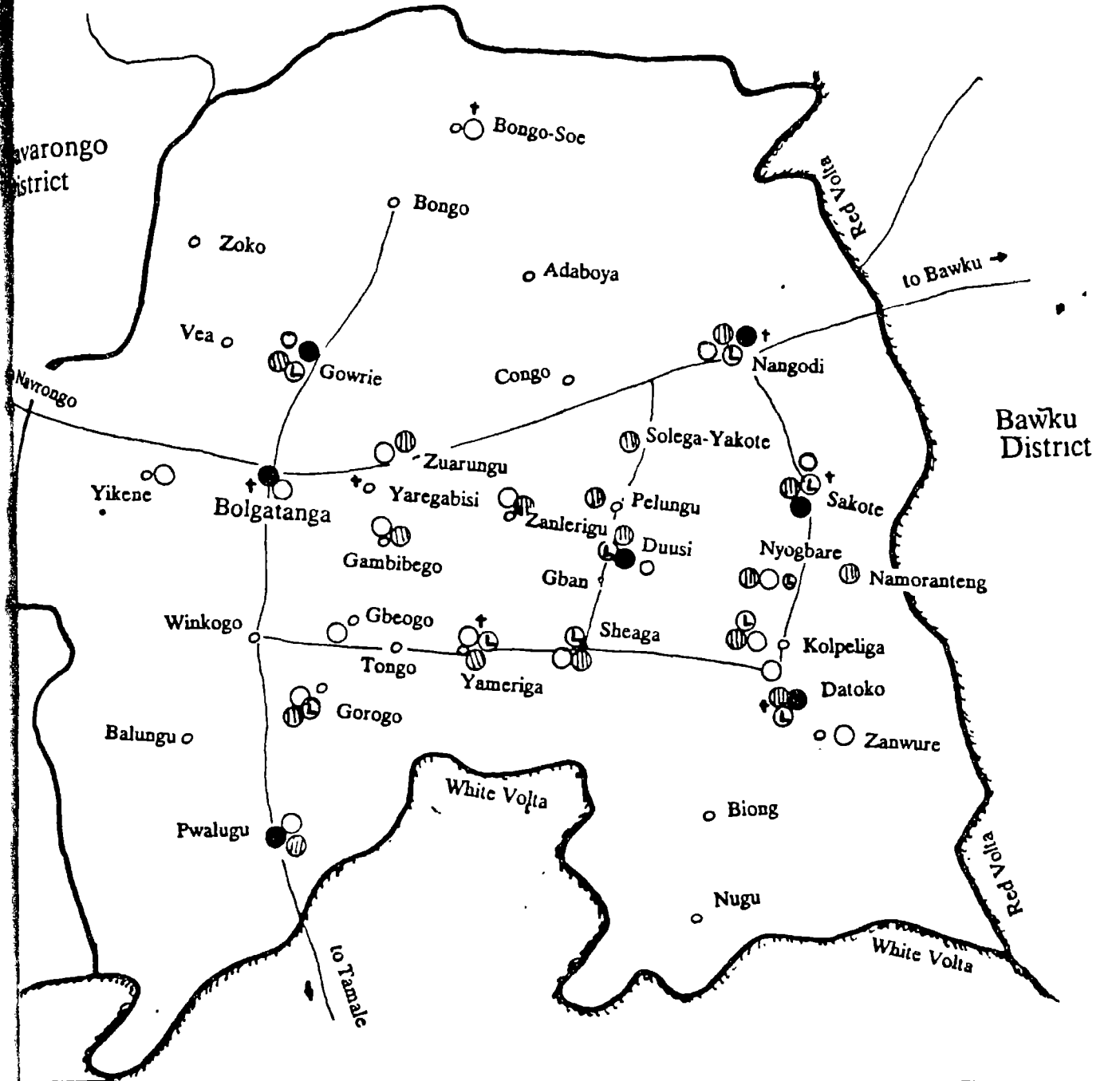
One cannot therefore describe this seemingly ecological practice as either hygienic or adequate. However, the situation lends itself to improvements since the concepts of waste recycling are both culturally acceptable and fairly well understood.



Recent rural sanitation intervention started in 1980 within the CIDA Water Utilization Project (WUP) Phase I through the introduction of the Mozambique slab type latrine. On record about 60 latrines (out of the 400 in the whole Upper East and Upper West) were installed in the Frafra district (see list - Annex C). This programme was discontinued after an evaluation carried out in 1985 by CIDA on grounds of poor delivery strategies and institutional incompatibility. However the Presbyterian Sisters based in Bolgatanga adopted this latrine concept in 1987 and popularized it through health workers within their Mobile Clinic (now Rural Health Centres) system. To date about 120 Mozambique slabs type pit latrines have been installed in about 10 communities.



BURKINA FASO



PRESBYTERIAN MOBILE CLINIC

- Village where Clinic is held.
- ⊕ Presbyterian Chapel.
- ⊙ Village with VHW's, old + trained in the year 1987.
- ⊙ Village with trained TBA's, old + trained in 1987.
- ⊙ Village with Latrines

HEALTH SERVICES.

Ministry of Health :

- Bolgatanga : Hospital.
- Bongo : Health Centre.
- Tongo : Health Centre.

Catholic Church :

- Mobile Clinic : Zoko
- Mobile Clinic : Bongo-Soc

Private Clinics :

- Bolgatanga : Two Private Clinics.

BOLGATANGA DISTRICT - FRAFRA DISTRICT

Fig. 3 : Map of Bolgatanga District, showing Health Services and Presby Sisters' Mobile Clinics



3.0 THE RURAL LATRINE DEMAND SURVEY

3.1 Expanded Terms of Reference

The consultant on arrival in Bolgatanga was provided with an expanded terms of reference by the Project Team Leader which formed the basis for the survey. Three (3) broad areas of investigations were outlined:

Social acceptance;
Technical appropriateness; and
Affordability.

details of the survey were to include:

- a) Household socio-economic status;
- b) Existing sanitation facilities;
- c) Existing sanitation practices;
- d) Socio-cultural values relating to sanitation, health and hygiene;
- e) Identification of community needs for sanitation i.e. improved sanitation facilities;
- f) Status of community participation in cash, labour, materials for construction and willingness to learn trade;
- g) Existing health facilities and possible extension;
- h) An appropriate latrine design that should minimise cost and maximise local construction materials.

3.2 Survey Methodology

Due to the constraint of time, the methodology for the survey was specified as below:

- a) Basic Demand and Affordability Assessment - through questionnaire administration and key informants interviews.
- b) Field Visits and Institutional Contacts - to assess roles, institutional strengths and forms of collaboration and draw lessons from organization carrying out latrine programmes in the district.
- c) Resources Survey - Assessment of skilled manpower in project area, prices of construction materials and availability in the market and materials available in the villages.
- d) Input of Survey Results into Latrine Design and pre-testing.



3.2.1 Details of Basic Demand Survey

The consultant focused on the following activities:

1. Clarification of survey objectives and questionnaire design. The survey scope was trimmed down and structured for input into a questionnaire which was pre-tested in the field for two days and finalised for administration. A copy of the final questionnaire used is attached as Annex A. Some of the questions were posed to assess notions which could later be analyzed and messages developed for use under the health and user education component of the project. Information/ data collected came under the titles below;
 - A. General
 - B. Household data
 - C. Existing sanitary facilities
 - D. Preference for latrines and siting
 - E. Affordability
 - F. Readiness for latrine installation
 - G. Sanitation practices and Design of latrines
 - H. Village organization/health problems
 - I. Comments on general household cleanliness
2. Mapping out of Survey Area, timing, language and recruitment of interviewers and field quality control.

i) Survey Area

As part of the strategy for sensitizing a fair percentage of the 50 hand pumps communities, the survey area covered geographically the whole of the project area (maximum distance 14 km from Bolgatanga town centre). The attached map - fig.4 show the extent of the sub-project areas covered. Also provided is the extent of coverage in the survey area as table 5 on page 19.

ii) Timing of Survey

The survey questionnaire administration took in all four (4) days; each day for a sub-area:

<u>Sub-Area</u>	<u>Date Surveyed</u>
SA1	15/08/88
SA2	16/08/88
SA3	17/08/88
SA4	18/08/88

Interviewers were despatched to the field at 6.30 a.m. each day and picked up between 12.00 and 13.00 hours. This was considered the best timing in recognition of the farming season period.



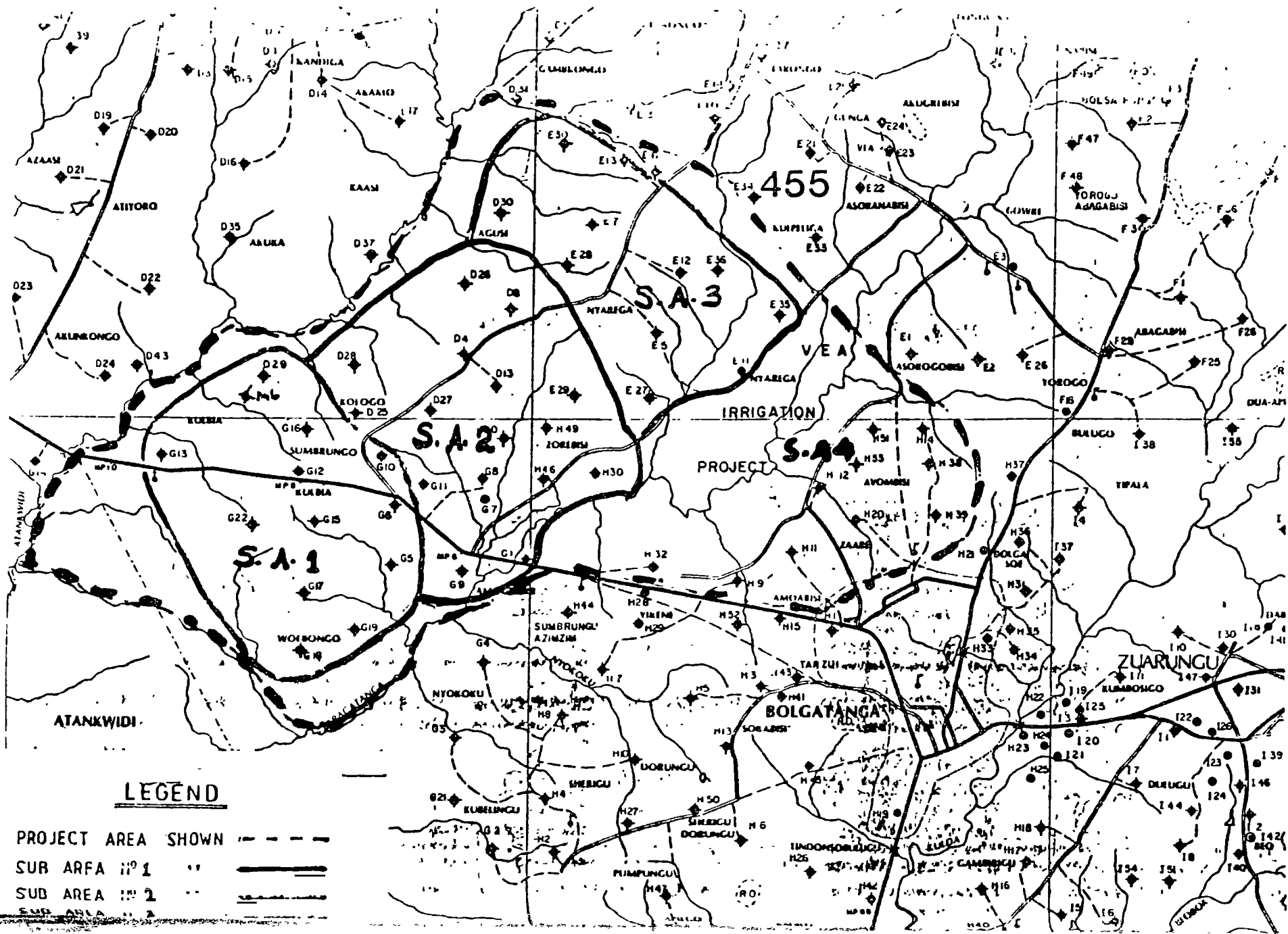


Fig 4 : Map of Project / Survey Area



TABLE 5: Pump Communities Surveyed

PROJECT AREA	VILLAGE NAME(S)	PUMP COMMUNITIES			NO. OF COMPOUNDS VISITED	
		PUMP NOS.	TOTAL NUMBER	NUMBER VISITED		
SA1	A. <u>SUMBRUNGO</u> 1. Kulbia	G05, G06, G12, G13, G15, G16, G17, G18, G19, G22, G23, D29, D46	13	9	42	
SA2	A. <u>SUMBRUNGO</u> 1. Kologo	D4, D8, D27, D28, G11	5	4	19	
	2. Agusi	D26	1	-	-	
	3. Zorebisi	D29, H30, H46	3	2	11	
	4. Amogribisi	D13, G01, G07, G08, G09, G20	6	5	21	
			<u>15</u>	<u>11</u>	<u>51</u>	
SA3	A. <u>ZOKO</u> 1. Gamborongo	E06, E07, E13, E30	4	4	24	
	B. <u>NYAREGA</u> 1. Nyarega	E05, E11, E12, E35, E36	5	5	26	
	C. <u>SUMBRUNGO</u> 1. Zorebisi	E27	1	-	-	
	2. Agusi	D30, E28	2	1	5	
			12	10	55	
SA4	A. <u>ZAARE</u> 1. Zaare Central	H57	1	1	3	
	2. Avombisi	H12, H38, H39, H53	4	4	10	
	3. Amoabisi	H11	1	1	4	
	B. <u>YIKENE</u> Yikene	H09, H32	2	2		
	C. <u>Yorogo</u> 1. Asorogobisi	H4, H51	2	2	9	
				50	40	181



iii) Recruitment and Selection of Interviewers

The strategy adopted was to involve extension staff and institutions who might be involved in the latrine promotion campaign. A balance of six (6) women and six (men) was achieved. The list of interviewers, their status and job output is given in the table 6 on pages 21-22.

iv) Survey Language

The survey language was the local frafra dialect 'Gurune'. Interviewers were therefore screened before selection. The only interviewer who was not very used to the dialect was made to pair up with another colleague.

v) Field Procedures and Quality Control

. Briefing and Debriefing of Interviewers

A half day briefing workshop was organized on 12/08/88 for the twelve (12) interviewers and three (3) project staff. The philosophy behind the pilot project, its scope and activities were explained by the Team Leader. The questionnaire and field procedures were then introduced to the interviewers. Common dialect words were found for all thorn issues and suggestions given for the refinement of the questionnaire.

Subsequently, interviewers were debriefed informally on critical findings and interesting responses. Emphasis was placed on using background initial stories on hand pump utilization to project introductions and avoid 'rigid' chronological questioning and recording.

. Selection of Respondents and Key Informant Interviews

A strategy was adopted to select respondents in such a way that the selection included some key informants. The selection of a sectional chiefs (giving respect to traditional system and also with the motive of sensitizing co-operation); pump man or the community water organizer (CWO) and a minimum of two other compounds was agreed upon for each pump community. Women were generally encouraged to participate in the answering of the questions. Other key informants interviewed alongside the compounds heads and women were women group leaders, teachers, health workers and village masons.

. Quality Control

This involved cross checking questionnaire administration by consultant and project staff accompanying selected interviewers on their rounds. The daily informal debriefings were imputed



each day into administration strategies. Compound inspections were undertaken in a cross-section of the survey area as a way of further checking responses.

TABLE 6: INTERVIEWERS' SCHEDULE

NAME OF INTERVIEWER	STATUS	VILLAGE VISITED	PUMP NUMBER	NO. OF COMPOUNDS
1. Theresa Abaane	Comm. Health Nurse	Kulbia	G05	5
		Kologo	D8	6
		Gaborongo	E06	5
		Avombisi	H53	4
				<u>20</u>
2. Ataki Anderson	Health Insp. Asst.	Gaborongo	E07	8
		Amogribisi	D13	6
		Kulbia	G23	4
				<u>18</u>
3. Isaac Yen	Health Insp. Asst.	Gaborongo	E13	5
		Amogribisi	G8	5
		Kulbia	G16	6
		Yikene		3
				<u>19</u>
4. Lucy & Kantara	Health Insp. Asst.	Gaborongo	E30	5
		Kologo	D27	5
		Kulbia	G13	5
		Asorogobisi	H51	2
5. Lucy Serwaah	Health Insp. Asst.	Avombisi	H12	3
6. E.K. Kantara		Avombisi	H39	2
				<u>22</u>
7. Mary S. Tobigah	Comm. Health Nurse	Nyarega	E05	5
		Kologo	D4	4
		Kulbia	G06	4
				<u>13</u>
8. Dorothy Abaah	Social Welfare	Nyarega	E11	6
		Kologo	G11	4
				<u>10</u>
9. Mensah Barnabas	Driver Mechanic	Nyarega	E11	3
			H11	1
				<u>4</u>
10. Ben A. Asoah	Pump Mechanic	Nyarega	E11	6
			Avombisi	H38



		Asorogobisi	H14	1
		Kulbia	G22	4
		Amoribisi	G01	7
				<u>20</u>
Sussana Adams	Health Insp.Asst.	Nyarega	E35	6
		Zorebisi	H30	6
		Kulbia	G12	3
		Kulbia	G15	3
		Amoabisi	H11	5
				<u>23</u>
Joseph Awuni	Health Insp.Asst.	Nyarega	E36	3
		Zorebisi	H46	5
		Kulbia	G17	4
		Yikene	H09	3
				<u>15</u>
Victoria Mbii	Comm.Health Nurse	Agusi	E28	5
		Kulbia	G16	2
		Amogribisi	G09	3
		Asorogobisi	H14	4
				<u>14</u>

181

3. Analysis of Questionnaire Responses

The analysis progressed by first identifying general trends in the response as noted by the interviewers during the daily informal debriefing sessions. These were cross checked during interviews with key informants and compound for confirmation. Responses in the survey areas proved in many respects fairly identical confirming the homogeneity of the area. Differences in responses which came under particularly household data and affordability assessment were compiled using a spreadsheet for quantitative measurement. The summary of the quantified and general trends are presented in section 3.3.

3.2.2 Field Visits, Institutional and Resources Assessment

The field visits included all villages in the project area and activities performed were key informant interviews, contact with pumpmen or community water organizers, compound inspections, local building practices and materials assessment and the identification of village masons as well as the identification of vehicles for latrine promotion which included women groups. Assessment of utilization of latrines installed within the project area under the CIDA supported Water Utilization Project



(WUP Phase I), and that of the on-going presby sisters mobile clinic latrine programme were also assessed.

Institutions visited included the District Administration - District Council, Environmental Health (Sanitation Department, Town and Country Planning Department, Ministry of Health, Department of Meteorological Services, Geological Survey and the Department of Community Development as well as the Water Utilization Project Team within GWSC.

The District Council and the Ministry of Health are institutionally weak in terms of quality of staff and their orientation to rural sanitation. The in planning capability is also weak. Staff could, however, be trained or re-trained for latrine installation in Bolgatanga and its fringes. Only 2 out of 12 interviewers recruited from the Environmental Sanitation Dept. of the District Council and the Community Nursing Division of the Ministry of Health have home latrines and that points to a weakness in either their level of motivation or their lack of appreciation of the importance of latrines or inadequate knowledge.

A packaged programme of training for installation of latrines in the homes of these extension worker will be a useful starting point for the district council's intervention. extention staff strength of the Dept. of Community Development is also weak. Additional on possible institutional cooperation is given as part of suumary below.

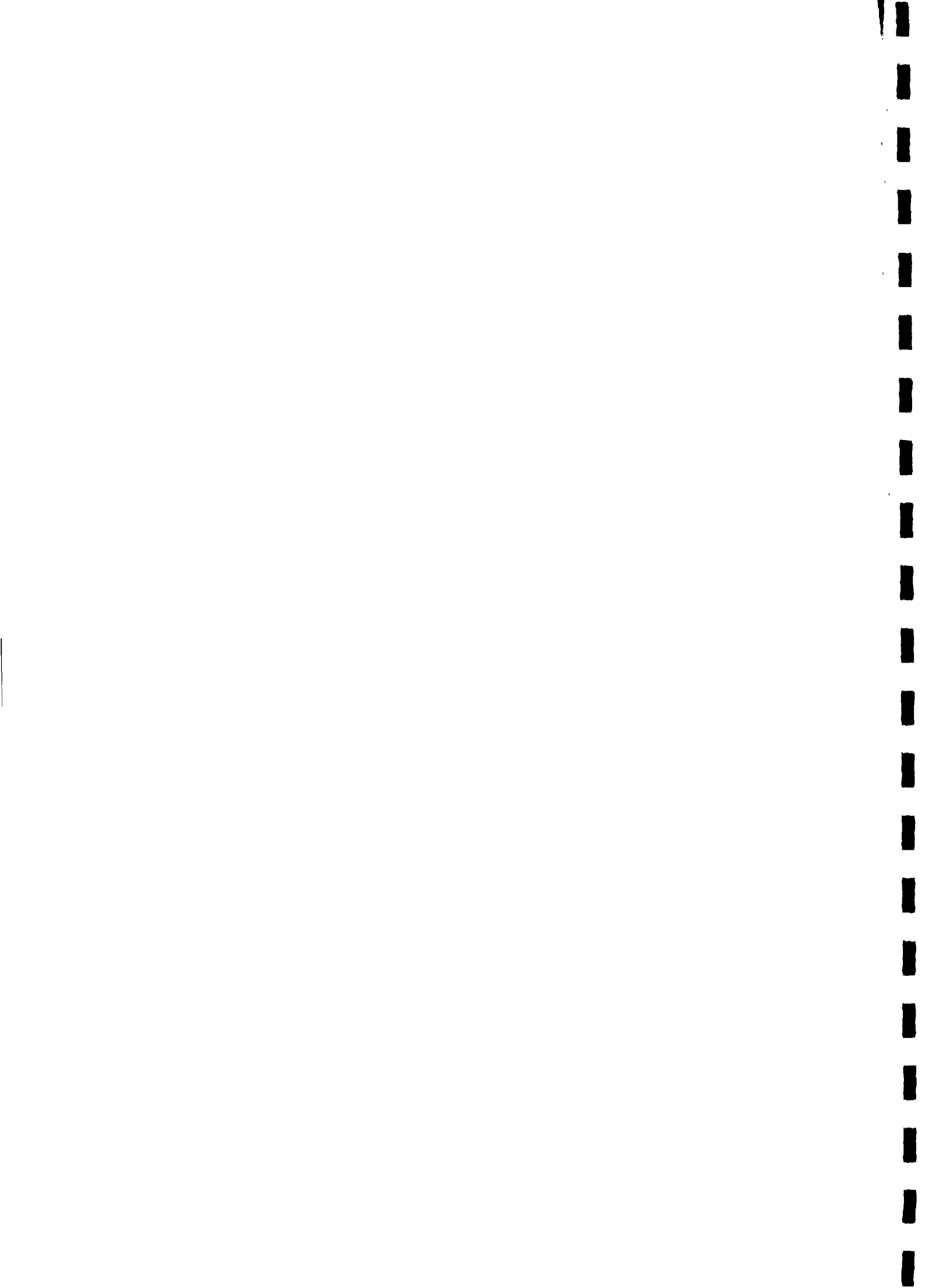
3.4 SUMMARY OF SURVEY RESULTS

A. GENERAL

- Total number of pump communities : 50
- Number of pump communities visited : 40
- Pump communities coverage : 80 %
- Estimated number of compounds : 1,000
- Number of compounds visited : 181
- Survey compounds coverage : 18.1 %
- Estimated population of project area : 15,000
- Average number of compounds to a pump: 20
- Average population to a handpump : 300

B. HOUSEHOLD DATA

- Average number of yards (households) per compounds: 3
- Average number of residents per compound : 13



C. EXISTING SANITATION FACILITIES

- Usual defecation place: free range (around compound) (for all age groups) and all seasons. Defecation is closer to compound in wet season due to privacy created by vegetation cover.
- Treatment of children (< 2 years) faeces: supervised defecation in or outside compound, covered with soil and throw on controlled dumping area (tampugre).

D. PREFERENCE FOR LATRINE AND SITING:

- Conception of present defecation place: Most responded not good enough for reasons of lack of privacy. A small minority have a vague notion based on health implications.
- Need for latrine: Most responded yes for reasons of privacy. On why haven't they built one, most indicated either no knowledge on construction or no money.
- Preference for communal or compound latrine - Most indicated preference for compound latrines also on reasons of privacy and long distance they will need to walk to communal latrine. Those who opted for communal latrine were found on further questioning to be strongly influenced by public latrine systems they have seen in Bolgatanga (most followed up later to respond that men and women cannot use a latrine - as is the practice in Bolgatanga). Due to land distribution and settlement pattern questions will arise on whose farm to locate the communal latrine on.
- Location of compound latrines: Most preferred outside the compound. This is linked to the notions of odours and fly nuisance.

E. AFFORDABILITY

- Main Occupation: Farmers (both men and women). Some men in some compound take on blacksmithing in the off season period whilst the women do weaving (baskets and hats and mats) or pottery. Some compounds also have dry season plots on the irrigation fields at Ve. No compound responded to the issue of hiring out labour.
- Indication of affordability:

Average farm size:	4 Acres
Ownership of bicycles:	48.6 %
Ownership of radios:	24.3 %
Ownership of cattle:	54.1 %
Average no. of cattle owned:	3



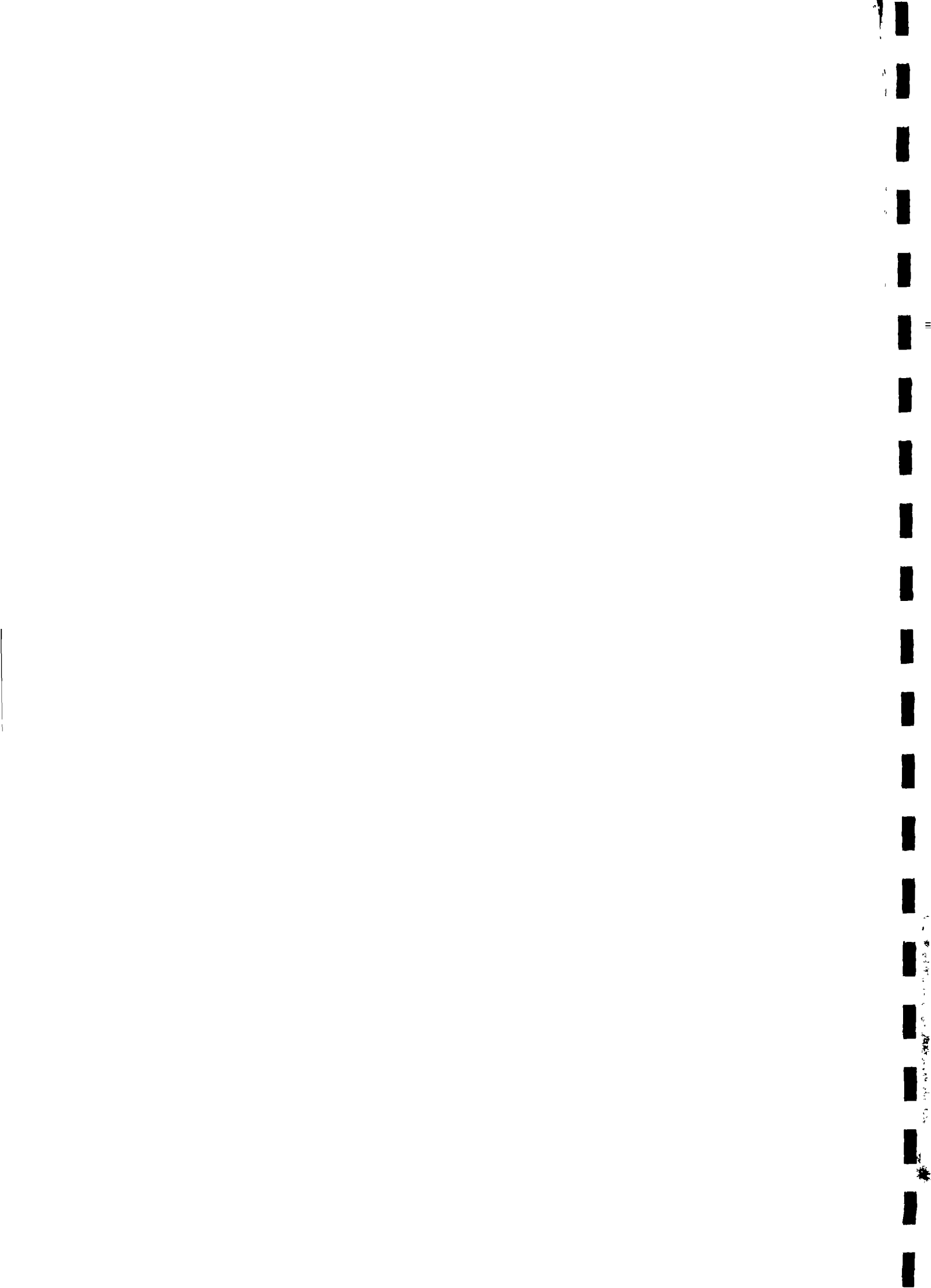
The above, however does not give a clear indication of income levels or wealth. Whilst ownership of a bicycle or radio give some hints of a transfers of accumulated savings, cattle ownership is more link to the cultural status of the landlord and is easily equated to liquid cash when it comes to the question of affordability. Cattle is the main object for the dowry system in Frafra society - four cattle is given out the bride. More premium is therefore given to the willingness to install a latrine which comes after this paragraph.

F. READINESS FOR LATRINE INSTALLATION

- Compound contribution: labour - self
materials -sand, stones, cement
- Cash (in kind) contribution: Most responded being able to provide one bag of cement.
- Payment of cement: whilst some indicated that they will pay on delivery of cement indications are that a spread across one harvest season is more realistic i.e. 50 % payment on installation and 50% after next harvest.
- Starting time for installation: most answered during the dry season i.e. from October.

G. SANITATION PRACTICES AND DESIGN OF LATRINE

- Anal cleansing material: leaves, twigs, small stones and millet cobs.
- Indications of taboos concerning latrines: non-existing. Those who answered yes went on to respond that men and women should not share the same latrine. This upon further probing relates more to notions on public latrines in town and privacy.
- Sharing of latrines: Most responded positive to sharing with women and children. Existing shared usage of compound latrines surveyed confirmed the above. Many asked how can we have a taboo on something we don't have.
- Notions on faeces of children (< 2 years): harmless except when sick since children only feed on breast milk.
- Notions on adult faeces: dirty and smelly and harmful but no clear ideas on how harmful.
- Notions on pit latrines and other known latrines: filthy, smelly and full of flies (an observation on public latrines in Bolgatanga).



- Re-use of pit content: Acceptable for conditioning soil but some object using fresh excreta, since it will soil and irritate feet and 'dirty' vegetables.
- Prefer defecation position: squatting (men, women and children).

H. VILLAGE ORGANIZATIONS/HEALTH PROBLEMS

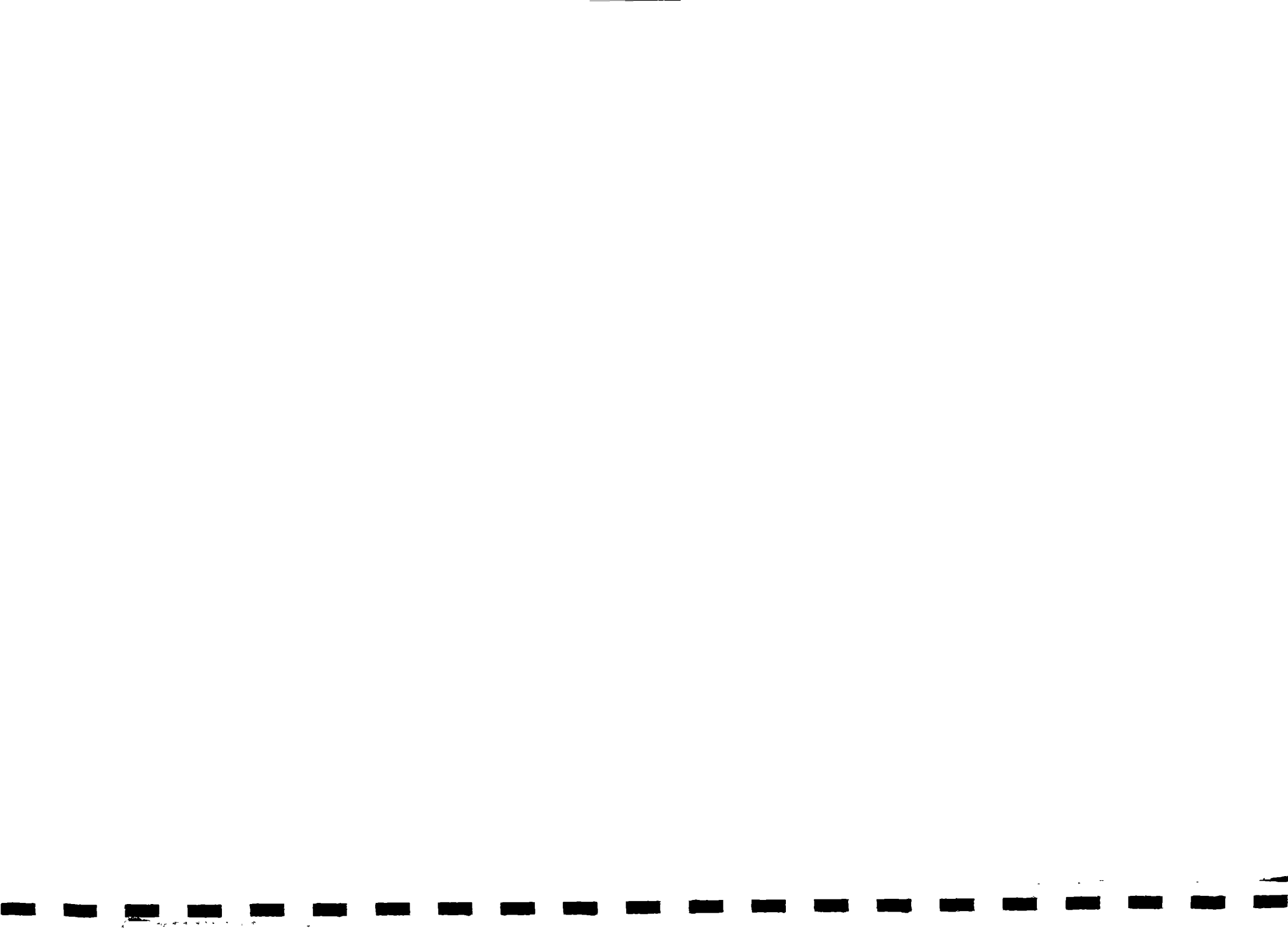
- Average number of masons per village: 1 (5 known masons in project area - 2 with each over 100 Mozambique slab type latrines to his credit.
- Village organizations/structures: chiefs and sub-chiefs, CDRs and some women groups - the most popular being the Avutobisi (Zaare) and the Nyarega Anaanore Groups. Both have an average of 60 registered women members and cash deposit of c100,000.00 in their bank accounts in Bolgatanga. The former is based on pottery and the latter on baskets and straw hat weaving.
- External contact groups/organizations: Pump Mechanics but occasionally church groups and public health nurses on market days or on immunization campaigns.
- Most often diseases: Diarrhoea, malaria, bilharzia and worm infestation - most have no idea of the causes but some opt that diseases came from God (or gods) or one has a 'bad stomach'.
- Average number of people with reading and writing skills per compound: 1

I. COMMENTS ON GENERAL HOUSEHOLD CLEANLINESS

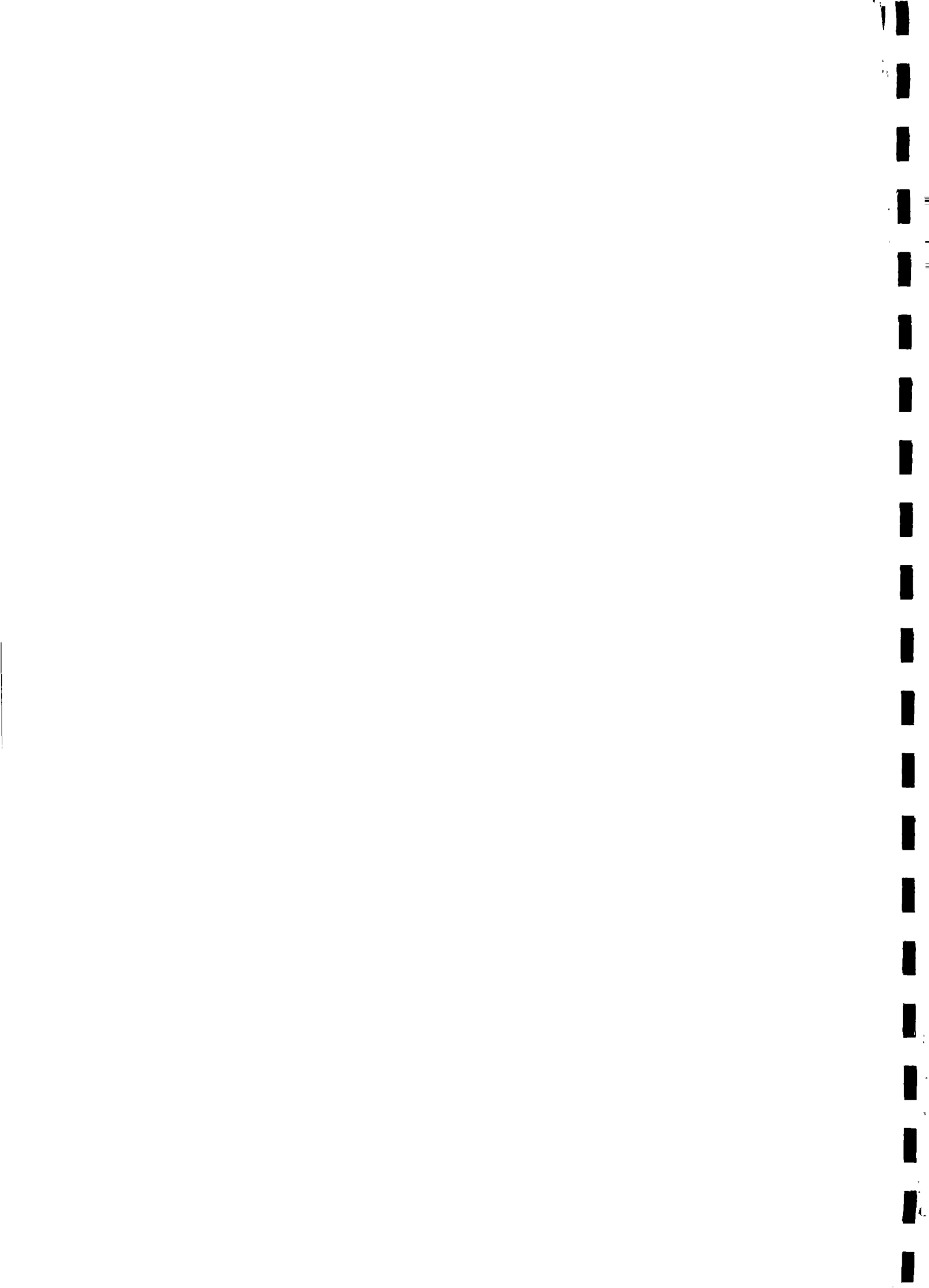
- Garbage disposal - by control dumping on 'tampugre' two (2) metres from gate.
- Sullage water - left to drain into vegetable plots.
- Conditions of pig sty: modest.
- Conditions at cattle and goats kraal: Messy particularly where storm water is left to drain through. Exceptions are where straw is used to cover piled cow-dung.

J. BUILDING MATERIAL SURVEY

- Cement - available on the open market at between c1,900 to c2,000 or at the district council at the government price of c1,600.



- Reinforcement Steel - Supply uncertain. Only 12mm(0.5 inch) dia. mild steel rods were found on the open market (only one ton was available at that time at c120.000 per ton wt.). This size in any case is not suitable for the reinforced slab option proposed for this project.
- Local Building Materials (sand ,aggregates, etc.) - all complementary materials for concrete work as well as earth for superstructure construction are available and are of suitable quality all over the project. area. Annual maintenance accompany building practice in the area. Finishes using sand and cow dung mixture is practised. Thatch for roofing are abound.



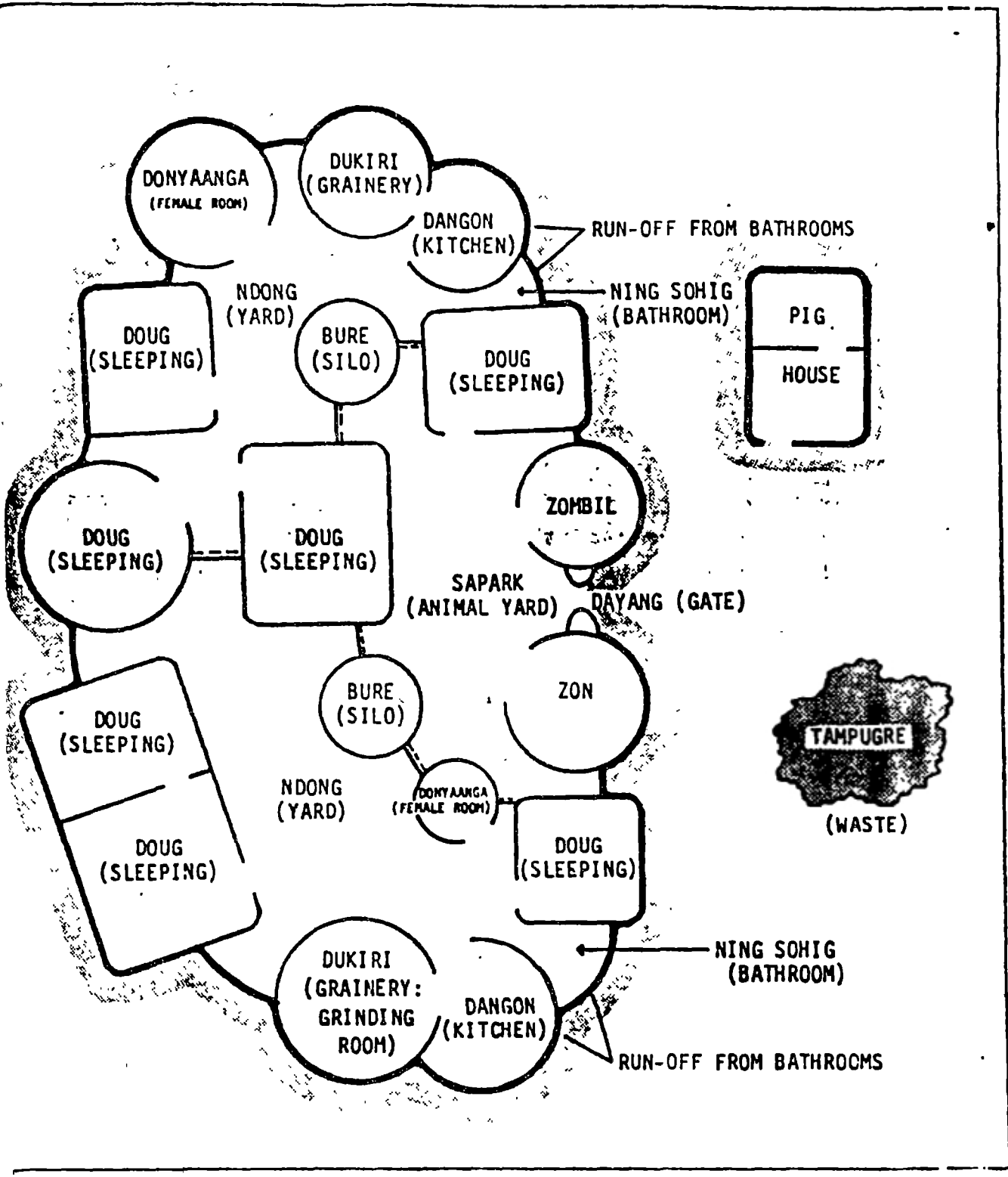


Fig. 5 : Typical Layout of Frafra Compound with two yards



4.0 PROPOSED LATRINE DESIGNS

4.1 Pre-Selection Criteria

From the survey results, market surveys and additional observations carried out in the project area, compound ventilated pit latrines (VIP's) come out strongly as the most affordable, technically feasible and socially acceptable system for the following reasons below:-

1. Low water consumption level of 15-20 litres per person per day coupled with the use of bulky material, (leaves, twigs and small stones) for anal cleansing makes any water based system impossible.
2. Soil conditions are fairly stable to avoid pit lining, ground water levels averages below 3.0 m for most parts of the district and where shallower depths are confronted these levels are subject to remarkable seasonal variations allowing depths of 2.0-3.0 from being achieved without any problem. Experience with hand dug well construction in the district indicate non-uniform soft rock condition at depths around 3.0 m but these are localised not extensive and can thus be managed easily by local pick axes and in critical cases by a chisel and hammer produced by local blacksmiths.
3. Settlement patterns, household sizes (average 13) and the assessment of income levels favour single unit systems which are 'comfortably' affordable by families. Survey responses as to the ability to offer on the average a bag of cement points to the scale of investment within the reach of most family. Unlined VIP latrines are the only systems which offer such possibilities.
4. Pit latrines are generally known to most families in the project area. Offensive odour and flies are the most dominant factors that most have against them. The provision of the vent pipe will thus be an extra incentive for adoption. The acceptance of the unvented Mozambique slab type in surrounding villages offer a measure of promise for slightly upgraded system (provision of ventilation duct - its construction fits into existing village practice of construction traptions of roosting birds).
5. Skills already exist in the project area for mass installation of latrines as exemplified by one mason installing in two years about 120 latrines in over 15 rural towns and villages. What is left is to provide a supporting promotional back-up training and supervision and social marketing strategy for delivery. Existing institutional framework and local organization, already in latrine



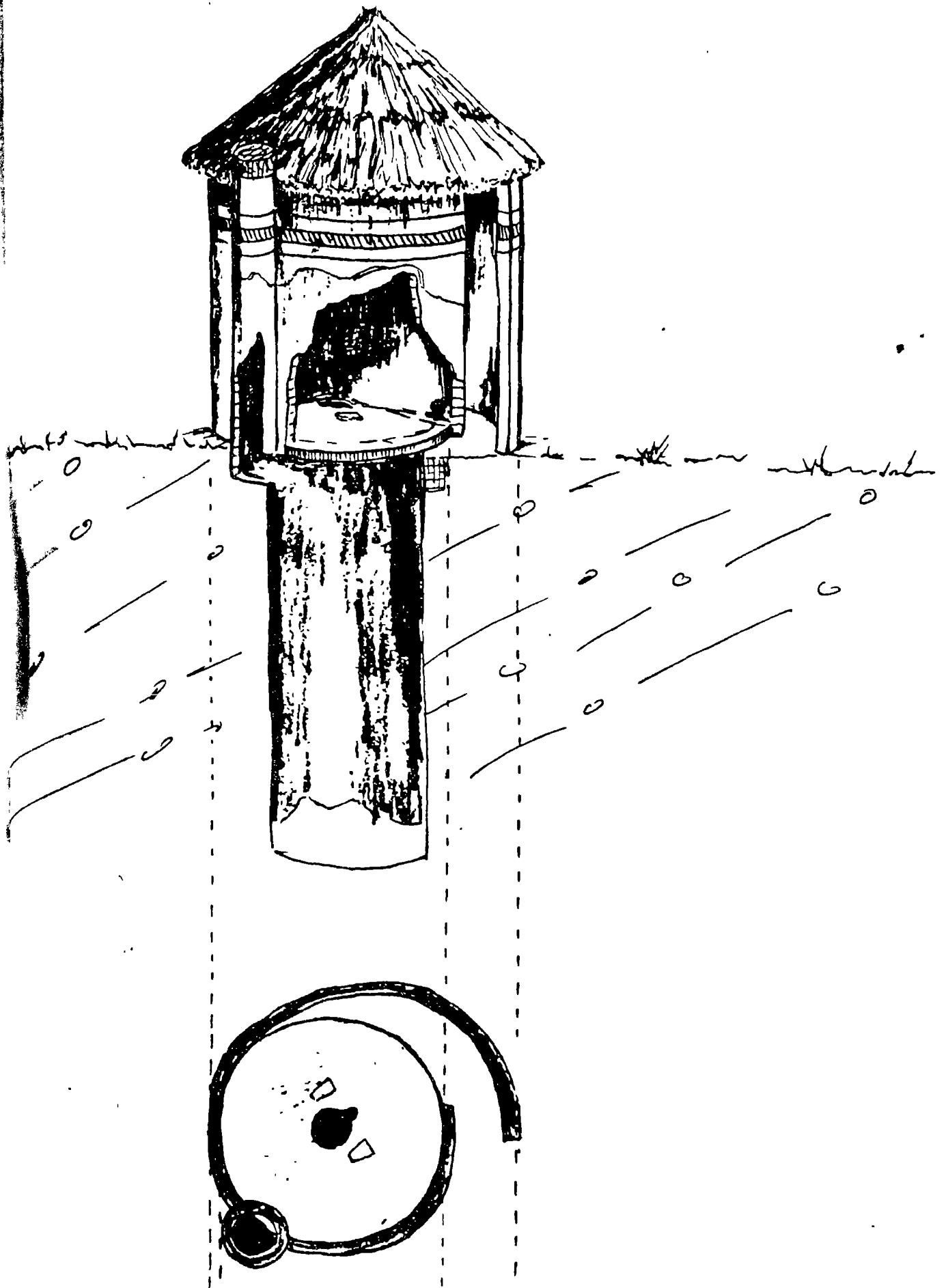
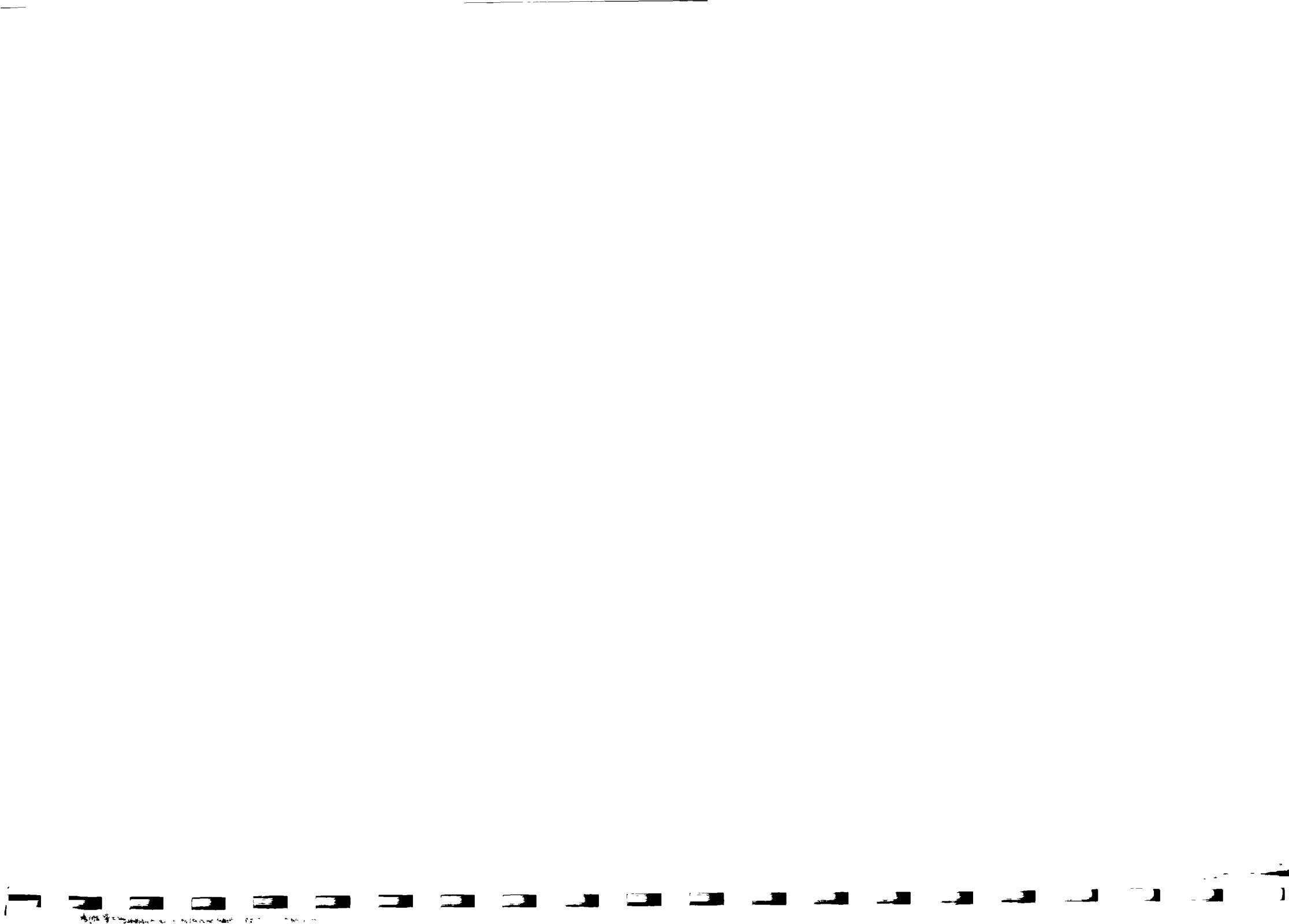


Fig. 7 : Proposed Latrine Design



promotion (e.g. Mobile Clinics, Women Groups, etc.) business is suitable for VIP latrine technology transfer.

4.2 Basic Principles

a. The latrine should not look better than the compound in terms of material input particularly for the superstructure.

b. All models in the demonstration phase for compound, school, markets and primary health care centres should all have the same or similar outlook and fit into local building practices and style.

c. As much local material (or in kind input from compound) should be utilized as possible. A limitation on one (1) bag of cement external input could also form part of the strategy in the marketing. The latrines should be sited as close as possible to the compound to facilitate the convenience and privacy factors and the use by children even at night. Trained and contract local masons should be utilized as much as possible.

4.3 Design Options

With the pre-select criteria and basis principle set out above, two (2) basic pit latrine systems are proposed i.e. the ventilated Mozambique unreinforced slab type pit latrine (VMUP) and the ventilated reinforced slab type pit latrine. The following table presents a summary of candidate systems:-

TABLE 7: SUMMARY OF TECHNICAL SPECIFICATIONS OF PROPOSED LATRINES

Specifications	A: Ventilated Mozambique Unreinforced slab type		B: Ventilated Reinforced slab type	
	Option 1	Option 2	Option 1	Option 2
<u>Latrine Type</u>				
<u>Pit</u>				
Shape	Circular	Circular	Circular	Circular
Diameter (m)	1.00	1.20	1.00	1.20
Depth (m)	2.00	2.00	2.00	2.00
Volume (cum)	1.57	2.26	1.57	2.26
Effective volume (cum) 90%	1.42	2.04	1.42	2.04
Normal sludge accum.rate cum/p/yr	0.03	0.03	0.03	0.03
Adjusted accum.rate (50%)	0.045	0.045	0.045	0.045
Life span of users	10-15	10-15	10-15	10-15
Frequency of relocation (yrs.)	2.0-3.0	3.0-4.5	2.0-3.0	3.0-4.5
Working time (days)	2-5	3-7	2-5	3-7



1. Foundation Slab

	Annulus	Annulus	Annulus	Annulus
Shape				
Width (mm)	150	150	150	150
Depth (mm)	150	150	150	150
Conc. Agg. Size (mm)	25-75	25-75	25-75	25-75
Outlet Sump (dia.) mm	200	200	200	200

2. Slab

Diameter (m)	1.2	1.5	1.2	1.5
Overlap on foundation (mm)	150	150	150	150
Thickness (mm)	75.0	75.0	75.0	75.0
Crown height (mm)	150	150	-	-
Squat hole dia (mm)	200	200	200	200
Outlet hole dia (mm)	200	200	200	200
Volume of concrete (cum)	0.06	0.10	0.07	0.11
No. of m.s. bars 10mm 0,90m	-	-	3	4
or 6.0mm-150 mesh (LxB)	-	-	1.2x1.2	1.5x1.5
Casting time (hours)	1.5	2.0	4.5	5.0

3. Superstructure

	coil/square	coil/square	coil/square	coil/square
Wall thickness (mm)	125-150	125-150	125-150	125-150
Diameter (m)	1.5	1.5	1.5	1.5
Height (m)	1.5	1.5	1.5	1.5
Wall overlap (m)	0.6	0.6	0.6	0.6
Width of Entrance (m)	0.6	0.6	0.6	0.6
Wall material	mud/brick	mud/brick	mud/brick	mud/brick
Roof pitch (m)	1.0	1.0	1.0	1.0
Roofing material	thatch	thatch	thatch	thatch
Outlet wall thickness (mm)	100-125	100-125	100-125	100-125
Outlet height above wall (mm)	300	300	300	300
Class of mud/No. if Adobe bricks	/	/	/	/
Construction time (days)	6/2	6/2	6/2	6/2

4. Maternal Input

Cement (bags)	0.75	1.0	0.75	1.0
Aggregate (size 4-12mm) buckets	4	5	4	5
River sand (buckets)	3	4	3	4
Water (buckets)	3	4	3	4
m.s. rod/mesh (No.)	-	-	3	4

5. Estimated Costs

Cement	1,500	2,000	1,500	2,000
m.s. rods/mesh	-	-	3,600	4,800
Mason (3 visits)	1,000	1,000	1,000	1,000
Mosquito PROOF netting	200	200	200	200
Total	2,700	3,200	6,300	8,000



4.4 Design Details

A. Pit dimensioning

For purposes of standardization two (2) pit diameters were evaluated i.e. 1.0 m and 1.2 m. The basic equation used is;

$$\text{Volume (Veff)} = \text{No. of users (N)} \times \text{Relocation time (R)} \times \text{Sludge Accumulation Rate (Sa)}$$

The following steps were then followed:

1. Determination of fixed volume

diameter D	1.0 m	1.2 m
depth H	2.0 m	2.0 m
Volume [V = $\frac{\text{PI} \cdot \text{D}^2 \cdot \text{H}}{4}$]	1.57 m	2.26m

2. Determination of effective volume:

(Use of latrine limit to 90% capacity)
i.e. about 300 mm below squat slab.

$$[\text{Veff} = 0.9\text{V}] \quad 1.42 \text{ m} \quad 2.04 \text{ m}$$

3. Selection of assumed sludge accum. rate (S) cm/person/yr

0.03 0.03

4. Increase by S by 50% to allow for bulky material (Sa = 1.5 S)

0.045 0.045

5. Input of design population No: (No. of users assumed 15)

15 15

6. Calculation of design life of Pit R: 2.0yrs 3.0yrs (Relocation [R = Veff/Sa.N])

See fig. 8 for details.

B. Slab Foundation

An annulus concrete ring beam of 150 mm width and 150 mm depth is specified to receive slab over the pit allowing slab overlap of 150 mm on all sides. No allowance is made for pit lining due to the very stable soils found in most parts of the district. It is preferable to cast ring beam before pit digging to avoid the use of formwork and large stones could be used and mortared in place. Leftover concrete from the slab casting, mixed with more with



larger stones is also recommended. A slot (vent sump) of dimension 200 mm diameter is left in the ring beam.

The advantages of the ring beam are as follows:-

1. Allows pit to be dug to measurement and an excellent guide to villagers.
2. Prevents storm water from widening pit entrance or flooding pit (especially when raised about 50 mm above ground level).
3. Provide unobstructed construction even during rainy period (as was observed during demonstration trials).
4. It provides an effective seal between seal and slab.

See fig.8 or 9 for details.

C. Cover Slab

Allowing for the overlap unto the foundation cover slabs will all have 300 mm extra over pit dimensions i.e. 1.2 m dia slab for a 1.0 m dia pit and 1.5 m dia slab for a 1.2 m dia pit.

Ventilated Mozambique Slab Type (VMUP)

A crown height of 150 mm is specified. This together with a uniform steel thickness of 50-75 mm is obtained by excavating the 150 mm into a level ground and mounding the soil after the 150 mm overlap width onto a 150 mm peg at the centre.

A squat hole with 800 mm is allowed with a 75 - 100 mm extension. This is obtained by using a village bucket No.32 in the project area but for the purpose of control a wooden mould will be made for the project. A half or full 200 mm dia vent hole is allowed for the vent pipe.

See fig. 8 for details.

Ventilated Reinforced Slab Type (VIP)

The design is same as the VMUP except that it is flat and therefore requires reinforcement to take up tensile forces to be imposed by the human weight on the slab. 75 mm thick slabs are specified with preference given to 150 x 150 mm 6 mm m.s. mesh as reinforcement. In the absence of a mesh cut up 6 mm Mild Steel bars could also be used at 150 mm centres in both directions. Square slabs should be adopted if cutting up of m.s. bares mesh proves problematic in the circular slabs.

See fig. 9 for details.



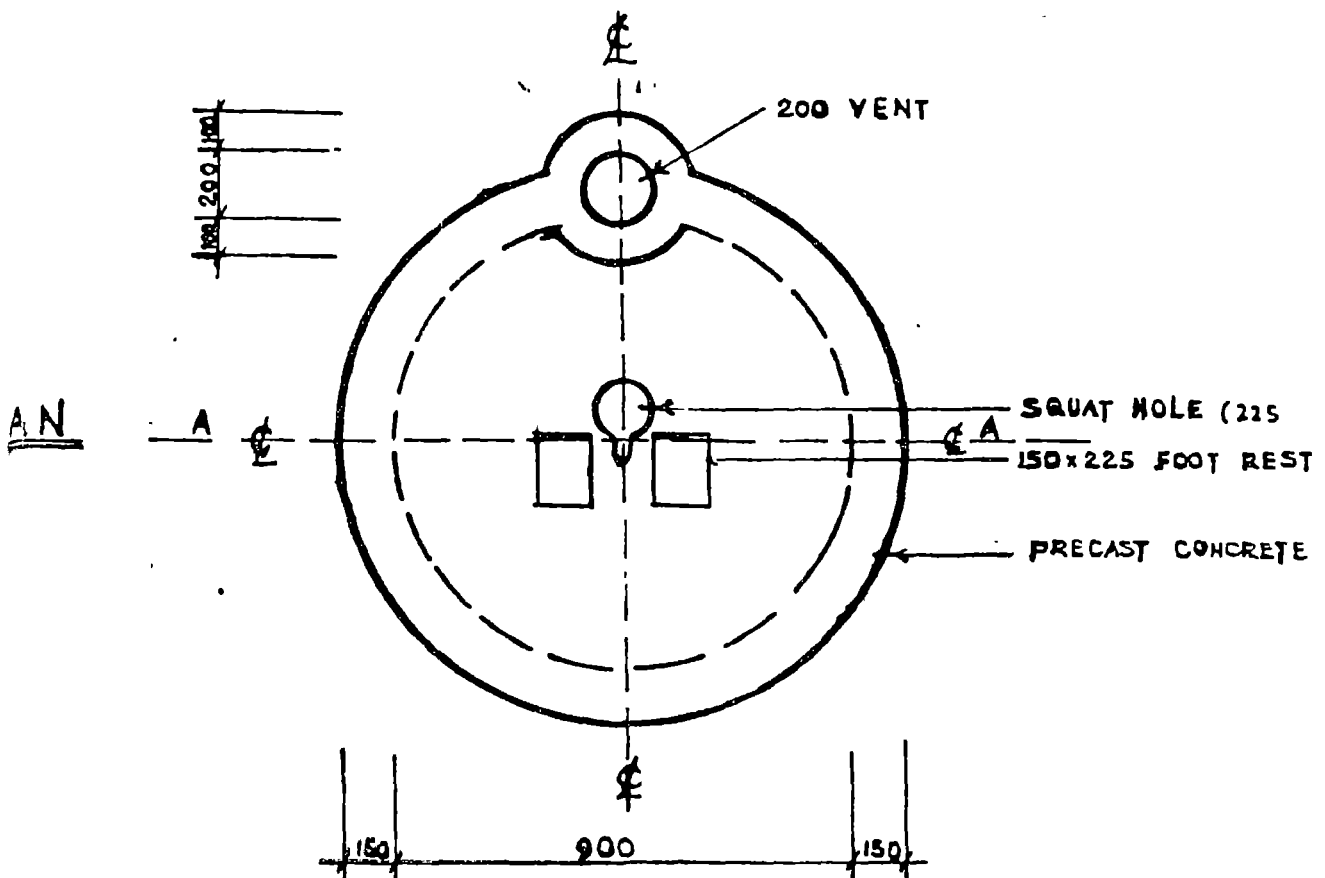
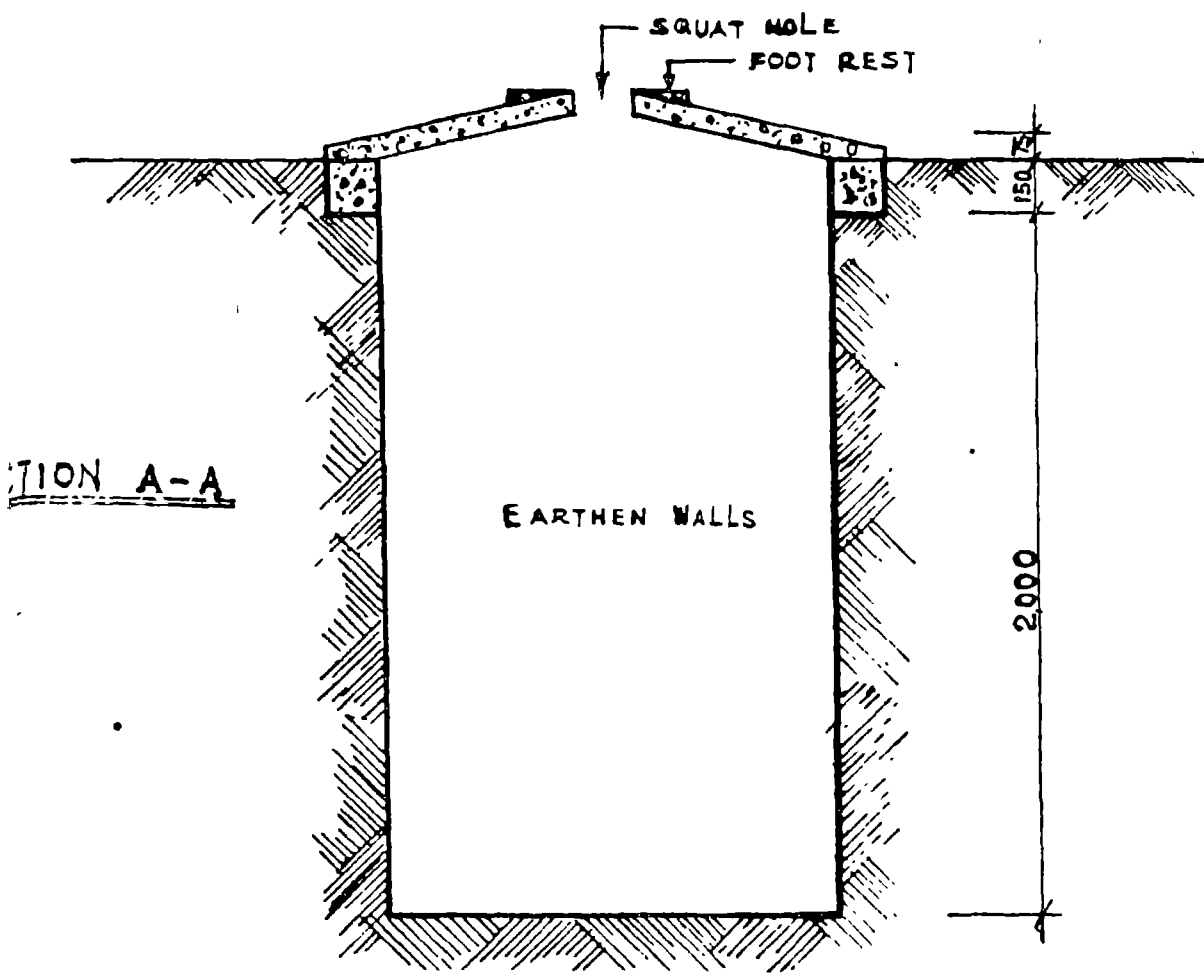


Fig. 8 : Plan and Cross Section of the Ventilated Mozambique Unreinforced Slab-Type Latrine



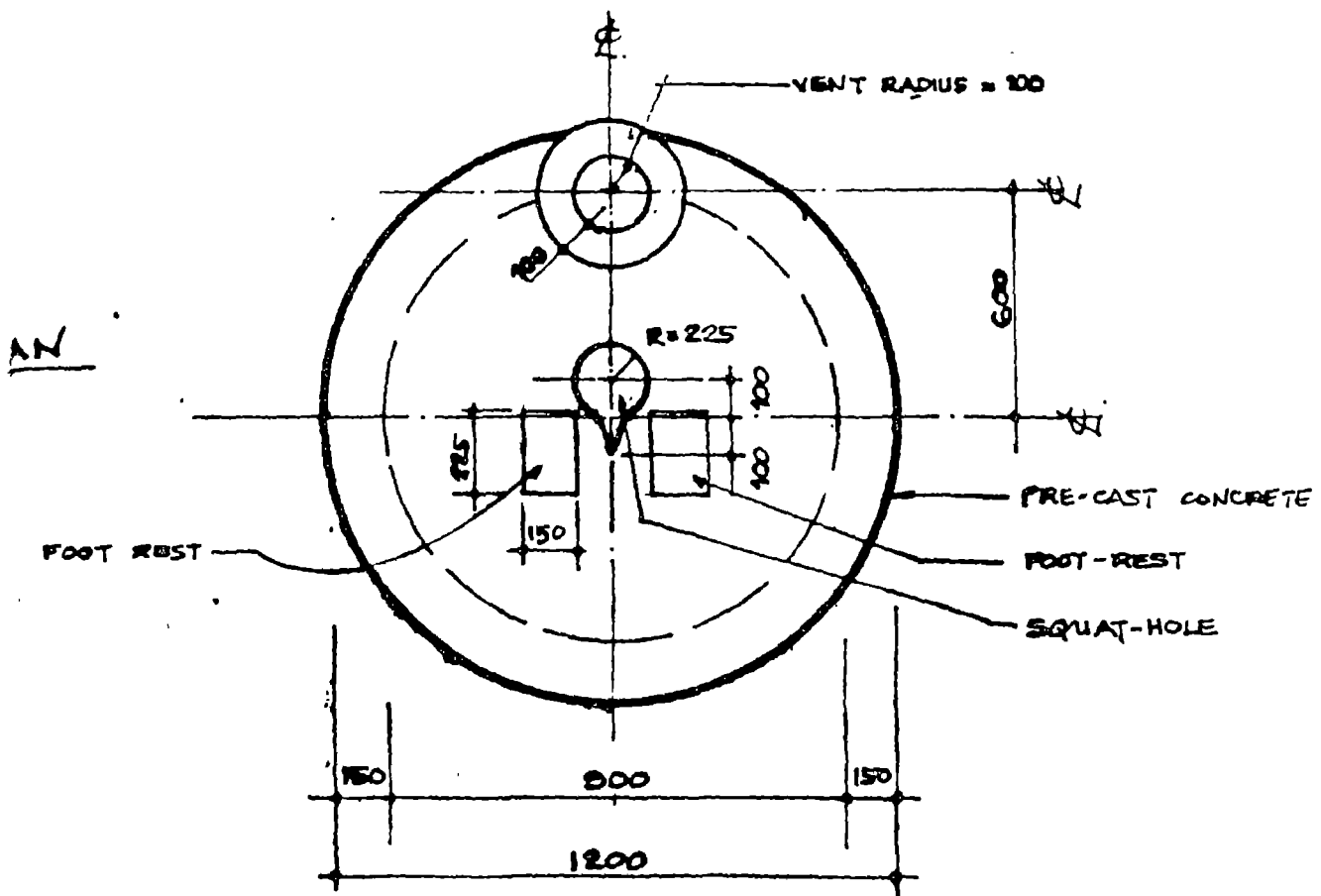
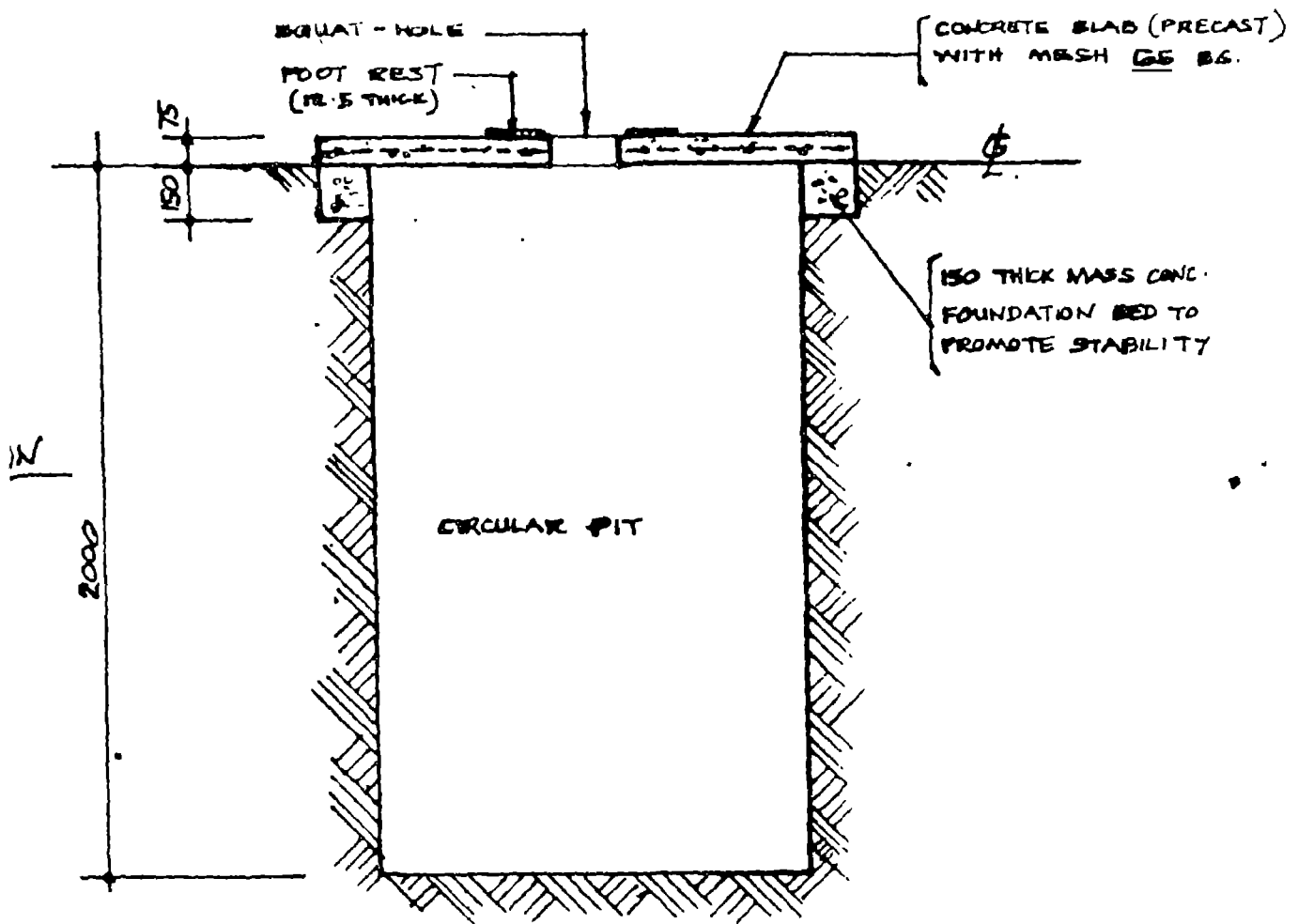


Fig. 9 : Plan and Cross Section of the Ventilated Reinforced Slab-Type Latrine



Foot Rests

A standard foot rest of 150 mm width, 250 mm in length and 25 mm thick is specified. A special template should be provided to the mason at fixing the foot rest. In the VMUP type special care should be taken to ensure a levelled surface.

See fig. 10 for details.

Finishes

A gentle screeding (gradient 1:10) should be provided in the direction of the squat hole. In the case of the VMUP slab type this will require in-filling of the inverted shell area before this could be done.

D. Superstructure

The superstructure will incorporate as much of local building practices and style as possible. The coil doorless mud superstructure is therefore recommended as it fits into the round compound building forms in the area. Another option is building with sun dried (Adobe) bricks which will take a square or more or less rectangular shape (also doorless and with the entrance overlap for enhanced privacy. Recommended finish could be the use of the local sand and cow dung mix or cement mortar plaster.

See fig. 7 for details

Foundation

A detail for integrating the vent pipe with the superstructure wall is shown in fig. 10. This fits into local practice of constructing chimney-like traptions within walls (monolithic construction) for chicken roosting. The foundation will generally be dug 50 mm deep and 150 mm wide with most falling outside the slab area. Only the base of the vent pipe will fall partly on the slab. Privy width of 1.5 - 1.8 m is recommended.

Wall and Vent Pipe

The wall will start at 150 mm at the base and finish off at 125 mm at 1.5 m high. Adobe brick walls will however be only 100 mm thick. The most important points are the:

1. Monolithic integration of vent pipe which will be 100 mm thick and 200 mm internal diameter and stand 300 mm above wall and the provision of a fly screen (mosquito proof netting 600 x 600 mm) to be tied securely at the top of the vent pipe.



1. Entrance overlap of 600 mm, entrance width of 600 mm (these conform to local building practices).

See fig. 7 and 10 for details.

Roof

Roofing will also conform to local building practices of using thatched pitch roof with crown height of about 1.0 m. Rafters will be local Neem tree branches and 3 - 4 layers of thatch will be used to ensure water-tightness.

1.5 Sequence of Installation

1. Check out local ground water and soil conditions.
2. Select site with household which should be preferably on the north or south ends of compound due to local wind condition and orientation of compound gate facing east) to ensure excellent odour control.
3. Prepare site for pit and for slab casting which should be as close as possible 2.0 m.
4. Mix concrete cast slab with squat hole and vent hole.
5. Use remainder of concrete with bigger stones added for the slab foundation, leave slot for vent in foundation ring.
6. Allow two days for foundation concrete to set and start pit digging inside the foundation ring.
7. Cover slab with wet sand for minimum of seven (7) days which coincide with maximum time for pit digging.
8. Prepare level of foundation area with some mortar and install slab.
9. Prepare superstructure and vent pipe foundation and build up superstructure for five (5) days allowing mud to dry each day. Roof could be prepared at the same time.
10. Put on roof, plaster level of privy room and construct foot rest. Plaster both superstructure with dung and sand mix and if possible left over cement. Construct 100 mm entrance wall to obstruct inflow of storm water. You are then ready for commissioning.

1.6 Evaluation of Design Options

Basically the two systems i.e. the ventilated Mozambique unreinforced slab type and the generic VIP are similar in



pit dimensions and capacity, foundation construction and superstructure. The only difference is that one is without reinforcement and the other reinforced. Secondly the options proposed differ only in pit dimensions that is diameters and depth. Both the 1.2 m diameter slab and the 1.5 m slab are made shallow for ease of access to decomposed pit material during the relocation period.

- These options have been proposed for pre-testing in the demonstration phase to assess ease of installation, confirmation of costs, institutional back-up requirements and to some degree beneficiary preference. Preliminary conclusions, however, point to the 1.2 m diameter and 2.0 m deep ventilated Mozambique slab type as the ideal option on strength of cost and ease of construction.

- It is about 20 % cheaper than the unreinforced 1.5 m dia.type and around 133 % cheaper than the reinforced concrete slab type at the same capacity. The pit diameter offers ideal working space that the local masons are used to. Being shallow allow easier access to pit content and meets more than adequately ground water conditions and soil conditions in the project area. The extra savings over the 1.5 m diameter type makes it additionally superior if cost is spread over 2 harvest seasons and therefore together with above reasons given above outweighs the advantage of the additional one year user life of the larger diameter type.

- Whilst the shallower pits offer a lesser risk to ground water pollution in localized areas its wet season ground water levels, annual flooding of pit for an estimated three (3) months will ensure better digestion rate.



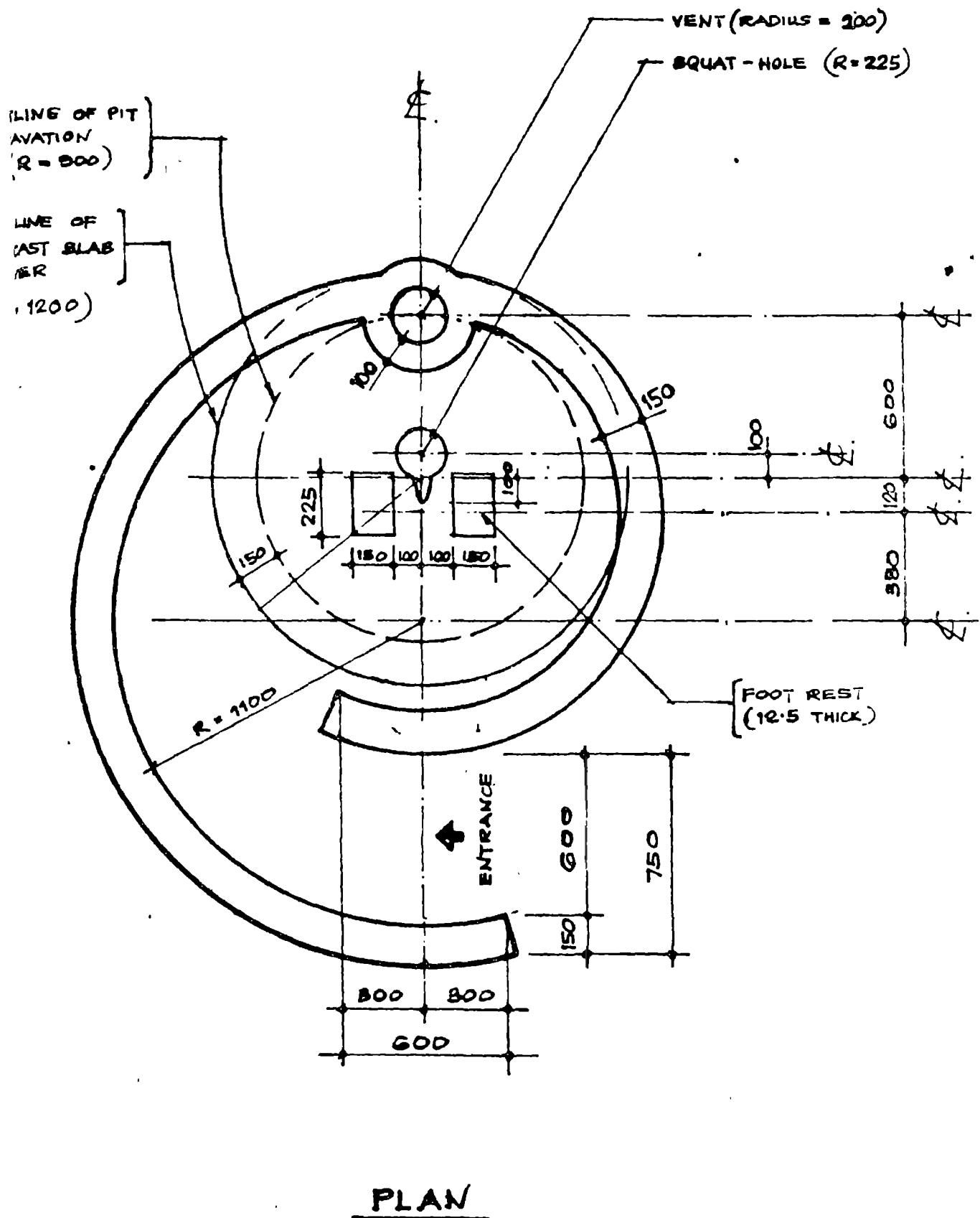


Fig. 10 : Superstructure Orientation and Vent-pipe Detail



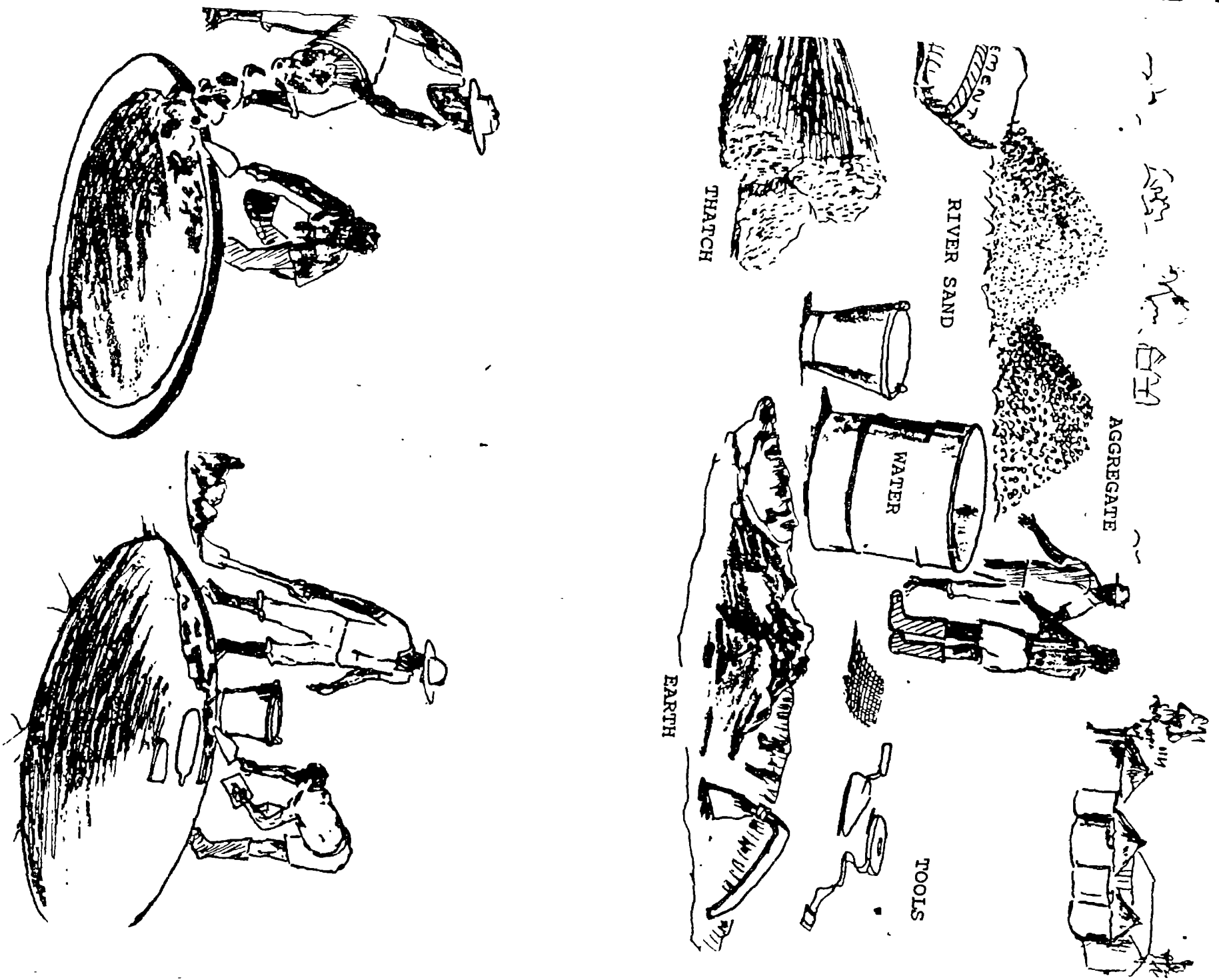


Fig. 11 : Sequence of Slab Casting



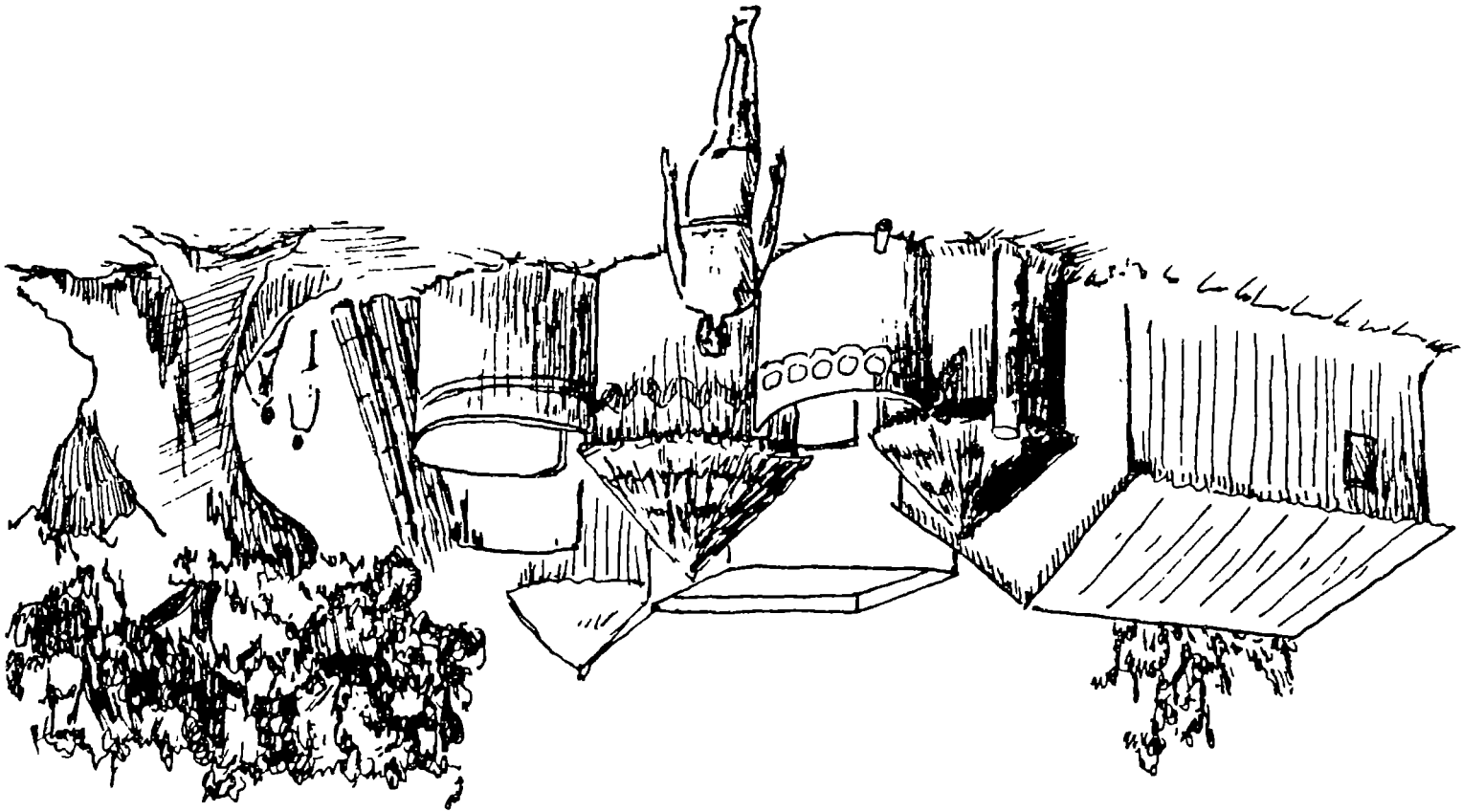


Fig. 6 : Artist's impression of Latrine integrated with Compound



ANNEX A

COMMUNITY WATER SUPPLY/SANITATION PROJECT

HOUSEHOLD LATRINE DEMAND SURVEY QUESTIONNAIRE

A. General

1. Village Name: Pump No:
2. Name & Status of Main Respondent:

B. Household Data:

4. No. of households (# of yards) in the compound:

5. Household
Composition

No. resident	No. of Rooms	Male >18 Yrs	Female >18 Yrs	Boys 6-18	Girls 6 -18	Children <6
--------------	-----------------	-----------------	-------------------	--------------	----------------	----------------

1.
2.
3.

C. Existing Sanitary Facilities

6. Where do your household go to toilet?

	(Season)	Men Wet/Dry	Women Wet/Dry	Adolescent Wet/Dry	Chdren Wet/Dry
Near Compound		/	/	/	/
Communal Trench Latrine	/	/	/	/	/
Free Range		/	/	/	/
Leave it for the pigs		/	/	/	/
Other (specify)					

7. Do you consider children faeces harmful? i) yes ii) no

8. How do you dispose of children faeces

First (a) (i) cover with sand (ii) use chamber pot
Second (b) (i) on tampugre (ii) near the house
(iii) other (specify)

9. Are they supervised? (i) yes (ii) no





ii) Outside

near tampugre/close to compound/far away from compound
10 ft, 30 ft.

E. AFFORDABILITY

16. Do you have one of the following?

(a) bicycle (b) radio (wireless) (c) cattle(how many)

17. (a) (i) Main occupation ii) other occupation

Men

Women..... ..

(b) Farm size (estimate in acres)..... ..

(c) Do you hire out your labour in the dry season? yes/no

Men
Women

F. Readiness for latrine installation

18. What would you contribute to the latrine?

i) labour (self, compound or hire) ii) materials (which?)
iii) cash
(stones, sand, cement etc)

19. What do you see as your cash contribution to your compound latrine?

(a) 2,000 (b) 5,000 (c) 1 bag of cement (d) 2 bags of cement

20. If we provide you with the cement how early can you pay?

(a) on delivery (b) 1 harvest season (ii) 2 harvest seasons.

21. When will you be ready to start building your latrine -
(now, month, season etc.)

G. Sanitation Practices and Design of Latrine

22. What cleansing material do you use?

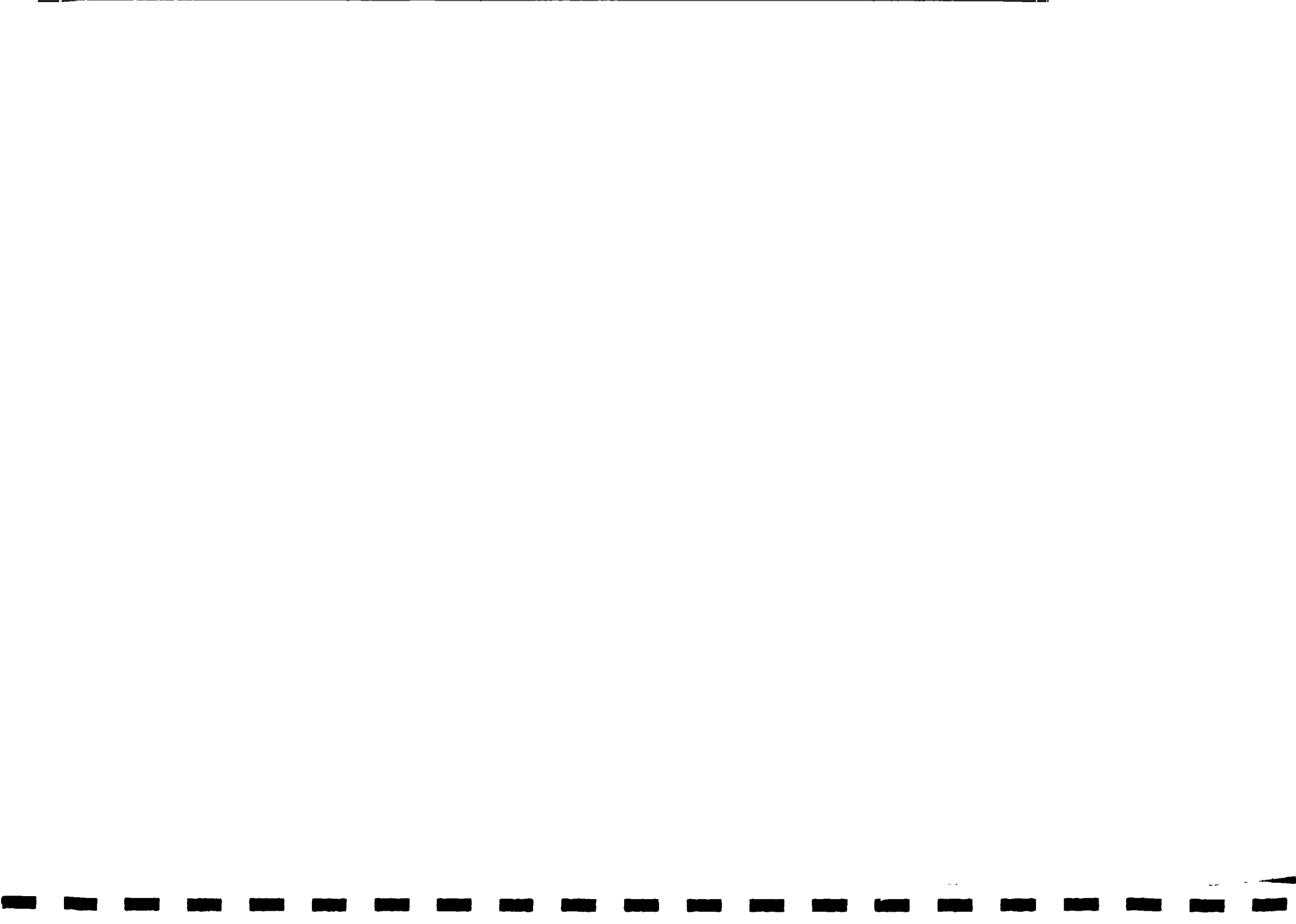
(a) stone (b) leaves (c) water
(d) corn cobs (e) stick



- (f) others (specify)
23. (a) Are there any taboos concerning latrine use? yes/no
 (b) If yes, what are the taboos.....
24. (a) Could men and women use same latrine? Yes(i)
 (ii) no
 (b) If no, why?.....
25. (a) Do you see your children share in the use of the latrine?
 (b) If no, what arrangements will you make for women and children?
26. What problems do you have against pit or other latrines you have come across?
 (a) odour and flies (b) collapsing walls (c) no super structure
 (d) too dark (e) other (specify).....
27. (a) Do you have anything against using contents of latrine for your farm?
 (i) yes (ii) no
 (b) If yes, why?.....
28. Would you like to sit or to squat?
- | | | |
|------------------|--------------------|-----------------------|
| Men
sit/squat | Women
sit/squat | Children
sit/squat |
|------------------|--------------------|-----------------------|

H. Village Organizations/Health Problems

29. Are there any masons/well sinkers in the community you know about or any contract builders (how many)?.....
30. (a) Which organizations exist in village?
 (i) CDR (ii) VDC (iii) Chief (iv) Women Group (v) other (specify).....
31. Which organizations usually come to your village and for what purpose?



Organisation

Purpose

- (i) Religious.....
- (ii) Extension Workers.....
- (iii) Health.....
- (iv) Hand Pump Maintenance.....
- (v) Others.....

32. (a) Has any member(s) of your family had any of these disease in the last 3 months and what do you think is the cause?

diarrhoea worms tapeworm dysentery malaria

You
Wife(ves)
Children

(b) Cause:.....
.....

33. How many people can read and write in the compound?

No.

Men
Women
Children

I. Comment on general household cleanliness

34. Garbage disposal

(i) on tampugre (ii) indiscriminate (iii) other (specify)

35. How far is the tampugre?

From gate (i) 3 ft. (ii) 6 ft. (iii) 10 ft.

36. Sullage water (bathing/cooking waste water)

(i) left to drain (ii) soak pit (iii) other (specify)

37. Conditions of pig sty

(i) clean (ii) not good enough (iii) filthy

38. Conditions of cattle and goat kraal

(i) clean (ii) not good enough (iii) filthy



(i) clean (ii) not good enough (iii) filthy

38. Conditions of cattle and goat kraal

(i) clean (ii) not good enough (iii) filthy

K. (a) Interviewer(name).....

(b) status.....

(c) Comments (including level of poverty, malnutrition
.....
.....

(d) Average number of compounds to a pump.....

to a village.....

(e) General comments.....

.....



Annex C

List of Project Staff

Messrs.	George A. Yanore	Project Team Leader
	Dadoho Mensah	Driver/Mechanic
	Philip Asaliya	Hand Pump Mechanic
	Cletus A. Amoah	Project Administrator
	Steve Anankum	Community Development
	David Kpanja Kabanda	Sanitation Specialist
	Bipin Raj Joshi	Project Advisor
Miss	Dora Abaah	Women's Organizer





