

**Water, Sanitation, Health and Hygiene Studies Project
Aga Khan Health Service
Northern Areas and Chitral**

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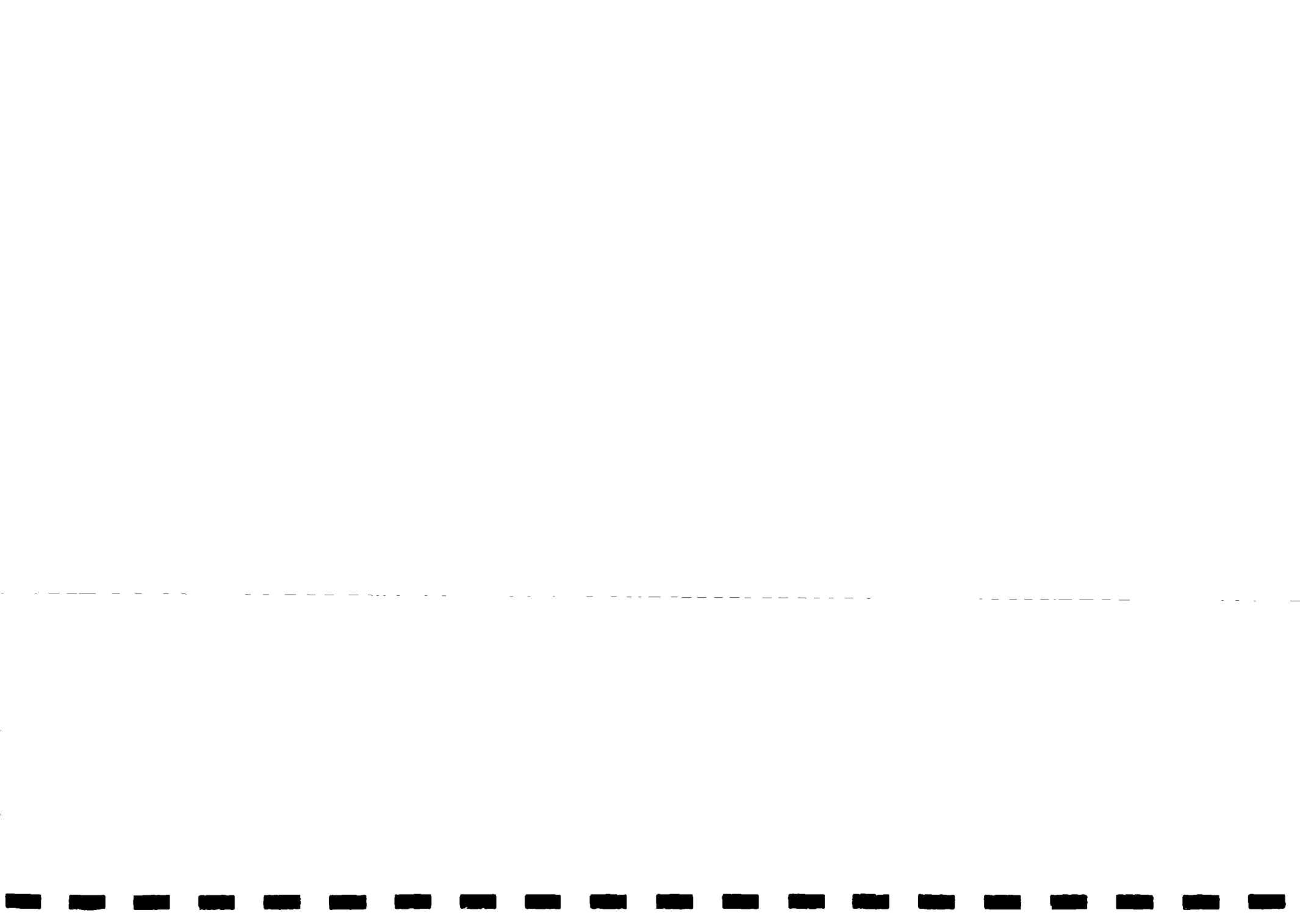
**WATER, SANITATION, HYGIENE
AND HEALTH**

POSITION PAPER 4: HUNZA / NAGAR

by:

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Altaf Hussain
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Haider Raza

1994



Water, Sanitation, Health and Hygiene Studies Project
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WATER, SANITATION, HYGIENE AND HEALTH

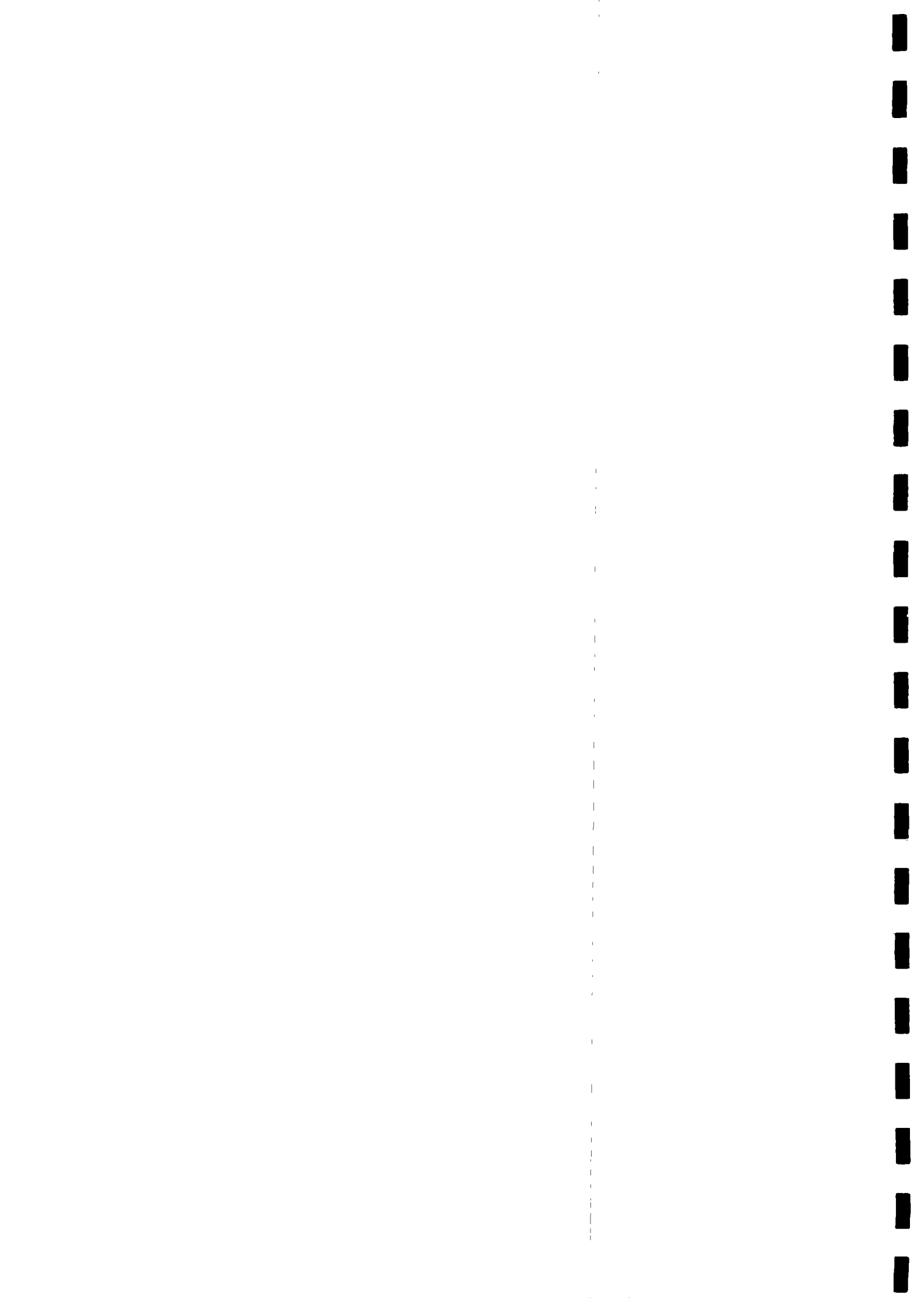
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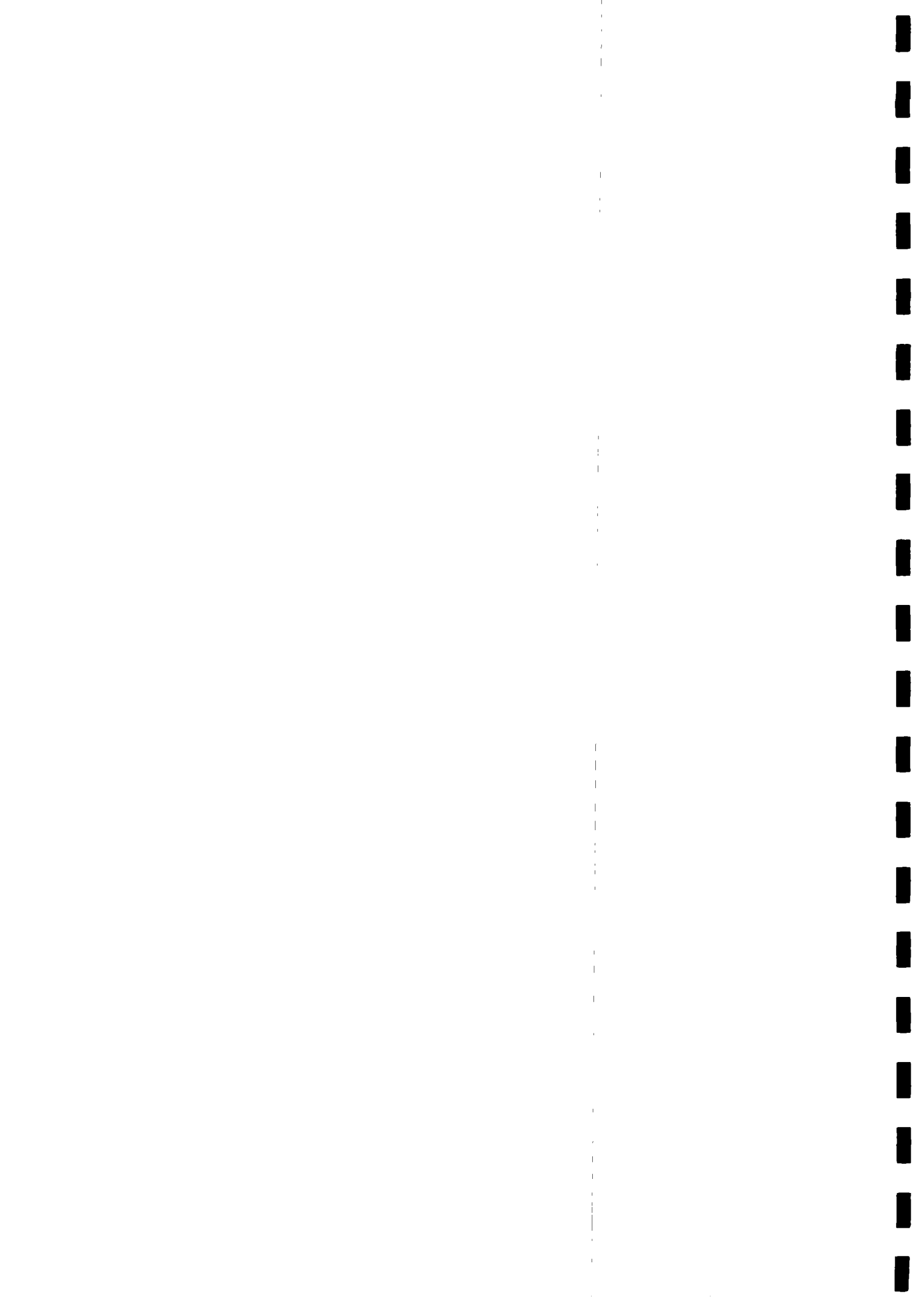
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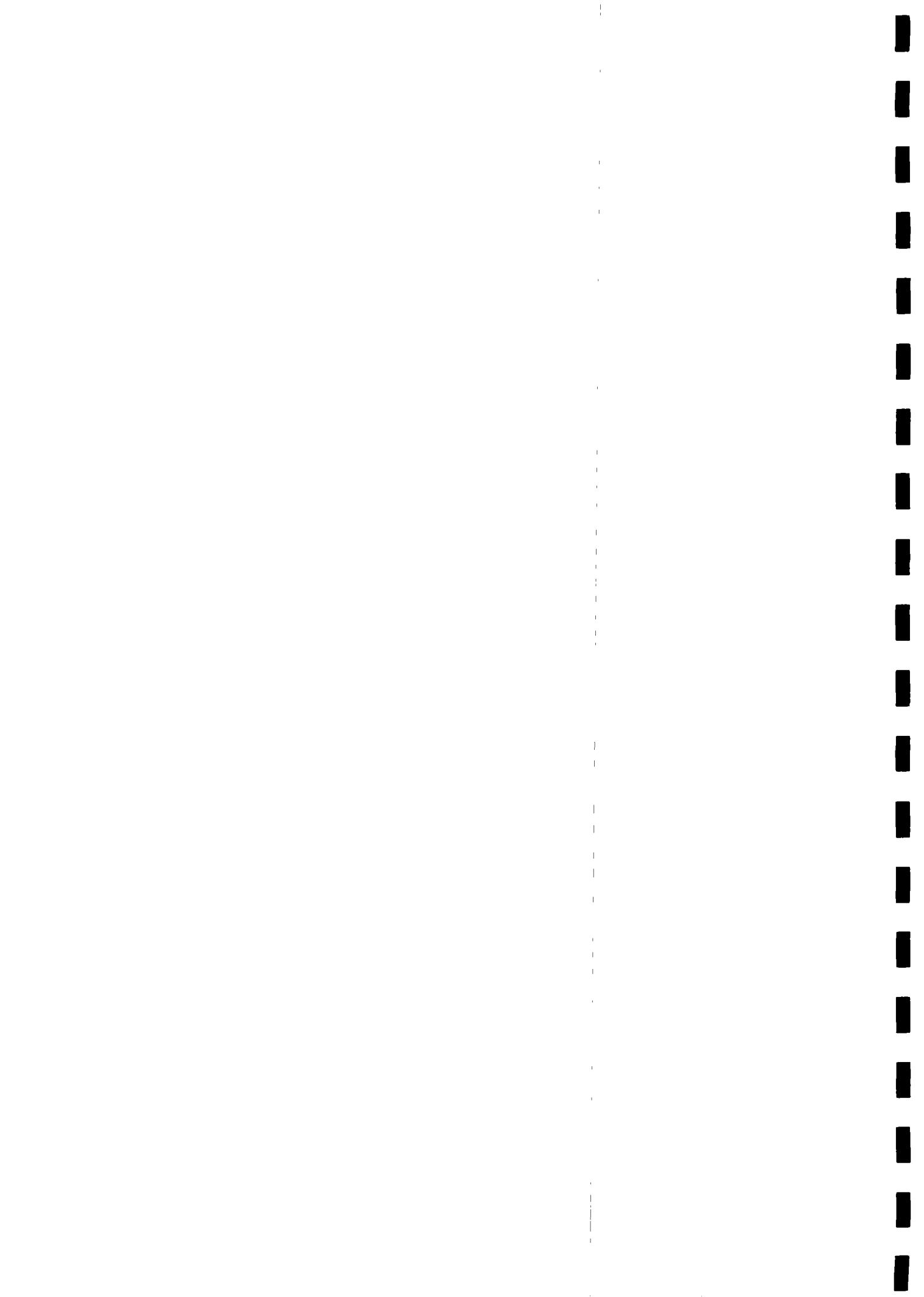
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INTRODUCTION

This position paper is the result of a several study visits of the WSH&HS Project team to Hunza and Nagar between June 1993 and May 1994. In different combinations the team consisted of engineers, microbiologists and anthropologists. The paper has been prepared by the anthropologists in collaboration with the assistant engineer and the microbiologist.

During this period the anthropologists worked on a rapid appraisal of the water, sanitation and health situation in the area. Furthermore they assisted the engineering staff in dialogues with the community and worked on an assessment of bleaching powder during the Cholera outbreak in the summer of 1993. The engineering staff assisted several households with the construction of experimental sanitation systems; the twin pit compost latrine and the twin pit pour flush latrine. The microbiologists assessed the water quality of various drinking water sources by taking a large number samples.

The objectives for the field studies were.

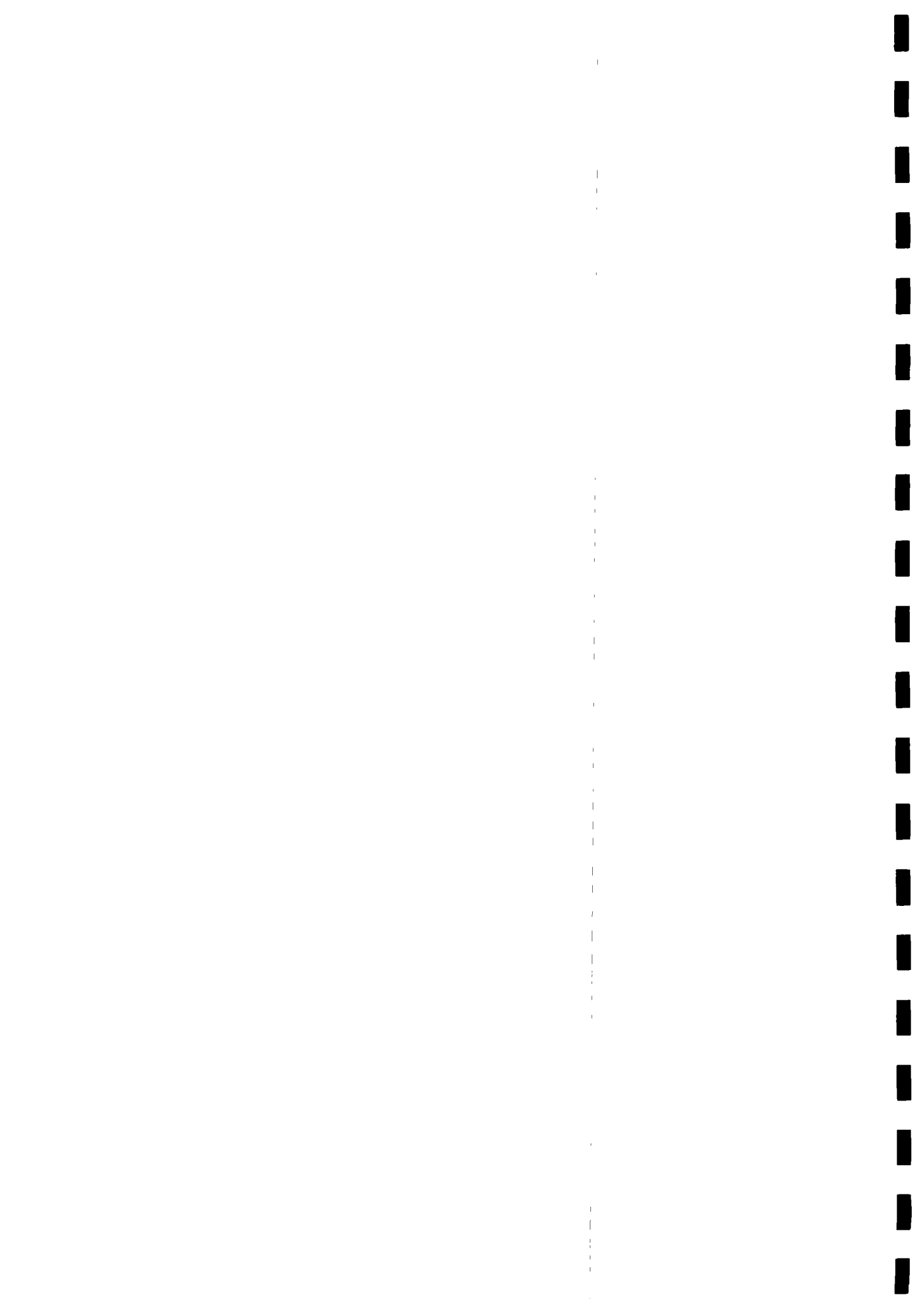
- * to assess the knowledge, attitude and practices of people concerning their water and sanitation systems;
- * to identify, develop and test improved sanitation designs aimed at decreasing health risks;
- * to increase our understanding of issues related to implementation of water supply such as water rights, conventional practices of collective work, and leadership hierarchies among different linguistic groups,
- * to assess the effect of seasonal variations on water quality, on health and on domestic and personal hygiene;
- * to identify health risks at domestic and community level.

Methodology

The field studies were focused on villages at different altitudes, with inhabitants of each of the three linguistic groups. The anthropologists used various research methods such as open ended interviews with the help of guidelines, male and female group discussions and observation of water sources, community and domestic hygiene. Documentation included written interviews and observations, village profiles, slides and photographs. One of the anthropologists focused on village women and LHVs. The other selected village men and key persons such as Council member, numbardar, religious leader, VO manager and well-informed people. In the evening of each day the anthropologists and engineer discussed and cross checked the data

After a literature review on sanitation the engineers developed the first designs for some feasible sanitation options. During village dialogues these options were discussed with villagers. In the households that showed interest latrines were constructed on a trial basis. The engineers visits these construction sites for regular monitoring. In some visits the sub-engineer worked together with one anthropologist during interviews in order to gather more technical detail about existing sanitation systems. The microbiologist did water quality testing with a portable test kit.

The field team collected recent information about water, sanitation and health from the offices of NAPWD, LB&RD, UNICEF, AKRSP, AKHB, KPSS and the Health Department



Position paper

After the introduction and a map of the area, Chapter 1 provides general information about the region. Chapter 2 gives a small description of institutions related to water, sanitation and health. Water in all its different aspects is the subject of Chapter 3. Various water sources, the management practices of the community and their beliefs related to water are included in this chapter. Also results of microbiological water tests and some technical aspects of water supply systems are presented.

Chapter 4 deals with conventional and modified sanitation systems and the intervention of the WSHHS Project in this field. Common illnesses and local treatment related to water and hygiene are discussed in Chapter 5. As far as knowledge, attitude, beliefs and practices were not discussed in the previous chapters they are discussed here. Finally Chapter 6 contains conclusions and recommendations.



CHAPTER 1 GENERAL INFORMATION ABOUT GILGIT DISTRICT

1.1. INTRODUCTION

The inhabitants of Gilgit district of Northern Areas have a number of obstacles on their way to improve their living standards. Lack of understanding about disease transmission, scarcity of domestic water for at least part of the year and other factors make people often careless about personal and domestic hygiene and therefore about their health. Unprotected water sources and traditional sanitation practices create risks of water and sanitation related diseases, particularly with an expanding population. The cholera outbreak in July 1993 was an example of the effect of poor hygienic circumstances. It is a big challenge for health departments to prevent this disease from recurring and is a warning for village people that improvements in their hygiene situation are needed.

i) Political and Administrative Organization

Gilgit town is the administrative head quarter of the Northern Areas. The head of the administration, the Chief Commissioner, has his office here. The administration of Northern Areas is functioning under direct control of the Ministry of Kashmir Affairs and Northern Areas (KANA division) of Pakistan. The present government is making some amendments in this administrative setup and in October of 1994 party based elections are expected. A Chief Executive is going to be based in Gilgit who will have an equal status to a federal minister.

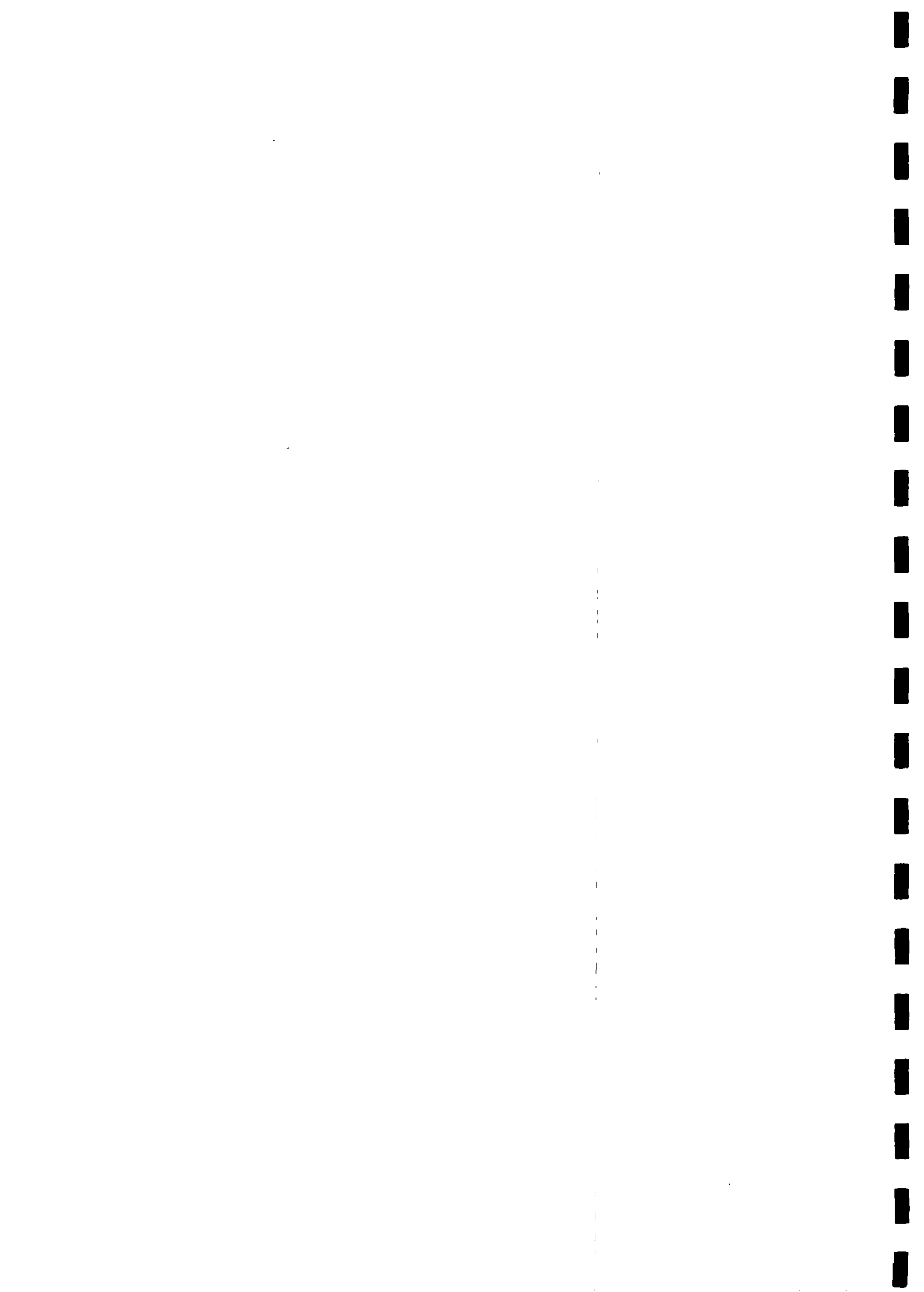
A Planning and Development Cell headed by a Development Commissioner is dealing with all developmental programs of the government in the whole Northern Areas. This Cell is also responsible for allocation of funds to various departments.

The Northern Areas consists of five districts, Gilgit, Ghizer, Diamer, Skardu, and Ghanche. A Deputy Commissioner (DC) is the head of each district and is responsible to maintain law and order in his district.

Every district is divided into sub-divisions and tehsils. Gilgit district has three sub-divisions, Hunza, Nagar and Gilgit. And four tehsils: Gojal, Hunza, Nagar and Gilgit. The whole Northern Areas consists of 13 sub-divisions and 18 tehsils. The administrative head of a sub-division is an Assistant Commissioner and of a tehsil a tehsildar.

The Northern Areas Council is the principle political institution with elected representatives from all five districts. The council has 16 male members and two reserved seats for women. The minister of KANA division is the chairman of the council. It is expected that the NA-Council will be expanded to 24 members after the October elections.

The second political tier, on district level, is the District Council. In Gilgit this council has 15 members with one seat reserved for a woman. The head of the council is elected from its members. The district council is implementing development projects through the LBRDD.



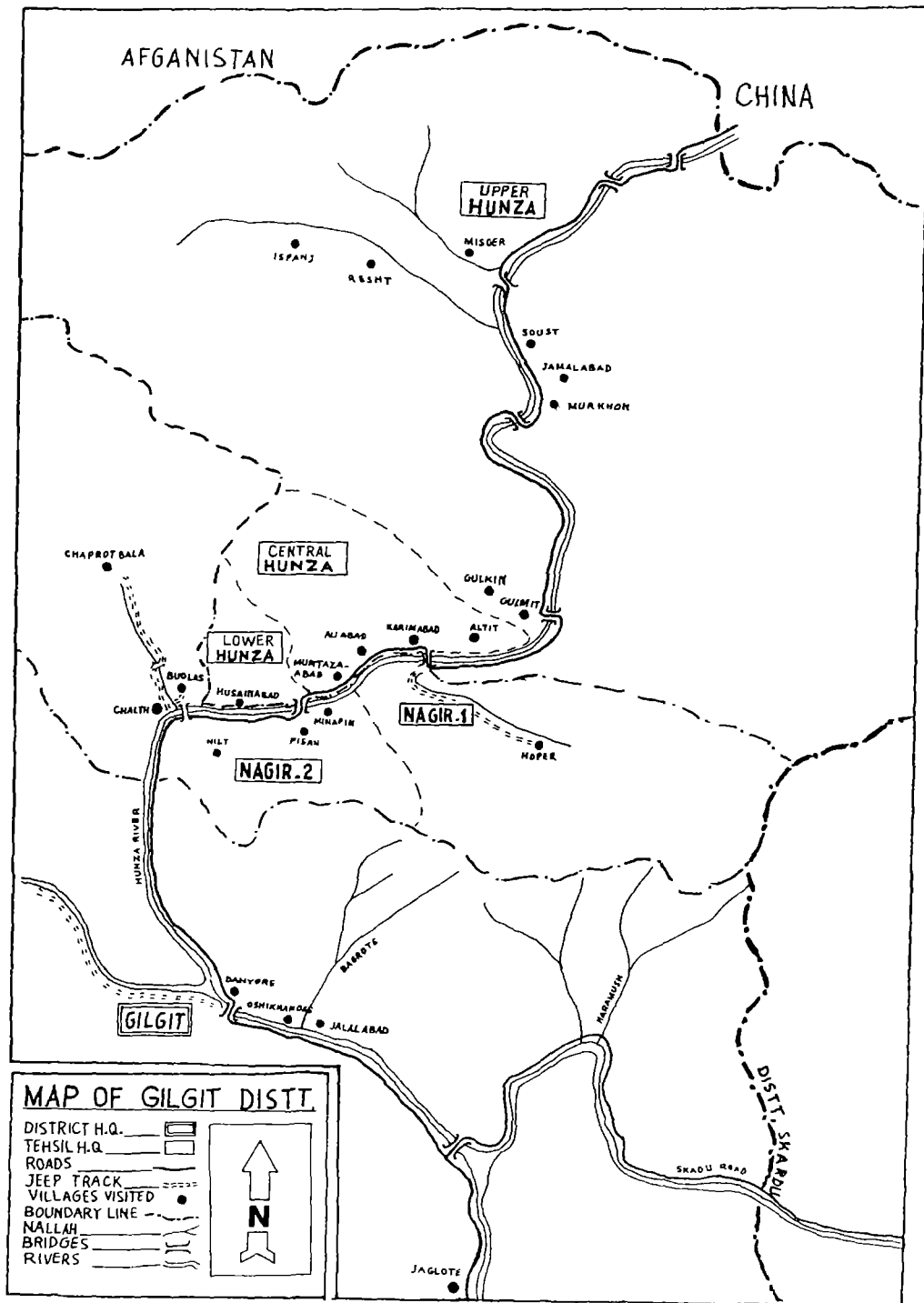
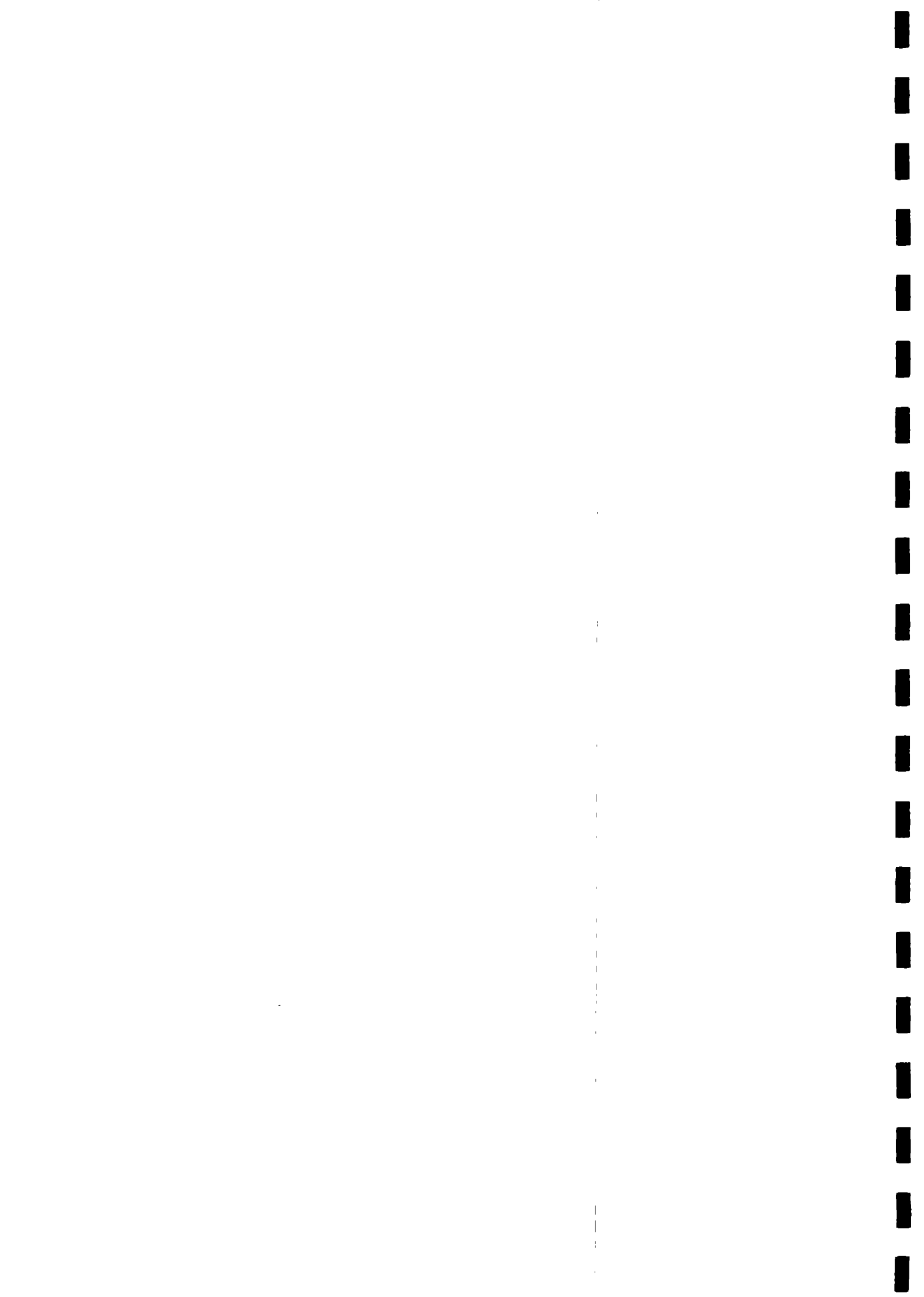


Figure 1· Map of Gilgit district



The Union Council (UC) is the smallest body of elected members. Every tehsil has one or more Union Councils, this depends on the number of inhabitants. Gilgit district has 25 Union Councils. Each council has five to six members, one being the chairman. Its activities are confined to small village level development projects for which financial and technical support is provided by the LBRDD. Annually small development funds are allocated to each Union Council, through the District Council and LBRDD. The local UC-member is elected for four years and he works in the village more or less like a lumbarbar was doing in the past. The UC-member acts as an intermediary between the community and government departments.

A Municipal Committee is present in the headquarters of each district. In Gilgit the municipal committee has 22 members and an elected chairman. The M.C has appointed two sanitary inspectors and some labourers who are responsible to keep the town clean. The committee raises money through an octroi check post and imposing small taxes in the town.

ii) Language and Religion

Inhabitants of the district come from three main language groups speaking Shina, Buroshaski or Wakhi. Three different sects of Islam are found in the region: Shia, Sunni and Ismaili. Although people have different cultural, ethnic and religious backgrounds they celebrate some common religious ceremonies and rituals. In Gilgit people with these different backgrounds live in one city. Outside Gilgit it is possible to point at geographical dividing lines among language groups and sects.

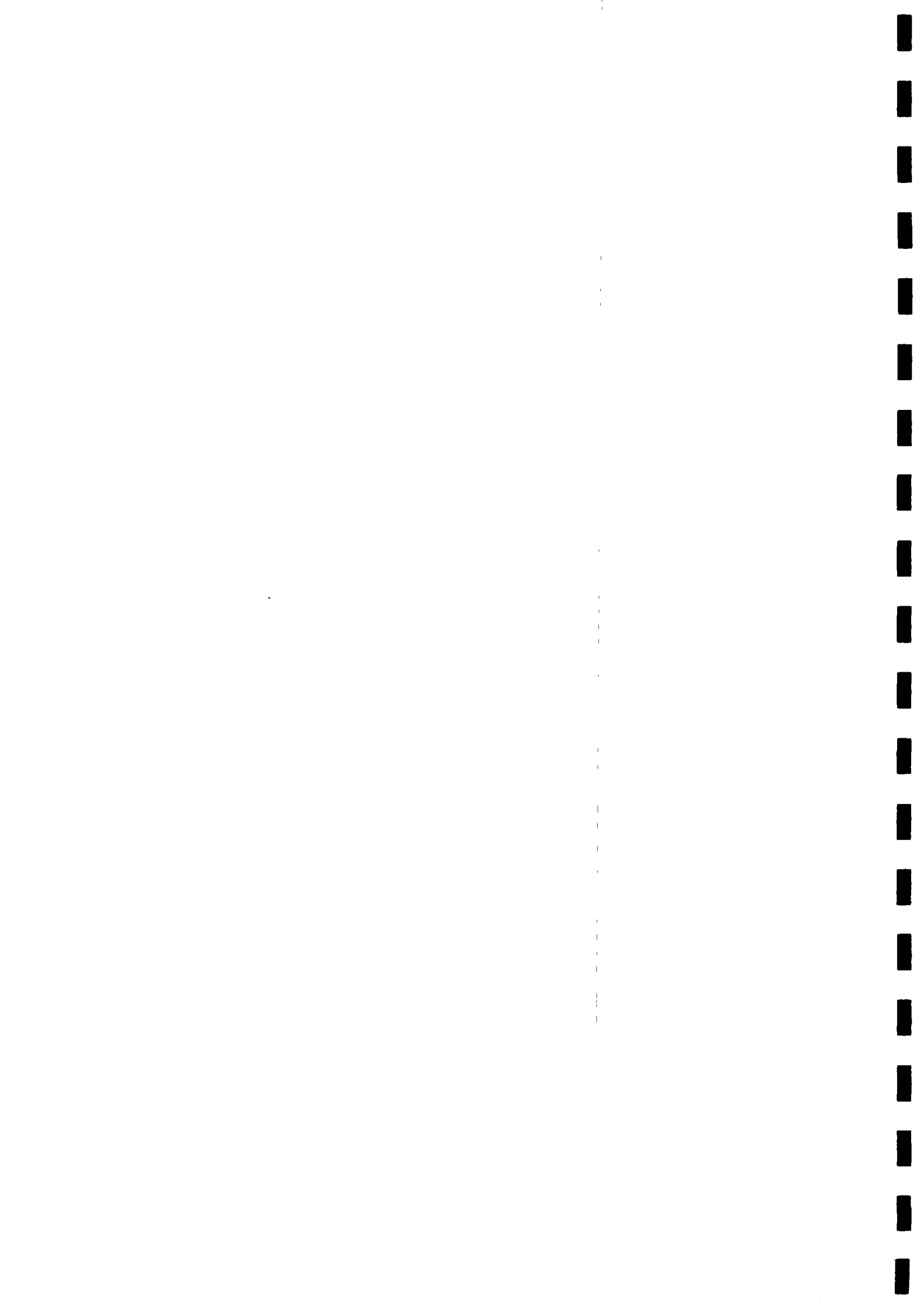
The Buroshaski speaking people are settled mainly in central Hunza and Nagar I (although those people speak a slightly different language called Khajuna). Wakhi speaking people are mainly settled in Upper Hunza. A pure Shina speaking population is settled in Lower Hunza and in Nagar II and in the area south of Gilgit such as Bagrote, Jaglote and Haramosh valleys up to Skardu district. The rest of the Shina speaking population is living alongside Buroshaski speakers.

In Upper and Lower Hunza almost one hundred percent of the population belongs to Ismaili Sect of Islam. In central Hunza a small percentage households are of the Sunni or Shia sects. In the Nagar, Bagrote and Haramosh valleys the population is one hundred percent Shia. In the area south of Gilgit on the Karakoram Highway and further south towards Diamer district the population is Sunni.

iii) Economy

In Hunza and Nagar almost every family has their own house with agricultural land and domestic animals. Traditionally villagers were engaged in keeping livestock, farming and horticulture for their subsistence. Some people were engaged in small businesses with Tajikistan and Afghanistan on the ancient Silk Route. Generally habitations were built on small infertile or rocky pieces of land while the fertile land was used for agriculture.

Hunza is a double cropping area until Karimabad, further north the villages lie in a single cropping area. Several villages in this region face problems with water shortage. The re-use of human excreta as the manure for crops and vegetables is a traditional practice, which still exists in most of the villages. Although chemical fertilizers are available, the people consider the human manure more valuable and powerful, particularly for potatoes and other vegetables.



Education and other external factors such as the construction of the KKH, promotion of tourism and development efforts have made significant socio-economic changes in the region. The farmers, besides growing the conventional crops of maize and wheat are now also growing cash crops like potatoes, vegetables. Some have even converted agricultural fields into orchards. Livestock keeping is decreasing and the amount of animal manure available is therefore diminishing.

The young generation is adopting new and modern occupations instead of the farming and livestock raising. They are doing jobs in the government and the private sector such as tourism and businesses.

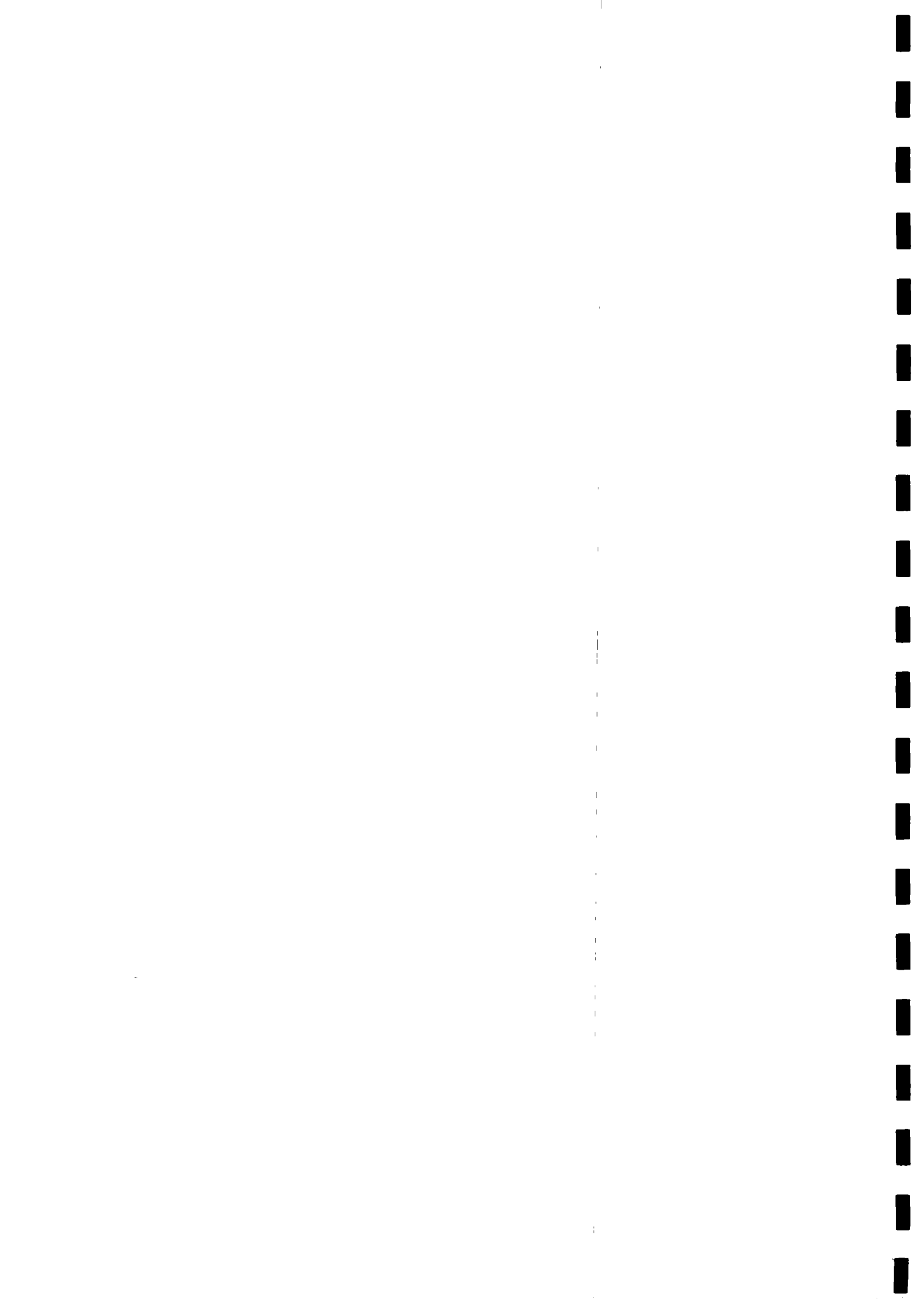
After the opening of the KKH in the late 1970s transportation became more easy and helped to pay frequent visits to the cities for higher education and earnings. A considerable number of students from Hunza and Nagar are studying in the professional colleges and universities of Pakistan.

iv) Infrastructure

After the construction of the KKH the inhabitants of the region got relatively easy access to modern facilities of communication and transportation. Many link roads have been constructed to connect villages with the KKH. Regular public transport is available to and from Rawalpindi. Access to Gilgit however is not guaranteed, particularly the flights are often canceled and also the road is sometimes closed due to landslides, usually after heavy rain. Telephone and television are available in some villages and newspapers are available to subscribers. Radio is the most common mass media. Radio Pakistan broadcasts in the region with local programmes in Urdu, Buroshaski and Shina.

A main market in Gilgit Town and several smaller markets provide basic commodities to the public. Electricity and tap water are not only available in Gilgit town but also in several other villages. Nonetheless all these public services have severe limitations due to electricity load shedding and the effect of weather on tele-communications.

The Gilgit district has 6 colleges, a girl's academy, 23 high schools, 51 middle schools and 111 primary schools for boys and girls. These are under government and Aga Khan Education Service. Besides these some private schools also exist.



CHAPTER 2

INSTITUTIONS IN THE AREA WORKING ON WATER, SANITATION & HEALTH

There are several Government and non Government agencies working in Gilgit that are related to Water, Sanitation and Health. With several of these organisations cooperation and experience sharing takes place

AKES (Aga Khan Education Service) Environmental Education Project

The AKES is responsible to improve education standard in Northern Areas. Besides basic education, one of their projects is on Environmental education. This projects objective is to focus on school children for giving environmental education. They have selected 3 D.J middle schools and 2 Govt high schools in Gilgit District. One of the topics of the project is water and sanitation. About water they teach its different aspects, for example the sources of water, how to clean it, turbidity and dangers of dirty water

AKHBP (Aga Khan Housing Board)

Aga Khan Housing Board is active in this area since 1980. Its main activities are related to the construction of buildings like schools and health centers. Under the Living Condition Improvement Programme (LCIP) they installed three experimental village water treatment plants in Gilgit district and introduced improved stoves, coolers with water treatment bags, pour-flush commodes and a ventilator. They constructed demonstration latrines in public places and provided commodes to villagers on a subsidy basis.

AKHS (Aga Khan Health Service)

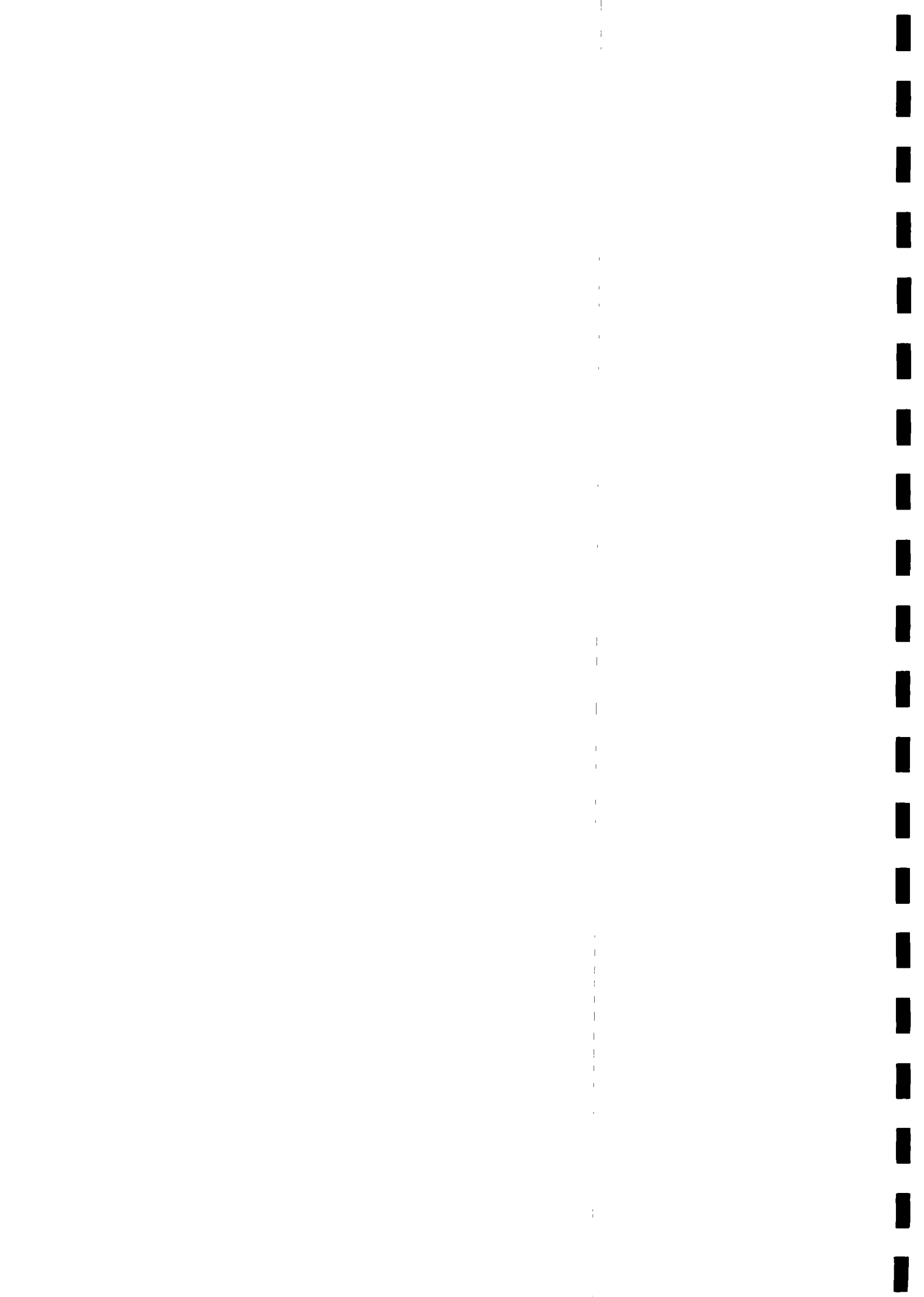
Aga Khan Health Service is operating a primary health care programme (PHC). A whole network of doctors and LHVs, and volunteer health workers (CHWs and TBAs) is established in Gilgit district. Eight health centers are providing basic health facilities in Nagar and Hunza. The staff of the health centers provide women and children with medical aid, immunization, pre- and post natal care, and with health education.

AKRSP (Aga Khan Rural Support Programme)

This organization was established in December 1982 and has promoted 250 VO's and 217 WO's in Gilgit district. It is a foremost agriculture oriented programme raising income and life quality of people in remote areas. They are developing institutional and technical models for progress. The AKRSP has also assisted the village Gulkin with a community based water supply scheme in 1990.

KPSS (Karimabad Planning Support Service)

This AK network organization was established in 1991. It is focused on historic preservation, conservation and infrastructural development of Karimabad with community participation. They are providing technical assistance to the inhabitants of Karimabad in commercial as well as technical activities. They have planned to establish a sewerage system for parts of the conservation area under funding from the Norwegian Government.



Government Health Services

Government Health Services are working here since the time of independence. Since September 1987 the Director Health Services (DHS) is highest authority with a DHO (District Health Officer) responsible for the health services in each district. Doctors, dispensers and LHVs are working for Government health services. Besides giving medical coverage, they enforce preventive health measures and provide emergency cover to any disaster. The DHS and DHO act as an advisor to Chief Commissioner. There are 6 Hospitals and diarrhoea treatment Units, 23 Dispensaries and 24 First Aid Posts in Gilgit District.

Government Health Services has strong links with AKHS. There is collaboration for example in vaccination programme training and the cholera campaign which is a joint effort of G H S, AKHS and WSHHS Project.

LBRDD (Local Bodies and Rural Development Department)

LB&RD is the rural development department of the Government. The funds come from annual development budget and from different international donor agencies such as UNICEF. LBRDD provides funds and technical assistance for infrastructural development projects to the Union Councils.

The projects identified by the Union and District Council members have to be approved by the Deputy Director LBRDD and Development Commissioner. After final approval the LBRDD will supply construction materials and technical assistance. The community is responsible for the labour, operation and maintenance. Examples of the type of projects that are implemented are water supply schemes, schools and link roads.

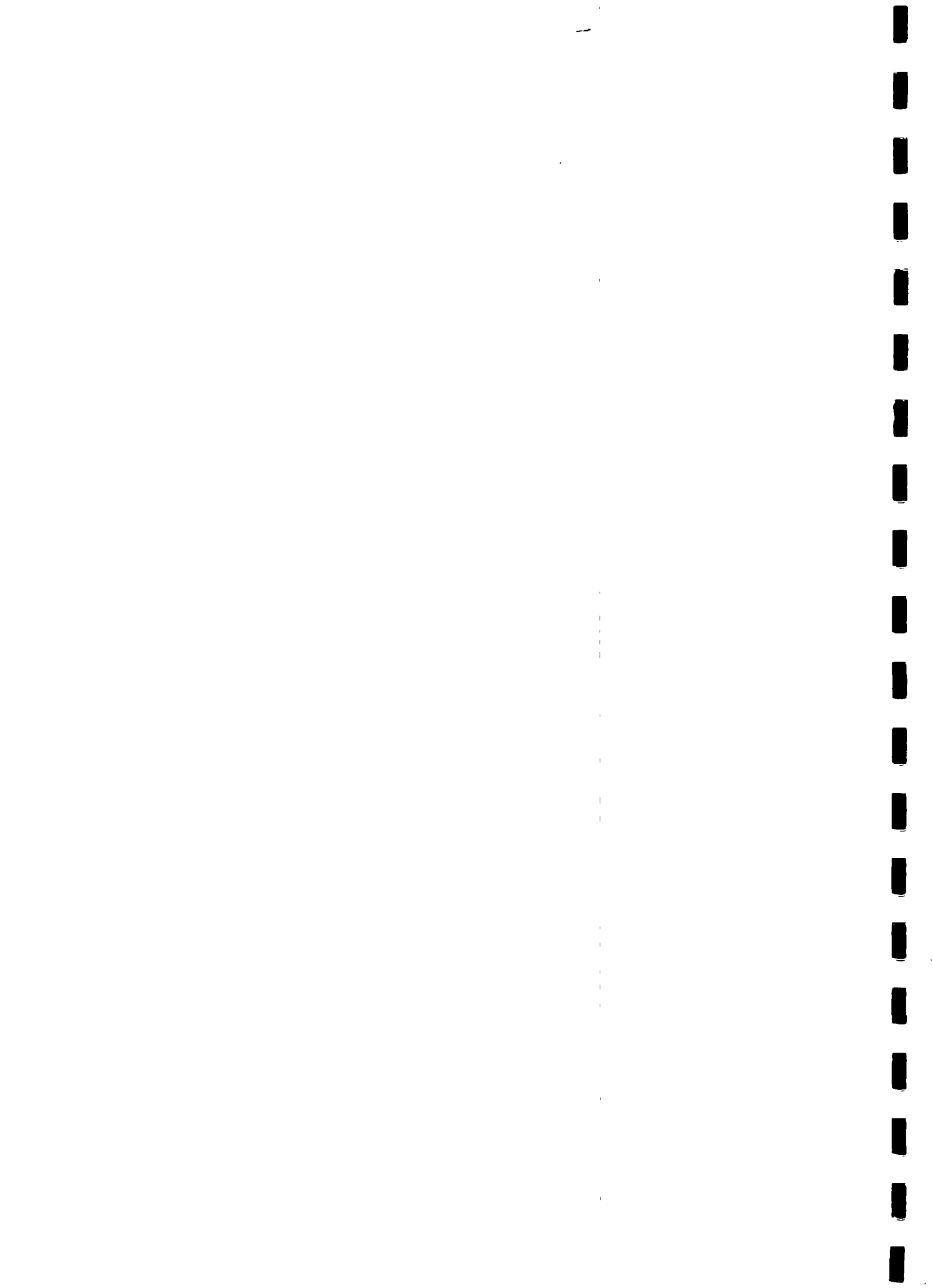
NAPWD (Northern Areas Public Works Department)

This department is responsible for implementing the projects identified by the members of the Northern Areas Council. It is also responsible for the maintenance of the projects which they have constructed. NAPWD for example provides the salary for chowkidars and plumbers of water supply schemes constructed by them. This department is entirely funded through the Federal Government budget and is responsible for electricity, irrigation, government buildings, roads, bridges and water supply schemes.

In their projects community participation is not a requirement. The water supply systems that NAPWD is building are in urban area, large villages and tehsil headquarters.

UNICEF

This international agency is providing funds to LBRDD. UNICEF provides pipes and cement for water supply schemes and also provides pour-flush pans to LB&RD for distribution in the communities. A Womens Integrated Development Programme is managed by the Planning and Development Cell with funds from UNICEF. Through this programme pour-flush pans and a water supply scheme have been implemented in the village Gulmit.



CHAPTER 3 WATER RESOURCES AND THEIR MANAGEMENT

One of the main purposes of the study was to collect information about existing water resources and domestic water management and to suggest ways for future improvements. Over 20 villages were included in the study. It is found that in most of the villages people are using various traditional water sources for domestic water consumption. Although in several villages water supply schemes have been implemented, some households are still using the traditional sources of drinking water, due to technical and social reasons

3.1 WATER RESOURCES

The rivers, springs and nallahs are the three primary sources for irrigation and domestic water in the district Gilgit.

i) River water

The Gilgit river and Hunza river are flowing in the area. They are drawing their supplies from glaciers, snow-melting, high altitude lakes and from spring sources. In summer the water level in the rivers increases and water becomes very turbid, flow and turbidity decreases in winter.

In several villages households are using river water for drinking and cooking. For example inhabitants of Gilgit and the lower muhallah of Oshikhandass are using river water throughout the year. In the villages Resht and Morkhon of upper Hunza, river water is being used by some households in winters

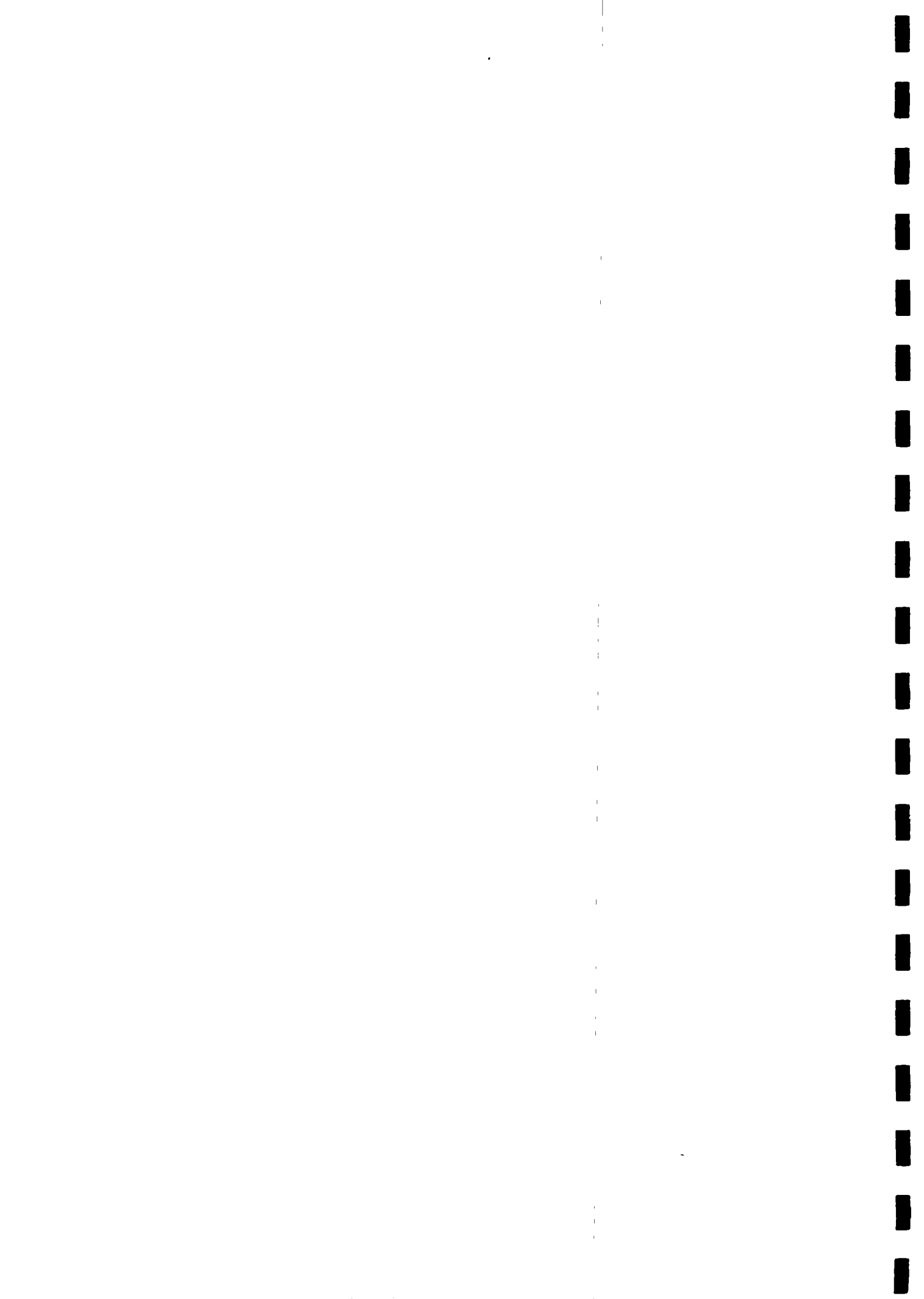
ii) Nallah water

Every village in the region has access to one or more nallahs, side valleys with a water stream. Most of the villages are relying indirectly on nallah water for irrigation and drinking. Channels lead from the nallahs to the inhabited area. In some villages people have to fetch the drinking water from the nallahs in winter season because these channels are closed. The villagers in Budalas and Morkhon, for instance, go to the nallah for water collection. The village Morkhon is situated high above the nallah. In extreme winters going to the nallah is a difficult job for the villagers. A male respondent said;

"In extreme winters going to the nallah for water collection, during rain or heavy snow-fall is a risk for illness or physical damage. Our nallah is very deep and the narrow track to the nallah becomes slippery in winters. Often women have fallen on the track during water collection and some have suffered from pneumonia and fever due to extreme cold. Our women use iron yerrycans (22 liter containers) for transportation of water from the nallah. They tie these on their back with a rope. Sometimes their clothes become wet and get frozen on the way back home".

iii) Spring water

Most springs are found relatively far away from the villages, on high mountains or below the settlements. In several villages small springs provide drinking water to the communities in summer. Most of these small springs become dry in winter. Other villages have big springs that provide water throughout the



year The village Misgar for example has two springs above the inhabited area, which fulfill all the water needs of the community. In summer water flows through small channels and pipes In winter villagers go to the spring source for collection of drinking water because their channels become frozen

Spring water cannot always be utilized by the villagers It is observed in Chapursan Valley (Upper Hunza) that most of the settlements lie on the left bank of the river while the springs are present on the right bank and their water flows directly into the river It is also observed in village Zoodkhood in early November that a small spring was found closed due a frozen outlet

We also heard about hot springs in some villages (Budalas, Bar, Minapin and Murtazabad) the water from these springs is used for bathing, utensil and clothes washing. Member District Council Syed Yahya expressed his opinion

"Like other villages Bar has a hot spring above the inhabited area It is possible to construct a hot water supply scheme for the village, which may improve the domestic hygiene and health conditions of the community Because they do not have enough warm water in winter due to scarce fire wood resources"

The table below shows the number of villages using each type of water source in the summer and the winter (sample of 20 villages) It may be observed that most villages use several different water sources during a particular season

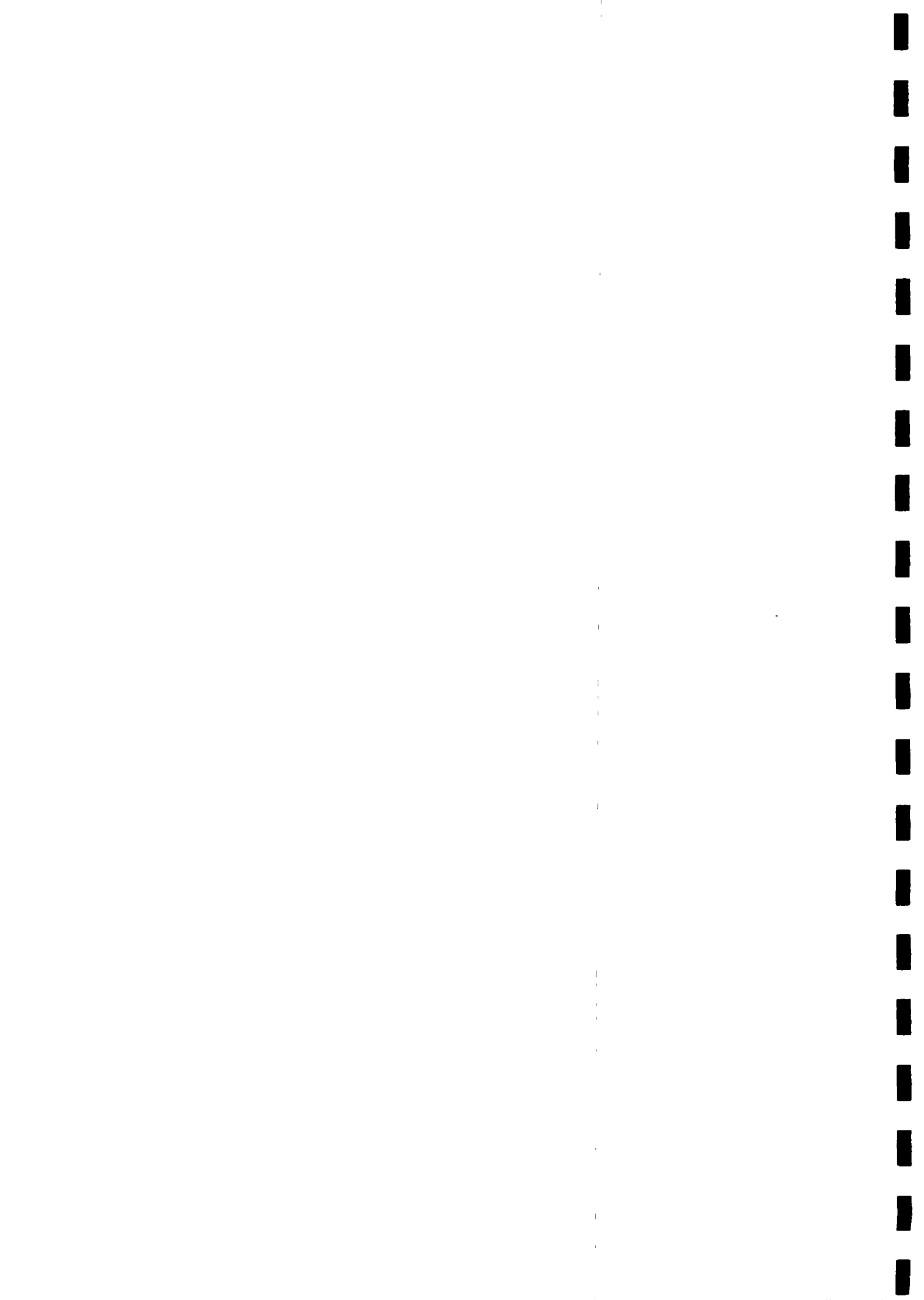
Table 1 The use of water sources according to seasonal variation

SOURCE	Number of village using a particular source	Use in summer	Use in winter	Use in summer and winter
TAP WATER	16	16	14	14
CHANNEL	19	9	10	10
GULK/TANK	15	5	10	10
SPRING	3	1	2	1
NALLAH	5	1	4	1
RIVER	3	1	2	1

iv) Water rights

Water rights, the right to utilize water for irrigation and domestic purposes. is an important issue for villages. especially during periods of shortage. In the past such water rights were established for irrigation water Nowadays it is also an important issue in relation to piped water supply schemes Water rights were mainly registered during the British period The records are kept in the Settlement Office where they can be consulted or updated with the consent of the Administration

Water rights were recorded for the settled areas Land that was barren at the time of registration often does not have water rights in the present day New settlers who try to develop agricultural land often



have to depend on excess water from the settled area. In some villages water rights have been modified after mutual agreements between old and new settlers. However, often disputes or conflicts occur over these issues.

With regard to piped water supply systems it should be pointed out that these water rights can become significant obstacles during implementation. If a piped system is approved for the whole village, including areas where new settlers do not have water rights, this might meet opposition from the original settlers.

Problems on water rights can also occur between villages. A spring or nullah lying within the village boundary is generally the common property of that village. Conflicts can easily occur when this water is used for a piped system designed to distribute to people who do not share ownership in this common property. Gulkin for example has a spring which is common property of the village. The spring is supplying a piped water supply scheme that distributes water to Gulkin and Gulmit. According to Gulkin's lumbar, the villagers are considering withdrawing this cooperation in the future because concern is growing that due to population growth and the construction of new houses and hotels the amount of water will not be enough to share with Gulmit.

3.2 DOMESTIC WATER MANAGEMENT

Villagers have different traditional and modern systems for managing the water from rivers, springs and nullahs. Traditionally men are responsible for irrigation activities such as construction, maintenance of channels and distribution of the water. This subject will not be discussed here as it is extensively dealt with elsewhere¹. Women are responsible for domestic water collection.

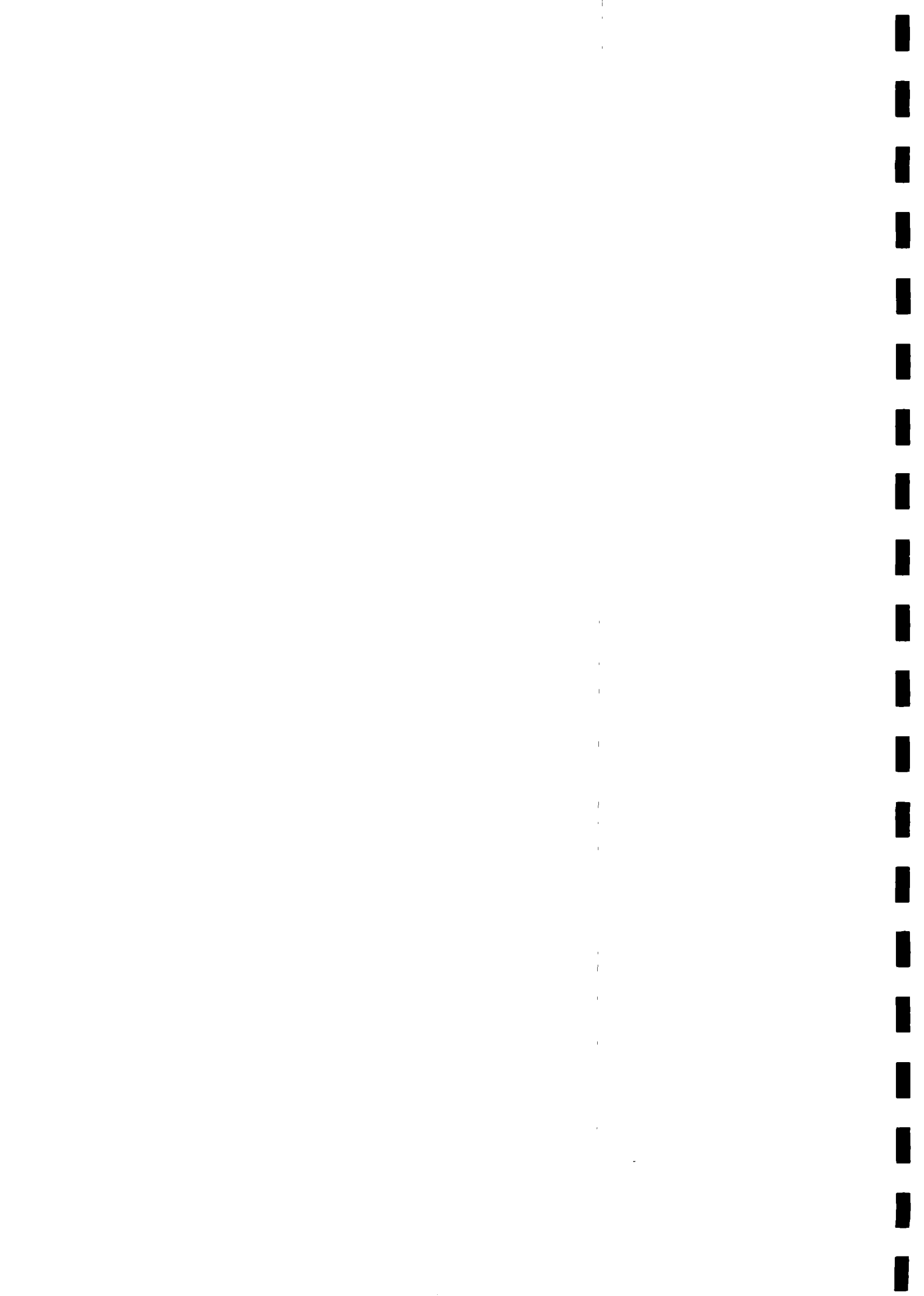
i) Use of Irrigation Sub-Channels

Irrigation sub-channels are a traditional source for domestic water and are the most common source in the villages of the area. Villagers have constructed main irrigation channels from the nullahs and springs, which divide into sub-channels (also called rill) in the settlements. These sub-channels are generally used for both irrigation and drinking water. Only in a few villages, like Minnapin the community has constructed separate channels for irrigation and for drinking water. People are prohibited to wash clothes or to discharge waste-water in the drinking water channel. They are allowed to wash clothes in the irrigation channel. A council of village elders is supervising this policy.

In other villages it is found that people sometimes go to the upper part of the channel to fetch drinking water. Some of the villagers are reluctant to fetch water near the houses because they realize that water in the village can be contaminated.

All channels have a high chance of contamination because they are open surface water systems. Channels are passing through streets, near agricultural fields and animal sheds. It has been observed that human and animal faeces are often nearby or in the channels, that waste-water from bathrooms flows into the channels or that women wash utensils and clothes in the channels.

¹ See for example Herman Kreutzmann Hunza, Landliche Entwicklung im Karakorum 1989, Berlin Dieter Heimert Verlag, and Anis Dani Institutional innovations of Irrigation Management. A Case Study from Northern Pakistan 1986, Katmandu ICIMOD.



A respondent in Nasirabad complained that he always suffers with diarrhoea when he returns to his village after being down country for a long time

Table 2 shows some of the results of microbiological water tests in channels and traditional water pits Both the channels and the water pits shows a high level of faecal contamination The WHO guideline figure for rural water supplies in developing countries is less than 10 E Coli/100ml.

Table 2 Microbiological water sampling in small channels and water pits in autumn 1993

Name of the village	E-Coli/100ml beginning of rill	E-Coli/100ml mid point of rill	E-Coli/100ml end point of rill	E-Coli/100ml Water pits
THOLE	04	TNTC	TNTC	TNTC
HOLSHEL	Frozen	Frozen	Frozen	98
BROSHEL	36	35	83	TNTC
SHIKAT	11	14	302	302
JAMALABAD	20	10	11	36
HUSSAINI	12	325	TNTC	no sample
GALABAN	13	93	156	no sample
KHUDABAD	6	60	TNTC	883
NAZIMABAD	11	969	480	480
AYEENABAD	0	106	160	TNTC
ALTIT	7	909	644	1030

TNTC = Too numerous to count

ii) Traditional Water Pits

The traditional water pit is very common in the region and it is a all year round water storage in many villages The local name for the pit is gulko or gulk. Generally a Gulk is an underground pit of about 10 to 15 feet deep, with a diameter of about 10 feet The pit has a round shape and a roof made of timber and earth In one side or on the top an opening is made that is used for access to fetch the water Sometimes a wooden door is used to close the gulk

Through a small channel water can enter from a sub-channel into the gulk The surplus can flow out through an opening back into the sub-channel Villagers try to fill the gulk in the early morning They say at that time the water is cleaner as nobody is washing clothes or irrigating land See figure 2 and 3

Depending on the water availability the gulks are charged with water every few days in the summer, to once or twice a month in the winter The microbiological results show that the faecal contamination level in gulks is always higher than in the supply channel (see table 2)



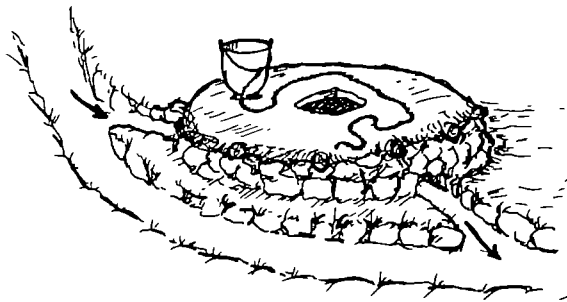
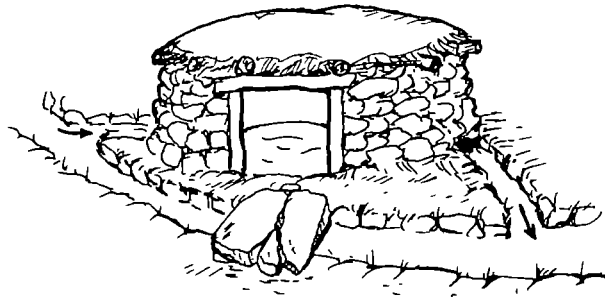


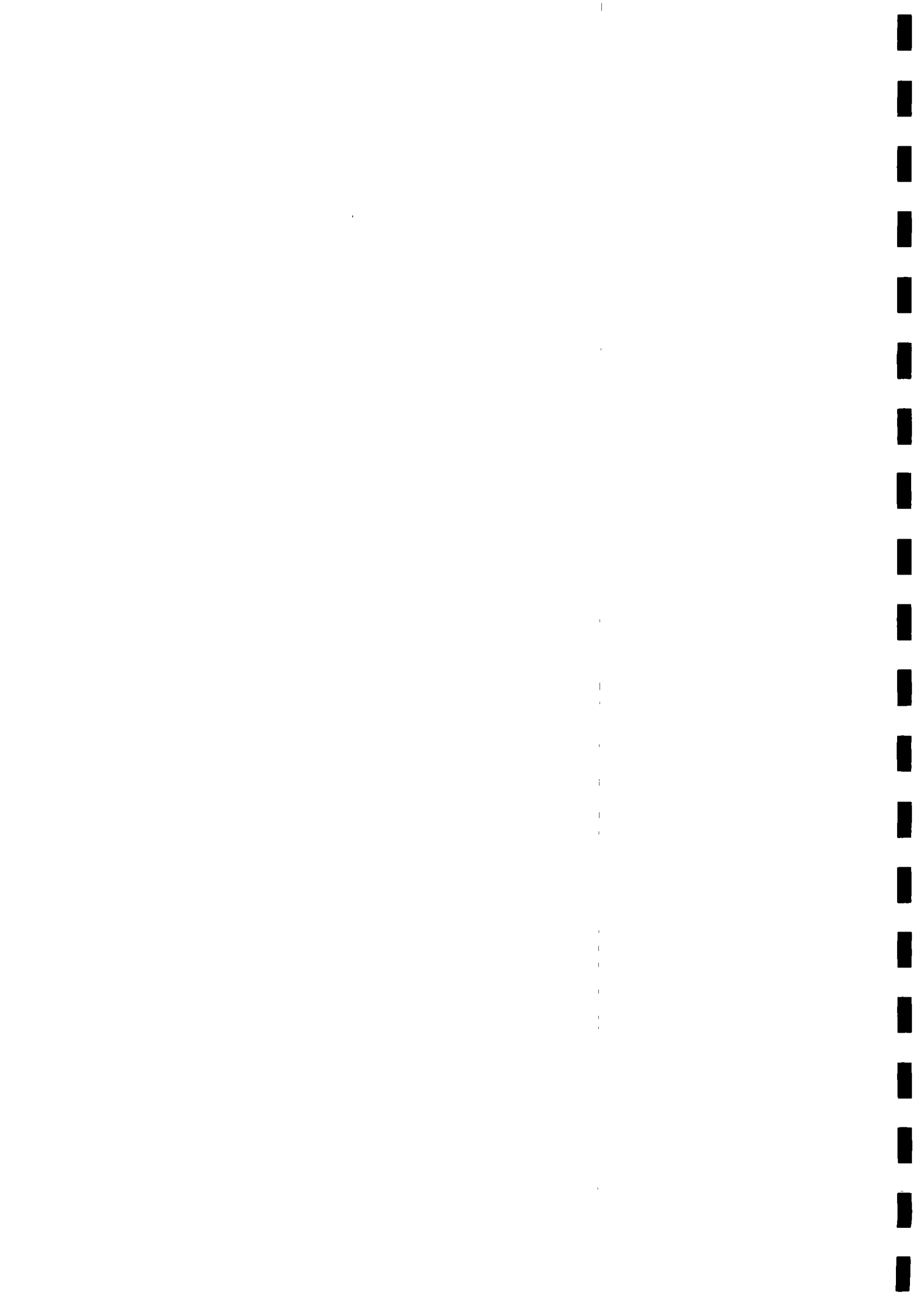
Figure 2· Two types of communal water pits with the opening on the side, and in the roof

The main reasons for use of water pits are.

- * water from the pits is considered relatively cold compared to other sources available in summer;
- * water can settle in the pit which will reduce turbidity;
- * a reserve of water can be stored;
- * food items can be stored near the pit to keep them cool in summer;
- * convenient access to the water. A private gulk is usually the nearest source of drinking and cooking water

The water from the gulk is often preferred above other, perhaps more clean water. In the village Chaprote Bala for example, a water supply scheme is functioning, but some households prefer to use gulk water for drinking in summer. They like the cold water of the gulk more than the warmish tap water.

Two types of gulks have been identified, the communal and the private water pit. Communal gulks (see figure 2) were mostly observed to be in an un-hygienic state, without door, stagnant water around them and animal faeces and other waste in the channel near the inlet. Some were also found without roofs and walls. The private Gulk (see figure 3) is more often found in a better condition with proper roof and sometimes with a door and a lock. Usually the key is kept by the elder woman of the household. Particularly in the private gulk it is a practice to keep milk, butter, food and medicines.



In recent years some changes have taken place with regard to gulks. In Jutial for example it was observed that some households have constructed cemented water tanks in place of the old gulks. Also in Hussainabad some people have constructed small individual household water tanks, which are supplying domestic water to the households through pipes.

In one other village people said they did not like to construct new gulks. A woman in Morkhon said;

"About 3-4 years ago, two children had fallen into a gulk in the village and died. After that incident people are afraid to construct new gulks"

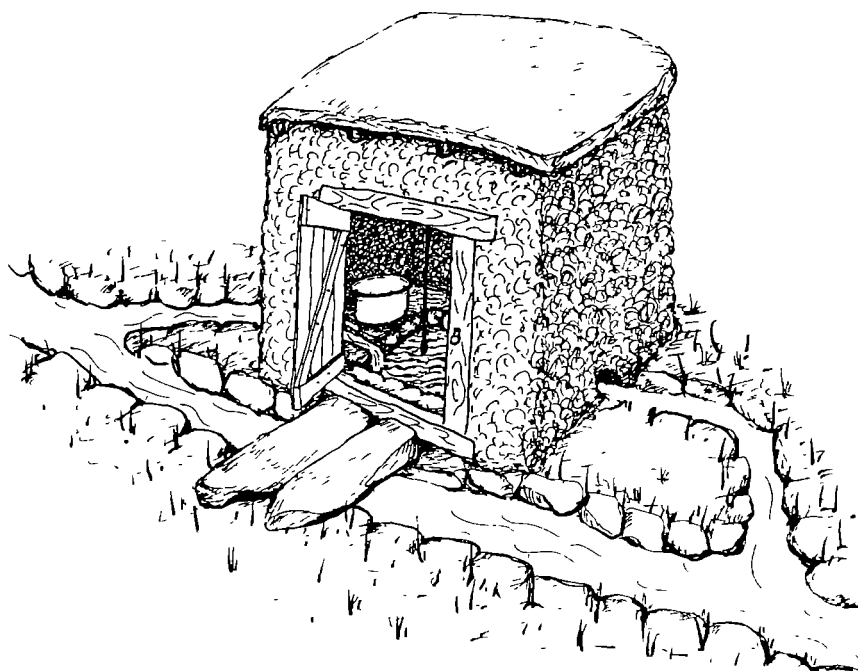
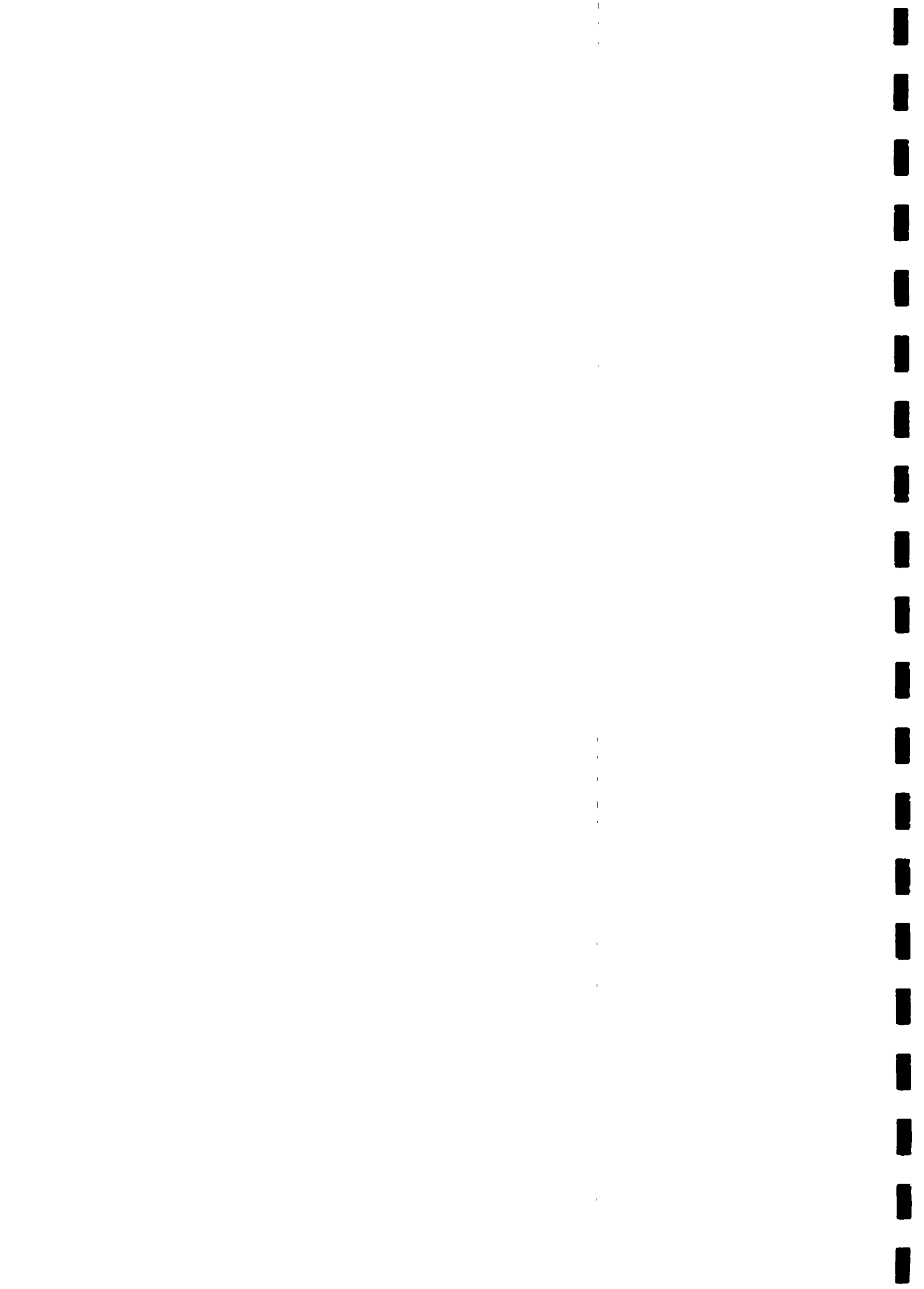


Figure 3. A private water pit (Gulk)

iii) New Water Supply Schemes

LBRDD and NAPWD are the main implementing agencies in the area. One of the main problems with water supply schemes is to keep them functioning properly. It is reported that several of the 17 schemes that were visited are not working at all or are working inadequately². The result is that some time after completion of the water supply systems users are compelled to return to their previous, often contaminated water sources.

² The WSHHS Project is undertaking an inventory of all water supply schemes in the Northern Areas and Chitral. Mid 1995 final results of this survey will be produced. See also the forthcoming issue paper with the work title 'Rural Water Supply Systems in the Northern Areas: Community Participation and other issues during implementation'.



In villages where a water supply scheme is installed the villagers also use channel water or other sources for their domestic water consumption. The main reasons are

- * people like cold water in summer season and tap water is considered warmer than water from the channel and gulk.
- * communal stand posts have been installed at some distance from the houses and people are not prepared to fetch tap water from these water points when there is a channel or gulk closer by
- * water is frozen in pipes during winters
- * schemes are not functioning reliably or they are only partly working.
- * schemes are small and only cover one or two muhallahs.
- * schemes are disrupted due to community conflicts.
- * schemes need repair work; water tanks or pipes have been damaged.
- * due to shortage of pipes or construction materials schemes have not been properly completed

The table below shows that in the seven villages listed the majority of the households use traditional water sources even though water supply schemes have been implemented.

Table 3: Present status of the piped water system and preferred source for drinking water in a sample of 7 villages

Village name	# of WSS	Functional	Not functional	source of the WSS	Coverage of households %	Households using other sources for drinking water (%)
Oshikhandass	2	1	1	nullah	23	77
Budalas	2	1	1	nullah	14	86
Hussainabad	2	2	-	spring + channel	13	87
Karimabad	-	-	-	-	24	76
Hoper	5	1	4	nullah	7	93
Misgar	1	1	-	spring	20	80
Morkhon	2	1	1	spring	24	76

The figure shows that in these villages the water supply schemes have not led to the desired results because people do not use the water. A large part of the population is using other water sources.

In villages where the water supply scheme is in proper working order the number of households using tap water is much higher. Generally this still does not mean that tap water is the only source of water used for drinking. Only in two villages, Gulmit and Gulkin, was it found that the whole village was using tap water and that they stopped using traditional sources of domestic water. In the table 4, on the next page, eight villages are listed where the water supply is better utilized.

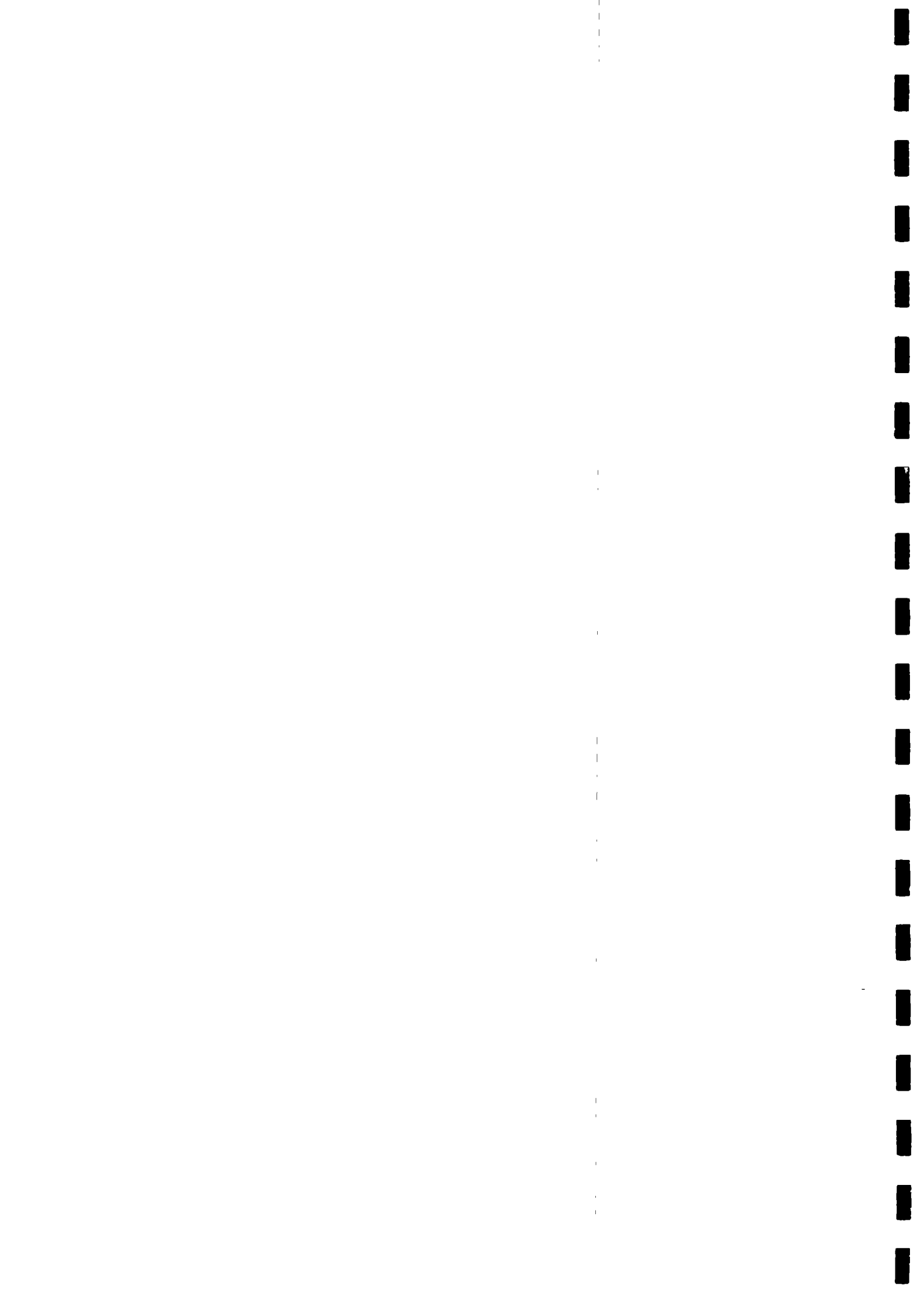


Table 4. Villages where the majority of the households use tap water

Village	# of WSS	Source	functional	not functional	Coverage of households	Use tap water (%)	Use other sources (%)
Danyor	1	Nallah	y	-	2000	75	25
Chaprot	1	Spring	y	-	95	92	8
Thole	2	Nallah + spring	1	1	62	96	4
Pissan	1	Spring	y	-	133	90	10
Gulmit	2	Spring	y	-	> 270	99	1
Gulkn	1	Spring	y	-	106	100	-
Ispanj	1	Spring	y	-	27	89	11
Jamala bad	1	Spring	y	-	-	100	-

3.3 TECHNICAL ASPECTS OF WATER SUPPLY SCHEMES

In several villages it is observed that water tanks are not built to the standards which can withstand the climatic and natural hazards. In some cases no proper selection of the water tank site has been made which caused damage to the tanks due to land slides. A number of water supply schemes have failed because the pipes have not been laid deep enough. The result is that water gets frozen and pipes burst. In Gulkn we were informed that the pipes used were of poor quality and that they have started rusting. In many cases tanks are without roofs which causes accumulation of dirt in the bottom and walls are not built high enough to protect the water from livestock.

An important observation was that water supply schemes have no arrangements for treating water before it is supplied to the community. In cases where turbid channel water is used to fill the tank the water reaches the community in the same condition. The same holds true for some muhallahs in Gilgit town such as Konodas and Zulfiqar Colony where water is pumped from the river up to a tank and then distributed to the community without treatment.

3.4 MICROBIOLOGICAL ANALYSIS OF WATER

In microbiological analysis of water for drinking purposes the key parameter is faecal contamination. The preliminary results of the microbiological sampling show that no water supply schemes are free of contamination, particularly those systems that have a nullah as the supply source. In table 4 results are given of microbiological water tests of four water supply schemes constructed in Hunza and Gojal that use nullah water.

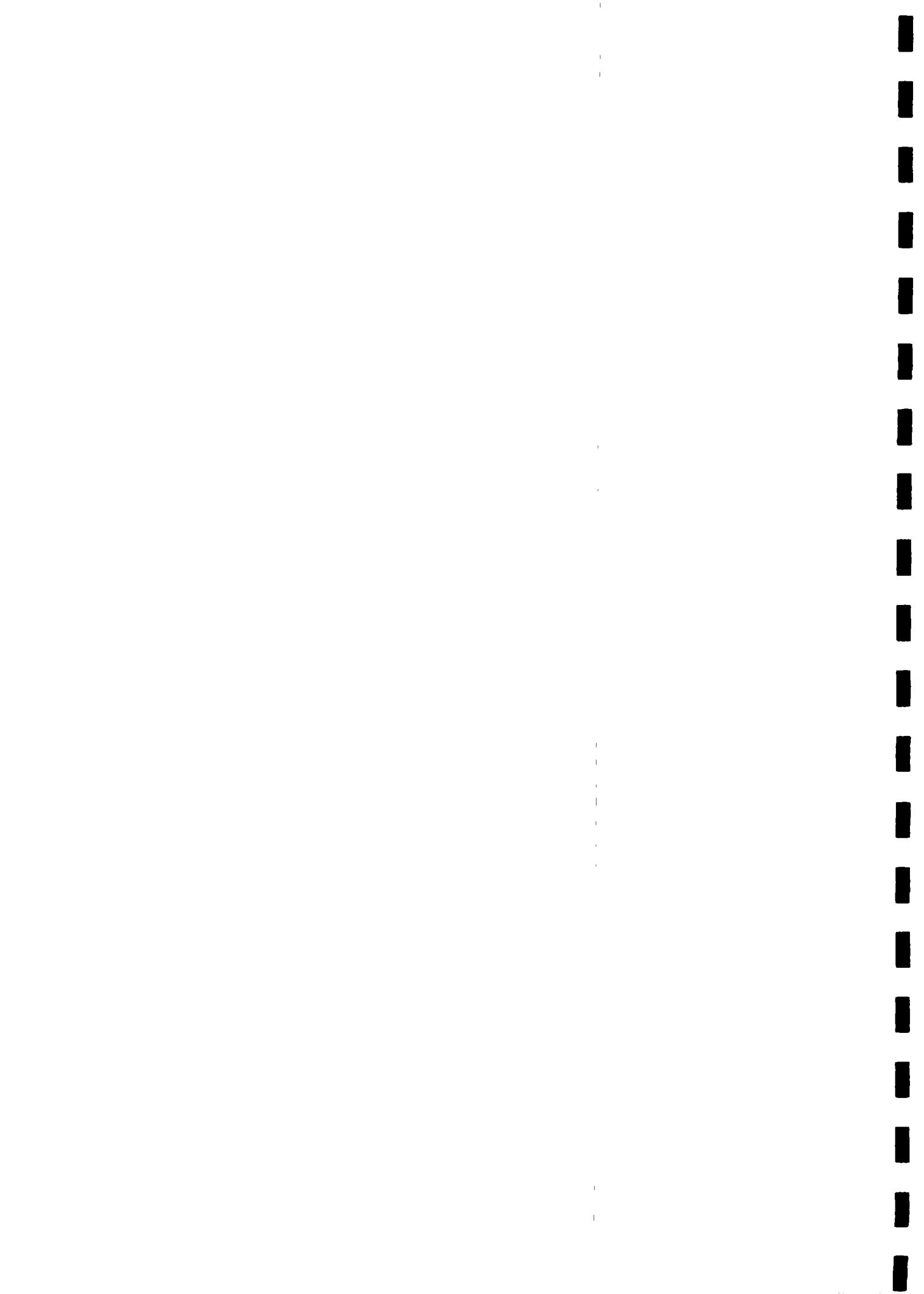


Table 5 Contamination levels in WSS using nullah water

Name of village	E-Coli/100ml entry point	E-Coli/100ml outlet of tank	E-Coli/100ml mid of line	E-Coli/100ml end of line
Nasirabad	14	11	10	329
Khanabad	13	14	29	water closed
Altit	7	28	16	water closed
Soust	0	0	70	95

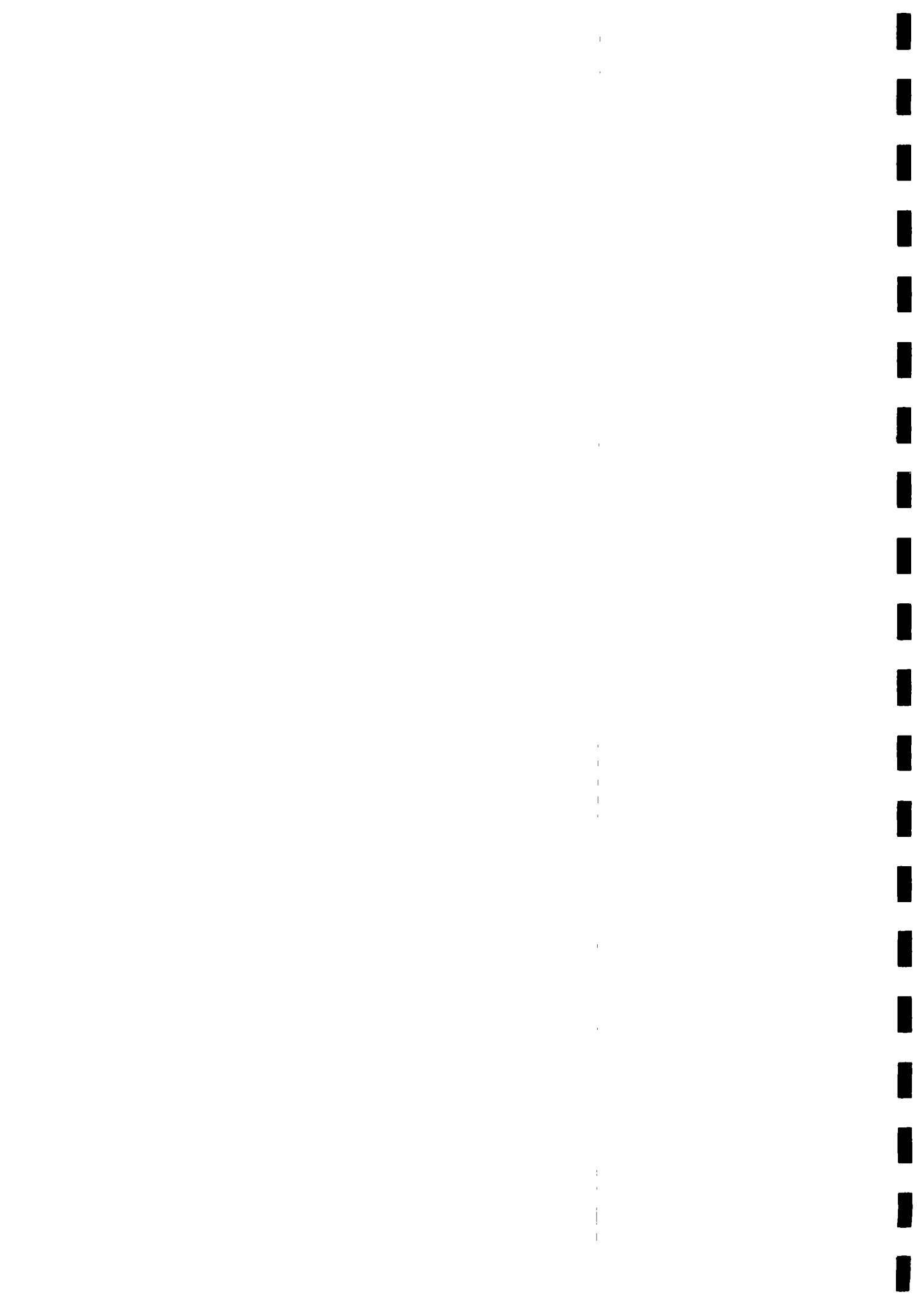
The results indicate that water is often only slightly contaminated when entering the system. The data also show that contamination almost always increases from the tank to the endpoint of the distribution system. Some possible causes of contamination can be

- * tanks have been constructed near the footpaths to the pastures where people and animals can stop above the path to relief themselves,
- * tanks are filled by open channels,
- * water tanks are uncovered,
- * tanks are without a care taker and lack proper maintenance,
- * Sockets leak and are haphazardly repaired;
- * Pipes run through channels where they might suck contaminated water.

Table 6 shows the results of sampling in water supply systems that are supplied by spring water. This clearly shows that spring sources are generally free of faecal contamination, but that in the water tanks and in the distribution systems water sometimes becomes contaminated.

Table 6 Contamination levels of WSS charged with spring water.

Name of village	E-Coli/100ml in spring	E-coli/100ml entry point of tank	E-coli/100ml in outlet of tank	E-coli/100ml distribution line
MISGAR	0	0	0	0
GIRCHA	0	0	5	1
KHUDABAD	0	0	0	0
MORKHON	0	5	10	10
KHYBAR	0	0	0	0
PASSU	0	0	0	0
GULMIT	0	0	0	0
SARAT	0	163	430	363
HAKULSHAL	0	14	226	173
THOLE	0	564	606	295



3.5 KNOWLEDGE, ATTITUDE AND PRACTICE WITH REGARD TO WATER

In villages there is an awareness that drinking and cooking water should be clean. Generally people were not satisfied with the quality of their traditional water sources. For most people clean means in the first place visibly 'clear' water, a smaller group of people also mention that water should be clean from bacteria. The term dirty water is used for water which is visibly dirty, like overflow irrigation water from fields and orchards, waste-water from bathrooms and water from clothes washing. If this dirty water mixes with channel water it is not acceptable for drinking. People believe they can recognize if dirty water has mixed with the clean channel water.

In addition to this need for clean and clear water it is particularly important to have the water near the house and conveniently accessible. Tap water is considered safe, clean and good for health. In all villages without piped water supply a demand for a system could be noted.

In villages where it is available people prefer to drink spring water, even if there is a piped water scheme. Where this is not available people will use the clearest water that is at a reasonable distance from their houses. In several villages it was observed that the nearest source, for example a channel, is not always used in favour of a more distant channel or other source that is considered clearer or cooler. In this sense the villagers also accept to drink nullah and river water if it is within reach.

A main problem mentioned by the communities is the turbidity³ of nullah and river water, particularly during summers. Villagers claimed that turbidity increases with the sunshine and water becomes less turbid in morning and evening. So people fill the water pits in early morning or nights. In other cases women will fetch water from the channel and keep it in big containers to settle the water.

A man in Murtazabad said that boiling will reduce minerals and iron. He also suggested the use of alum to reduce the turbidity of the water. Several other informants related this high turbidity to stomach worms and kidney stones. Some added that they have worms of different colours and sizes in their water supply which causes the worms in their stomach.

³ In this regard it should be mentioned that Aga Khan Housing Board has installed three experimental water filtration units (WFUs). Due to the extreme high turbidity of water in the valley the results are not yet satisfactory. Also some problems have arisen with proper maintenance. In the future the WSHHS Project has planned to also perform some modifications on the existing WFUs and some new construction will take place.



CHAPTER 4 SANITATION SYSTEMS

In the rural areas of Gilgit district people are using a number of different sanitation systems, depending on their socio-economic position and their customs. Besides open fields a number of traditional sanitation systems are used called chukan, sarooi and gem. Very often these are composting systems. Nowadays several households have constructed pour-flush latrines. Finally the WSHHS Project is doing trials with a modified compost latrine.

4.1 TRADITIONAL SANITATION SYSTEMS

i) Chukan

Chukan is the only word, among the names of traditional systems, which literally means latrine. In Hunza and Nagar this system is very common, less so in Gojal. Almost every household has a compost system, either chukan, gem or sarooi. After complete or partly composting, the contents of the Chukan are used for manure on vegetable gardens and fields. (see figure 4) The Chukan is very similar to the Balti-latrine in its use, construction and emptying practices

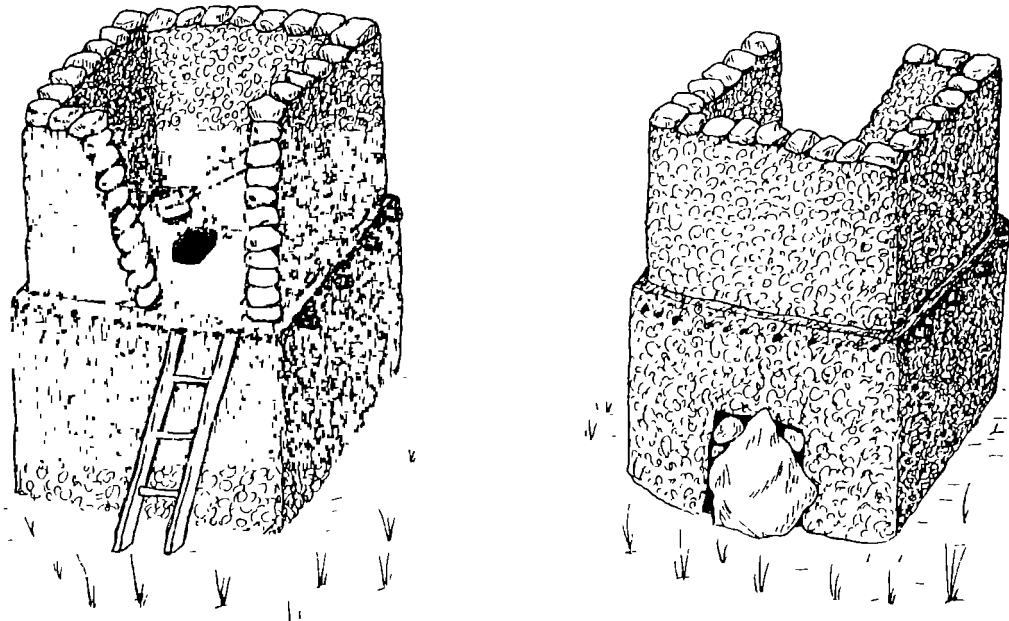
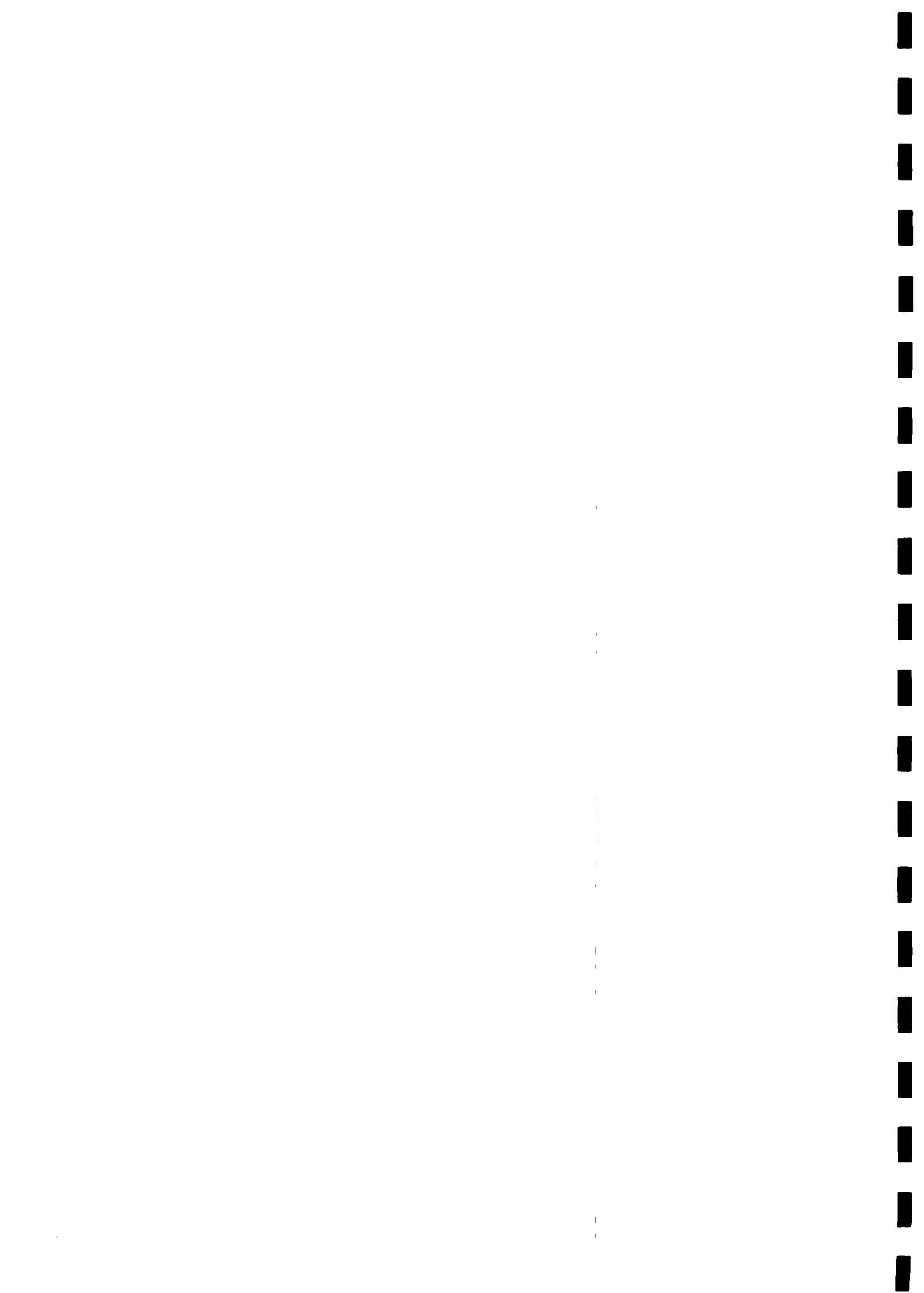


Figure. 4 A typical chukan

The basic design of the chukan is similar to the Balti-latrine, a double story construction. People relieve themselves in the upper portion and waste accumulates in the lower portion. The number of squatting holes varies from one to six. The size of chukan depends on the number of family members but is generally much smaller than in Baltistan. In the latter region animal dung and soil is mixed in the lower portion which is not a custom in Hunza and Nagar.



The location of chukan depends on the availability of land. If the houses are tightly clustered then the chukan is very near to the living rooms and if the housing is loosely clustered or dispersed, then the chukan is usually built in the corner of the courtyard. In a few villages, like Minapin and Hoper communal chukans were identified near communal bathrooms or in the fields.

Although there are no particular rule about the location and orientation of the latrine it is thought that a household will try to avoid to construct the chukan near the living room or kitchen. Generally families will be careful that the direction of the squatting hole in the latrine is towards North or South.

The cost of a chukan depends on the building materials available in the village. In most of the areas people mentioned the approximate cost between 500 to 1000 rupees. It depends on the style of construction which is conditional on the economic situation of family. In some households it is built with a proper roof and door while in others there is no roof and they use pieces of cloth for privacy. The superstructure of the chukan also depends on its location. If it is far away from the house then people generally care less about the roof and door while in a congested area a properly closed cubicle will be built to provide complete privacy. Nevertheless there are many local variations, like the different design of chukan which was observed in Budalas (see figure 5).

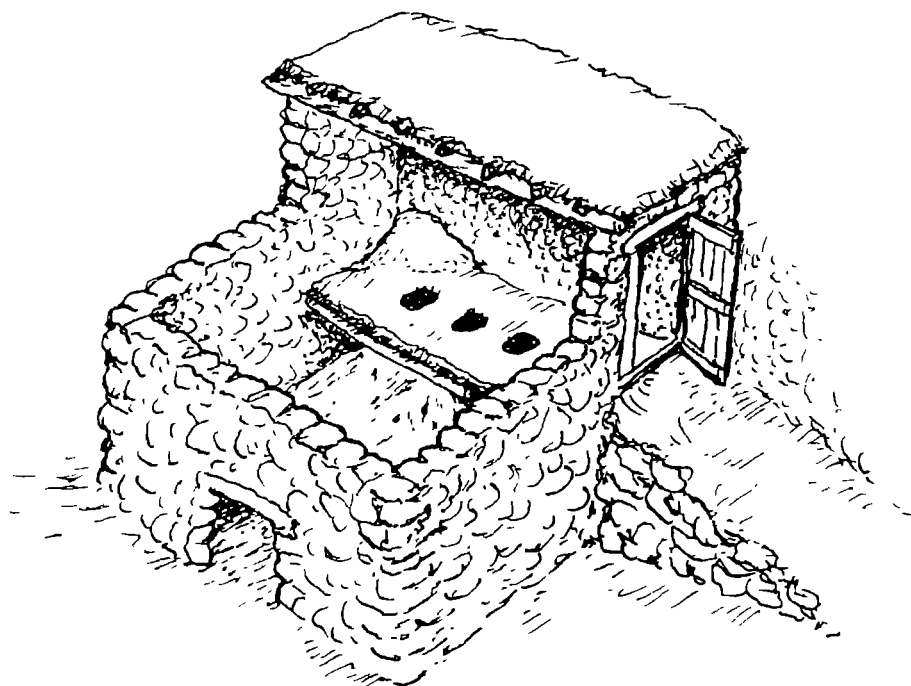


Figure 5 A chukan in Budalas



Construction of the chukan is a joint activity of the household. The men build the structure and women help by collecting stones, and fetching water to make mud. Only in Murtazabad villagers said that the chukan is solely built by men. Construction takes two to three days. A chukan's life time is subject to the weather and the building material used but will normally be between five and ten years.

The use and management of the chukan

In the villages included in the study both men and women use the same chukan. One exception is Budalas. In this village only women and children use the chukan, it is considered very shameful for men to go into a chukan, so they use the open fields.

If the chukan has more than one squatting hole then women and children may sit together; men will never do this. The purpose of having more than one hole is to spread the excreta evenly in the pit below. Next to the squatting hole often a small heap of soil is present. After defaecation every user is supposed to cover the excreta with a small amount (about one or two hands full) of soil. For anal cleansing some people use soil, others water.

Some people try to keep the contents of their chukan dry by using a very small amount of water for cleaning on a plain area next to the holes. Others may use cattle sheds for conducting their ablutions. It was not observed that villagers have a special ablution place like that reported from Baltistan.

Emptying the chukan

It is a common practice to empty the chukan once or twice a year. People appear to think that the composting process goes relatively quickly. People think this goes relatively quickly. People do not like to empty the chukan if it contains very fresh excreta and in Hussainabad and Chaprot for example the people close the chukan for two or three days before emptying. In the mean time they will use open fields or women and children will use a neighbouring chukan.

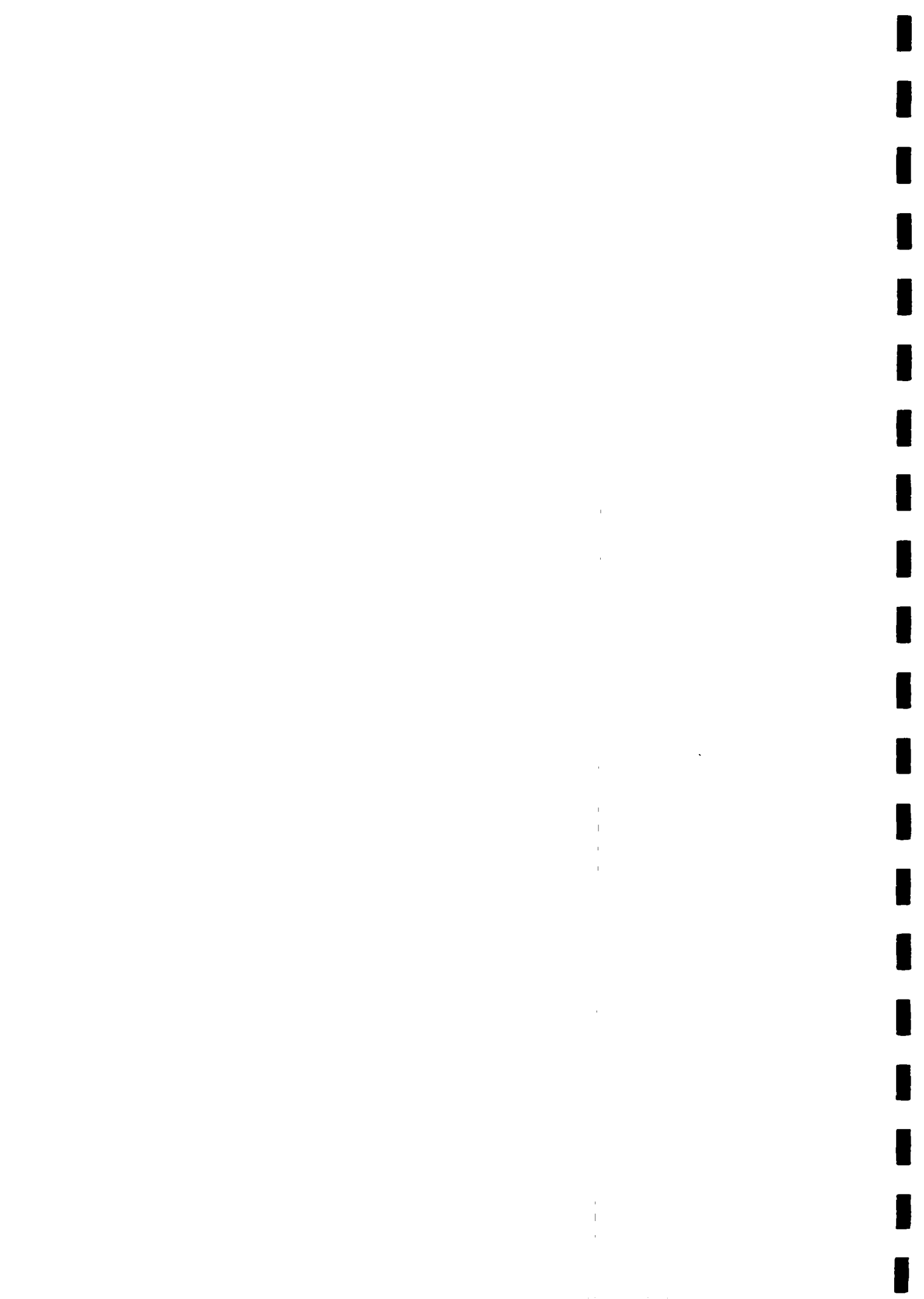
In all the villages included in the study it was the women who empty the chukan. They remove the contents from the pit and carry the manure to the fields in a basket, called giran. This whole process takes one to two days. After a question about whether men ever empty a chukan a woman said

"Do you think that men will empty it? No! It is shameful for men to empty a defaecation place".

Presently people are using manure from the chukan on their fields and they consider it as a very useful conditioner for soil. Women, however, are very uncomfortable with the responsibility for removing the manure. They would be happy to be rid of this activity.

ii) Qem

The meaning of word Qem is 'a piece of delineated land'. It is a traditional system which we observed in various forms throughout the area. The use and management of the qem varies according to its design. In some cases such as shown in figure 6 people use the qem as a shallow squatting hole. In other cases, shown in figure 7 and 8 a flat area next to a shallow pit is used for defaecation after which the excrement is pushed into the pit. The contents of the pit are used on the fields or vegetable garden as fertilizer.



In the past it was common to construct communal qems in fields. The owner would keep it clean and use of bags to provide privacy and sometimes decorate it with colourfull cloth to attract users. In this way it was possible to increase the amount of manure for one's fields. Nowadays this type of qem is found only in few villages.

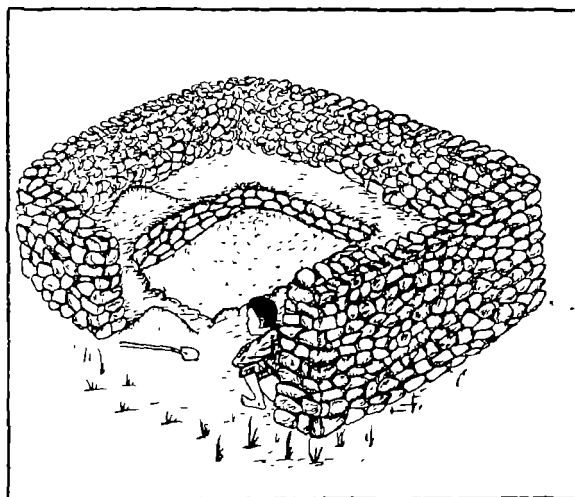
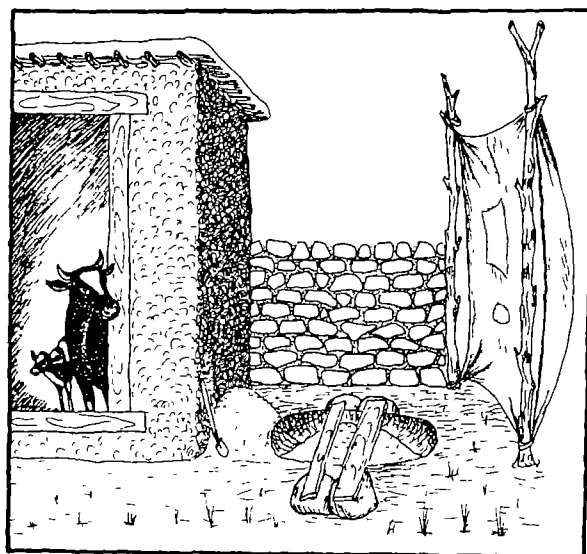
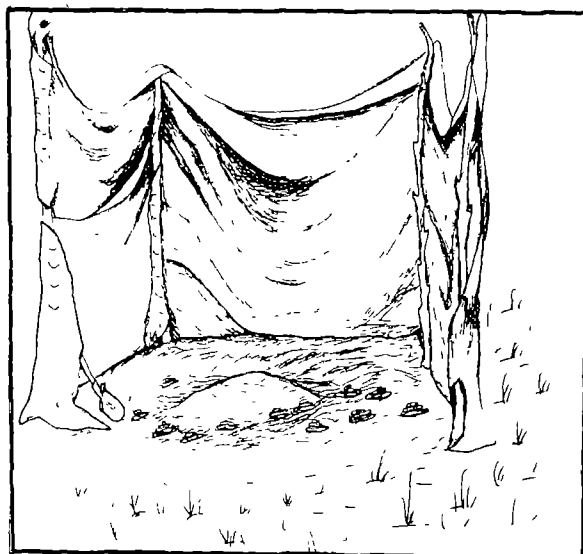
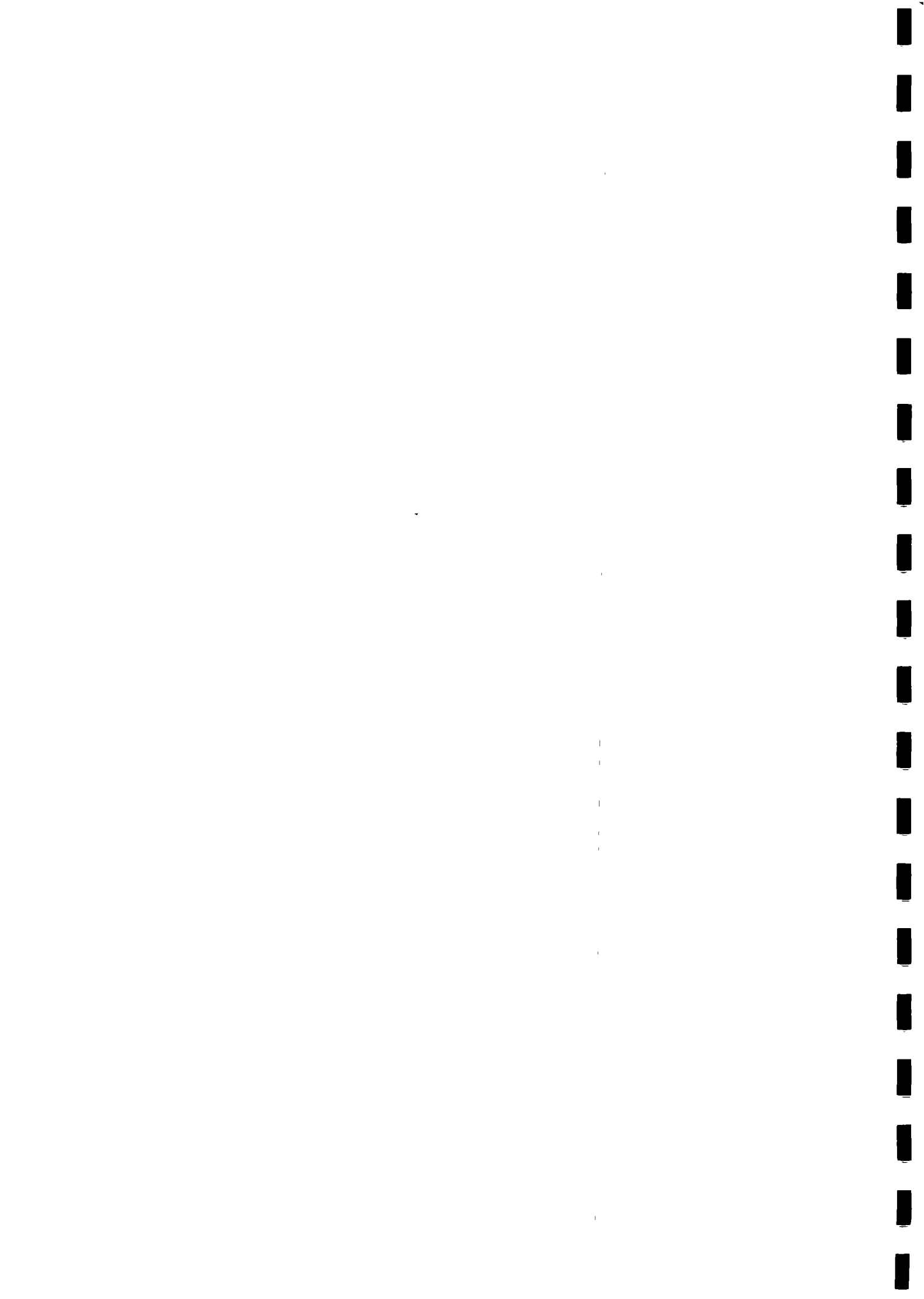


Figure 6, 7 and 8 Different types of Qem



iii) Sarooi

In Gojal the word sarooi⁴ refers to a part of the house where cattle are eating fodder. Often a sarooi is a simple walled compound, adjacent to the house, with a roof, walls and a door. Both men and women can use this place for defaecation, see figure 9. They defaecate on the ground and cover the faeces with soil. Some sarooi are separate from the house, similar to animal sheds in other regions. In this situation construction is more simple and cheaper.

In some villages people migrate to a summer house. They will then have a sarooi in both houses; one will be used in the winter and emptied in spring, the other used in summer and emptied in autumn. One person summarized the important advantages of the sarooi:

"This system is far better than a pour-flush because it gives us manure and never gets frozen".

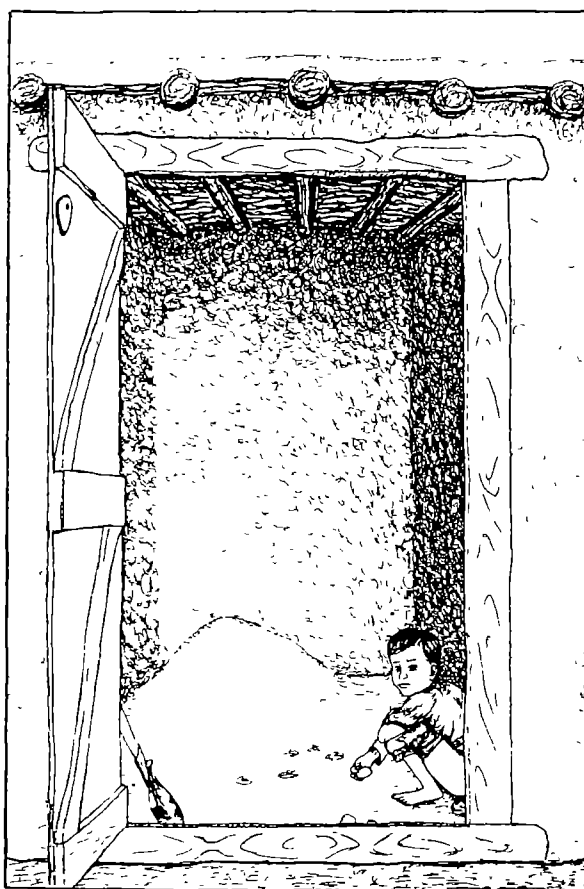


Figure 9 A typical sarooi

⁴ The term is used in Wakhi speaking areas. In some areas of Gojal also the Wakhi terms Tarak or Sharan are used. The exact name of this system in other areas needs more exploration.



Emptying of the sarooi will take place once (Gulkin and Ispang) but usually twice a year. In some villages like Rashit, Ispang and Gulkin it is emptied by men. In Morkhon on the other hand it is emptied by both men and women. Wheel barrows and baskets are used to carry the manure to the fields. The manure from the sarooi is valued highly on fields with barley and potato. For vegetables the villagers consider this manure is dirty and prefer to use cattle dung.

In recent years a change is taking place in the location of the sarooi. In traditional houses one had to pass the sarooi before entering into the living room, as is shown in figure 10. Nowadays it is still constructed near the house but always facing opposite the residential area. Two examples of the changes of location of latrines in new houses are shown in figure 11.

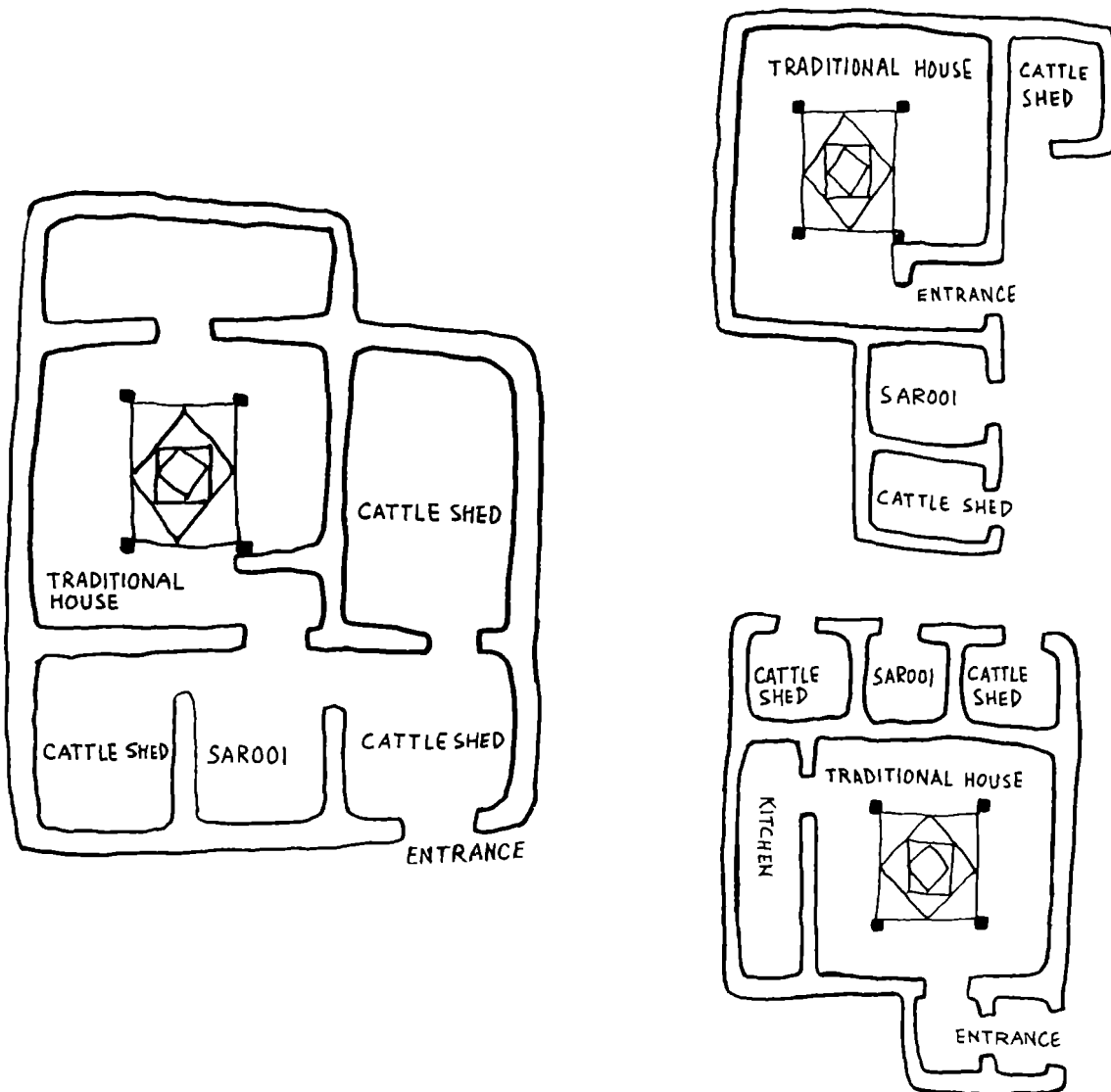


Figure 10 Location of the sarooi in Wakhi houses

Figure 11 Two examples of the new location of the sarooi



iv) Open fields

Although the above mentioned sanitation systems are very common the open fields are also frequently used for defaecation, especially when people are working in the fields and at night time. In some areas where men are socio-culturally restrained from using the formal sanitation system they will have to use the fields.

4.2 LOCAL BELIEFS ABOUT SANITATION

During the day women and children are not afraid of going to the latrine alone but at night-time they are and they will prefer to go together. In some villages evidence was found that their fear is related to beliefs in super-natural beings. In Chaprot bala some women said:

"The Sheikh told us that Jin and Parri⁵ live in dirty and dark places. So we always take a lantern with us at night to the chukan to chase them away"

In Hussainabad women said that because of the belief that Jin and Parri live in dirty places they go to the chukan accompanied by others, but they use it turn by turn. In most other villages there were no particularly strong beliefs about Jin and Parri visiting latrines, although some people did associate these spirits with certain diseases. Generally villagers' belief in spirits and fairies is waning. Particularly the younger generation considers these beliefs a part of their forefathers culture.

4.3 NEW SANITATION SYSTEM; THE POUR-FLUSH LATRINE

i) Pour-flush latrine

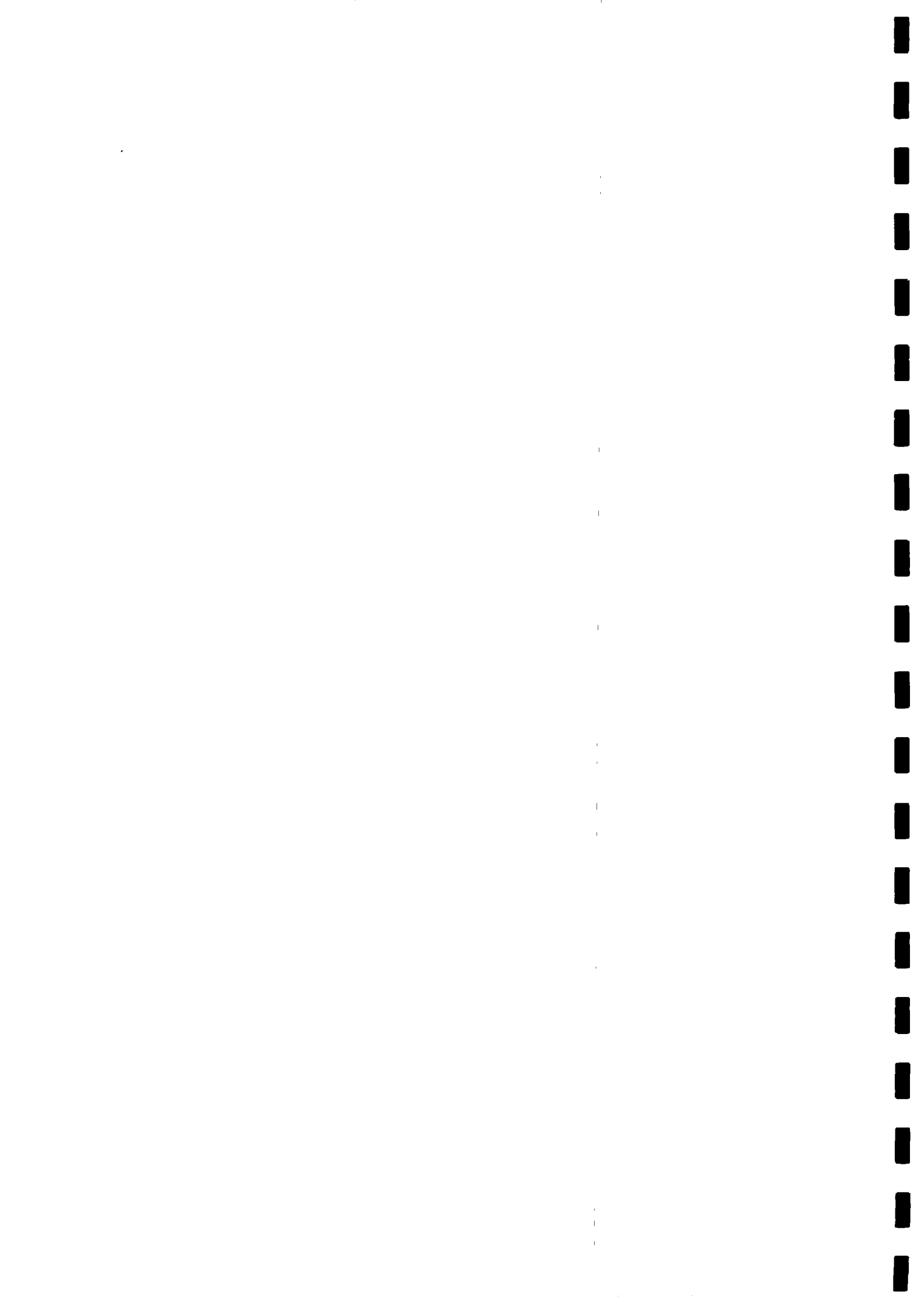
The pour-flush latrine has become a well known and desirable sanitation system in Hunza and Nagar. Unlike Baltistan men and women are familiar with this system. In all villages pour-flush systems are present, ranging from just a few to a considerable coverage. Most villagers have built pour-flush latrines on their own initiative. The Aga Khan Housing Board and UNICEF have also helped the introduction of the system.

AKHB developed a programme in which they built demonstration latrines in several villages. Later they offered the inhabitants of these villages a commode, p-trap and a ventpipe for a subsidized rate of 200 rupees per set.

The demonstration pour-flush latrines were not very successful. Management problems caused many to be out of use. In Murtazabad for example two latrines were installed in a school, one was closed due to a broken pan, the other was only used by teachers but was smelly. The introduction of individual pour-flush latrines were more successful.

Through LBRDD also UNICEF promoted pour-flush latrines but these were free of cost. In Pissan for example 14 pour-flush latrines were donated. After installing, however, the owners did not use the latrine but kept it for guests. The villagers say the reason for not using it is the ground condition. The area is

⁵ These are terms used for evil spirits and fairies from the mountains who are related by villagers to problems and diseases. Jin and Parri are said to like dark and dirty places and uninhabited areas.



very rocky and villagers could not dig deep soak pits. The villagers therefore fear that with regular use the pit will fill up soon. The observation that pour-flush latrines are usually not used by the family members was made in many other villages in the area⁶

UNICEF has also introduced pour-flush latrines through their Womens Integrated Development Programme in the village Gulmit. In 1989 they formed a village council and Womens Cooperative societies in the village. 90 units (commode, p-trap, drainage pipe and one bag of cement) were distributed among the members of the Womens Societies. Two latrines were completely constructed free of cost in two poor households. The construction expenditures of the other sets was the responsibility of the community. The Programme arranged training in how to construct a pit and install the commode.

Beside these 90 latrines many villagers in Gulkin have bought commodes on their own expenses. The village council secretary said that each new house will have individual water connection and a pour-flush latrine. The result is that this village has a much higher sanitation coverage than any other village in the valley. Most families have even stopped using the sarooi and now use chemical fertilizer instead of human compost.

Many people in other villages expressed their desire for having a pour-flush latrine. It is unknown how many of them express a genuine desire or would like to have the system primarily as a status symbol or as a need for their guests. During the study some evidence was found that, at least some of the villagers have difficulties with emptying and using the manure of the traditional latrine. A village woman said

"We do not like to empty the chukan. The flush system is more convenient and clean. But we do not have enough money to construct it. The money we have is hardly enough for the schooling of our children. And as far as manure is concerned I think cattle dung and chemical fertilizers are enough."

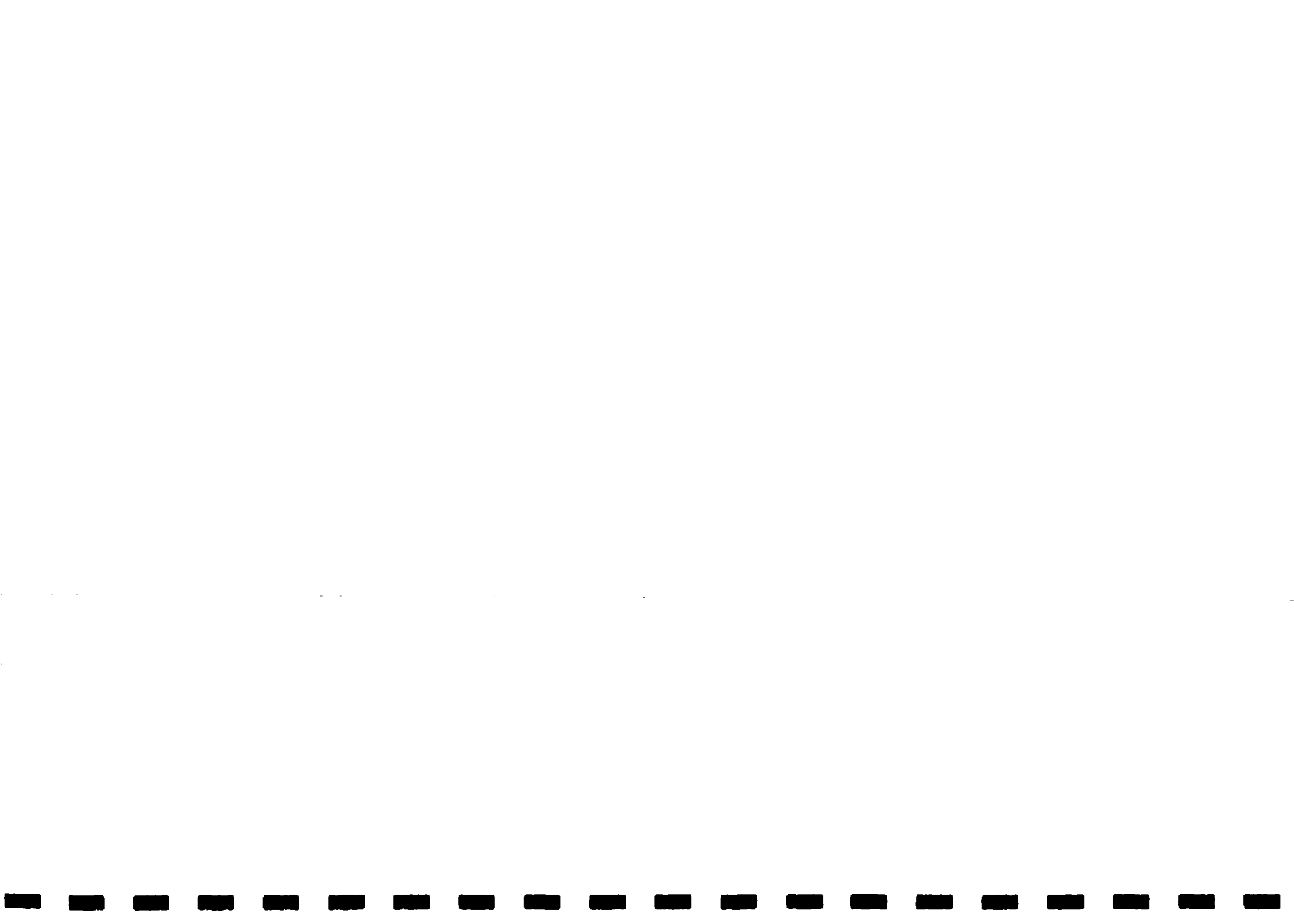
Also the pour-flush latrine has disadvantages. In those areas where water freezes during the winter the water seal of the pour flush can get blocked. Pour-flush latrine owners either use hot water to melt the ice or use their traditional latrine. For this reason it is not a trend that households with a pour flush latrine in cold areas destroy their traditional compost latrine. Often both systems are used alongside each other.

ii) **Technical analysis on the pour flush latrine**

Two kinds of flush latrine are used in the area. One which is flushed with water from a tank or cistern and one which is flushed manually by pouring water from a lota or bucket. The former can only be used in villages with individual house connections to a piped water supply scheme like Gulkin.

The disposal system generally consists of a simple soakpit, or sometimes a 'septic tank' and soakpit. Some people believe that worms in the pit will eat its contents and they prefer a single soakpit. Whereas others think a single soakpit will fill up easily and they prefer to also have a septic tank. The combination with septic tanks results from the involvement of skilled masons. Generally these masons include a septic

⁶ Similar data were found in a comprehensive study of the pour-flush latrine in Chitral. See The Pour-Flush Latrine For Guests Only? 1993, Issue paper 3, Gilgit WSHHS Project.



tank in the construction sometimes with a man hole because otherwise they claim the pit fills up quickly and will produce bad odour

During discussions with various people it emerged that in most cases the soak pit was dug up to 16 feet deep, without considering family size, ground conditions and whether or not a septic tank is included

Considering the cost of installing a pour-flush latrine, people have the idea that it cannot be built for less than seven and ten thousand rupees. Actually in households where a pour-flush latrine has been installed the construction costs are closer to two thousand rupees. The reason for this discrepancy is probably that people are thinking not only about the cost of the pour-flush latrine but also about an attractive and respectable bathroom.

4.4 EXPERIMENTAL SANITATION SYSTEMS

The WSHHS Project is investigating the acceptability of alternative systems for this valley which meets the physical as well as the socio-economic conditions. In 1993 the Project started a number of experiments with two improved systems. One is the twin-pit compost latrine, the other system is the twin-pit pour flush latrine.

For the selection of interested and suitable households dialogues were held with VOs, WOs or with women individually. In these meetings technical drawings were used to explain the new sanitation systems to the people. Pros and cons of various systems were discussed taking local conditions into account. In each village two or three participants showed their willingness to participate in construction. Considering the proposed site, the existing sanitation situation, and the enthusiasm of the household head the final candidate was selected.

At present the twin-pit pour flush latrine is tested by a family in Nilt, while a total of seven twin-pit compost latrine are tested in Misgar, Karimabad, Hoper and Oshikhandass⁷

⁷ See a forthcoming issue paper on experimental compost latrines



CHAPTER 5 COMMON ILLNESSES IN RELATION TO WATER AND HYGIENE

5.1 HEALTH RISKS ASSOCIATED WITH TRADITIONAL WATER SOURCES

In most of the villages of Hunza and Nagar people are living in clustered housing. There is a trend to construct new houses with more rooms and with boundary walls. The majority of the population still rely on traditional sanitation systems and un-protected and contaminated sources of drinking water

In many villages people drink water from communal gulks. In Jalalabad and Minapin we observed a small container made of wood or tin near the communal gulk. Everybody uses the same container to take water and drink from it. This practice can be a means through which bacterial or viral diseases spread through the community. Other examples of unprotected water are the open containers for water transportation and storage in the house.

In most villages water shortage is a problem particularly in winters. Also firewood for heating up water is expensive. These factors compel villagers to live in an un-hygienic environment. The level of domestic and personal hygiene is higher in summers when water is more abundant. One respondent said.

"In winter we can wash ourselves once or twice a month and clean our houses and yards once a month. But in summers we are working in the fields and due to hot season we wash once or twice a week"

In cases where piped water supplies are available the hygienic situation is not necessarily better. Many water supply schemes were observed to be poorly maintained; water tanks for example were uncovered, taps and pipes are broken with stagnant water around communal stand posts.

5.2 LOCAL IDEAS ABOUT THE CAUSES OF WORMS AND DIARRHOEA

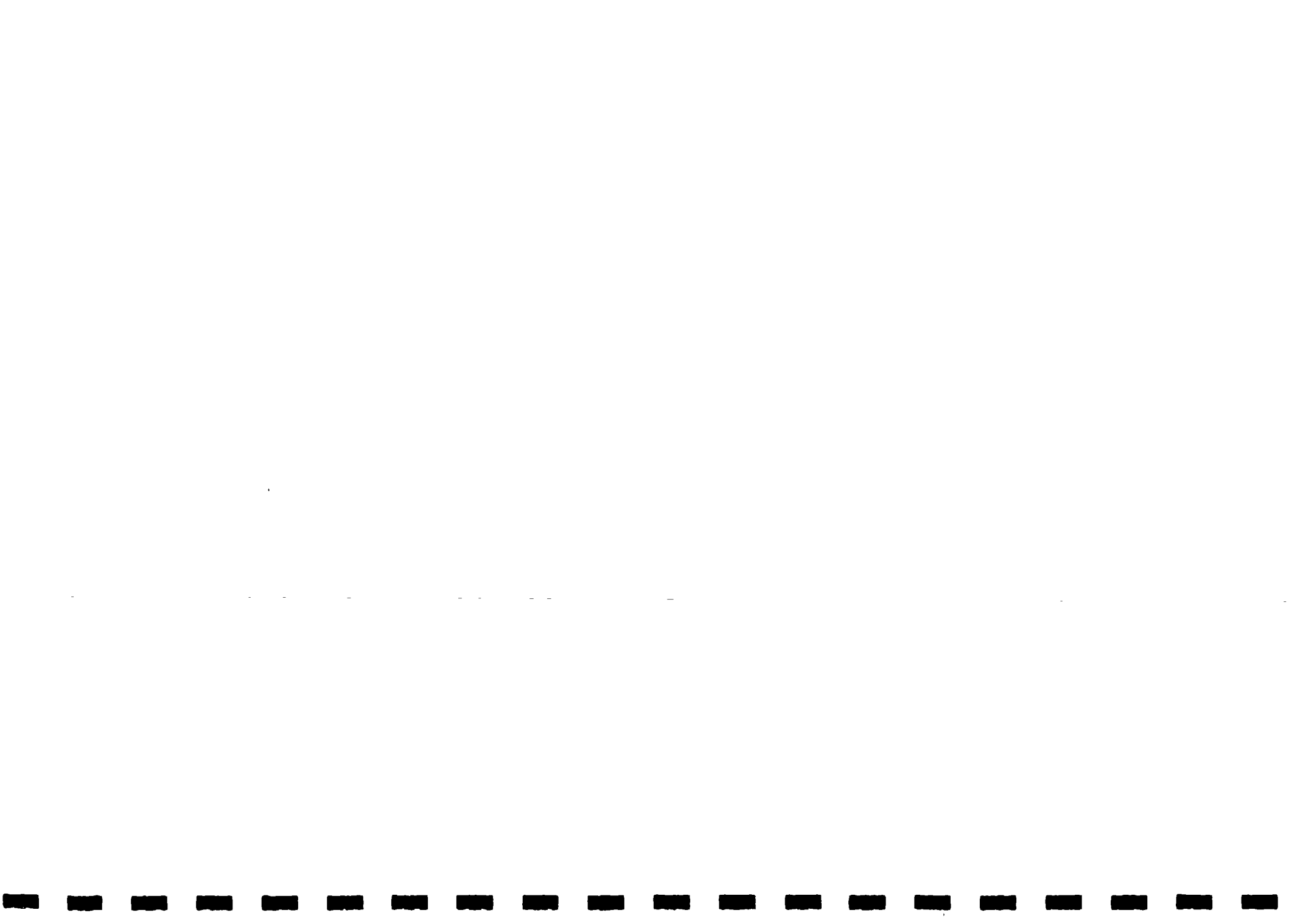
Common diseases are clearly related to the season. Stomach and intestinal problems are more common during the summer, whereas acute respiratory infections (ARI), eye infection and body joint pains are more common in the winter months

Among stomach and intestinal problems diarrhoea and parasitic worms are the most common. There are many different concepts existing among men and women about the causes of these problems. Some of the causes of worms are

- * eating of mud (mainly children);
- * eating too much sweet food,
- * many people seem to think that worms are normal and not a disease. If a person eats too little food or food that is not good it will activate any worms inside the stomach. This can cause pain, diarrhoea or vomiting

The causes of diarrhoea are related to

- * the hot weather during the summer,
- * eating too much ripe or unripe fruit and uncooked vegetables,



- * when intestinal worms are activated,
- * the milk of lactating women who work too much in the sunshine or carry heavy loads on their shoulders will be effected. When they feed their children this causes diarrhoea. This is a very common concept found in every village;
- * effect of evil eye. A women said that the diarrhoea caused by evil eye⁷ starts gradually and is accompanied with vomiting;
- * in a limited number of interviews women connected diarrhoea with water. In Budalas a women said

"The water that comes in our muhallah is dirty because it crosses the fields of the upper muhallah where people spread manure from their cattle shed and chukans. We drink this contaminated water and it can make us sick "

Women do not have any clear concept about the cause of skin diseases Most of the time skin diseases are attributed to the will of God

5.3 LOCAL TREATMENT PRACTICES

If diarrhoea is connected with evil eye then for treatment religious leaders like sheikhs, akhuns and khalifas are consulted. These religious teachers give taveez sometimes accompanied with a request to sacrifice a chicken or a goat. Another treatment for diarrhoea caused by evil eye is that some soil is brought that the patient has walked on The soil is kept in both hands and whirled around the head of child three times. After this the left hand throws the earth in the chukan and the right hand into the stove

Diarrhoea is also treated with herbs and dairy products One herb which is used is called shoto. It is boiled in water and given to the child Kehwa (green tea) is also prepared from the herb tumoro Bread made from a herb called hamamo is given to the patients to eat Also mothers who breast feed and have a sick child eat this in the belief that they will pass on the herbal effect to their child. Apricot oil is also used as medicine for diarrhoea The dairy products cheese, sheep milk and yogurt are taken as medicines to stop diarrhoea.

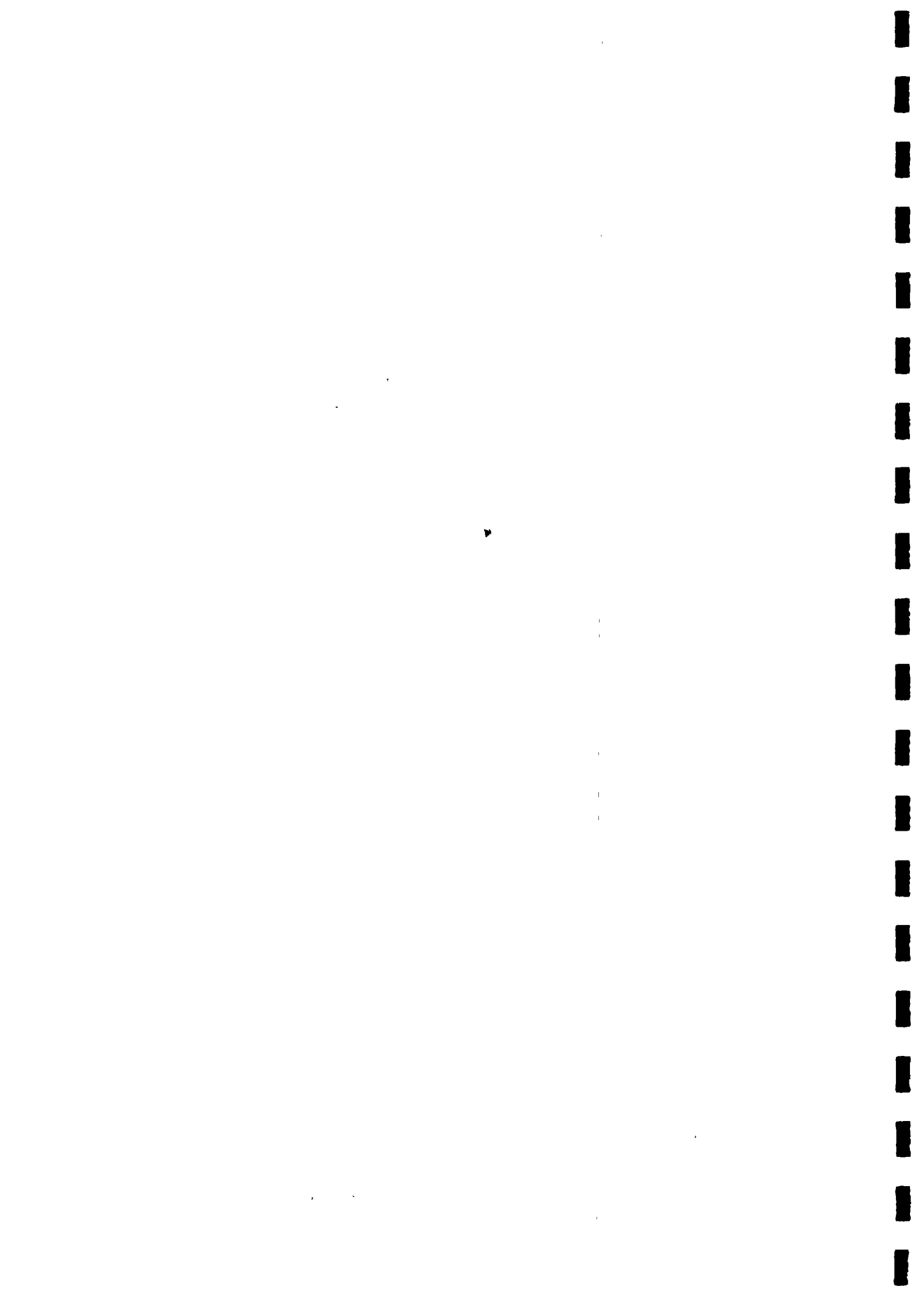
During diarrhoea mothers do not motivate their children to eat or drink more than usual, so food and liquid intake totally depends on the child In those areas where there are health centers, dispensaries, and hospitals mothers also give their children ORS or Ninkol available in packets. Many adults seem to think that ORS is just for children Beside these simple home remedies medical practitioners can and often are consulted

When worms are causing pain people sometimes use to rub a herb on the stomach called khakashu Allopathic medicines are also used for worms but as these are expensive many people cannot afford them

Among skin diseases dandus (scabies) is very common The oil of a plant named as chagho is used for its treatment Wheat oil is also rubbed on the affected parts On eruptions and boils a salve is applied prepared from hot mashed tomatoes

⁷. A method villagers use to check the evil eye is as follow

A woman take chillies and circles around the head of child Then she throws it in the fire, if it produces strong smell it means that the child does not suffer from evil eye but if it gives little smell the child must be affected by the evil eye.



CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

CONCLUSIONS

This paper is the outcome of the field-visits undertaken by a combination of staff including anthropologists, engineers and micro-biologists. Interviews, group discussions and observations have been conducted with men and women in order to obtain information on both the social as well as the technical situation. For specific information on health and hygiene conditions interviews with LHVs were conducted.

Nullahs, springs and rivers are the primary water sources in the region and sub-channels, gulks and tap water are the secondary sources. Water is generally clean before entering the village but gets more contaminated the further it comes down in the village. Gulks are more contaminated than other sources. Also piped water usually contaminated. In many villages turbidity is extremely high, particularly in summer.

LBRDD, NAPWD, UNICEF and to a minor extent AKRSP have been involved in the installation of piped water supply schemes. The level of success of these water supply schemes is very variable.

Among the traditional compost latrines the chukun and sarooi are very common in Hunza and Gojal respectively. Emptying these latrines is not liked by the villagers and this is an important factor why people are attracted to the pour-flush latrine. In many villages people continue the use of their compost latrine because they value the human excreta as a fertilizer. Therefore the WSHHS Project has started with experimentation to attempt to improve certain aspects of these latrines with the aim of reducing associated health risks.

RECOMMENDATIONS

Water issues

- A detailed study of successful and unsuccessful schemes is proposed. Identification of the strong points and the flaws of existing and ongoing water supply schemes can help to improve the design of future strategies.

The study should include systems that are functional like Gulmit or Pissan, systems that are out of order like Hoper, and systems that are under construction such as Murtazabad.

Topics to be focused on should include the impact of piped water on the community, enhancement of community participation in planning, design, operation and maintenance, tradition of collective work and women involvement.

- In water supply schemes that have been community participation for maintenance and repair received limited attention. A training module for villager plumbers cum caretakers should be developed.



- Practical plans for rehabilitation, operation and maintenance should be developed during village workshops with both VOs and WOs. This should include estimating the rehabilitation and recurrent costs to help guide decision making by the community
- Consideration should be given to utilize hot water springs located in Murtazabad and Minapin. These can help to improve the personal and domestic hygiene conditions in the villages
- Attention should be given to ownership of water resources in order to avoid community conflicts for water distribution
- It is impossible to discourage the gulk system unless piped water coverage is reliable and complete. Technical recommendations should be prepared in order to reduce the health risks of these systems.

Microbiological testing

- The microbiologists should continue with testing the sources of water supply schemes under construction by LBRDD.
- During spring and summer seasons the over-flow water from the fields should also be tested in order to know the level of contamination of this water. In those areas where manure is spread during October it will be interesting to know its effects after six months.
- Microbiological tests of latrine contents of both traditional and improved designs should be carried out at different times of the year. More data on this is needed to assess health risks of existing latrines and the efficacy of the improved design.

Sanitation

- Simple modifications should be designed and tested by the engineers for the qem and sarooi aimed at reducing their health risks in a cheap way. These should be included in a proposed guideline for AKHS dealing with various issues related to sanitation
- The trend away from compost latrines towards disposal systems (or at least flush latrines) should be closely monitored and if possible be worth an in-depth study
- The WSHHS project should try to foster a unified policy among the agencies implementing latrines (LBRDD, UNICEF and AKHB)
- For villagers who are interested in the pour-flush latrine and can afford it themselves the WSHHS Project should produce a standardized technical drawing and construction guideline
- In Gojal, particularly in Chapursan valley and Soust, tests with lids on the commode may be conducted to check its effectiveness against freezing



Regarding the experimental latrines

- One attribute of the twin pit pour flush latrine is that it can be used as a compost system. This is a quality that has not been fully explored and field tested and thus may be included in future experiments
- Another sanitation system that can be included in the sanitation experiments is the solar compost latrine, a single pit latrine with a metal sheet facing south. The faecal matter in the latrine will desiccate quickly as temperatures inside the pit can rise to over 60 degrees centigrade (see picture below)

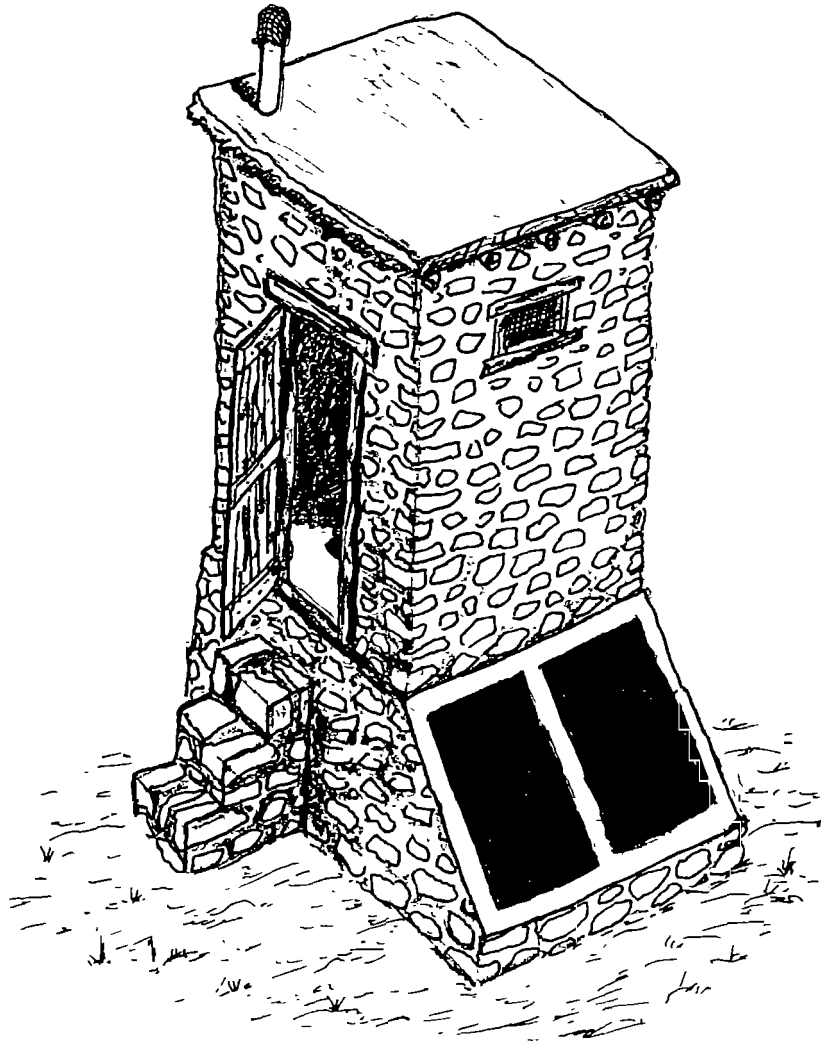


Figure 12 The solar compost latrine

