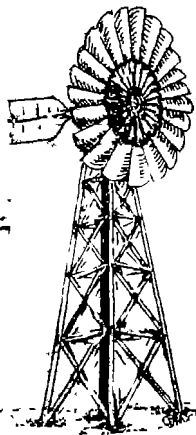


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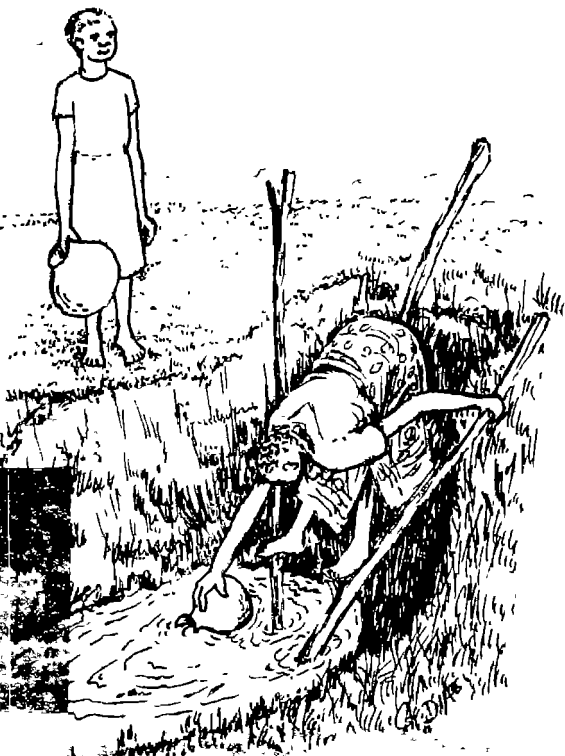


DEVELOPMENT OF WATER SUPPLIES IN SINGIDA REGION, TANZANIA

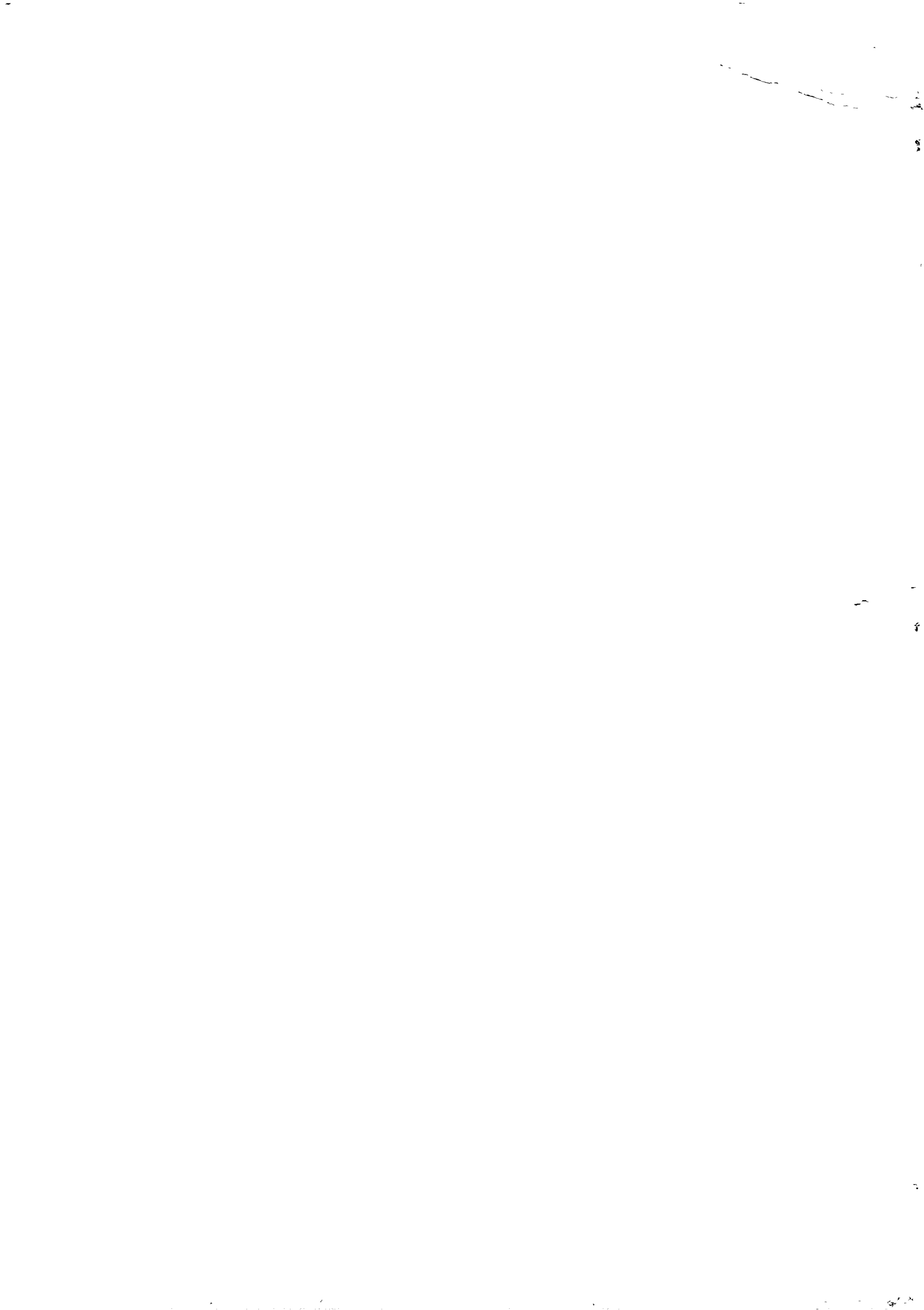
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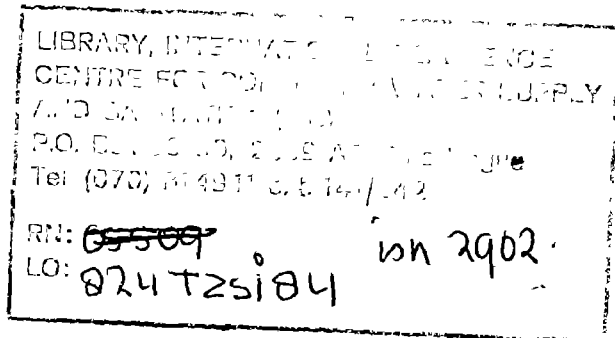


Institute of Resource Assessment
University of Dar es Salaam

Research Report No. 62

DEVELOPMENT OF WATER SUPPLIES IN SINGIDA REGION, TANZANIA
PAST EXPERIENCE AND FUTURE OPTIONS.

Ingvar Andersson
Carolyn Hannan-Andersson



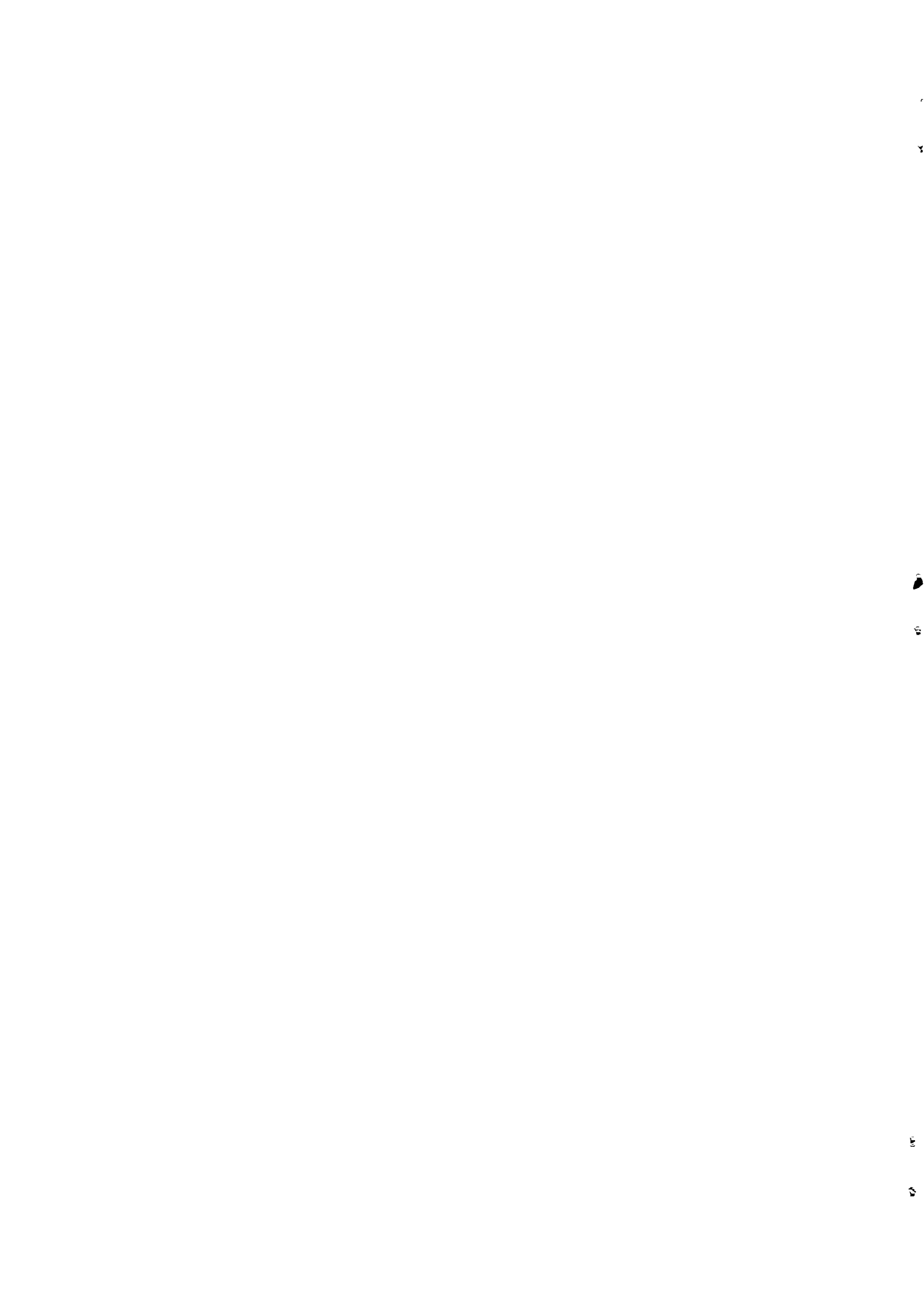
June 1984

Institute of Resource Assessment
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Tanzania



ABSTRACT

The water supply/sanitation/health situation in 3 villages in Singida Region was the focus of this study. The objective was to investigate general conditions and to identify the explicit needs of the communities. Relevant socio-economic data on production, livestock, ecological system, etc, is presented, as well as a historical overview of the developments in the water supply sector. Water-use patterns and standards of health, hygiene and sanitation were investigated in 75 households. An attempt was made to evaluate improvements to the water supply in two of the villages, i.e. the functioning of the supplies, the extent of utilization and the impact, e.g. on water use patterns, work burdens and general welfare and health. The effectiveness of the strategy for improving water supplies using shallow wells with handpumps is assessed. The aspects of density and location of supply are stressed as crucial for the achievement of impact. An alternative strategy is suggested - the improvement of all traditional sources both for domestic and non-domestic uses (livestock and small vegetable gardens). The motivation for and realism of such a strategy is discussed and a tentative plan for practical implementation is presented.



PREFACE

This report was produced in the context of a project on the development of domestic water supplies in rural areas in Tanzania, "Domestic water supplies: a vital component in Tanzania's rural development. A consumer-orientated study of selected schemes in four regions." This project currently being carried out by Ingvar Andersson and Carolyn Hannan-Andersson (1980-1984) is financed by a research grant from SAREC, the Swedish Agency for Research Cooperation with Developing Countries (9.49 u-forsk 80/78:2) and involves research cooperation between the Institute of Resource Assessment in Dar es Salaam and the Department of Social and Economic Geography at the University of Lund, Sweden.

This report should be seen as a complement to the report "Development of Water supplies in Singida Region, Tanzania. The realities for village women." by Carolyn Hannan-Andersson (1984).

The report is based on fieldwork carried out in 3 villages in Singida Region in November/December 1982 and January 1984. We have also made extensive use of the excellent background material provided by the work of Harold K. Schneider in 1959-60 and Marguerite Jellicoe in 1959-65. Both of these works contain the kinds of socio-economic data upon which all strategies for development, including improvements to water supply and sanitation, should be based. Although much time has elapsed since their fieldwork was carried out and some important changes have occurred in Tanzania, not least villagisation, it would appear that much of the information is still applicable today. This was confirmed by Jellicoe herself on a return visit to Singida in 1975. (Jellicoe, 1979:xii)

It must be noted here that the project described in the report "The Tanzanian Village Water Development Project" - a cooperation between the governments of Tanzania and Australia - is in the process of being closed down. This development is regrettable since there had been positive changes of direction within the project.

Our thanks are due to Professor Adolfo Mascarenhas, director of the Institute of Resource Assessment, Dar es Salaam, and to Olof Nordström at the Department of Social and Economic Geography in Lund, for the support given to the project. We are also grateful for the logistic support provided by the Project Manager, Glynn Roberts, and the staff of the Tanzanian Water Development Project in Singida.

The maps were drawn by Peter Lunkombe. The cover illustration by Mr G. Dias, and the typing was done by Ingrid Ekström. The Swahili translation of the summary and conclusions was prepared by Mr H. Mwansoko.

In addition, we wish to acknowledge our excellent field assistants, Augustine J. Yonah, Antonia Everest Msoffe and Joshua Malanga, and also the hospitality and openness of the people of Unyianga, Unyangwe and Nkhoiree villages.

Dar es Salaam
June 1984

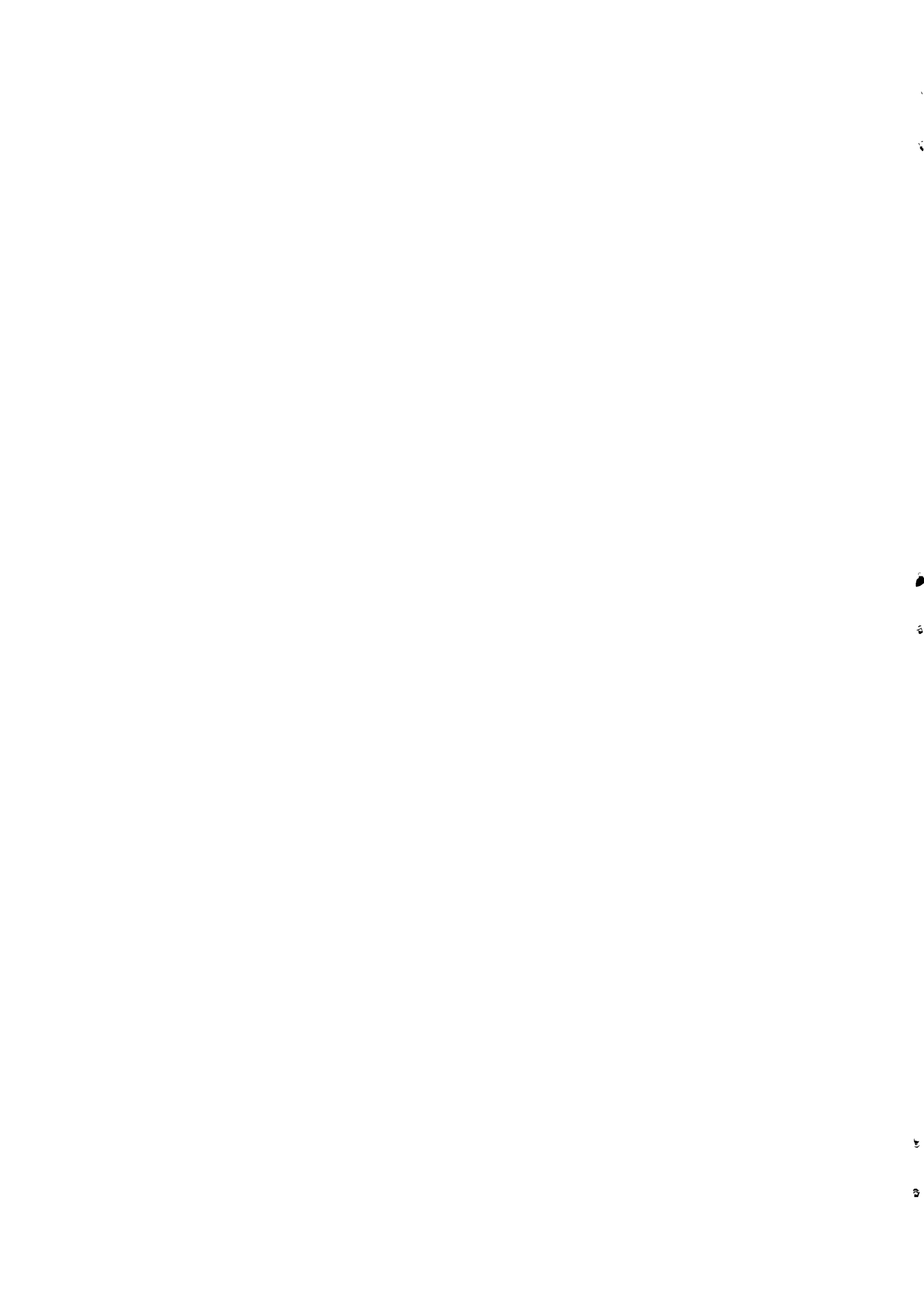


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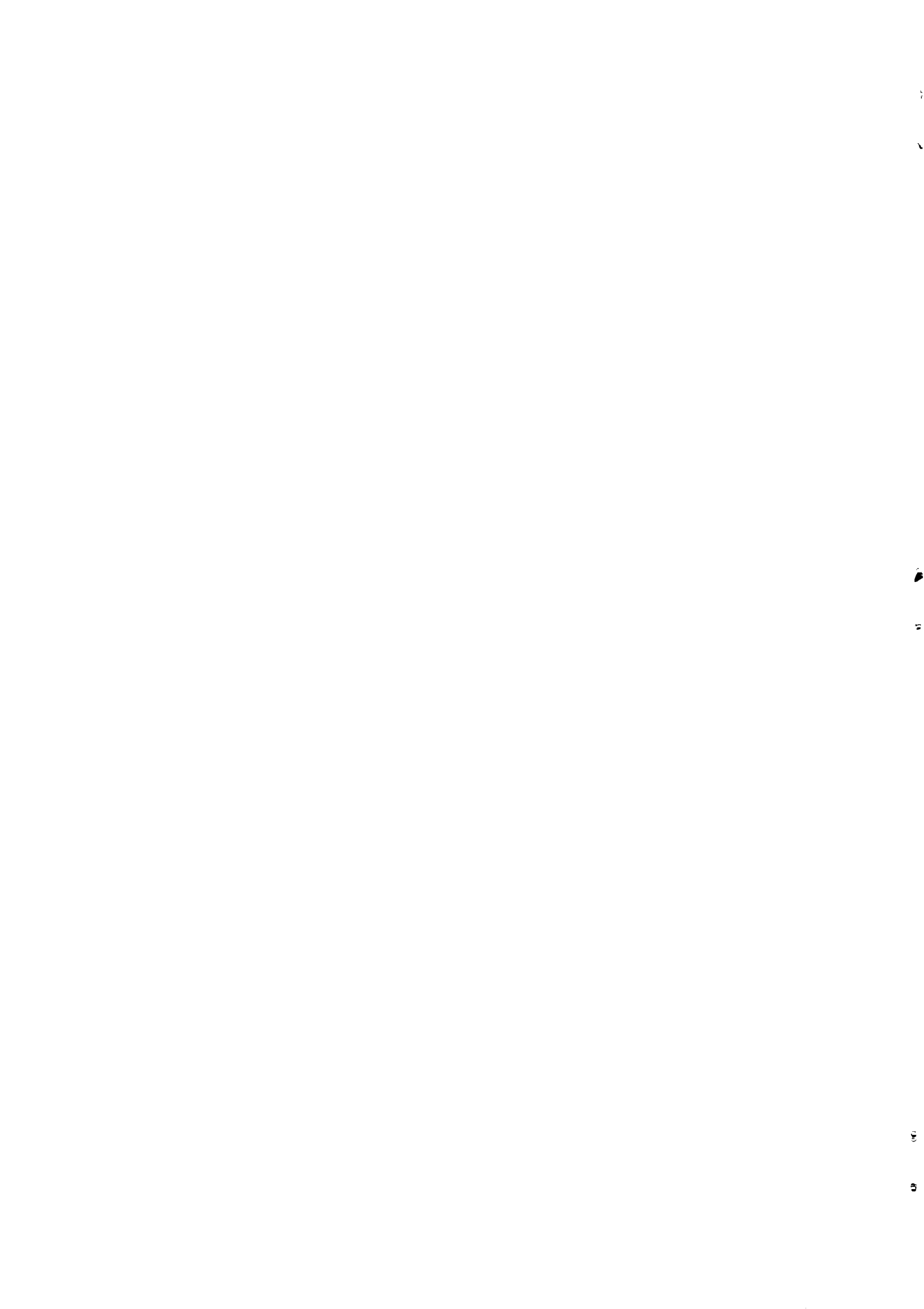
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MUHTASARI NA MAHITIMISHO

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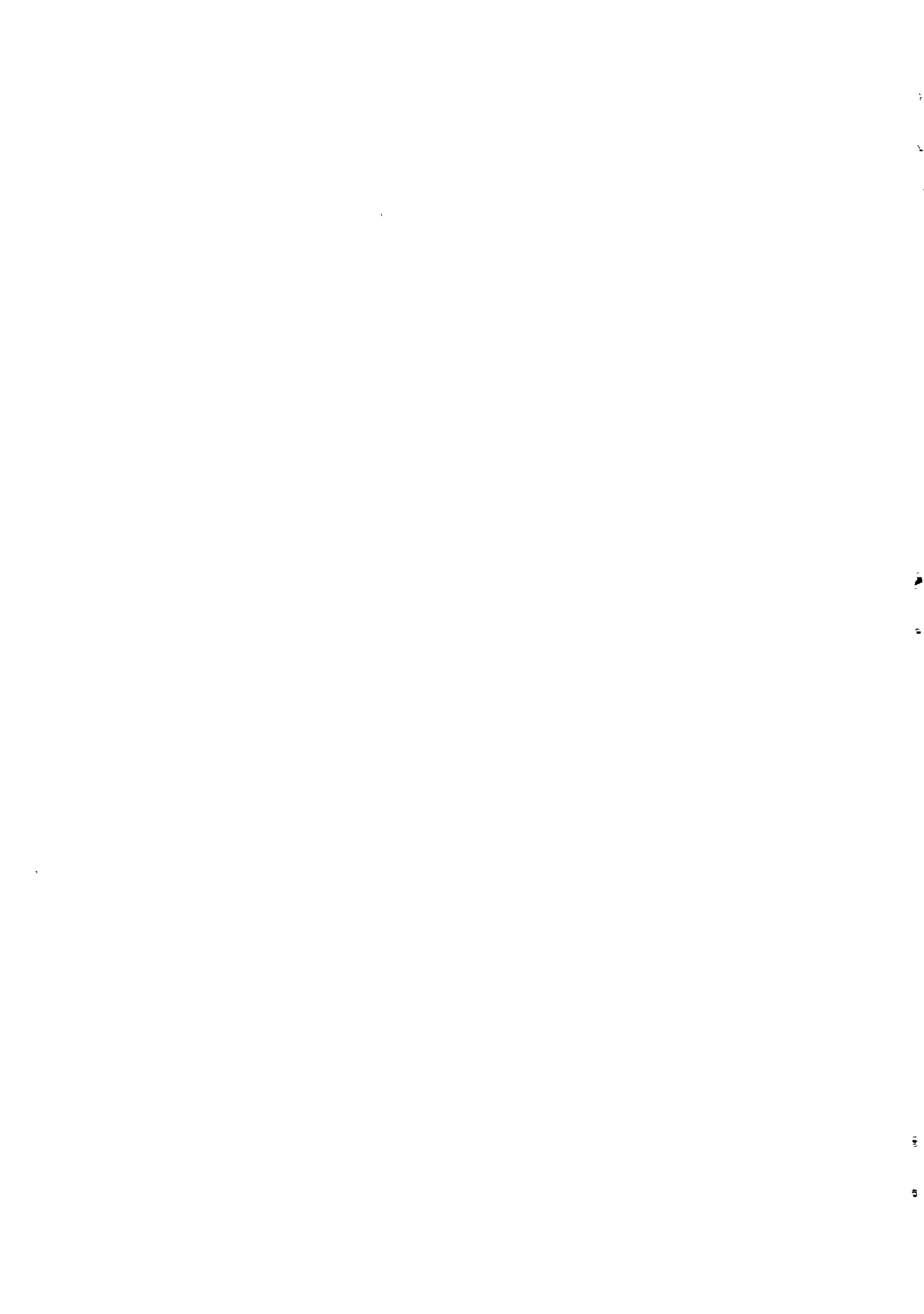
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1. Singida Region in Tanzania
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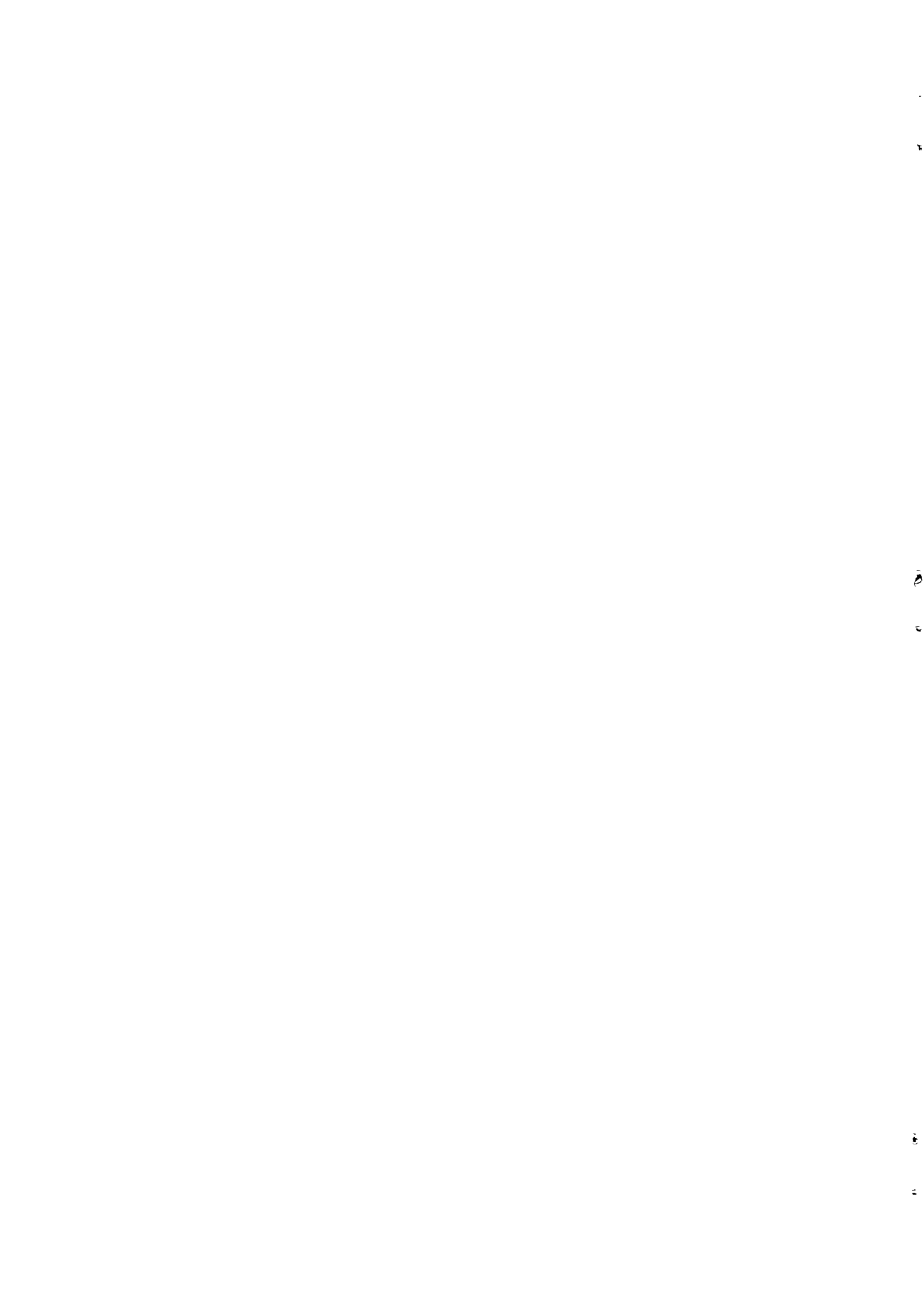
MUHTASARI NA MAHITIMISHO:

Jitihada zimefanywa ili kuendeleza ugavi wa maji, viwango vya afya na usafi baina ya Wanyaturu tangu miaka ya mwanzoni ya 1900. Mafanikio kidogo yamepatikana. Wakati haiwezekani kusema kuwa Wanyaturu wanapinga mabadiliko kama yalivyo, lakini ni kweli kuwa hawapendelei kukubali mabadiliko (mageuzi) yanayopindua mmo mfumo wa kimapokeo au yanayogharimu mmo kwa upande wa fedha, muda na juhudi. Iwapo mabadiliko yanatakiwa yafanywe basi faida sake lazima ziwe wazi na mbimu za utekelezaji wake zieleweke. Uwezo wa kuwasiliana na wakazi wa kila kaya ni muhimu. Hali kadhalika msingi wa kutosha wa maarifa juu ya mapokeo ni muhimu. Teknolojia sharti iwe ya gharama ndogo na inayolingana na mazingira zinamoishi jumuiya.

Katika kupanga maendelezi ya ugavi wa maji ni bora kuelewa umuhimu mkubwa kiuchumi na kihisia wa mifugo kwa Wanyaturu. Wakati msingi wa kuishi kwao ni uzalishaji wa mtama na mahindi, sifa kuu ambayo kwayo kilimo cha Wanyaturu kinategemea ni utiaji mbolea wenye mpangilio kwenye ardhi inayolimwa unaofanywa kila mwaka. Kwa hali hii ng'ombe ni wa lazima kabisa katika kudumisha mfumo wa kilimo na pia ni chanzo cha fahari, mapato na usalama, kwa wanaume na wanawake. Kutokana na hali hii maji kwa ajili ya mifugo yanapewa aula ya juu kabisa na Wanyaturu, na pengine kuchukuliwa kuwa ni muhimu zaidi kuliko maji ya matumizi ya nyumbani.

Hali ya ugavi wa maji katika vijiji 3:

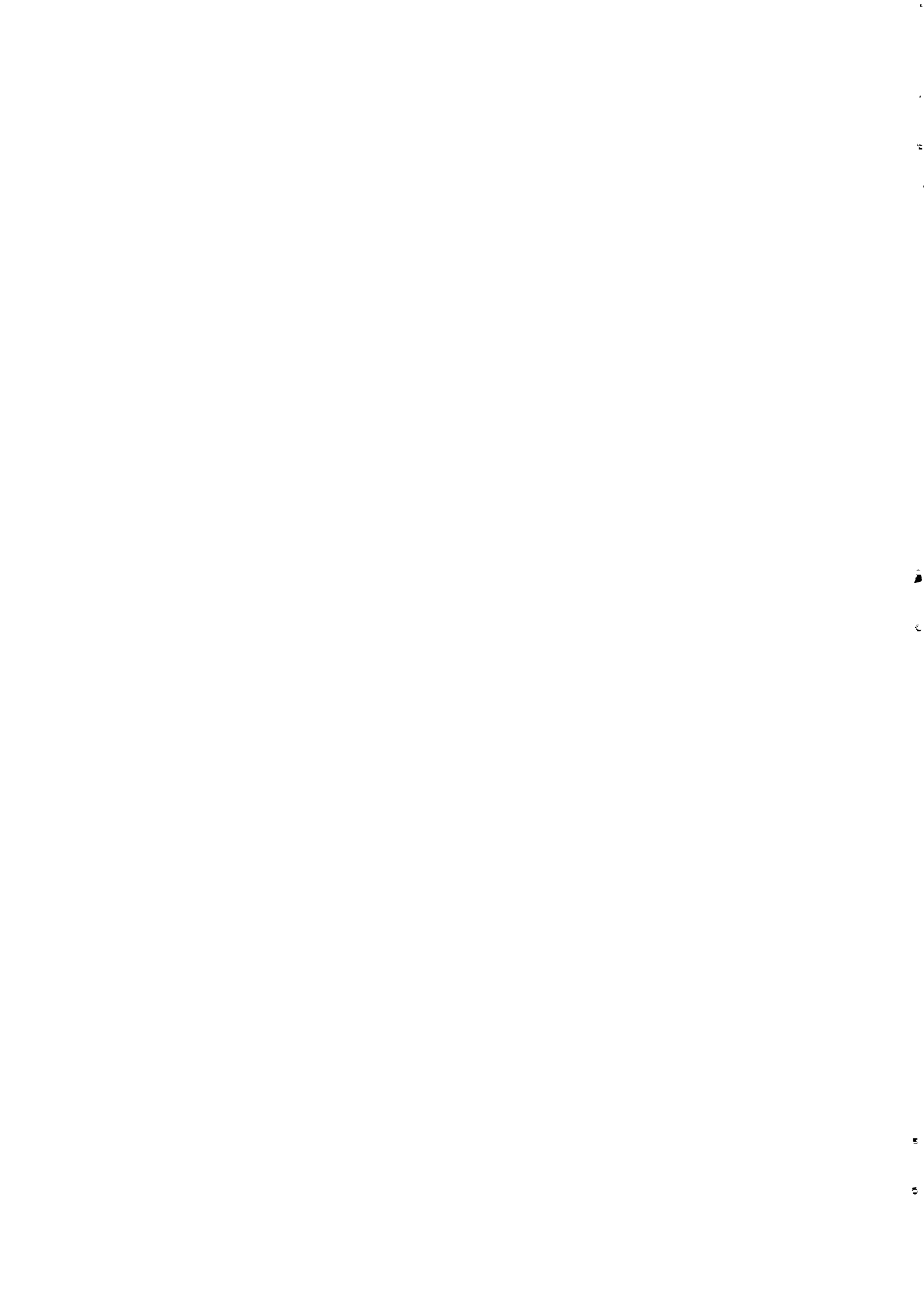
Katika vijiji vyote vitatu idadi kubwa ya kaya zinategemea vyanzo vya kimapokeo kwa ajili ya maji ya matumizi ya nyumbani. Hii ni pamoja na kwamba viwili kati ya vijiji hivi tayari vimeshapatiwa ugavi mzuri zaidi, kufuatana na mpango wa kuendeleza ugavi wa maji mkoani Singida. Vyanzo vya kimapokeo vinavyotumiwa ni vile visima vilivyochimbwa kienyeji kwa mikono. Uhora wa maji haya ni wa wasiwasi. Wakati ugavi ni mwingi kwenye majira ya masika, pengine vyanzo hivi hukauka kabisa wakati wa kiangazi, au maji hupenya (hujitokeza) polepole mmo na kulazimisha kuwepo kwa milolongo mirefu ya watu visimani. Visima tofauti huchimbwa kwa ajili ya ng'ombe. Vingi vya visima vya maji ya matumizi ya nyumbani tulivyovitembelea havikuzungushiwa maboma wala vizuzi vyovyote kuwazua wanyama, hivyo uchafuzi kutokana na ng'ombe mbwa na fisi unawezekana kuwepo.



Kijiji kimoja, Unyangwe, kilikuwa na ugavi ulioendelea zaidi na kusema kweli ulikuwa unafanya kazi wakati tukifanya utafiti. Kijiji hiki kilikuwa kimeshapatiwa pampu mbili za aina ya "kangaroo". Moja kati ya pampu hizi iliharibika muda mfupi baada ya kuanza kazi. Pampu ya pili imeendelea kufanya kazi bila matatizo. Kijiji cha Unyanga kina kinu kinachoendeshwa na upepo ambacho kina historia ndefu ya kuharibika na matengenezo ambayo kufanywa polepole sana. Mfumo wa pili wa ugavi uliopangwa kwa ajili ya kijiji hiki bado haujamalizika na hauna mategemeo ya kukamilishwa kutokana na ugavi usiotosha wa maji. Kijiji cha Mhoiree bado hakijapata ugavi wowote mzuri lakini upimaji umeshafanywa.

Maendelezi yaliyokwisha fanywa kwenye vijiji viwili, Unyanga na Unyangwe, hayakutosha kabisa. Pampu mbili zinazosukumwa kwa miguu katika kijiji chenye wakazi 1671, na kinu kimoja kinachoendeshwa na upepo kinachotoa maji kwenye eneo moja tu la wakazi na kwenye hori la ng'ombe kwa kijiji chenye wakazi 2158, bila shaka haviwezi kukidhi mahitaji ya jumuiya. Hata kama ugavi wote uliendelezwa unafanya kazi ni asilimia ndogo tu ya wakazi inayofaidika. Na ukichanganya na matatizo yanayotokana na uharibikaji wa mashine asilimia hii inapungua zaidi. Inawezekana kusema kwamba athari ya maendelezi yaliyofanywa haikuwepo. Kaya zinazotumia ugavi ulioendelezwa na zile zinazotumia vyanzo vya kinapokeo zilikuwa na hali inayofanana kabisa katika matumizi ya maji, namna na viwango vya ^{elimu}afya, ~~siba~~ na usafi. Kushiriki kwa jumuiya kulikuwa kidogo sana na karibu hakukuwa na habari yoyote (kubusu maendelezi yaliyopangwa, matumizi ya ugavi uliondelezwa au masuala ya kiafya) iliyopokelewa. Hakukuwepo na mwingiliano wowote baina ya maendelezi haya na elimu ya afya au pembejeo za usafi. Kutokana na hali namna hii haishangazi kuona kwamba kuna athari ndogo tu.

Asilimia ya kaya zinazotumia ugavi uliondelezwa (wakati unapofanya kazi) ilionyesha kuridhishwa na ubora wa maji. Wakazi walidai kuwa kuumwa matumbo kulipungua wakati ugavi ulipokuwa unafanya kazi. Malalamiko makubwa kubusu mfumo iliyoendelezwa yalikuwa kwamba mfumo hiyo haikutosha kukidhi mahitaji ya jumuiya. Kulikuwepo pia na malalamiko mengi juu ya utengenezaji wa polepole wakati pampu

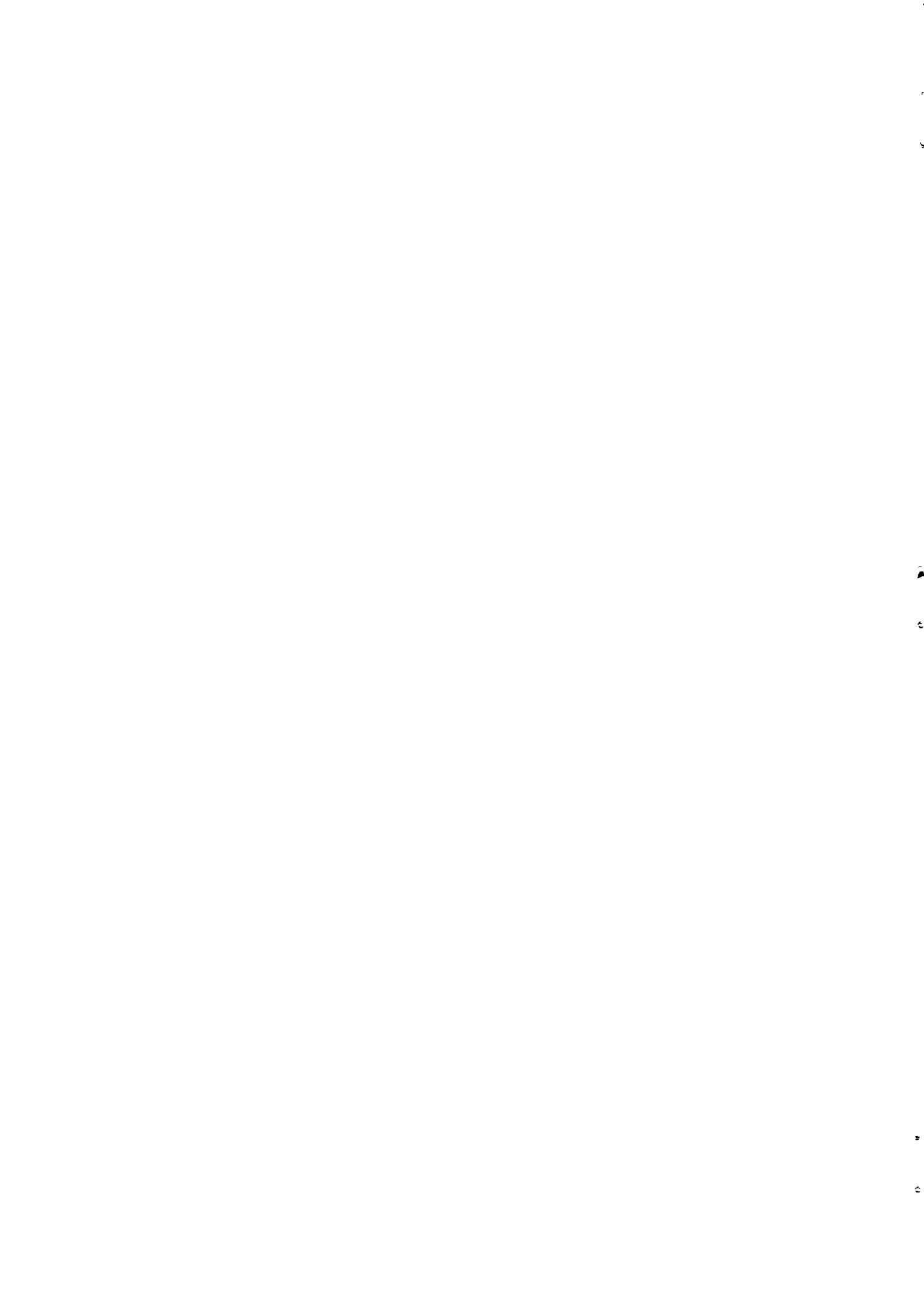


na vimu vya upepo vilipoharibika. Mapendekezo yaliyotolewa kufanya hali iwe nzuri zaidi yalikuwa kujenga visima zaidi vya pampu za mikono ili viwe karibu na kaya zote. Asilimia ndogo tu ya kaya katika kijiji cha Nkchoiree (ambacho bado hakijapatiwa ugavi wowote ulioendelezwa) iliitegemea serikali kuleta maji ya bomba.

Kaya katika vijiji vyote 3 zilipeleka kiasi kidogo sana cha maji kwa matumizi ya nyumbani. Wastani wa "PCC" ulikuwa wa chini kiasi cha lita 8.7 kwa mtu kwa siku (kukiwa na kiwango cha lita 2.6-20). Hata hivyo lazima ijulikane kuwa ufuaji mwingi wa nguo ulifanywa visimani na hivyo kiasi cha maji kilichotumika kwa shughuli hii hakikujumuishwa kwenye mkokotoo wa "PCC" uliofanywa hapo juu. Juu ya hapo, baadhi ya ucgaji ulifanyika pia kwenye vyanzo. Lakini hata kama lita hizi za nyongeza zingejumuishwa bado "PCC" ingekuwa mbali kabisa kutoka kwenye kiwango kilichoshauriwa (kilichopendekezwa) cha lita 20.

Juu ya matumizi madogo, ambayo hayakuonyesha kubadilika sana wakati kaya zilipotumia ugavi ulioendelezwa, utumiaji wenyewe wa maji humo majumbani uliwezesha kujinuliza maswali mengi. Viwango vya elimu siha ya watu vilikuwa duni sana. Hali ya usafi bado inatatanisha, kwani ni vigumu kukadiria matumizi halisi ya vyoo kwenye uchunguzi wa muda mfupi kama huu. Hata hivyo inadhaniwa kwamba wakazi wa kaya wanatumia msitu kwa kiwango kilekile wanachotumia vyoo, hasa kwa sababu vyoo vingi havikuwa na faragha wala usalama wa kutosha kwa matumizi ya mara kwa mara. Hali ya vyoo ni duni sana kwa kulinganisha na hali ya ujumla ya nyumba. Ilikuwa wazi kuwa pembejeo katika elimu ya afya kwa uwiano wa afya na maji, siha na usafi wa watu binafsi zinahitaji kwa haraka sana. Pembejeo za namna hii lazima ziambatane na maendelezi ya ugavi wa maji.

Hali ya afya kama ilivyoonyeshwa kutokana na kuzisaili kaya 75 si nzuri. Kulikuwa na kuumwa kwingi kwa matumbo kwenye eneo na pia kichocho, malaria na baadhi ya magonjwa ya ngozi na macho. Kuhara vilevile ni tatizo ingawa si kaya zote zililionga kuwa ni tatizo kubwa. Jambo hili lazima likusishwe na viwango vinavyotofautiana vya elimusiha ya watu binafsi katika kila kaya pekee, kwani bila shaka mara nyingi kuhara kunaambukizwa kutoka mkazi mmoja wa kaya hadi mwingine kutokana na elimusiha duni - kwa mfano katika utayarishaji na uandalizi wa chakula, katika mazoea ya watu wote kunawa mikono katika bakuli moja la maji kabla ya kula, katika kunywa kwa kutumia dundu moja au kutosa mikono kwenye maji ya kunywa, na kutonawa mikono baada ya utajitakamwili.

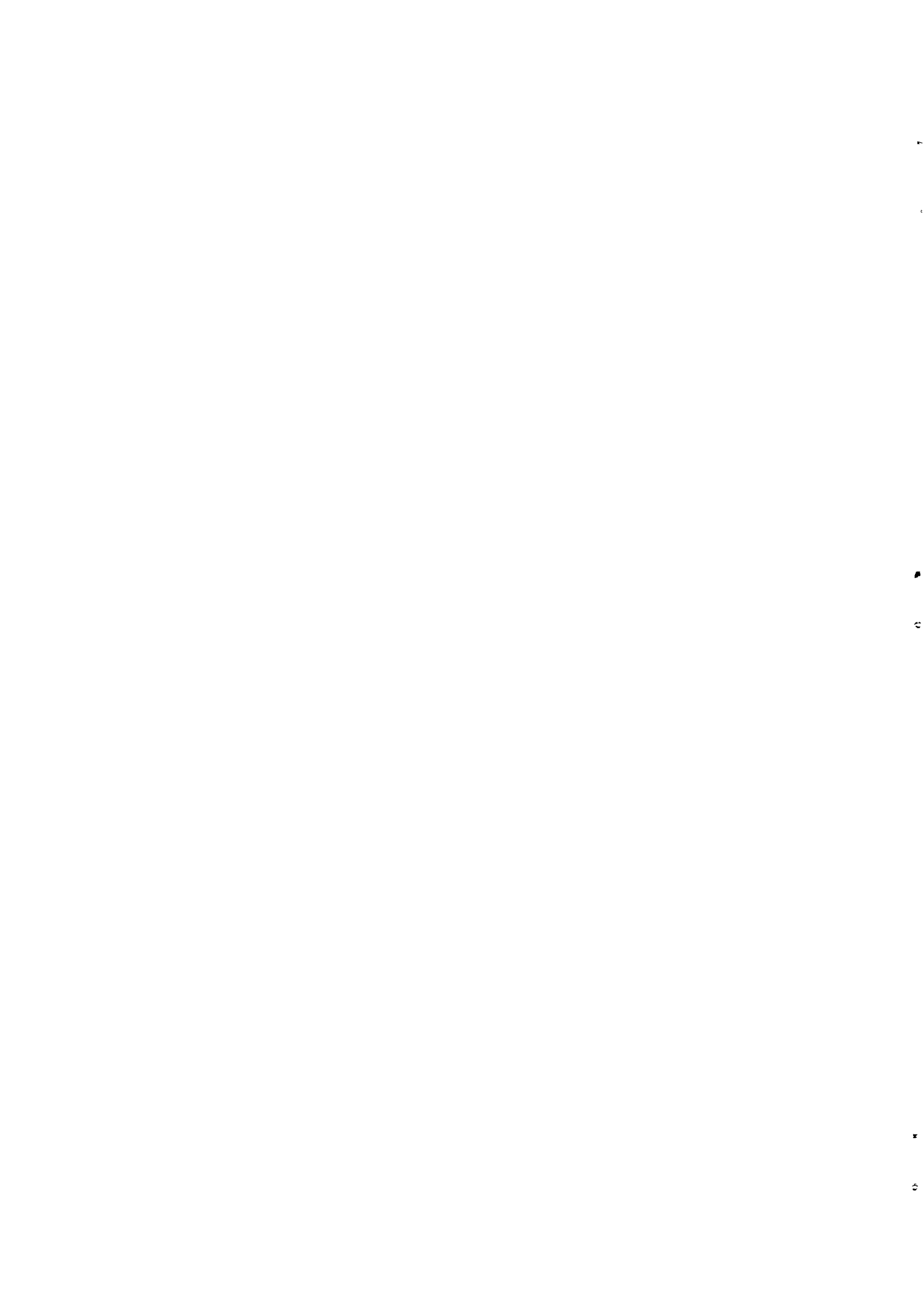


Mkakati wa sasa wa Singida:

Mkakati wa sasa mkoani Singida ni kutilia mkazo visima vifupi vyenye pampu. Hii inaambatana na mwelekeo wa kutilia maanani teknolojia za bei nafuu zinazofaa. Hata hivyo katika ripoti hii imeonyeshwa kuwa mkakati huu una vikwazo kadhaa ambavyo vinazulia utekelezaji wake ikiwa utafanywa kwa kiwango kikubwa. Ukichukuliwa kama njia mojawapo tu katika mpango wa maendelezi ya ugavi wa maji, mkakati huu una thamani kubwa. Lakini ukiwa ndio mkakati pekee unaotumiwa faida zitakazopatikana zitakuwa kidogo. Kitakachofungamana na mkakati wa nama hiyo ni kiwango cha chini cha ufikio kwa sababu ya hali ya mazingira inayotawala mahali vilipo visima na pia kwa sababu ya itikadi ya kisiasa ambayo inatilia mkazo usawa wa ugawanyaji baina ya vijiji kinyume na usambazaji unaotosheleza wa ndani ya kila kijiji pekee. Matatizo ya kifedha vilevile yana nafasi kubwa katika kusababisha upungufu wa pembejeo. Ili kupata faida mintarafu maendelezi ya afya na kuongezeka kwa nafuu kwa watumiaji ni muhimu kwamba wakazi wote wa jumuiya wafikiwe. Lakini matatizo yanayoletwa na malengo ya kisiasa na hali halisi ya kiuchumi ya sasa nchini Tanzania yanakufanya kufikiwa kwa malengo kwa kutumia mkakati wa sasa kusiwezekane.

Uzoefu kutoka Singida waelekea kuonyesha kwamba matatizo mawili makubwa ni mabali vilipo vituo vya ugavi na msongamano wake. Hakuna visima vya kutosha vijijini kuhudumia jumuiya yote na mabali vilipo visima hivyo hapatoi mategemeo ya kuendeleza ufikio. Mara nyingi kinyume chake ndicho kinachotokea. Faida pekee anayoipata mtumiaji ni ubora ulioongezeka. Lakini hali ya chini ya kuaminika kwa ugavi ulioendelezwa (inayoambatana na upungufu wa mfumo wa matengemezo) inamaanisha kwamba hata ubora wenyewe wa maji hauwezi kuwa wa hakika. Wakati visima vinapoharibika watumiaji hulazimika kurudia kuvitumia vyanzo vya kimapokea vilivyochofuliwa zaidi.

Kutokana na matatizo haya athari ya mpango wa ugavi wa maji ulioendelezwa kama ulivyotekelezwa mkoani Singida yaelekea kuwa ndogo. Kwakuwa mifumo mipya haiwezi kushindana na vyanzo vya kimapokeo mintarafu urahisi wa ufikio na kuaminika hakutakuwepo na "mabadiliko kamili" kuelekea kwenye ugavi ulioendelezwa. Vyanzo vya kimapokeo vitaendelea kutumiwa na faida zote za



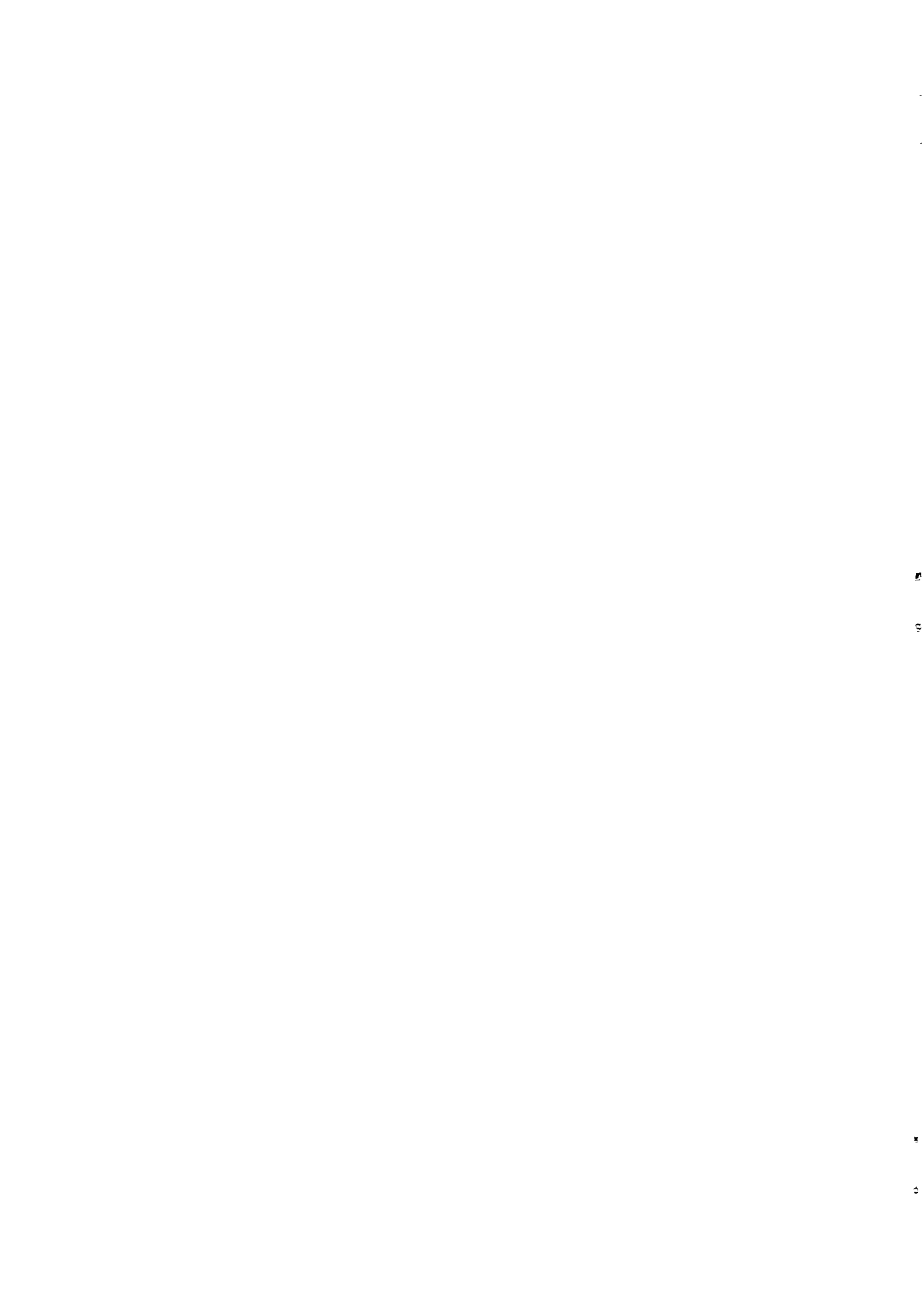
kiafya zitakataliwa. Kwakuwa hakuna vituo vya kutosha vya ugavi ulioendelezwa kukidhi mahitaji yote ya jumuiya, faida za upeo mintarafu afya iliyo bora zaidi na nafuu iliyoongezeka hazilwezi kufikiwa.

Mkakati mbadala: uendelezaji wa vyanzo vya kimapokeo?

Ukichukua hali ya kiuchumi na malengo ya kisiasa kwa upande mmoja, na ulazima wa kufanya ugavi wa maji uwe bora kwa wakazi wote wa jumuiya kwa upande wa pili, itaonekana kwamba mkakati unaofaa zaidi utakuwa ni uendelezaji wa vyanzo vya kimapokeo vilivyopo. Mwanzo wa kuendeleza ugavi wa maji itakuwa ni orodha ya vyanzo vya kimapokeo ambavyo tayari vinatumika. Utekelezaji utajihusisha na kuonyesha ni vingapi kati ya vyanzo hivi vinaweza kuendelezwa ili vitowe maji yaliyo bora, mengi na yanayotegemewa zaidi. Maendelezi yanaweza kuwa ya namna mbalimbali - kuongeza urefu wa visima na kuvilimarisha kwa majenzi ya sementi, na pale ambapo ni lazima kabisa kuviwekea pampu za kuendesha kwa mikono au miguu. Mkakati huu haukatai kabisa visima vilifupi na pampu, bali unayafaa mambo haya kama mbadala unaowe-zekana wa maendelezi.

Sababu za kutumia mkakati huu kwa kifupi zinaweza kuwa zifuatazo:

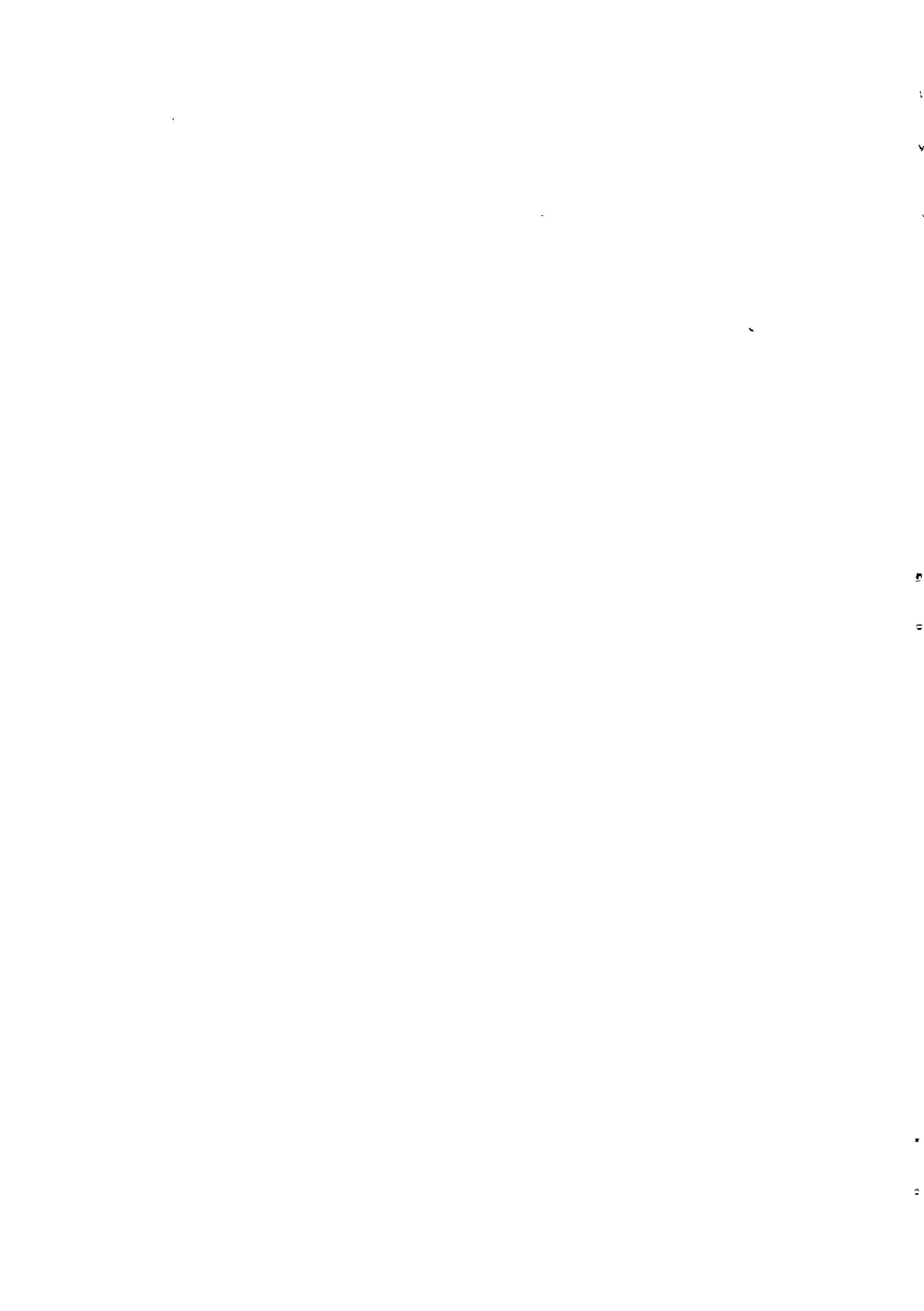
1. Kwa sasa unaonekana kuwa ni njia pekee ianyowezezekana ya kuleta athari ya maana, yaani kuleta faida kwa wote au kwa wakazi walio wengi zaidi katika jumuiya mintarafu upatikanaji wa mahitaji yanayotakiwa, upunguzaji wa mzigo wa uchukuzi wa maji na uendelezaji wa afya.
2. Unaambatana na mitindo ya kimapokeo ya matumizi ya maji na unabakisha kiondosha hatari cha asili katika uzoefu wa kutumia vyanzo vingi.
3. Unawezesha kuishirikisha jumuiya, hasa kuwashirikisha wanawake.
4. Ni teknolojia ya bei nafuu sana na hivyo inalingana na hali halisi ya kisiasa na kiuchumi ya Tanzania ya leo.
5. Itawezekana kuendeleza vyanzo kwa ajili ya matumizi yasiyo ya nyumbani, ikiwa ni pamoja na maji kwa mifugo.



6. Mwisho iwapo kushirikishwa kwa juu kabisa na pembejeo nyingi zitaweza kupatikana, hii itawezesha kuenea katika jumuiya nyingine uhitaji na nguvu inayotakiwa kuchochea ushirikishwaji wa jumuiya katika kutatua matatizo yao.

Faida kwa watumiaji lazima zitakuwa nyingi. Ufikio hautabadilika (mpaka ufikio huu mgumu urekebishwe) na namna ya uchukuzi wa maji kimsingi itabaki ileile. Watumiaji tayari wamejiambatisha na vyanzo kwani vimechaguliwa na wanavijiji wenyewe kuwa vimo katika maeneo yaliyo mazuri kabisa, na vingi vimekuwa vikitumiwa kwa muda mrefu. Maendelezi yoyote madogodogo bila shaka yatafurahiwa. Faida kubwa watakozopata watumiaji zinahusiana na utegemezi mkubwa na ubora zaidi wa maji. Wanavijiji wangeweza kushiriki katika upangaji na utekelezaji wa maendelezi na uendesaji na utunzaji umo katika kiwango cha uwezo wao. Mfumo wa utunzaji ulio changamano na tata hautakuwa wa lazima. Kwakuwa viingizia mali vya palepale vinavyohusu ujuzi, watumishi na vifaa ndivyo vinavyotumika, kushiriki kwa mkabala wa "chaguo la mtumiaji" kunaweza kutekelezwa na gharama zikabakia kuwa za chini kabisa. Ukweli kwamba vyanzo kwa ajili ya ng'ombe vitatiliwa mkazo utafurahiwa sana na Wanyaturu.

Ingawa maendelezi haya ni rahisi hata hivyo kuna ulazima wa kupanga vizuri. Hasa lazima kuangalia vema mambo kama vile aula ya mahitaji ya wakazi, gharama na michango, umiliki n.k. Masuala ya uongozi ni muhimu na muundo wa mpango wenyewe lazima uweze kuruhusu mabadiliko kulingana na mazingira ya mahali penyewe. Vipengele vya afya na usafi vya mpango wa namna hiyo lazima vitiliwe maanani na vilingane na mazingira halisi. Kushindwa kwingi kwa maendelezi ya ugavi wa maji mpaka sasa pengine kwa sehemu fulani kunaweza kuwa kumesababishwa na ukosekano wa maarifa ya undani wa maisha ya kila siku ya jami za mashambani, maarifa ambayo ndiyo yangekuwe chanzo cha upangaji wa maendelezi ya hali za maisha bora. Hivyo msingi wa kutosha wa maarifa ni sharti la kwanza kwa ajili ya kupanga maendelezi yanayofaa, uwezekano wa kushiriki kwa jumuiya na pembejee zinazofaa za elimu ya afya na usafi.



1. INTRODUCTION

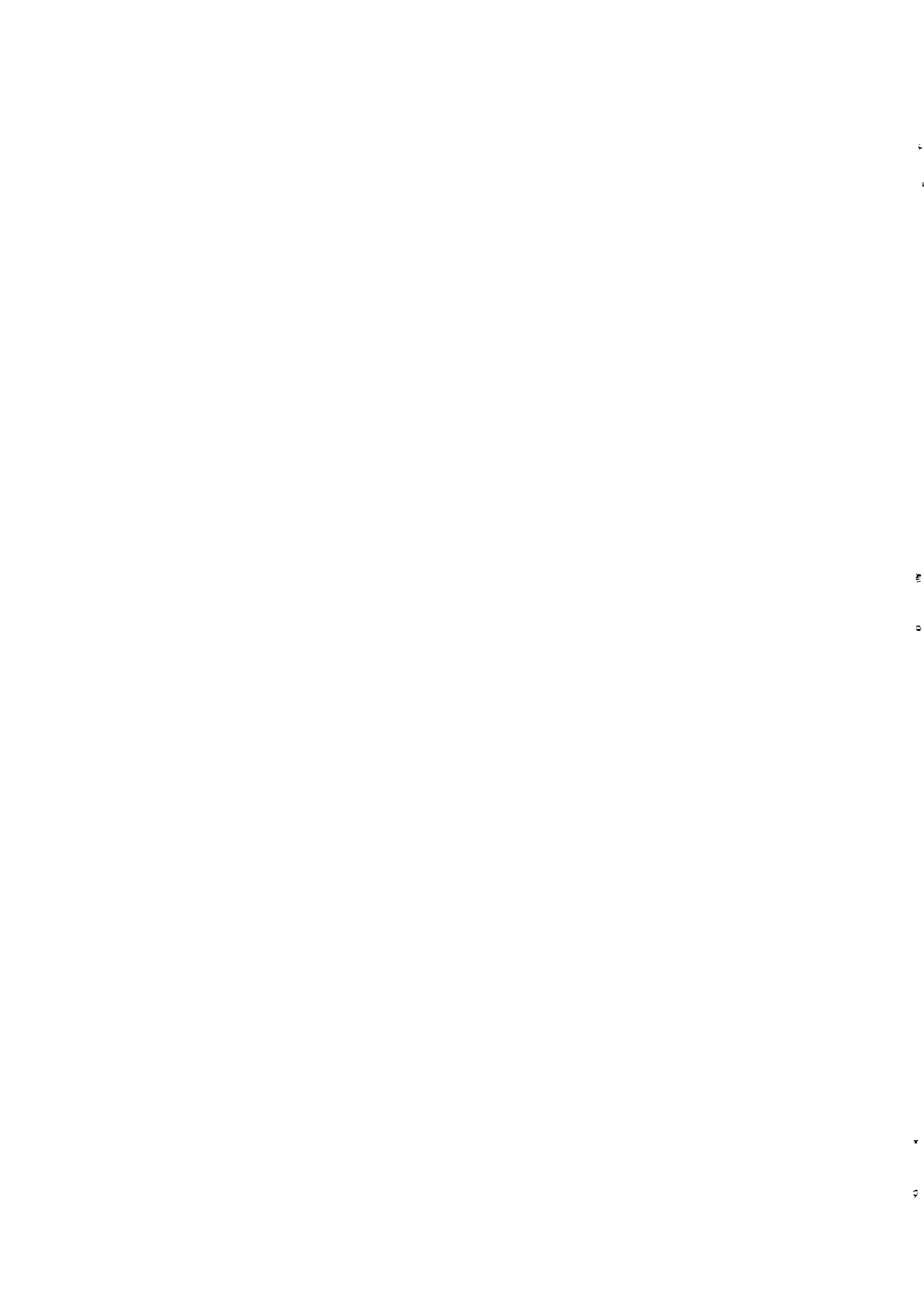
1.1 Improvement of water supplies, the goal and strategy

The goal of improving domestic water supplies, now widely advertised by the advent of the International Drinking Water Supply and Sanitation Decade, is to bring a saving of time and energy for women, to improve public health and to release women's productive energies for other tasks than collection of water. There has been much discussion as to whether these benefits can be automatically expected with the installation of improved water supplies. It is now widely accepted that the improvement of the water supply alone cannot bring these benefits. In particular there is a need for related improvements to the environmental and sanitation conditions in the communities. As well there is a need for health education efforts to concentrate on the relationship of health and water and to attempt to improve standards of personal hygiene.

There is a growing acceptance of the fact that, for many people in rural communities, it is difficult to compartmentalize the water problem (as the experts tend to do) into water for domestic use, water for livestock and water for small-scale irrigation. Especially for agro-pastoralist groups the water for cattle is extremely important, perhaps more important than improved supply for domestic use. Schemes for improving water supply in certain areas might well be rejected by the local people if no consideration is given to the needs for water for other activities.

There is still a general tendency to treat the problem of water supply as the major issue in rural communities, and the improvement of water supplies is thus often seen as the ultimate goal. This is because of a confusion of strategies and goals. Inadequate water supply is only one of the problems experienced by rural communities, and in many cases not even the most important one. To improve the water supply is one strategy to improve living conditions and stimulate development. By itself it cannot achieve these goals. There are many other factors involved. All too often the developmental approach used is to compartmentalize development, when what is needed is an integrated approach which tackles the problems on a number of fronts simultaneously, starting from those which have the highest priorities for the communities concerned. Water supply projects may be rejected if other, more pressing, problems are left unattended. Village life is complex and the problems experienced are all inter-related. It is not possible to stimulate development by isolating one problem and concentrating all efforts on that particular aspect, be it water supply, firewood supply or whatever. The piecemeal approach cannot succeed, especially since many of the developmental problems in rural communities are related to the general poverty of the communities. Such aspects as low level of production, poor condition of livestock, high incidence of disease, malnutrition, inadequate sanitation facilities, poor housing conditions, poor standards of personal hygiene, low level of literacy and generally unsatisfactory environmental conditions, are all important factors which must be taken into account.

In most cases because of the piecemeal approach development funds are allocated to one sector at a time. Thus even when it is blatantly clear that a particular village needs assistance with health services, transport or livestock management, the funds are available for wells and handpumps only. Ideally of course funds should be diverted to alleviate the need felt to be most pressing by the community itself. However this is not possible. The funds are ear-marked for water, and the water supply will be constructed,



with or without the enthusiasm of the community itself. In such a situation, even if the need for improved water supply is very evident to the outside observer, it is obvious that a great deal of effort will have to be put into discussions and motivation/promotion aspects with the villagers, in order to facilitate acceptance of the improved water supply.

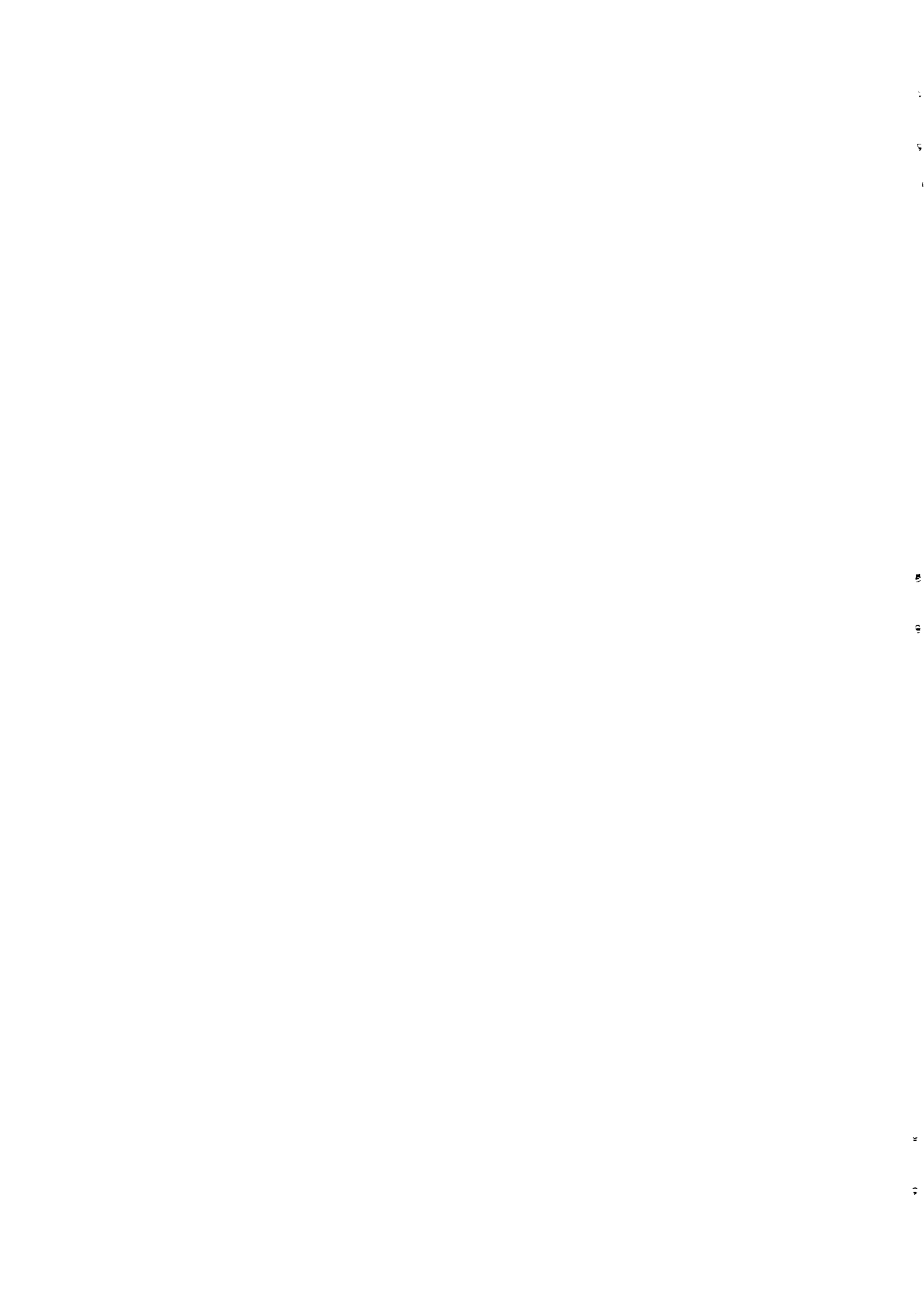
There is increasing emphasis on the importance of "felt needs" in stimulating development in rural areas. This means that before efforts are made in rural communities there should be an expressed "felt need" by the community itself. Ideally the initiative and request should come from the community. However the reality is seldom so. Once, for example, a water supply programme is underway in an area, there is usually a certain rate of implementation which must be achieved (in the name of efficiency and economy), and the idea of the villager's perceived needs usually takes second place. In theory the concepts of "integrated development" and "felt needs" are essential elements in bringing about social change. In reality development is sectorised and while community participation and the importance of community initiative are given lip-service, the decision is taken from outside (usually on a national scale) as to what the villages need. In the best of cases efforts are made to motivate the improvements undertaken; in many cases the projects are presented on a "take it or leave it" basis. Under such circumstances the chances for achieving the goal of stimulating development are very slight.

1.2 Improvement of water supplies: The impact

Given the lack of integrated development efforts and the poor implementation of community participation (including a lack of local initiative), it is not surprising that the impact of efforts in the improvement of water supply has been limited. When development is applied from above there is little spin-off effect. The rural communities have come to expect that impulses will come from above, and are embittered when they are not forthcoming. In many areas local initiative is non-existent. Inputs into communities such as water supply improvements and health education programmes have little impact.

The attainment of the specific goals of improved water supply - increased convenience, improved health and increased production - are difficult to measure. Before any impact can be measured the functioning and utilization of the improvement must be assured (WHO:1983). In many areas of Tanzania both the functioning and utilization are poor, in some cases due to poor motivation of the communities, and in others because of the inappropriateness of the improvements. In recent years much emphasis has been placed on "appropriate" technologies. The hey-day of complicated, expensive piped supplies which relied on diesel power has passed. The fuel supply position and general economic situation in the 70s indicated that rather drastic changes in approach were required if any impact was to be achieved. As pointed out by Ahman (1981) the magnitude of the task required *"a qualitative, not just a quantitative change in methods of delivery"*. There is an obvious need for new approaches in technology and management. Lower standards of service, lower unit costs as well as a much expanded mobilization of the local community are now prerequisites for attainment of impact from improved water supply.

One low-cost alternative which has received much attention internationally is that of shallow wells with handpumps. Within Tanzania this technology type has been implemented on a relatively wide-scale in Shinyanga, Morogoro, Mtwara/Lindi, and to a lesser extent in Mwanza, Tanga and Singida regions. Shallow wells with handpumps have been considered for implementation on a nation-wide scale. However it is proposed in this report that impact from the shallow-wells with hand-pumps strategy is limited. The most appropriate



level of technology has not yet been reached, i.e. a technology type which will allow for maximum attainment of impact in terms of improved convenience, improved health and possibilities for increased production.

1.3 Objectives and methods of this study

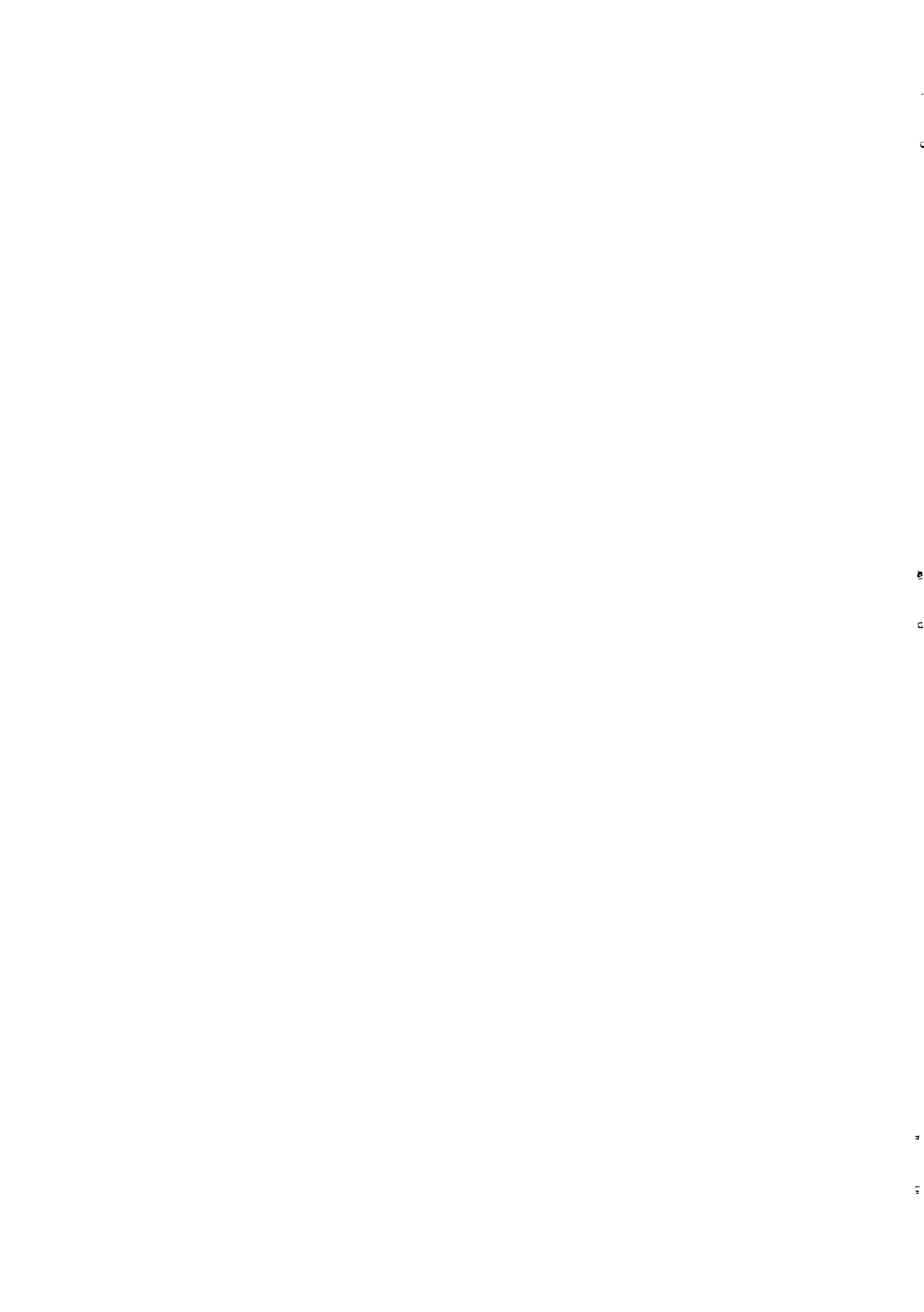
Generalisations on water supply and sanitation on a world-wide or even national level are of limited value. The differences between and within countries are very apparent. All too often the information available has been inclined to reflect national aspirations rather than real accomplishments, and is too often based on data on expenditures and plans rather than on the results of monitoring and evaluation of water supply improvements already in operation. (White and White:1981) In order that necessary changes in approach can be designed and implemented, evaluation of concrete experiences are needed to provide an information base for a reappraisal of approach. The information, which is required, is on functioning, utilization and the impact of improved supplies.

This information must be collected at the local level to ensure that an accurate picture of the situation is obtained. This is because, even within one country, the differences physically, socially, economically, culturally, are enormous. Only a focus on the micro-level can take into account the diversity of local conditions which greatly effect the options feasible and the level of acceptance and utilization. Such an approach is also necessary to ascertain the possibilities for integration of water supply improvements with other development programmes at the local level.

While it is impossible to carry out research on each individual community within Tanzania, research which is carried out must be at the level of individual communities in order to shed light on the general quality of life, the problems experienced and the priorities of the people themselves. General patterns for the different areas within the country can be established, and these can be used as the basis of further planning within that area.

The objective of this study was to focus on 3 communities to investigate the general living conditions and identify the explicit needs of the people. Two of the communities had received improved water supplies, while the third would receive improved supply in the near future. An attempt was made to evaluate the improvements - to determine the extent of utilization, the functioning of the supplies, and to assess the impact. Water consumption, water use patterns and standards of health, hygiene and sanitation were investigated. In addition the strategy applied in the area, shallow wells with handpumps was evaluated in the light of the experience in these three communities.

Fieldwork was carried out during two periods, November/December 1982 and January 1984. It was an advantage to revisit the communities after a period of one year had passed. However it would have been beneficial to visit the area during the dry season as well. Within the three communities several meetings were held with village leaders and a number of households (25 in each village) were selected for in-depth informal interviews. Thus a total of 75 households were visited in the three communities, and of these 34 were visited twice. In most cases both husband and wife were present for most of the interview. An attempt was made to achieve a reasonably representative sample - i.e. not too many of the well-off households or those holding political positions. In addition the sample was spread geographically as widely as possible, especially in terms of distance from the various water sources.

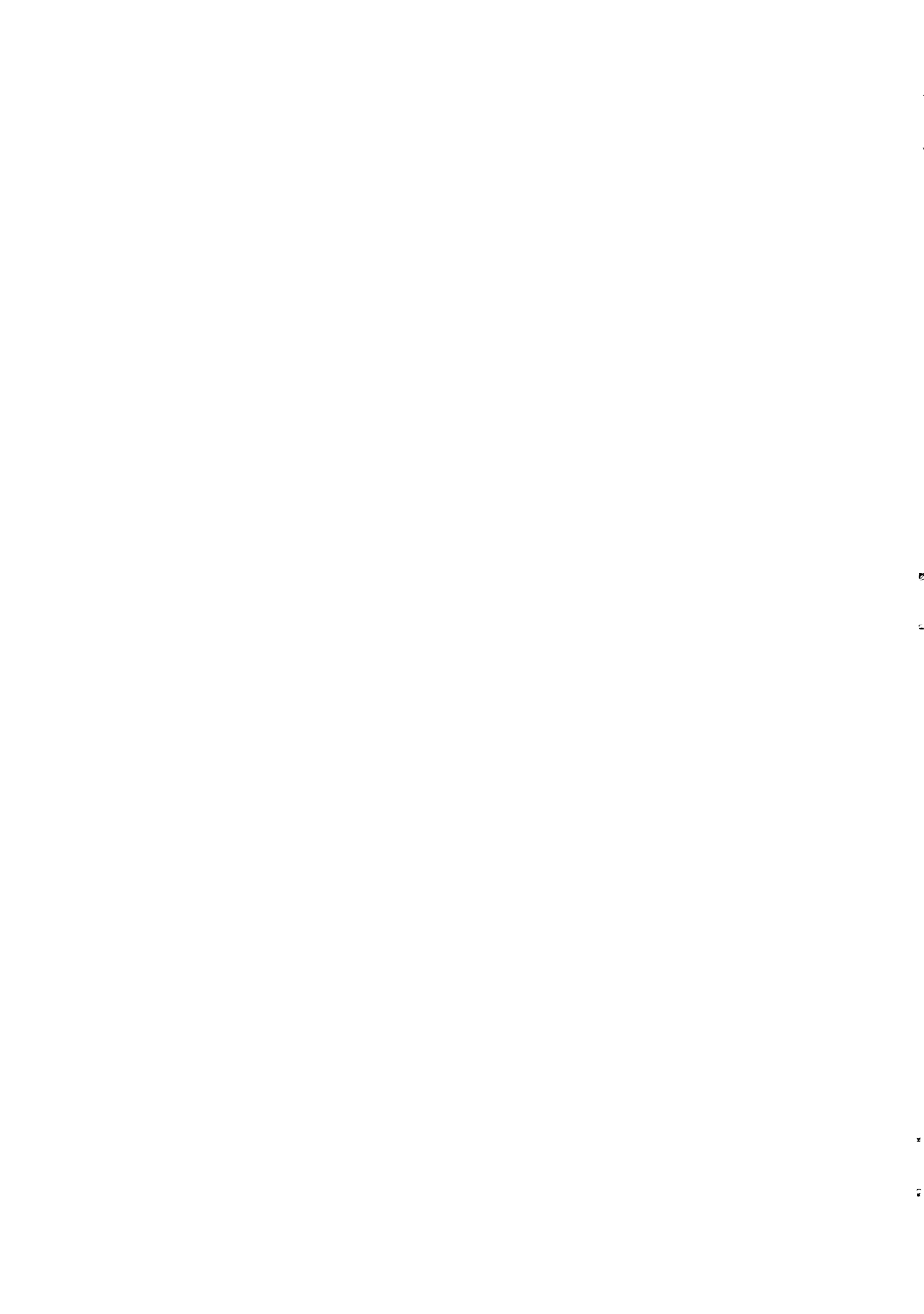


Because of the small-scale approach no claim is made that these findings from the three communities are representative in all aspects for the whole of the region. However it is certain that the findings and resulting recommendations can be of interest and relevance for planned development in this region.

For practical purposes, since these three communities are relatively homogenous with regard to infrastructure, economic base, standard of living, water supply, health and sanitation aspects, most of the data for the households in the three villages has been presented as one group in the report text. Thus some attempt has been made to generalise. However, where there were significant differences between villages this is mentioned.

1.4 Presentation of the material

In this report an attempt has been made to present and discuss socio-economic data which is considered highly relevant for planned social change. As well as basic information on physical conditions and the ecological system, the aspects of conflict and competition vs cooperation in Wanyaturu society are presented in section 2, since these obviously have implications for attempts to involve the communities in improved water supply and sanitation improvements. Likewise emphasis is placed on the Wanyaturu and change. Information is presented on changes which have been attempted, reasons for resistance to innovations and criteria for successful interventions. Section 3 gives an overview of the development in the water supply sector in Singida region, dating back to the German occupation. Such a historical perspective is considered essential since many of the changes attempted today were already undertaken 50+ years ago. Some attempt must be made to assess the reasons for the lack of success of efforts at social change if present inputs are to have a better chance of success. In section 4 the situation in the three villages (which forms the basis for the recommendations made in this report) with regard to general living standards, and in particular with regard to water supply, sanitation and health conditions is presented in some detail. The present strategy emphasizing shallow wells with handpumps is evaluated, and its limitations illustrated, in section 5. A more appropriate strategy based on the improvement of traditional sources is proposed and a tentative schedule for implementation is presented. Some of the problems arising from such a strategy are also discussed.



2. THE WANYATURU - SOME SOCIO ECONOMIC DATA¹.

Singida Region is situated in central Tanzania (Map 1). It is composed of 4 districts - Singida Urban, Singida Rural, Manyoni and Iramba. Singida town is the administrative centre of the region. Two of the villages studied, Unyangwe and Nkhoiree, are in Singida Rural District and the third village, Unyanga, is in Singida Urban (Map 2).

The population of Singida Region is 614,030 in 302 villages (1978 census figures). The rural population is 556,000 and the average size of a village is 1850. In Singida Rural the average size of a village is 1650. The area is populated by the Wanyaturu, a bantu-speaking agro-pastoralist group. Statistics from the 1978 census reveal that the general standard of living is relatively low in this area. Housing conditions are poor. Only 5% of houses had walls of burnt brick or cement, and only 35.5% had mudbrick walls. The remaining were of mud and wattle. Similarly 4% of houses had corrugated iron roofs and 94% had roofs of mud and poles. As far as the water supply is concerned, only 13% had piped water. 54% of households had built latrines and 17% shared latrines with others.² Educational standards are also good indicators of socio-economic conditions. In the rural areas in Singida 75% of females over 15 years of age were illiterate. The corresponding figure for males was 47%. 55% of the population had had no formal education.

2.1 Physical conditions

The landscape is undulating, with few sharp rises other than those along the fault block, the sides of the Singida depression, and the Rift Valley wall. Low hills are common as are the fantastic granite outcroppings which create a rather spectacular landscape.

The area is characterized by the many marshes, which vary in size from small areas which lose their water very quickly, to wider expanses which hold surface water most of the year. These depressions play a vital role in the production system of the Wanyaturu. The swamps provide a permanent water supply and the marsh vegetation is used for reserve grazing in the dry season. Thus it is the existence of the swamps which "*makes possible a sedentary life for these herding people.*" (Schneider, p. 13) In addition these swampy areas are used for small vegetables gardens which supplement the diet and provide some cash income.

Climate

For 8-9 months of the year there is little rain at all. Most of the rain falls between December and March. In general the rainfall can be characterised as erratic and unreliable - both in terms of amount and timing. On an average the rains fail approximately every 10 years, resulting in famine.

Another characteristic feature of the climate is the fairly constant strong wind which blows across the area from the east.³ The temperature in the cooler months of the year is low at night. Temperatures as low as 5 degrees C have been recorded.

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1. In this section much of the information is based on the work of Schneider (1970) and Jellicoe (1978) (To be referred to in the text by authors' names only.) Both Jellicoe and Schneider carried out their fieldwork in Wahi, in what is today Singida Rural District.
 2. This does not mean they were used.
 3. Attempts have been made to utilize these winds for improving water supplies using windmills.

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2.2 A Nyaturu settlement: an ecological sketch

The Nyaturu word for village is *itumbi* (plural: *katumbi*) which means "high place". Such a village was made up of a cluster of homesteads (*khaya*). Within a homestead there were several houses,¹ (*nyumba*). The male head of a homestead usually had his own special house (*ikumbu*) and each wife was entitled to a separate house. A village was typically located on a ridge or small hill.² Immediately surrounding the village is open grassland. The swampy areas are located in the depression and the forest lies further away. This is well illustrated in the figures on the following page.

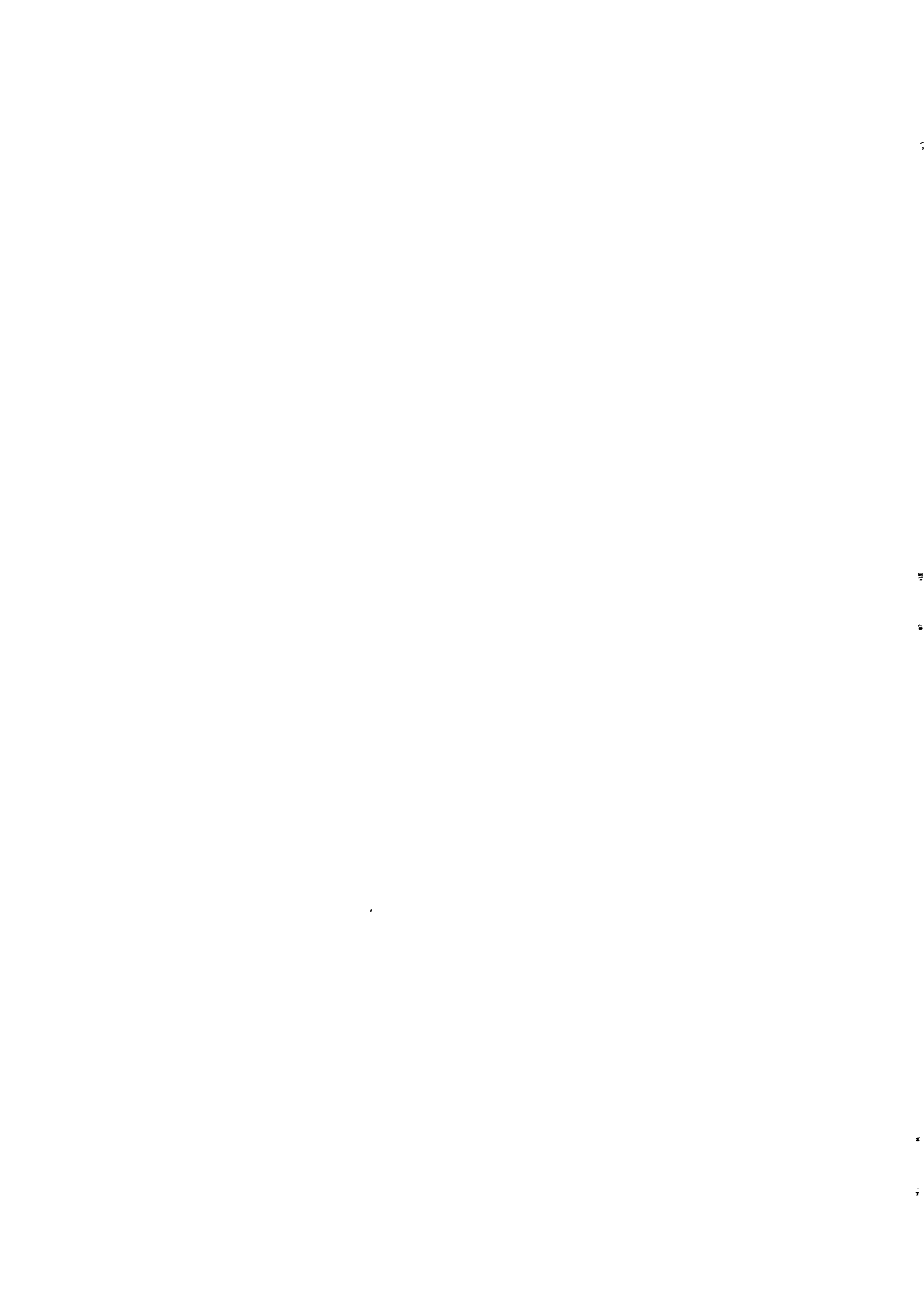
The cultivated fields traditionally surrounded the individual homesteads. However following villagisation most households have a small field (< 1 acre) close by the house and they continue to cultivate their old fields which are often at least 1 hour from the house. The surrounding open grassland is used for wet season grazing. Here the wild leaves which are used to make relish are gathered by the women. The low-lying area of semi-permanent swamp is reserved for dry season grazing and for the production of fruit and vegetables in small gardens. This area is also the source of water for domestic use and for livestock. The forest provides the wood for house-building, farm equipment etc. Firewood is also collected in the forest area. Important supplements to the diet are also provided by the forest, such as honey, herbs, roots, berries, fruit and small game. Cattle are grazed here and in some parts new fields may also be opened up.

2.3 The production system

Schneider claimed that the Wanyaturu maintained higher concentrations of population and more intensive utilization of the land than such a difficult habitat would normally allow. High concentrations of population are possible in areas of rich fertile soil, but in most Wanyaturu country the soils are poor. The patterns of settlement and production must instead be related to the technology which has developed to make the most of a difficult environment and to capitalize on resources available in the habitat, e.g the marches and forests.³

The principal feature upon which the Wanyaturu depend is the systematic manuring of the arable land each year. It is for this reason that the cattle are kept penned for such long periods and are grazed close to home as much as possible - in order to be able to easily collect the manure. Without the application of manure the whole existence of the agricultural system would be jeopardised. Sufficient production of foodcrops is only ensured by the application of sufficient amounts of manure. The declining production among the Wanyaturu must be related to villagisation. Since the households cannot

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1. These houses of the women will in future be referred to as households.
 2. This was the traditional pattern. Villagisation has disturbed the pattern to a great extent in some areas by combining several settlements. The new settlements are often larger than traditionally, and in many cases there is a resulting less efficient utilization of the resources of marsh and forest. Because the traditional system has been disturbed there is a risk that soil erosion has increased and production has been reduced.
 3. As mentioned earlier villagisation has resulted in even greater concentrations of population, and distance to the resources of marsh and forest has increased. The full impact of villagisation has yet to be assessed but indications are that it is not entirely positive.



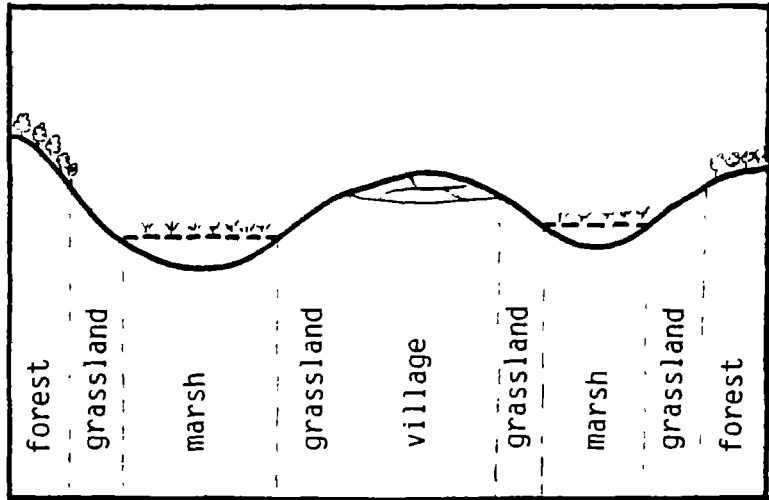


Figure 1. Cross section of ecological pattern of a Nyaturu village
Source: Schneider, 1970:17

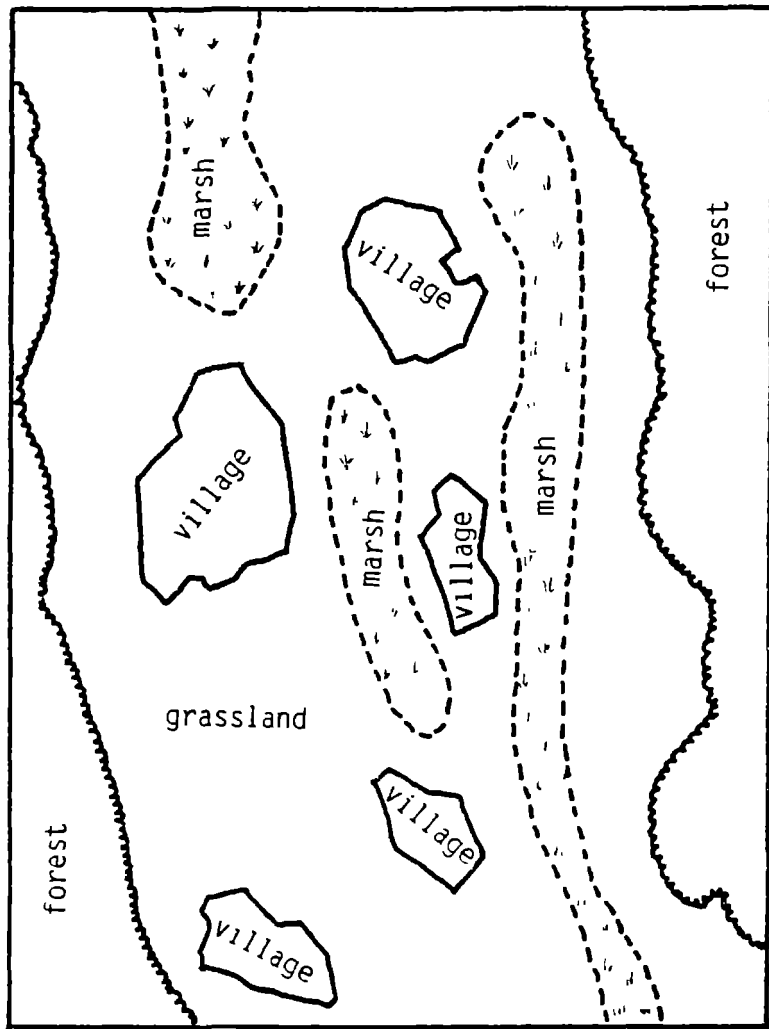
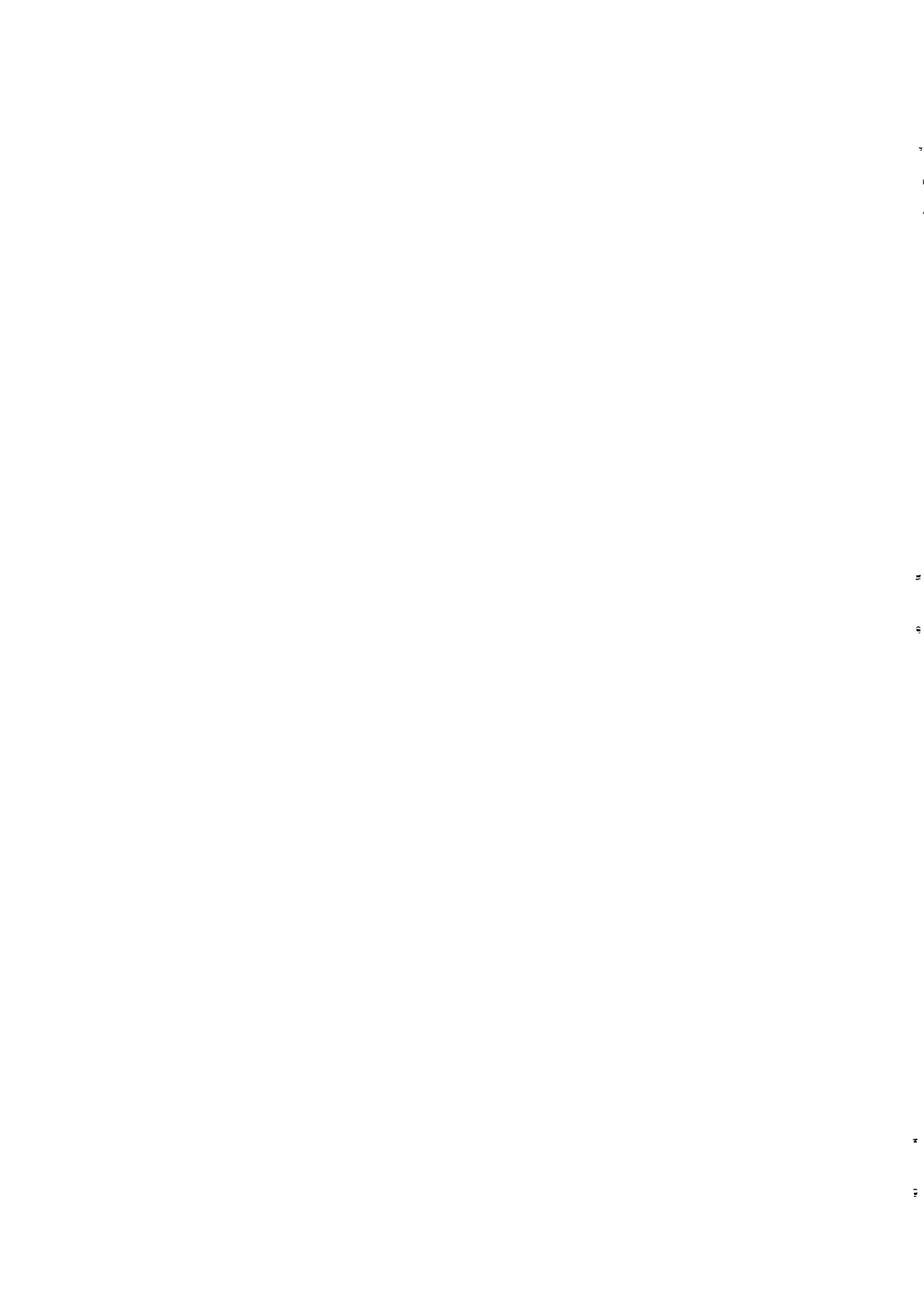


Figure 2. Air view of ecological pattern (in Wahi area)
Source: Schneider, 1970:17



exist on the small amount of land around the house, they are forced to rely on the production in the fields they used before they were moved. However, because of the distance from the homestead they are no longer able to apply manure, with the result that production has decreased.

The Wanyaturu have a calendar founded on the alternation of the wet and dry seasons. In the first half of the cycle, the wet season, it is the women's work on the food crops which is the most important, while in the second half, the dry season, it is the men's herding activities and the annual rites which become the most meaningful activities (Jellicoe). The main crops grown are sorghum and bullrush. Maize is less important though most families do cultivate some maize. Pumpkins, and to a much lesser extent beans, are also grown. Even cursory observation of the agricultural activities reveals that women are much more involved than men. Livestock have great importance as a source of prestige and security.

While the basis of the subsistence of the Wanyaturu is the production of food crops, the livestock are indispensable elements in maintaining the agricultural system, as well as being a source of income. As pointed out above, without sufficient manure production is not adequate. As a result livestock are of utmost importance in the Wanyaturu economy. However it is important to note the social significance of livestock. Livestock have immense value as a source of prestige and power, especially when livestock can be loaned out to others. In this respect livestock also have significance for women since women have an interest in ensuring that their sons have many cattle, as a sort of security for themselves in old age. It is therefore not surprising that water for livestock is top priority for Wanyaturu, even for the women.

Schneider pin-points the significance of livestock when he describes the central aim of Wanyaturu economic activity as the acquisition of livestock.

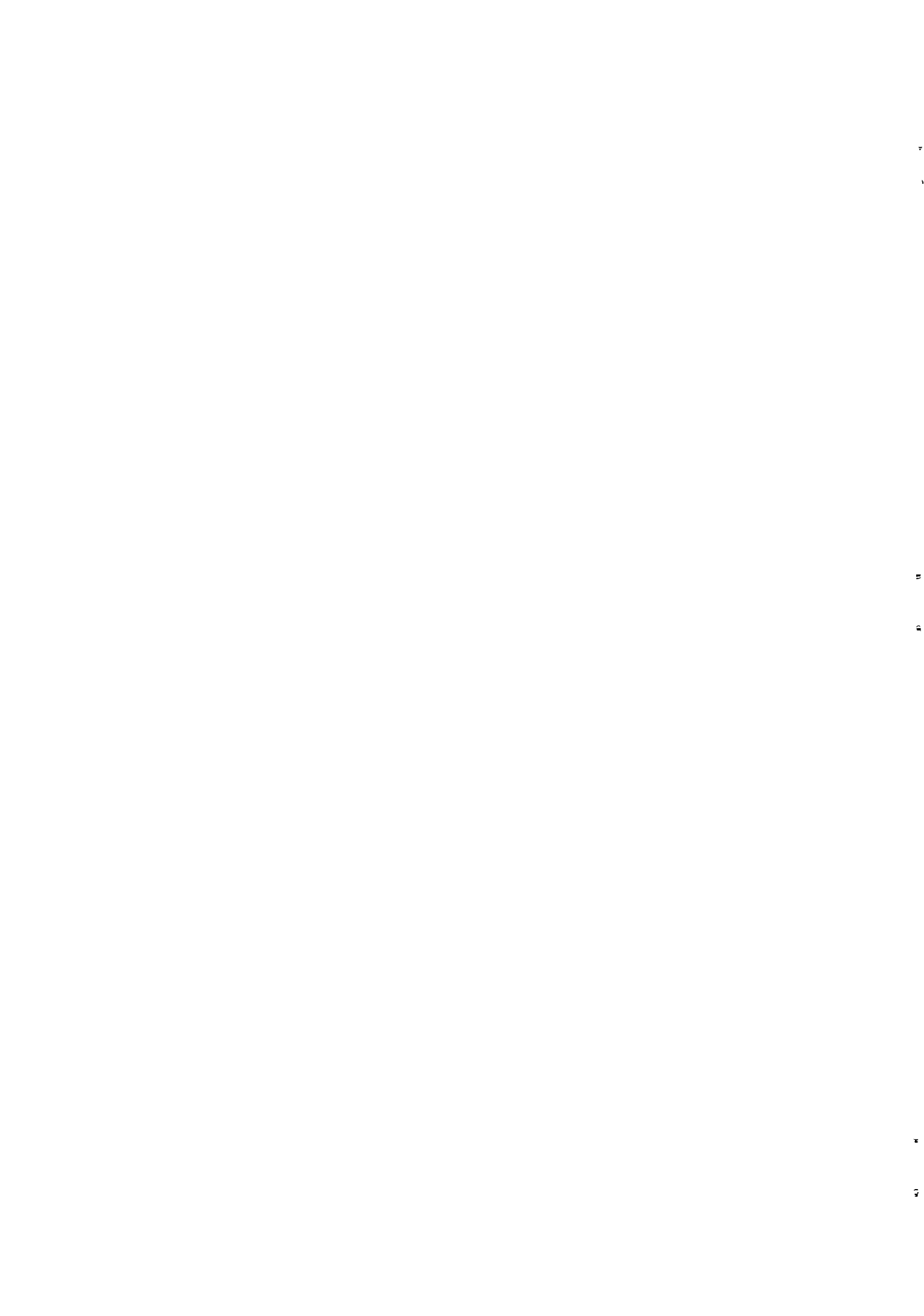
"As well as storing against emergencies, when production of grain or other necessities falls below needs, cattle are the means of increasing production of millet and livestock by investing them in land, wives and tools, and they are ultimately desired for the prestige they give their owner. All these considerations are in addition to their value as real capital in the production of hides, milk, meat and manure."
(Schneider, p 61)

Given the importance of livestock for the Wanyaturu it would appear logical that planned improvements to water supplies should consider possibilities for improving water supplies for livestock as well as for domestic use.

2.4 Conflict and constraint in Wanyaturu society

It is important to note that both Schneider and Jellicoe emphasize the element of conflict within the Wanyaturu society. Without an understanding of the strains and stresses operating it is impossible to come to terms with the motivations for the patterns of living and the potential for change.

With regard to hierarchy and social status, all men are senior to all women. However, among men and among women there is also a seniority order. Within a family the eldest and youngest sons have privileged inheritance rights.



This leads to much hostility among brothers, particularly if there are several middle brothers who do not stand a chance to inherit much. Another important factor to take into account is the patrilineal/patrilocal system which means that wives are "outsiders" within the homesteads who have their closest allegiance to their fathers who may be separated from them by long distances. This dual allegiance of wives can lead to much hostility between husbands and wives. In addition there is often jealousy and conflict between co-wives who are bent on procuring the best for their families.

The conflicts and strains within homesteads and between homesteads "*the interplay of individual, interlineage and inter-sex rivalries*" (Jellicoe p 169) have obvious implications for the achievement of community involvement. There must be a clear understanding of the probable opposition, hostility and passive resistance which can result if development projects are tackled in the wrong way. Jellicoe maintains that it was competition between lineages rather than cooperation which was responsible for the rapid spread of literacy groups in some areas of Singida Region in the early 60s. Schneider also points out that the amount of group cooperation which does exist, for example in agriculture and grazing of cattle, is less a function of norms than of strategic considerations. He warns against the assumption of cooperation and mutual aid among the members of the homestead and the larger community.

With regard to improvements to water supplies, where only one or two wells or windmills can be established in each village, it may be difficult to avoid jealousy and resentment for those who live too far away to benefit from the improved supply. Those who are not going to benefit will be difficult to mobilize for self-help activities. The importance of adequate information on, for example the siting of wells, is clear if suspicion of favouritism of certain groups is to be avoided.

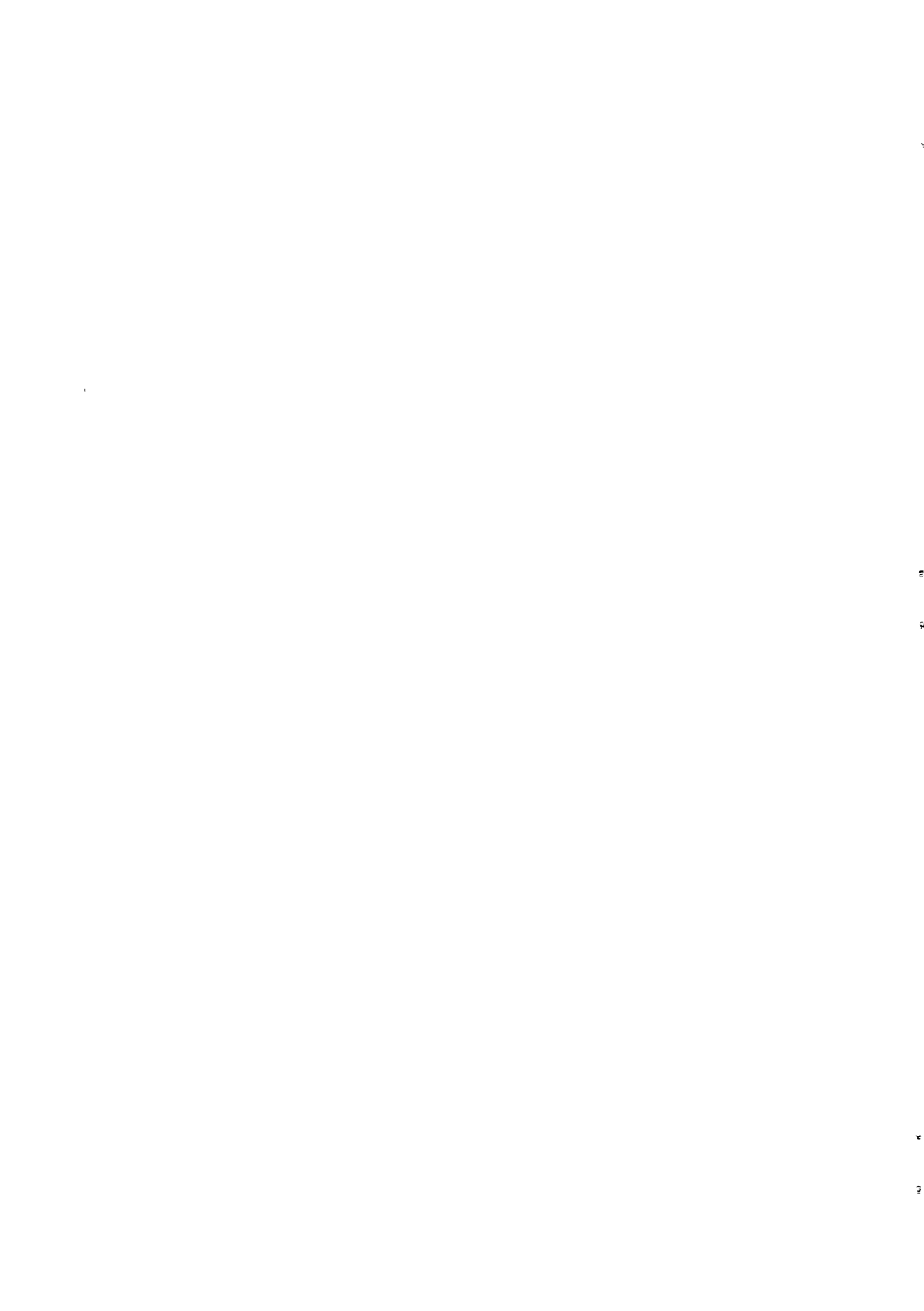
2.5 The Wanyaturu and change

"The striking aspect of Turu society today is not what has changed but what has not changed, the very weight of retention of traditional forms arguing the functional insignificance of apparently radical changes such as those in the form of government. (Schneider, p 157) (My emphasis)

Schneider emphasized the continuity of the way of life of the Wanyaturu, noting that the work of Von Sick in 1916 gave a similar description of the modes of production and associated activities as he himself observed in 1960. Jellicoe's study carried out after that of Schneider, indicated that change occurred at a very slow pace. Even the changes in the 70s, the decentralisation, dissolution of the cooperatives and villagisation appear to have had little impact on the mode of production or way of life of the Wanyaturu.¹

According to Schneider (p 6) the stasis in Wanyaturu society is "*partly a function of the lack of new goals and partly a function of the lack of understanding of how economically to pursue new goals.*" He maintains that the traditional Nyaturu society had an integrated method of production and appropriate goals combined with a social structure which was suited to these, and neither the Wanyaturu themselves nor outsiders have been able to find an adequate replacement.

1. The problems of lowered production and risk of soil degradation after villagisation have already been mentioned.



It is interesting to note that the basic technology recorded by Von SICK in 1916 and Schneider in 1960 is still basically unchanged today. Grain is still often ground on the indigenous grindstones though when possible women prefer to use a machine; food is cooked in clay pots produced by female potters; solids are still often carried in troughs made of wood; liquids are carried and stored in gourds and clay pots; and grain is kept in bark bins. Most innovations are to be found in the agricultural sector, with the use of hoes and in more recent times the spread of oxenisation. While Schneider noted widespread use of aluminium pots (sufurias), today most households had at most one small sufuria, which must be related to the inadequacy of the production and/or distribution system. What is important to note in the context of improvements to water supplies is the lack of response to developmental inputs. The Wanyaturu have succeeded in retaining much of their traditional way of life in spite of all attempts from outside to change them.

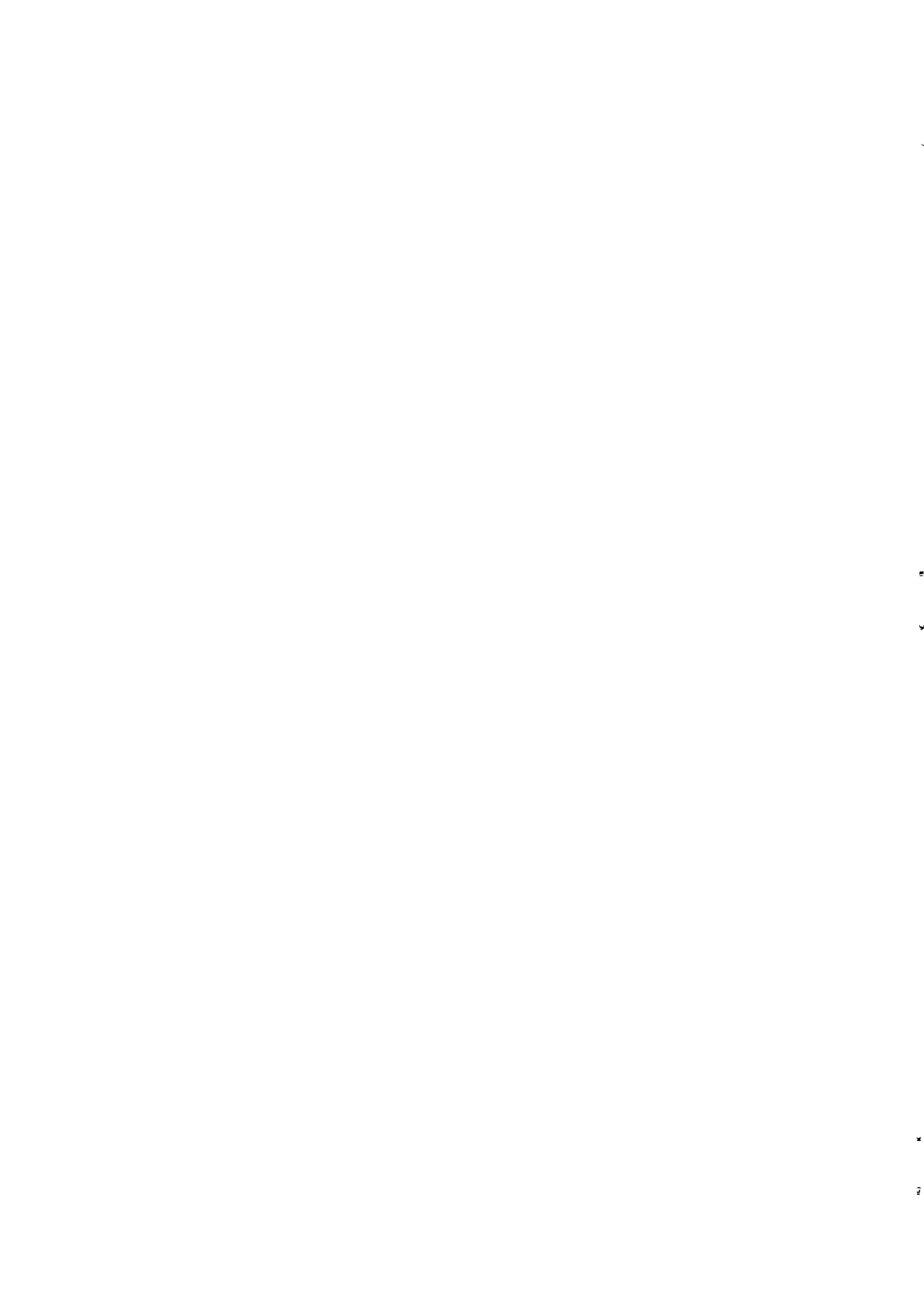
Changes which have taken place

In order to understand changes which have taken place in a rural society one needs a sound knowledge of the traditional way of life. Even when traditional practices such as circumcision, bridewealth, polygamy etc, are in the process of disappearing (and perhaps even when they have disappeared completely) their impact can still be retained in the value system and way of thinking. The extent and types of changes which occur in rural societies are difficult to assess. Changes at the level of value systems are not easily identified and investigated. Changes of a more practical nature are more easily observable. Some of these changes¹, such as dress, housing, circumcision etc. are discussed below.

One innovation which spread with some speed was the replacement of skin clothing with cloth, at least among the men. As early as 1916 men had almost completely replaced goatskin with cloth, whereas women continued to wear skins up until 1945. Another important change was the introduction of the practice of brewing beer for sale in individual houses. Other changes noted by Schneider included the disappearance of use of cattle urine for washing; the disappearance of the custom of drinking cattle blood, after the penetration of Islamic and Christian ideas; the disappearance of the custom of extracting the lower front incisors of children; better attendance of children at school; the shortening of the menstrual seclusion for girls; the holding of circumcision later in the year and earlier in life so as not to interfere with the school year.

One campaign which met with some success, especially among the women, was the literacy campaign which began in the 1950s. Following on the success of this campaign (success at least in terms of numbers of groups formed) efforts were made in some districts to initiate programmes on nutrition, health and child-care, agriculture, livestock raising and "*social or status raising activities*". (Jellicoe) These attempts at community development met with varying success. Many of the changes attempted are similar to development efforts in progress today, including improvements to water supply, sanitation and health. A more thorough study of the success and failures of these earlier attempts and the reactions of the communities would prove beneficial. (See Hannan-Andersson: 1984)

1. There have of course been other changes since these discussed here, especially related to national policy decisions e.g. villagisation, general primary education, health inputs etc.



Jellicoe, when re-visiting the area of her fieldwork in 1965, noted that the literacy campaign had collapsed but the growing of groundnuts, castor beans and vegetables, as well as the sale of cattle for meat had increased appreciably. It was felt that people were cleaner and better dressed than previously. (Today the opposite could perhaps be said, due to the shortage of soap and the difficulties in getting new clothes.) More Swahili was spoken. In general trade had increased considerably. Fresh fruit and vegetables were sold by the men who grew them in swamp gardens. Women sold chickens and eggs as well as pumpkins and millet flour. The shops had a larger and more varied stock, which now included toilet soap, dried and tinned milk and tinned vegetable fats (all items which are in great demand today but which are unavailable on a regular basis).

Resistance to change

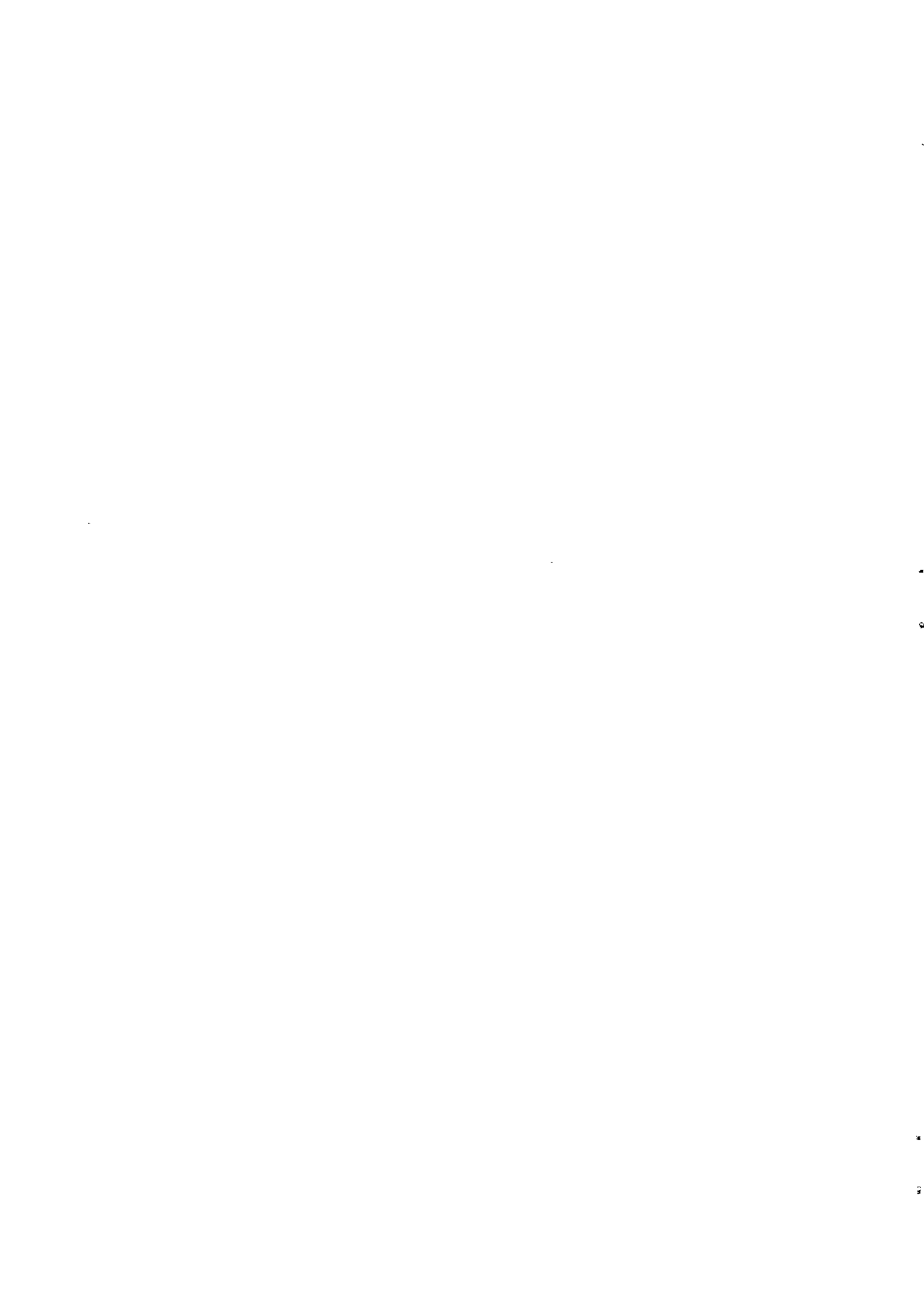
Not all recommended innovations in the community development effort of the 1960s and later have met with a positive response. There has been resistance of varying degrees to some attempts to introduce changes, as recorded by Schneider. Destocking efforts in the 1950s were bitterly opposed. Windows in houses were unpopular, and even when constructed were closed up with rags for fear of sorcery or intruders. The growing of elephant grass for fodder was rejected, as was the planting of cassava and sweet potatoes as emergency crops in times of famine. Communal shops and communal vegetable plots were rejected. (Today both communal shops and communal plots are found in most villages.) Health facilities were not well attended. (Today the situation has changed for the better in that people are more willing to attend clinics and dispensaries. However people invariably complain that there is no medicine available.)

The reasons for rejecting some innovations and accepting others is related to the aims of the Nyaturu society. The main aim as defined by Schneider is to preserve the integrity of the system. If changes proposed pose a threat to this system they are rejected, actively or passively. Schneider further concludes that in attempting to understand reasons for the rejection of what seem desirable innovations (at least to the outsider) costs must be calculated not only in terms of money but also in terms of time and energy. Wanyaturu refuse to be involved in activities which divert their time and energy from activities, which are of more central interest to the people. One of the reasons given by Jellicoe for non-acceptance of innovations was that the needs considered important by the outsiders tended to be too long-term to arouse the people, and their satisfaction demanded specialized knowledge which the people did not possess.

Potential for change

The notion of inevitable resistance by indigenous societies to influence from outside is dismissed by Schneider as "romantic notion". He believed that the Wanyaturu *"would be quite willing to become westernized if the change could be accomplished with appropriate and dependable future rewards"*. Both Schneider and Jellicoe record some enthusiasm for change, especially among younger Wanyaturu.

In recording the changes which did take place during the 50s and 60s using community development methods, Jellicoe noted that changes at the homestead level were the most accepted and apparently most stable. Inputs at the homestead level are appreciated since the homestead is both the active centre of work aimed at the supreme value of increase and also proof of its achievement. Development efforts must give adequate attention to the homestead level - especially in terms of motivating and involving individual households (nyumba).



The criteria for achieving acceptance of innovations, based on the experience in Singida so far, would appear to be:

- the innovation should not upset the existing traditional structure too much
- it must involve advantages for the communities (as understood by the communities themselves)
- it should not involve too many costs for the communities - in terms of money, time or energy
- it should be comprehensible to the communities
- efforts should be directed particularly at the homestead/household level

The implications of the above criteria for planning would be that there must be an understanding of the traditional structures and patterns of living of the Wanyaturu before any changes are attempted. Especially the needs and priorities of the communities must be known. Appropriate technologies are essential to reduce costs and to allow for participation of the communities in planning and implementation. Adequate information must be given to the communities to ensure that they understand the advantages and implications (including future responsibilities and costs for the communities). Where possible opportunities to increase income should be incorporated in planned changes.

1

3. DEVELOPMENT OF DOMESTIC WATER SUPPLIES IN SINGIDA REGION

3.1 Inputs in water supply/sanitation/health fields up to mid 70s¹

It is interesting and somewhat disturbing to note the attempts at improving water supply, health and sanitation which have taken place in Singida region without much noticeable effect.

Improvements to water supply

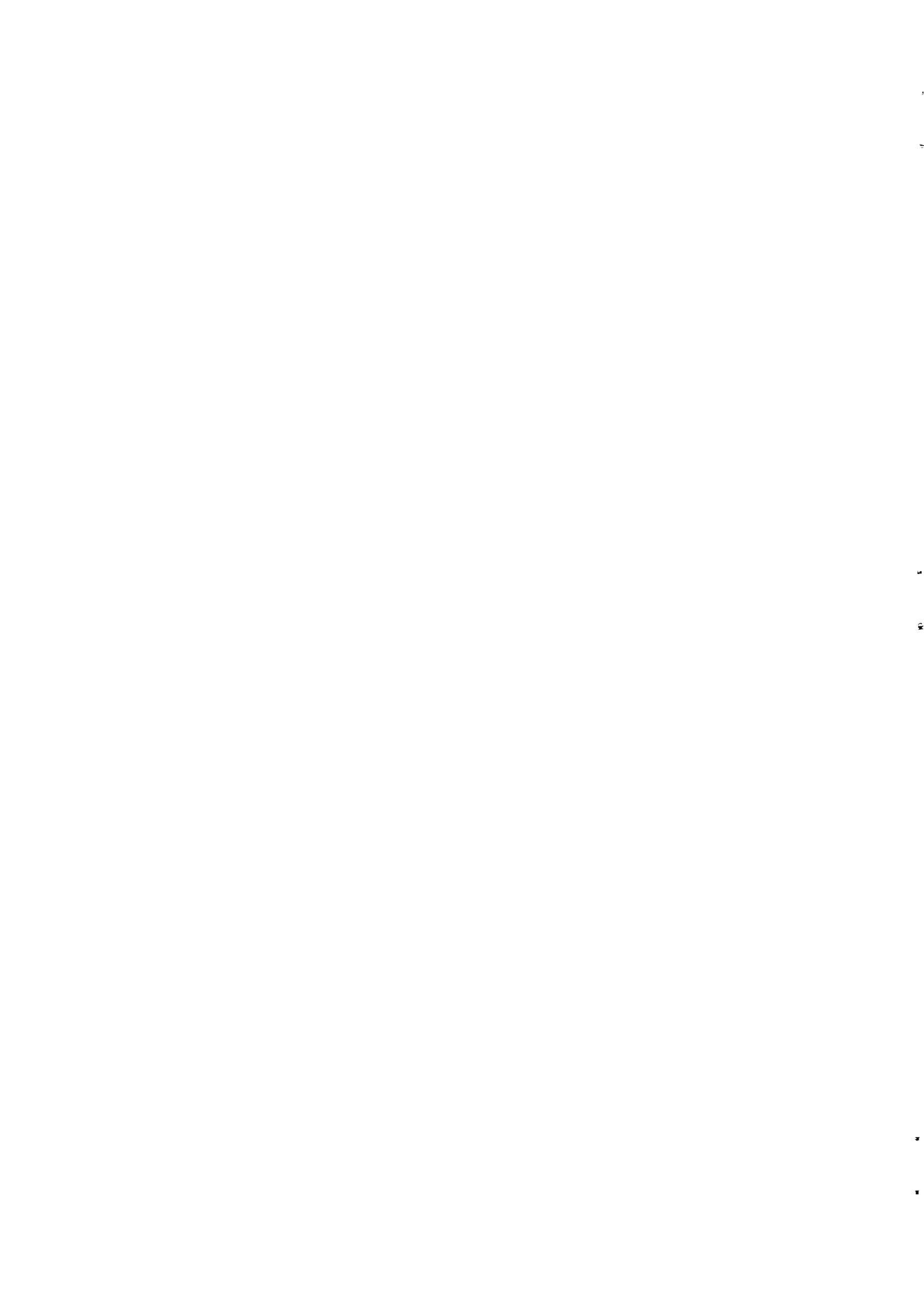
As far back as the time of German occupation efforts were made to improve water supply. Both Schneider and Jellicoe mention wells which were constructed during the German period. (In fact one such well, still functioning, was visited during the fieldwork period in 1984.) Von Sick had 50 stone-lined wells, and watering places for cattle (which were lined with sheets of corrugated iron) dug in the villages, through mobilization of the village headmen. Thus the idea of making improved wells using local labour was not new when encouraged by the British Administration in 1920, when stressed by the Rehabilitation Plans of 1948, nor when re-introduced by the Community Development Teams in the 1960s (and it can hardly be called a "fresh initiative" when promoted in the developmental efforts today). What was new in 1960 was the first determined attempt to persuade villagers to make changes without external compulsion. (Jellicoe)

Jellicoe further noted that in her fieldwork area both men and women showed interest in modern-type wells. Some had seen such wells in other places. In general the idea of clean water appeared to have both a practical and emotional appeal. Though suggestions that drinking water supplies should be cleaner sometimes received a hostile response. The proposal that the men should dig the wells and the Social Development Department provide the cement for lining was a very acceptable one to the communities. By 1965 75 wells, six of them with pumps, had been dug and the villagers trained to maintain and repair them. (Jellicoe) It appeared that the wells were used by many in the communities, though some problems with vandalism had been reported.

Sanitation

As early as directly after the 2nd World War latrine campaigns were in progress in Singida. The building of latrines was enforced through fines. However Jellicoe's observations revealed that *"there remained in 1958 a few tottering latrines"*. Schneider also observed that latrines had indeed been built but that they were not used. The construction and use of latrines was again in the community development programme in 1959. Assistance with the building of latrines and the attempts to encourage people to use them met with some success. However problems developed because of the costs of the slabs and the difficulties in raising the necessary finance. By 1965 Jellicoe reported that about 30% of the homesteads now had latrines outside the enclosures. Most appeared to be used by someone. However, it was obvious that a good many women and children still did not use them because of avoidance rules.

1. In this section most of the information is based on the work of Schneider (1970) carried out 1959-60, and Jellicoe (1978) carried out 1959-65.



To understand the limited impact of sanitation inputs it is necessary to have an awareness of the traditional attitude to human excreta. According to Jellicoe faeces is one of the chief materials for sorcery. Thus the safe disposal of faeces is very important. Jellicoe even claims that one of the reasons for constructing circular enclosures in the homesteads was that it provided more room for the private disposal of human faeces, which was deposited there and covered with the foot, if the bush was too distant and the household had no latrine. In how far this is still a common practice is difficult to assess. However it is presumed that where there are latrines, the latrine is preferred to the enclosure when the bush or fields are too inconvenient.

Because of the symbolic significance of faecal matter in Nyaturu society there is a strong emphasis on avoidance both between the sexes and between adults and children, when disposing of excreta. (Jellicoe) It is therefore probable that an important motive for the erection of latrines and their use by the men was based on increasing difficulties of such avoidance in heavily populated settlements some way from the forest¹. In which case, villagisation should have provided an impetus for the building of latrines since the population concentration increased. Other motivations given by Jellicoe for the building of latrines include the notion that, in some unspecified way, latrines prevented ill-health, and the fact that latrines became a kind of social symbol of commitment to progress.

Health education

The health education component of the community development programme undertaken in the early 60s emphasised the necessity to boil both drinking water and milk, and to cover storage vessels. In addition it was recommended that the practice of drinking from the same gourd was stopped. Other recommendations were given on nutrition for small children and weaning practices. However when the villages were revisited in 1965 Jellicoe found that most of the recommendations were not followed. Other measures advocated to promote better health, i.e. improvements to houses - better ventilation, removal of animals from women's sleeping quarters, greater cleanliness, etc had not been adopted.

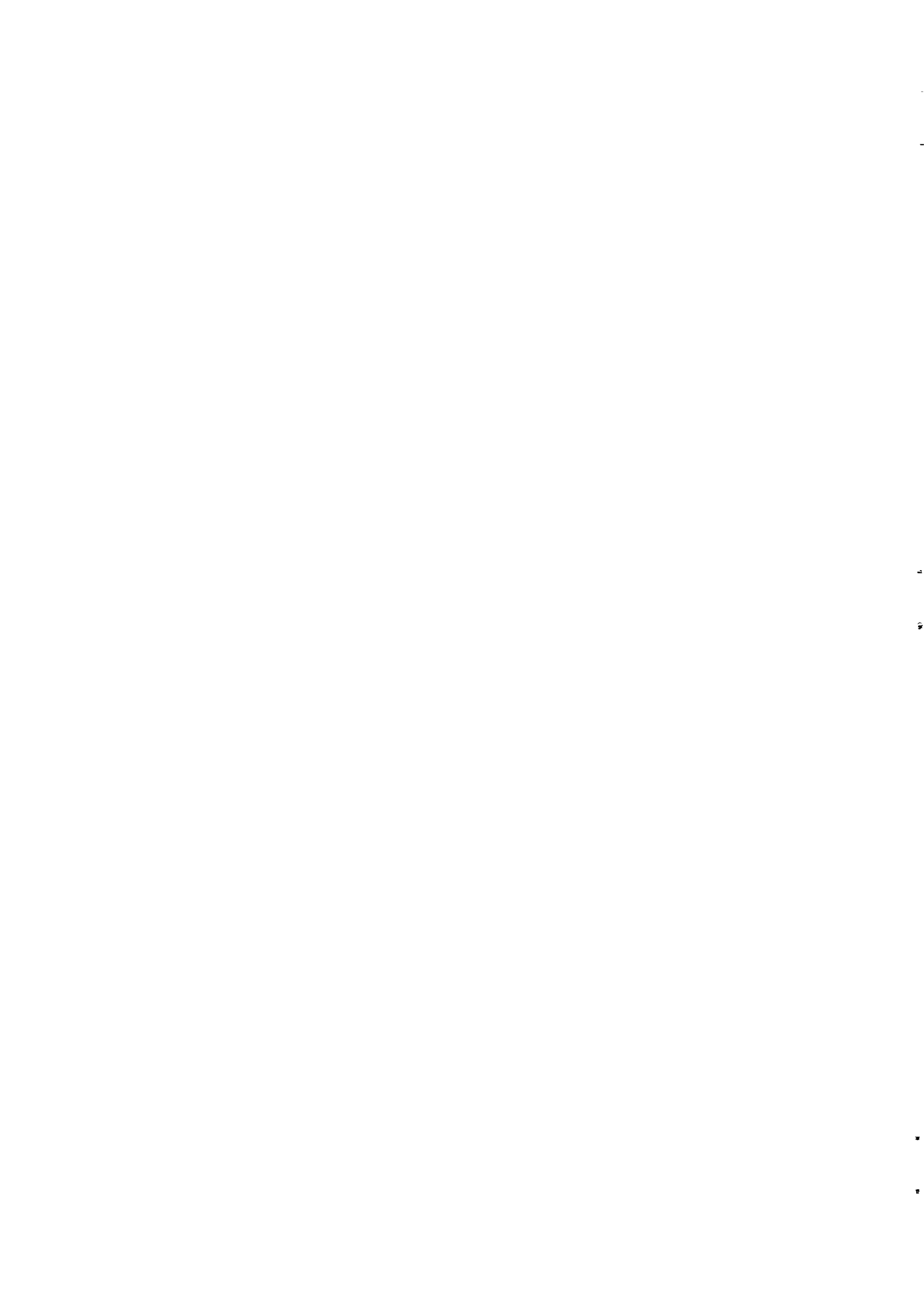
The recommendation to boil drinking water was not heeded, probably because of the work load of the women, but also because, as pointed out by Jellicoe, there was no real understanding of bacteria and contamination. It is tied up with the traditional idea that some diseases are caused by sorcery. Many people complained that the water in the wells was polluted by hyenas, an animal usually associated with sorcery by the Wanyaturu. Boiling of water was thus considered inadequate to combat the effects of sorcery. The difficulty in imparting an understanding of bacteria is well illustrated by the comments of some men when exhorted to use separate drinking gourds for local beer.

"If this beer is so powerful that it makes even a big man completely helpless, how can those little animals you talk about as swimming inside possibly get the strenght to do us any harm?" (Jellicoe, p 284)

Why so little impact?

One of the most important reasons for the limited impact of attempts to improve water supply, health and sanitation must be the lack of attention

1. However today people deny the existence of such avoidance rules.



given to traditional practices and the motivations behind them. Another important aspect, especially for health education and sanitation inputs, is the tendency to rely on enforcement measures. Real change cannot be brought about by establishing rules and regulations, e.g. by forcing people to build latrines and imposing fines if they refuse (Hannan-Andersson, 1983). Development will not be achieved by forcing people to change the pattern of living against their wills. To be effective the changes must be accepted and internalized by the people themselves. This can only be brought about through a process of conscientization. Especially with regard to educative aspects of improvements to water supply and sanitation there is a need for qualitative changes, a rethinking of the aims and methodology of health education programmes (Hannan-Andersson, 1983 and 1984).

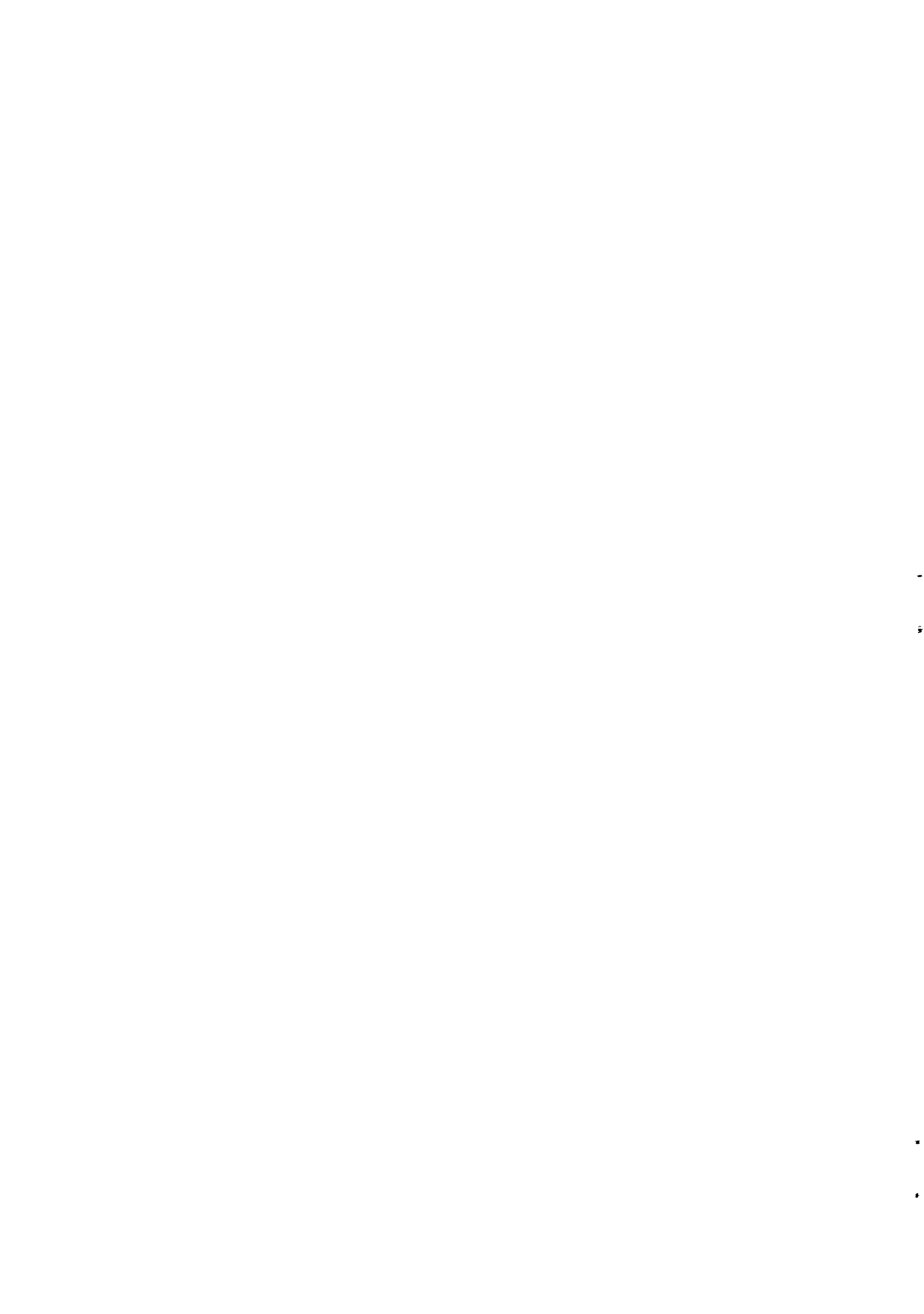
An important aspect is the fact that real development is not only to be measured in terms of the individual changes achieved but in the consequent willingness of those concerned to consider further changes. (Jellicoe) In the attempts made in Singida it is obvious that the diffusion effects of the improvements was slight. The assistance received with constructing wells did not result in spontaneous improvements to traditional wells. The majority of the population in Singida still relies on unimproved traditional wells for their domestic water supplies. Sanitation has not improved greatly. There are a great number of latrines, but continual effort is needed to ensure that they are replaced when they fall down, and there is no evidence that they are used at all times by all household members. The health and hygiene situation in the households indicate the ineffectivity of the health education inputs.

For deliberately induced social change, such as changes in sanitation patterns, water-use behaviour and personal hygiene patterns, not only do social systems have to be taken into consideration, but social values as well. In addition it must be affected by a two-way communication process, what has been described by Jellicoe (p 358) as *"persuasion involving the maximum participation of the people concerned"*. Not only is it necessary for the "change agents" to know and respect the values held by the people, but they must also learn to understand what they mean to the people. Only then can new values, ideas and the associated practical changes be presented in such a way that *"the people can best grasp their import and make a meaningful synthesis for themselves"*. (Jellicoe, p 361)

At the basis of all attempts to change patterns of living must be the effort to convince people of the necessity and worth of the changes to be introduced. The starting point for discussion must be the knowledge, values and world-view of the people involved. The changes advocated must be compatible with people's conceptualization of their place in the changing world. *"Human beings have a right to live in a meaningful world. Respect for this right is a moral imperative for policy."* (Berger: 1976, p 193)

3.2 Recent developments - 1975 to 1984

The Tanzanian Village Water Development Project currently underway in Singida Region is a cooperation between the governments of Tanzania and Australia. The consultancy firm, Snowy Mountains Engineering Corporation, is contracted by the Australian development agency, Australian Development Assistance Bureau (ADAB), to carry out the implementation. The project is integrated



with the Regional Water Engineer's Office in Singida. There is no Water Master Plan for Singida region, but an inventory has been carried out.¹

Technology choice

The programme initially emphasized mechanized drilling of deep boreholes equipped with Monopumps and windmills. 165 deep wells were drilled, of which 62 were equipped with pumps (35 windmills, 27 diesel powered). Since 1980 there has been a change in policy. Mechanized drilling is at a standstill. Present implementation is exclusively shallow wells (ring and tubewells) with hand and foot pumps. About 150 wells have been constructed to date (1984).

Selection of villages and level of service

The policy and priority criteria for selection of villages is controlled by the Regional authorities. The aspect of "felt need" has had little attention. In general there has been a very low coverage of village needs, with an average 3 wells per village. The goal is to supply as many villages as possible, even if the level of service in all villages is inadequate as a result.

Participation

In the initial stages of the project village involvement was non-existent. However community participation is receiving more attention and in 1982 it was incorporated into the project in a more formalized way. To facilitate the involvement of the villagers at an early stage, a social survey team consisting of two terrestrial surveyors and two female assistants has been formed. This team surveys villages where improvements to the water supply are planned, thus providing an advance team for project activities. They stay in the village for one week to obtain basic data for project planning, and to advise and negotiate with the village leaders.

Integration with overall rural development efforts

A very positive development in the Singida project is the appointment of a Rural Development Advisor (November 1982). This followed recognition of the need for complementary environmental and social components in the project. The main tasks of this advisor are to:

- propose methods of maximizing benefits of village water supply systems
- provide basic data on appropriate allied activities such as population studies, health, agricultural systems and patterns, land use, soil erosion and water usage
- establish guidelines to examine the total rural environment to monitor the effects of project activities.

Maintenance system

There is a centralised maintenance system. The major proportion of the project's current workload is maintenance of improved water supplies (mainly diesel-powered and wind-powered supplies) in both urban and rural areas. There are plans to hand over the maintenance of the shallow wells and handpumps programme to the districts.

1. Tanzania Ministry of Water and Energy.

"Hydrological Statement and Surface Water Resources, 1975-76" Dar es Salaam



Training

Training has so far concentrated on maintenance of vehicles, engines and windmills. However plans are underway for establishing a more comprehensive training programme. As well as catering for the operational/technical staff from the project and Maji (Ministry of Water), the programme will attempt to reach community user groups, village councils, well and pump attendants, school children, etc, with information on aspects such as use of facilities, maintenance, cleaning, reporting breakdowns, further uses and applications of facilities, and health issues.

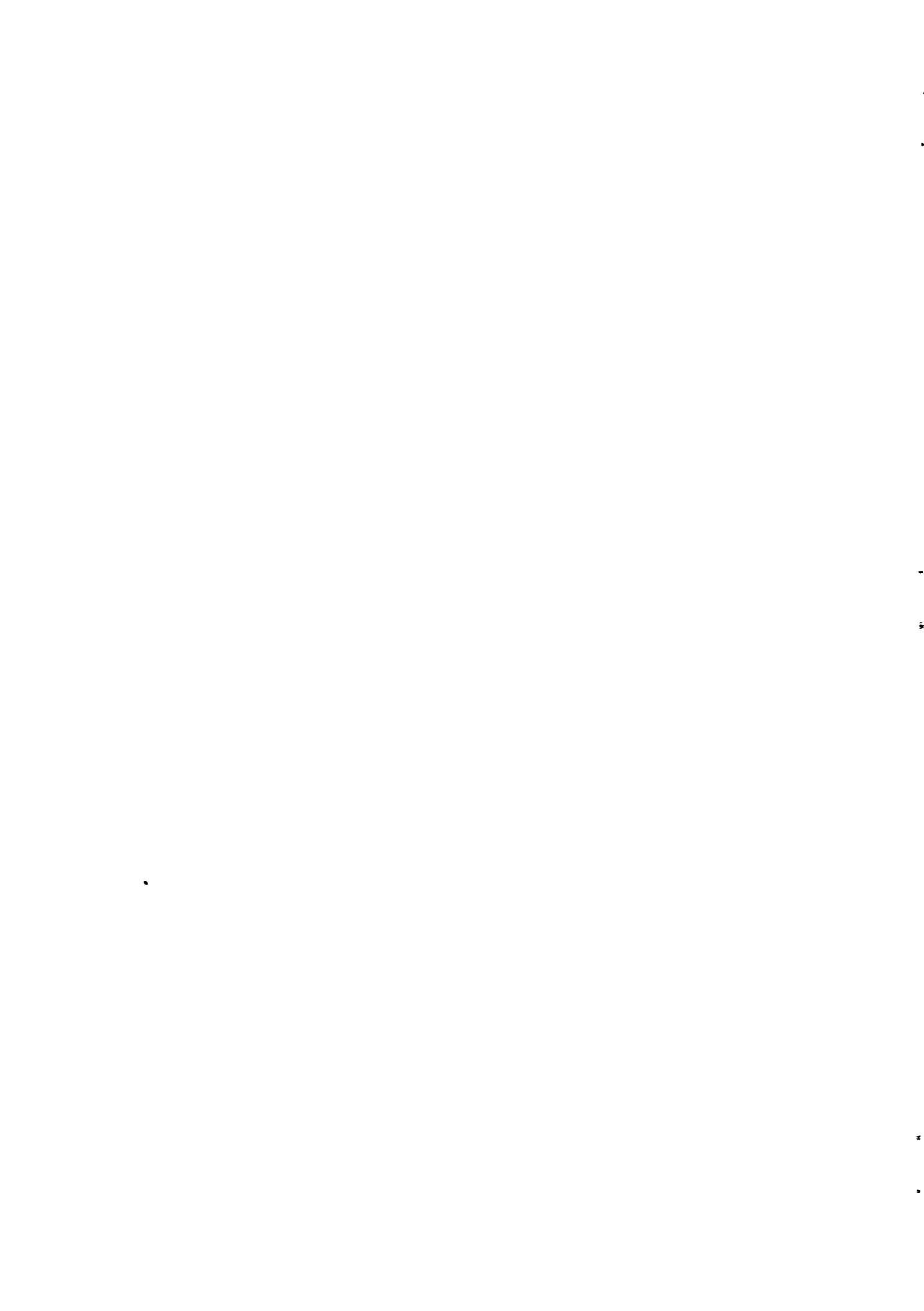
Sanitation and health education

There has been no involvement with improvements to sanitation in the villages in conjunction with improvements to water supplies. Likewise no attempts have been made to provide health education. However both these aspects will be emphasized in future programmes.

Summary of the present situation

In spite of the inputs received in Singida Region over the past 50+ years, the situation has changed little. The major source of water for domestic use continues to be unimproved traditional sources. Even when villages receive improved supply the impact is very limited. The coverage provided is so inadequate only a small percentage gains any benefits at all. Frequent breakdowns and inadequate maintenance further reduces the percentage of population receiving any impact. These aspects and the consequences for future planning are discussed in more detail in section 5.

The standards of health, sanitation and personal hygiene, as well as the patterns of water use behaviour, are far from satisfactory - as the information on the three villages studied (presented in section 4) will illustrate. The integration of improvements to water supply with sanitation and health education inputs has been negligible. Without adequate information and motivation on proper use of source, water use behaviour and relation of water to health, improvements to water supply can have little effect.



4. WATER/SANITATION/HEALTH SITUATION IN THREE VILLAGES

4.1 Basic information on the villages studied

Information on the location and population¹ of the three villages is contained in the following table.

Table 1 Village information

Village	District	Population	Number of households	Number of 10-house cells
<u>Unyianga</u> (Map 3)	Singida Urban	2158	451	33
<u>Unyangwe</u> (Map 4)	Singida Rural	1671	307	23
<u>Nkhoiree</u> (Map 5)	Singida Rural	1873	300	23

Villagisation

All three villages were affected by the villagisation programme in the mid 70s. As a result they are all large settlements with a more concentrated area of population around the central area of CCM office, shops and primary school. In Unyianga, according to village leaders, as many as 300 families were moved, many of the from 10 smaller settlements which were up to 3 miles away from the original settlement of Unyianga. Similarly in Unyangwe many of the families had been moved in from a radius of 1-2 miles in 1974-75. In Nkhoiree it was estimated that at least 1/4 of the households had been moved from outlying settlements. It appeared that most households in all the villages had been moved, even if only 50 - 200 metres from the original sites. This was in order to make straight roads in the villages. At times the homesteads were turned around so that the cattle enclosure faced away from the road.² Discussions with the households revealed that the move was not popular, and most people only moved because they felt they had no choice. There were accounts of the use of force, in pulling down people's houses when they refused to move.

The effects of villagisation have not been evaluated sufficiently. However it appears certain that the impact on food production has been negative. All three villages, in particular Unyianga, were experiencing serious food shortages. The last season 82/83 was a particularly bad one, but households reported that their food production had been generally reduced after villagisation.³ As a result of the current low production and the resulting food shortages, many households have already moved out from the centre of the village, and more are planning to do so after the next harvest. The centre is overpopulated and there is not enough land for subsistence of the households living there. Four areas of resettlement were identified in Unyianga and it was estimated that at least 50 households had already moved. These households were not permitted to move as individual households, but as 10-house cell units. Similarly in Unyangwe and Nkhoiree there was increasing pressure on village leaders to allow further re-settlement of outlying areas.

1. Based on 1978 census figures

2. Obviously no consideration was taken of the fact that traditionally the opening to the Nyaturu homestead faced west. The placing of the house of the first wife was also important.

3. The problems experienced by the households will be discussed further in section 4.2.



Distribution

Each village has 2 shops, one cooperative and one owned by TAPA (Tanganyika Parent's Association). The second shop appeared to have been started in the hope of receiving more supplies of essential commodities. The shops are poorly stocked, and the villagers complained about the inadequate distribution of goods. An inventory of goods in stock in the shops revealed that only the following types of goods were available on a fairly regular basis (and then only in small quantities): teeshirts, shirts, underclothes, skin and hair oil, pencils, aspirin, matches.

A more detailed inventory was made in the cooperative shop in Unyanga of the stocks of essential commodities received during a 6 month period in 1982. The results are given in the following table. It should be remembered that these items are to be distributed between 451 families.

Table 2 Essential items received for distribution during a 6 month period in 1982 (Unyanga)

Item	Amount received	Amount per family and month
Sugar	1087 kilos	0.4 kilos
Washing soap	260 bars	0.1 bars
Bathing soap	200 bars	0.07 bars
Cooking oil	115 litres	0.05 litres

By way of comparison, village shops visited by Jellicoe (1978) in 1958 had the following stocks: paraffin, cooking oil, coarse blue soap, cheap strong cigarettes, a very little cloth, some shorts and shirts, tea and sugar. By 1965 this stock had been increased to include toilet soap, dried and tinned milk and tinned vegetable fat.

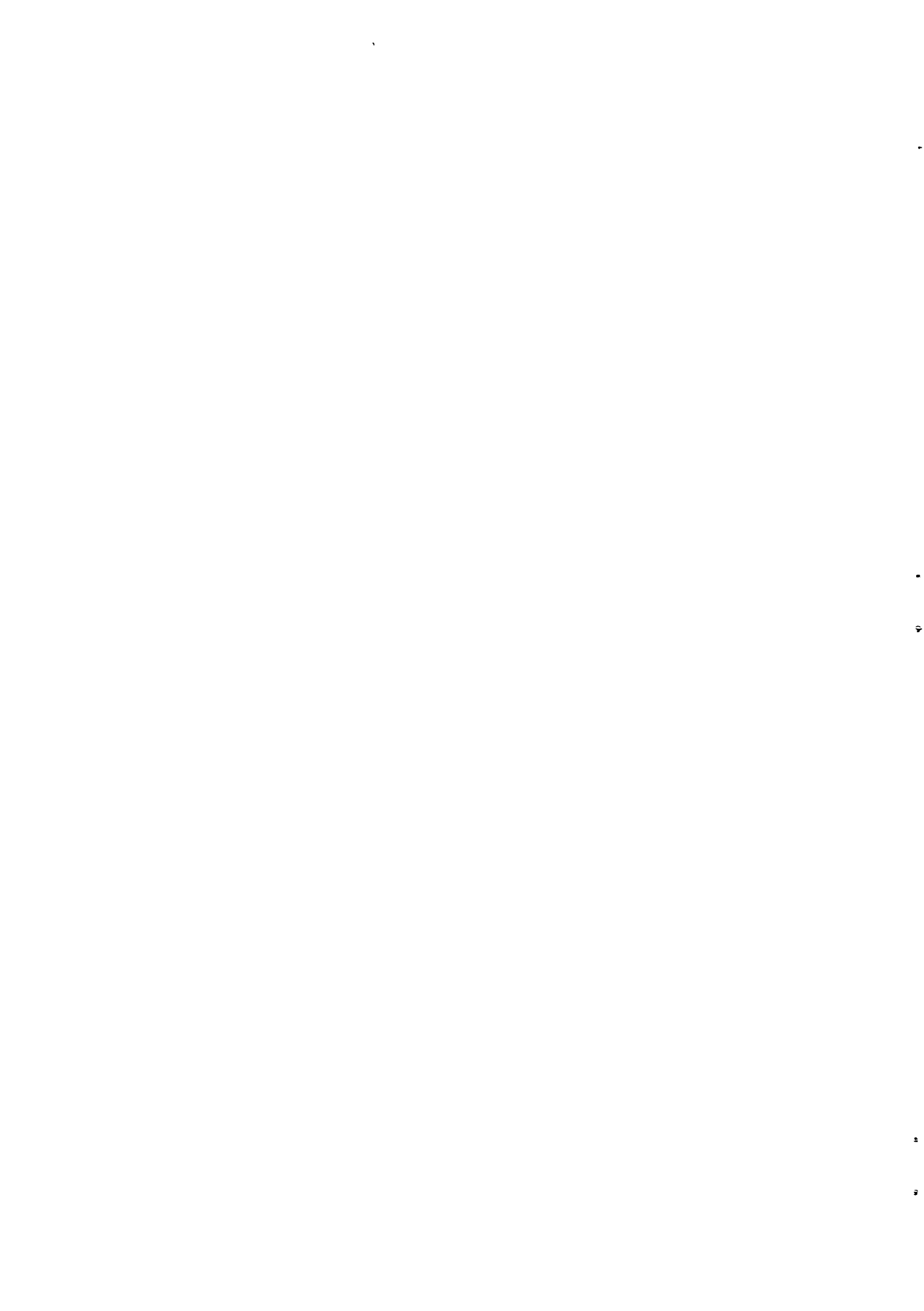
Health services

None of the villages has a dispensary. Unyanga has a First Aid box with an attendant who had received 3 months training in Singida town, and who is paid from village funds. Villagers from Unyangwe and Nkhoiree walk (or take the daily bus when running) to Ihanja or Puma for medical treatment, while those from Unyanga walk to Singida. Some villagers preferred to travel the longer distance to the mission hospital, Makiungu, because they were more sure there would be medicine available there.

Educational facilities

All three villages have a primary school catering for students up to standard 7. The oldest school is that of Unyanga which was opened in 1956. The schools have latrines for the students, but those of Unyanga and Unyangwe were not as clean and well-kept as could be desired in a school. Nkhoiree school had 4 latrines which were in good condition.

Adult education classes are held in all villages in the off-peak agricultural season, from about April until October. Classes are usually held three times a week. The teachers are standard 7 leavers from the village. The main programme is teaching literacy, though some attempt is made to include agriculture, nutrition and health. The aim is to have one class per 10-house cell. Each 10-house cell is responsible for building its own "banda" or



shelter. Non-attendance at these classes is fined. None of the villagers had special women's maendeleo (development) groups.

Other services

No markets were held in these villages, but the women attended markets in other villages in the vicinity. There is no bus service to Unyanga but this village is within walking distance (2 hours) of Singida. Villagers from Unyangwe and Nkhoiree can use the daily bus service from Puma to Ihanja/Matongo.

None of the villages has a cooperative milling machine. In Nkhoiree a private individual had bought a machine in the period between the first and the second visits to this village. This means a great saving of time and energy for the women in this village. Women from Unyanga walk to Singida to use a machine, and those from Unyangwe use the machine in Ihanja (when working) or in Puma.

Communal activities

All three villages have communal fields. Only Unyangwe village used this land for food crops. In the 1982/83 season they planted 50 acres sorghum, and in the 83/84 season they had planted 20 acres of cassava. This village also required the households to grow $\frac{1}{2}$ acre of cotton. Unyanga village had a communal plot of 150 acres of cotton. Nkhoiree cultivated 135 acres - 100 acres of sunflower and 35 acres of cotton. In general the yields were very low, for example the cotton harvest in Unyangwe had been so low the last two seasons that it had not been collected. The poor results were blamed on weather conditions, sometimes too much rain, other times too little. It was very obvious that the communal shamba is not a great source of income for the villages. Neither does it appear to have any diffusion effect - stimulating more progressive techniques in individual householder's fields. If the level of production was as low on individual farms as on the communal fields, the households would not survive.

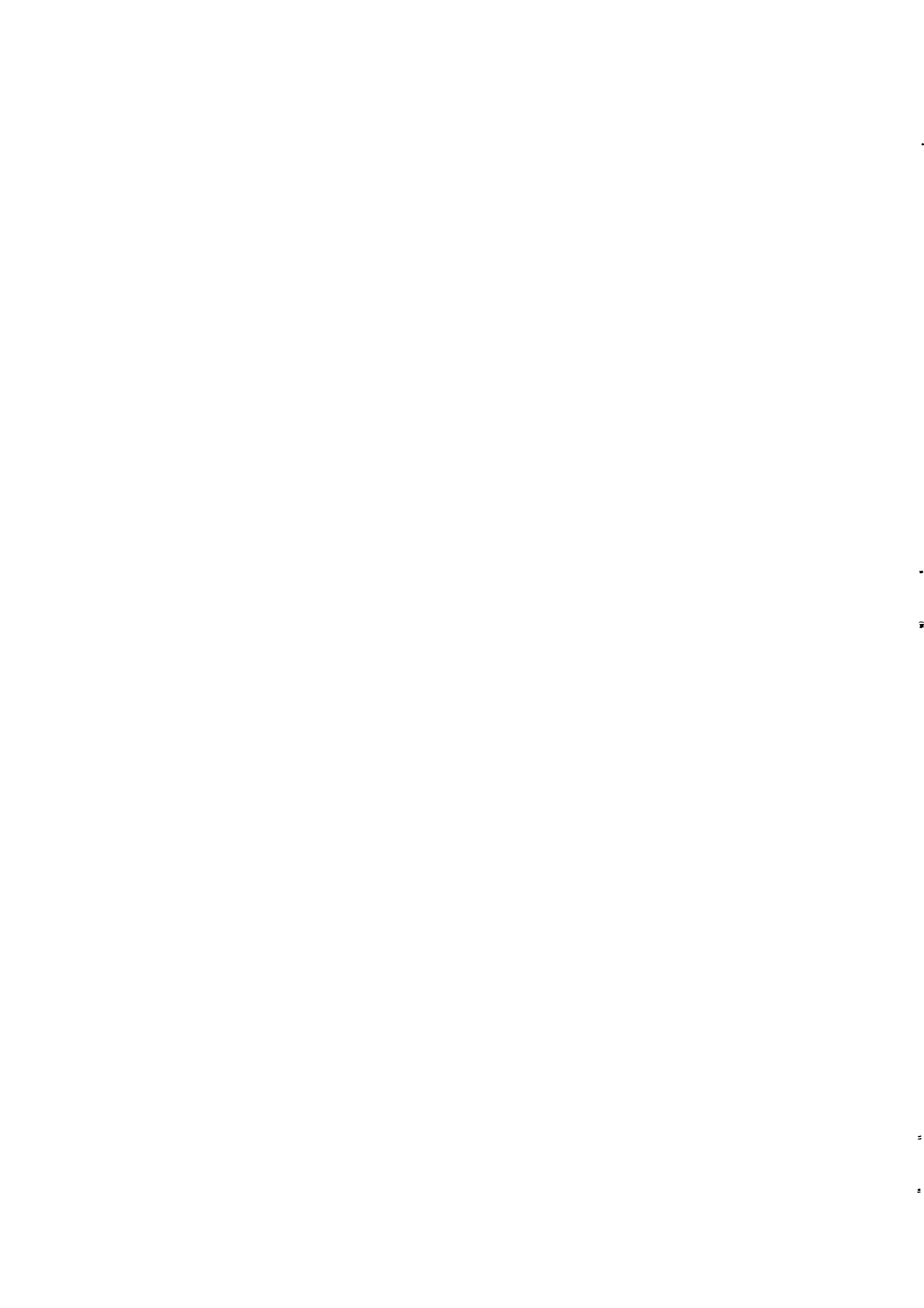
Each village had constructed a CCM party office on a self-help basis. Unyanga and Unyangwe had built latrines for the CCM office. As pointed out earlier, each village also has a cooperative shop.

Unyangwe and Nkhoiree villages had planted seedlings received from the Forestry Department. In Nkhoiree the seedlings arrived too late and they had all died when replanted. Those in Unyangwe had survived but were still small. Two acres had been planted in 1981. The primary school had also ordered 1000 seedlings. It was maintained that no instruction on the proper care of the seedlings was received. In Unyanga 20 acres had been prepared for a forest and plans were underway to obtain seedlings this coming year.

Village income

Income is obtained from taxes on the sale of cattle; taxes on brewing of the local beer; the communal fields; the shop; and various fines. Unyangwe village owned an ox-cart, 10 ox-ploughs and 6 trained oxen, all of which were hired out. This village also owned two hybrid bulls and 3 cows and employed a villager to tend these animals.

The tax on sending cattle to the auction was 10/- per head. The tax on local brew varied from village to village, ranging from 30/- in Nkhoiree to 20/- in Unyanga and Unyangwe. However if the brew was for a special celebration the tax could be lowered. There are regulations governing brewing, but these



also appeared to vary. In Unyangwe villagers were only allowed to brew at the weekends during the wet season (busy agricultural period) while in the dry season there was a restriction of one brew per day in each area. Unyanga had fewer regulations in the dry but the 'weekends only' restriction held for the wet season. A rough calculation in Unyangwe revealed that it was possible for the village to earn 320/- per week in the wet period (December - May) and up to 720/- per week in the dry period.

The fines imposed were for non-attendance at the communal field and non-attendance at the adult education classes. In Nkhoiree non-attendance at the field could cost the villager a maximum of 250/- and non-attendance at the classes cost a chicken. The fines in the other villages were not as high for failing to attend the communal agricultural work. However it is not known to what extent these fines are actually imposed.

Livestock

The total livestock (according to figures given by village leaders) in November 1982 were as follows:

Table 3 Livestock in the three villages

Type	Unyanga	Unyangwe	Nkhoiree
Cattle	2314	2868	3177
Goats	1824	3022	4137
Sheep	1016	1390	1160
Trained oxen	72	79	Not known

Oxenisation

The extent of oxenisation in the villages is illustrated in the following table. However this does not indicate the extent of the use of hired ploughs, both those of the village and those of private individuals.

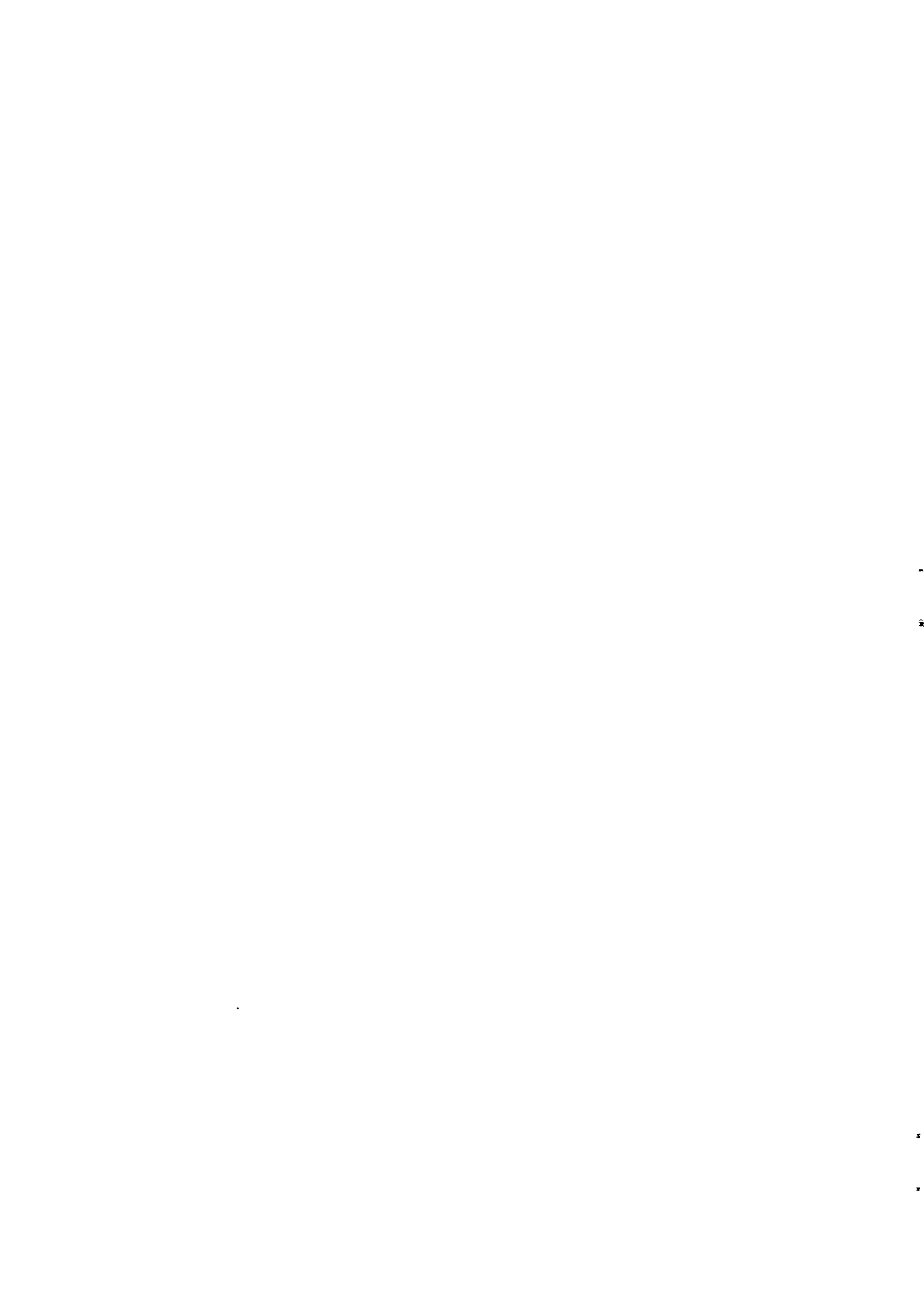
Table 4 Oxenisation

Implement	No. in village		
	Unyanga	Unyangwe	Nkhoiree
Ox-plough (private)	30	176	30-40
Ox-plough (communal)	3	10	0
Ox-cart (private)	6	9	3
Ox-cart (communal)	0	1	0

There was no use of tractors in these three villages. The majority of households continue to use hand-hoes.

Skills available in the villages

The villages had the usual mixture of "fundis" (local experts) in carpentry, masonry and simple repairs to bicycles etc. The types of skills available



are illustrated in the following table.

Table 5 Skills available in the villages

Type	Unyanga	Unyanagwe	Nkhoiree
Blacksmith	1	2	2
Mason	3	4	4
Carpenter	1	2	2
Bicycle repairs	1	0	0
Radio repairs	0	1	0
Tailor	0	1	0

4.2 Information on the sample households¹

Household composition

The average household size was 5.7 members. The average birthrate of the women in the sample households was 5.3. 27% of children born in the households had died while still young. The average number of children living at home at the time of the fieldwork was 3.1 per household. Of these children 32% were under 5 years of age, and 11% of these under-fives were infants (less than 12 months old). 41% of all households had persons other than nucleus family members living with them. These included parents, brothers and sisters and children of close relatives. These households with extra women have an advantage because of the extra work potential.

Agriculture

All households had between 1-4 shambas (fields), not counting the small gardens for vegetables. The average acreage was 4.3, with a range of 2-12 acres. 57% of the households had shambas which were more than 30 minutes walking distance from the homestead. Some were up to 2 hours away. The crops grown were bulrush, sorghum, maize, cotton, pumpkins and beans. In Nkhoiree groundnuts and sunflowers were also grown.

33% of households used ox-ploughs. The impact of oxenisation was more noticeable in Unyanagwe where 52% of households ploughed with oxen. 21% of all households in the three villages owned ploughs themselves and 7% owned carts. (Corresponding figures for Unyanagwe were 32% owning ploughs and 12% owning carts. The village also owned 1 ox-cart and 10 ox-ploughs which were hired out.) There was no use of tractors for ploughing. 67% of households still rely wholly on hand-hoe for cultivation in their fields.

The raika² system of cooperation in agriculture seemed to be utilized. 59% of households said they organized raika work-parties, though not when there was a shortage of grain as in January 1984. It appeared that it was still more often

1. The number of households studied in each village was 25, giving a total of 75 households in the three villages. Where the sample was less than 75 households this will be indicated.
2. The "host" household prepares beer and/or food and friends and neighbours are invited to come and help with agricultural tasks, such as weeding or preparing the fields.



men than women who attended such work-parties and that it was often close neighbours or relatives who participated. The use of paid labour appeared to be common (though it is not known what impact the bad season had on the figures obtained, since many families were dependent on such work for survival in January 1984) 53% of households reported that they usually employed labourers at least once per season for agricultural work. The labourers were paid in cash or kind. 41% of households reported that one or more members worked for others as day-labourers. (Again this figure may be high because of the food shortage situation during one of the fieldwork visits.)

35% of households claimed that they usually had some food crops over to sell, either as food or as grain for beer brewing¹. This figure was noticeably higher in Nkhoiree, 48%. In January 1984 only 13% of households had sufficient food to last them until the next harvest. (The figure for Nkhoiree was 26%.) Of the 87% with insufficient food crops, 76% had already finished their supplies (some as early as August 1983)². In comparison, during the 1981/82 season only 20% had experienced food shortages.

Cash crops were grown in 52% of all households. Cotton was grown in all villages and sunflowers and groundnuts in Nkhoiree. Vegetables and fruits were grown in gardens in the swampy areas by 49% of households. This was more common in Unyangwe (71%) which was a more swampy area. The gardens appeared to be mainly tended by the men. The crops included tomatoes, onions, cabbage, pepper, pawpaw, sweet potatoes, sugarcane. These crops were a source of income for the families, though it was claimed that a lot was eaten by the families themselves.

It is important to note the extent of beer-brewing for sale in the three villages, since this has obvious implications on the food supply for the families. Only 25% of households did not brew. More than half of the families who did not brew gave religion as the reason, while others said it was too hard work. The frequency of beer-brewing varied from family to family but it was obvious that there is a general seasonal trend. Most beer-brewing is done in the dry season, after the harvest when there is plenty of grain and the women are not engaged in other agricultural activities. In some families women claimed to brew once a week in the wet season, but it was extremely difficult to determine how often a year. On the basis of the information gained in these villages, it does not seem feasible that women can make large sums of money on an annual basis. They perhaps make a few thousand in a couple of weeks, which spread over a 12 month period is not such a large amount of money, given all the needs for cash income. In addition it is not known how much of the money earned is spent on buying beer from other families. In January 1984 there was no beer-brewing at all because of the acute shortage of food. Unfortunately it was not possible to determine how much of the scarce grain reserves from the 82/83 season were used for beer-

-
1. This figure does not take into account the exchange of good crops for other commodities, e.g. livestock, in the internal village economy.
 2. This would seem to be confirmed by the report "Makiungu Hospital Singida Tanzania" (1984) in which it is stated "In March 1983 the wet season was exceptionally short, consequently reserves of food were low, or in many districts, completely used up before the first harvest of 1984. Thus an acute food shortage was observed between mid February to mid March". In addition a nutrition survey carried out in Mother + child clinics of children aged 1-5 in 8 locations in Singida Region from 14th January to 15th March 1984 gave the following results:
malnourished 26.5%; poorly nourished 12.8%; well nourished 60.7%



brewing, though some families admitted that there had been beer-brewing, in spite of the fact that people were aware of the coming food shortage. It cannot be claimed that the families brewed in order to have cash to buy more grains later in the year as the price of grain rose astronomically when the supplies became scarce. One debe (tin containing 18 lit.) of maize cost 300/-¹ (official price was 107/- debe) and at the market in Singida a sack of maize was selling for 2,500/- (January 1984).

The problem of recurring famine was stressed by most of the households visited. The 82/83 season was extreme because of failures of rain, but there was a general complaint about reduced production following villagisation. As pointed out earlier households cannot exist on less than 1 acre surrounding the homestead. A lot of valuable time and energy is wasted getting to and from the former shambas, which often lie more than 30 mins walk away from the homestead. This is a special problem since it is the women who have the main responsibility for food crop production, as they also have the responsibility for preparing food and taking care of small children and other domestic duties. In addition the problem of manuring the fields has already been pointed out. The only solution seen by the people is to move back to their former fields. Following the current bad season (and especially if the coming season is also poor) there will probably be a move back to the old areas. Such a trend was already evident in January 1984.

Villagisation

Only 8% of all households had not been affected by villagisation. 71% had moved from 1-2 kms away from the centre. It appeared that there was an attempt by people from the same area to keep together. All households were supposed to have been given 1 acre of land, which included the land on which their homestead and cattle enclosure were to be built, though in many cases it was probably less than 1 acre. Even those who had been close to the centre often lost some of their land. Some homesteads had had to move 50 metres in order to keep the roads straight, and others had to turn their homesteads to face the other direction, in order that all cattle enclosures faced away from the roads. This showed a total disregard for traditional Nyaturu customs of having the entrance of the homestead facing west, and the importance of having the house of the senior wife, the emotional and ritual centre of the homestead (Jellicoe) backing on to the east, with one central door facing west.

It was claimed that there was some use of force when people protested, that houses were knocked down if people resisted. Generally people were opposed to the whole operation. In 23% of households it was claimed that the water supply had improved. Few households could name any other advantages, such as proximity to neighbours in case of need; proximity to the school and shops was also considered positive. Among the disadvantages mentioned were distance from the main shamba and the resulting reduction in production; quarrels with neighbours, sometimes because conflicting groups were mixed, or, more often, because of land disputes; and increased distance to firewood and grazing in the forests.

By far the most serious negative impact of villagisation was the effect on production. 72% of households claimed that production had been decreased

1. At harvest time maize sells for 40/- to 50/- debe in the villages.



markedly over the 10 years since villagisation. The bad season of 82/83 probably marks a crisis point in these villages since 27% of households admitted that they planned to move back to their old areas after the next harvest. Combined with the 19% who had already moved back, this means that almost 50% of households will be back in the old areas by the end of the coming year. The implications of this for development planning and, for example, improvements to water supplies is something which has to be come to terms with.

Livestock

As pointed out earlier cattle are important for Wanyaturu both economically and socially. Without cattle a Nyaturu family has lessened prestige and status, and without manure their production of food crops is affected. In addition surplus grain is exchanged for livestock, which are then a security for the household. In all probability families which have no cattle are not in a position to purchase manure from others so that it is difficult for them to improve their situation through increased production of food crops for sale or beer-brewing. The only way they can have access to cattle is through borrowing from friends or relatives. This system is quite widespread among the Wanyaturu. 49% of households had borrowed cattle. However not all of these families were poor, since the loaning of cattle between friends is a way of creating bonds and obligations. For poorer families it is an important economic asset to be able to obtain manure and milk. However 21% of households in the three villages did not have cattle at all. Some of these households were women-headed households.

The total number of cattle in the 75 households was 941. 25% of these cattle were on loan to others than their owners (Unyanga: 37%; Unyangwe: 26%; Nkhoiree: 25%). The range of cattle owned was between 3 and 58. Further information is contained in the following table. The man/animal ratio is relatively high, 1:2.8.

Table 6 Livestock in the sample households

Type	<u>Unyanga</u>	<u>Unyangwe</u>	<u>Nkhoiree¹</u>	<u>All 3 villages combined</u>
Cattle	378	289	274	941
Goats	380	351	172	903
Sheep	184	148	55	387

General economic position of the households

Cash income:

The households received their main cash income from varying sources. Table 7 below indicates the main sources according to frequency of the number of households mentioning them, not according to the relative amounts of cash loaned. Since there were rather great differences between the three villages, information is given on each village separately. The villagers in Unyanga, being closer to Singida town, have more opportunities for earning cash income than those of Unyangwe and Nkhoiree. For example, 48% of households sold salt in Singida; 32% sold firewood; and 28% sold charcoal. In addition the sale of milk was greater in Unyanga than in the other villages. In Unyangwe where

1. There would appear to be some discrepancy between the figures given for number of goats and sheep by the sample households and the figures given by the village leaders for the village as a whole.



oxenisation had had more impact there were more opportunities for earning money through hiring out ox-ploughs and ox-carts. Because of the location close to swampy areas 48% in Unyangwe sold vegetables at neighbouring markets. Cash-crops were more prevalent in Nkhoiree and 36% sold sunflower seeds and 4% sold groundnuts.

Table 7 Main sources of income¹

	% of households			All 3 villages combined
	Unyanga	Unyangwe	Nkhoiree	
Beer brewing	60	84	80	75
Livestock	48	48	28	41
Food crops	16	28	20	21
Day-labour	28	20	8	19
Vegetables	4	48	0	17
Salt	48	0	0	16
Sunflowers	0	0	36	12
Firewood	32	0	0	11
Charcoal	28	0	0	9
Chickens	0	4	20	8
Milk	12	4	4	7
Hiring ploughs/carts	8	12	0	7
Regular waged labour	4	8	4	5
Cotton	4	4	4	4

Other means of obtaining cash income, which were mentioned by individual households were making ropes and baskets, bee-keeping, carpentry and training of oxen.

The main needs for cash incomes mentioned by the households (not according to priority) included the following:

- clothes and shoes
- foodstuffs such as sugar, salt, cooking oil
- kerosene
- soap
- school uniforms and fees
- household equipment and utensils
- food crops for food and for beer brewing
- meat
- beer
- milling fees
- hospital fees and medicine
- CCM fees

Social status

The housing standards can be a good indication of the status of the households. Only 14% of houses were made of mud bricks. One house had an iron roof. The

1. Note that most households mentioned several sources of income so that the total is more than 100%



remaining houses were of traditional tembe style. In general the houses were in very poor condition.¹ Walls and roofs were in need of repair. The surroundings were often unhealthy, particularly because of the wet muddy cattle enclosures, ideal places for mosquito breeding, and because of the piles of manure left lying around, sometimes even inside the women's houses.

Only 15% of households owned a radio and 8% owned a bicycle. In Unyanga, probably because of the proximity to Singida, the figures were 20% owning radio and 20% owning a bicycle.

The average age of male household head was 43.6 (with range of 22-65). The average age of wives was 36.8 (with range of 19-55). The educational standard of the male heads of households plus their wives is given in the table below. Only 23% of women knew Swahili well enough for conversation during the meetings in their homes.

Table 8 Educational standard in sample households

	Women	Men
No primary schooling at all	64%	42%
Up to standard 4 or more	28%	40%
Completed standard 7	9%	10%

37% of the households had members holding some kind of position of authority or responsibility, usually the homestead head. Such positions included balozis (ten-house cell leaders), members of various committees, UWT members, literacy teachers, members of church committees etc.

19% of households were run by women, the household head having died or the woman having been divorced. Only 21% of sample households were part of polygamous homesteads. This is 29% of all non-christian households included in the sample. 73% of households were muslim or traditional.

Villagers' perception of village problems and needs

The households were asked to identify the biggest problems in the village. Unfailingly the problem of recurring famine and the food shortages during the 82/83 season were mentioned. This was related to the lowered production after villagisation and the inability to apply sufficient quantities of manure. The other problems listed according to the number of households mentioning them, are given in the table below

1. It needs to be remembered here that many households were contemplating moving back to their old sites and therefore were not interested in improving the existing house.

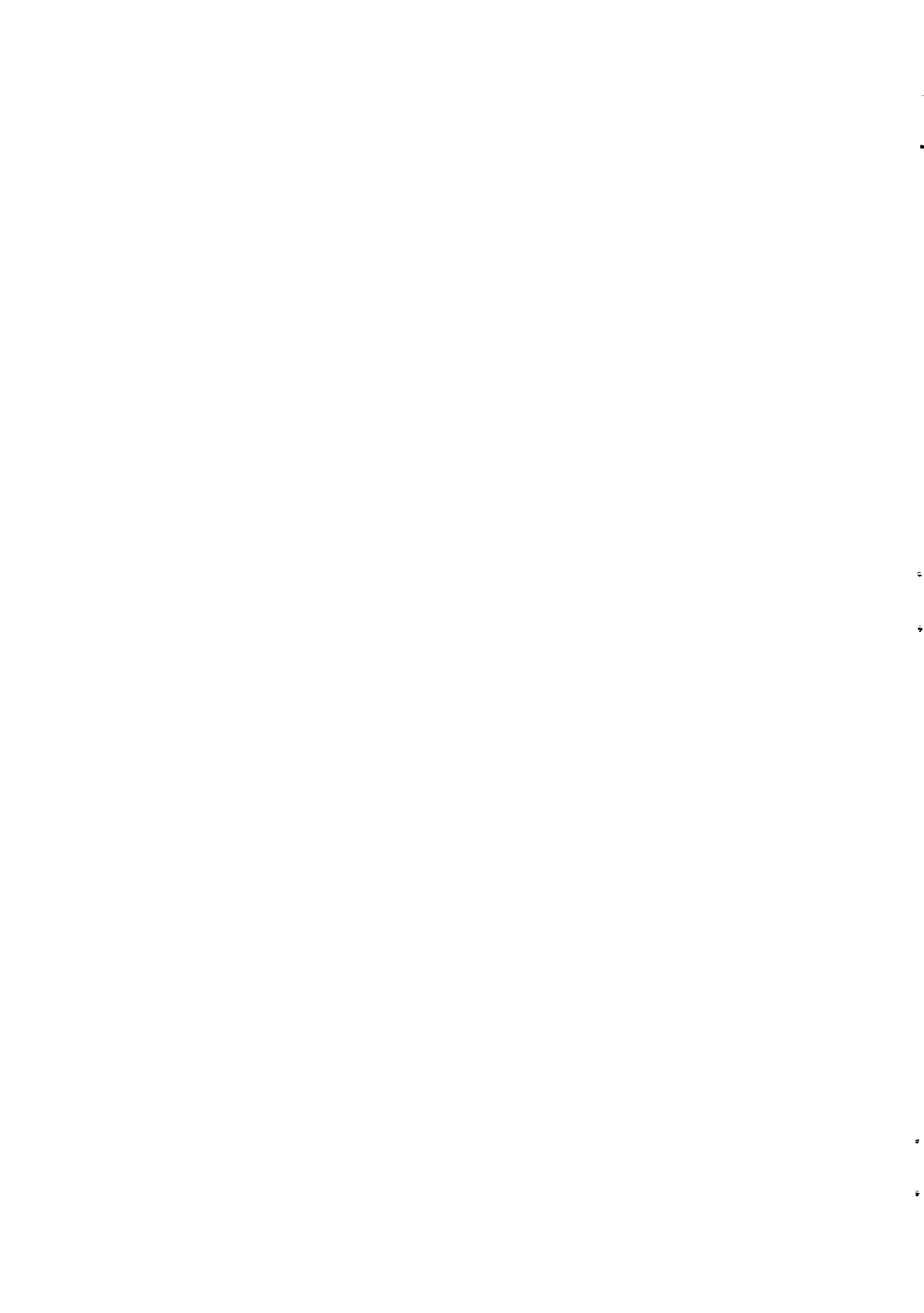


Table 9 Priority of village problems

Problem	% of households mentioning this problem			
	Unyanga	Unyangwe	Nkhoiree	All three villages combined
Water supply	36	12	33	27
Poor distribution of goods	24	44	5	25
No dispensary	8	4	38	20
No milling machine	4	12	0 ¹	6
Lack of agricultural inputs	8	4	0	4

Other problems mentioned by individual families included shortage of grazing land, cattle thefts, too much communal work and lions coming closer to the settlements.

4.3 Domestic water supplies

Water sources.

As mentioned earlier, the three villages were chosen as a sample because of the varying water supply situations. Unyanga and Unyangwe villages had received improved water supplies. Plans were underway for improvements in Nkhoiree.

a) *Improved supplies*

In Unyanga a windmill and tank were constructed in 1980. This system pumped water up to a domestic point with 4 taps near the primary school. A cattle trough was also constructed. After only 9 months the windmill was out of order. Repairs were made but within a short time the windmill was again not running. During both fieldwork periods the windmill was not operating and villages had returned to the traditional sources they used previously. The village leaders claimed to have reported the breakdowns. In addition, after a survey in 1977, a tank had been constructed on a hill near the village, and domestic points placed around the village in 1979. This was in preparation for a scheme which would pump water from a nearby village, Mwankoko. However this scheme had never been completed. The taps were standing dry and it was reported that the pump which had been installed in Mwankoko had been stolen. The villagers did not know why the scheme had not been completed, but there were rumours that the water in Mwankoko was not sufficient for such a scheme. During the last fieldwork visit there was evidence that the villagers had begun to tire of this monument to bad planning, as there had been some vandalism along the pipeline.

Unyangwe village had received two foot pumps in November 1981. One of them had worked for a very short time only. When the breakdown was reported the pump had been removed for repairs but had not been returned to the village. The villagers took water from this well using a bucket and rope. Others returned to the traditional sources they had been using before the foot pump was constructed. The second pump was still in good working condition. There were no hedges around the well. The sites were kept fairly clean, although people were washing clothes and themselves too close to the well site.

1. It should be remembered that a private individual has set up a milling machine for the villagers in Nkhoiree.



At the time of the first fieldwork period (November/December 1982) a survey team was in Nkhoiree in preparation for constructing an improved supply. In this context it was interesting to investigate the expectations of the villagers and also the extent of participation in planning. Almost half the households contacted (5/12) did not know what the surveyors were doing in the village. The remaining households understood that it was something to do with water supply but had received no real information from village leaders or the survey team. They thus had differing expectations about the type of supply to be constructed and this has obvious implications for the acceptance and success of the improved supply actually implemented. 2/12 of households thought that they would receive a diesel-powered piped supply, while the others expected windmills or handpumps.

At the time of the second fieldwork visit, 13 months later, nothing more had happened in the village. The leaders complained that they had contacted the Ministry in Singida but that they had heard nothing more. There was a general feeling of frustration about the whole question of improving water supplies.

Utilization of the sources already constructed:

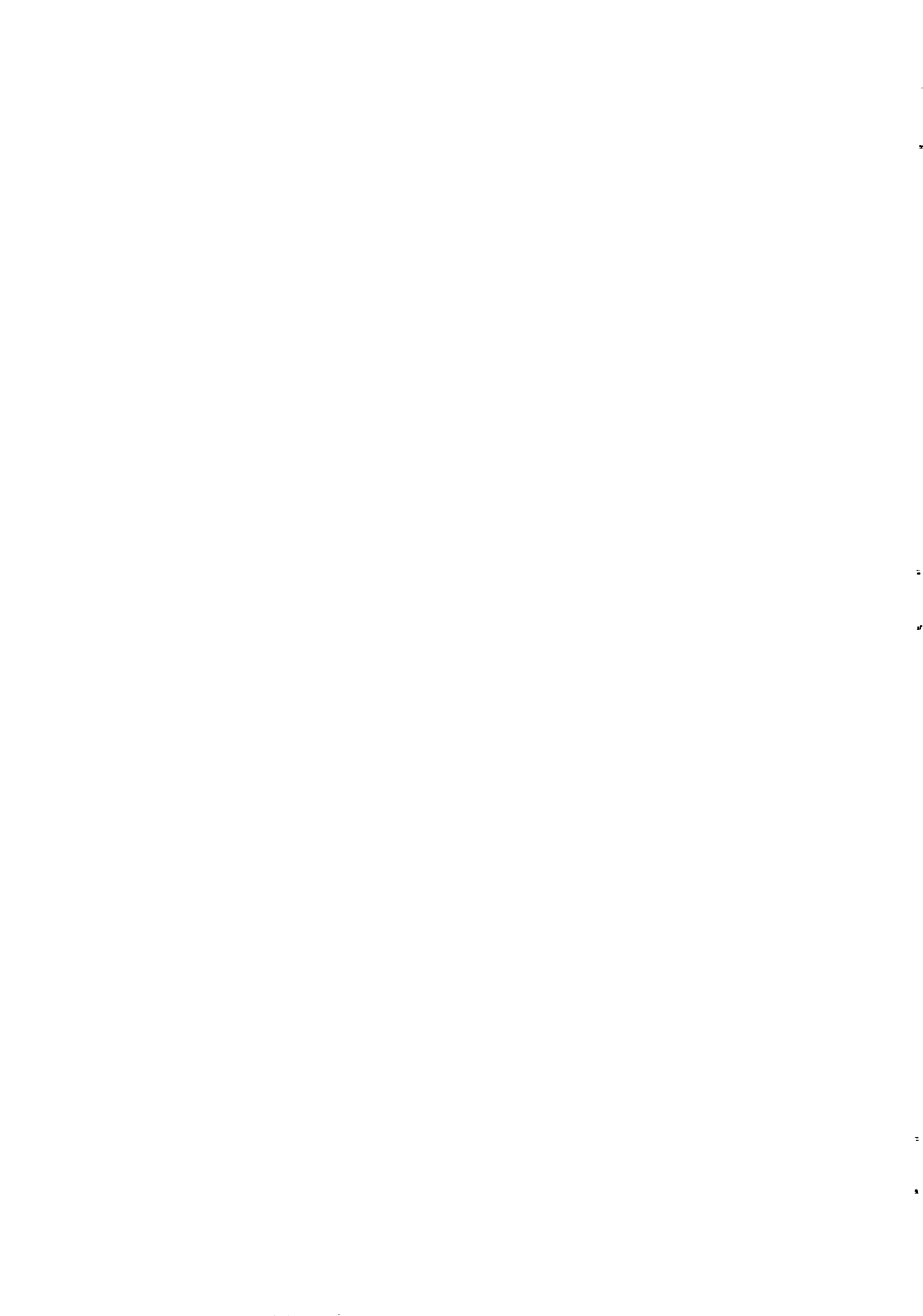
44% of households in Unyianga claimed to have utilized the windmill source when it was working, even if it meant a longer distance. For many of the households there was no possibility to use this source because of the long distance. One family walked to the neighbouring village to collect water from a handpump when they considered the water in the traditional sources was too polluted, or when these sources dried up. This entailed quite an extra distance to walk. Those who had used the windmill claimed to have used it in all seasons. There were complaints that the queues were long as so many people wanted to utilize the improved source.

The cattle trough was not a success since it was too frail and too small for the type and number of cattle needing to use it. The villagers suggested the construction of a much bigger and more solid type to withstand the onslaught of 50 or more thirsty cattle at a time.

In Unyangwe 24% of households were using the foot pump which was still working, and 12% were using the well with the broken foot pump. They were drawing water with a bucket and rope. However it appeared that not all these households were using the improved supplies continuously. Some households admitted that it was mainly when the traditional sources began to dry up. Normally the traditional sources were closer and they continued to be utilized. The benefits from the improved supply were thus more marked in the dry season when women began to have to walk further from their houses to find water in traditional sources. Two of the households continued to use traditional sources for some water uses, e.g. bathing, even when they were using the improved sources for water for cooking and drinking. This was because the improved source was further away from the house than the traditional sources.

Benefits of the improved sources

The main benefits attributed to the improved supplies were improved health (and in particular less stomach problems) because of the better quality water. All the women using the improved supply claimed to have saved time which they utilized for collecting firewood, irrigating vegetable gardens and agriculture, washing clothes, resting and visiting neighbours. In Unyangwe the improved convenience was especially appreciated as well as less queueing and the permanence. While it is difficult to determine whether or not all these benefits are in fact real, it is nevertheless important to record them since they are the perception of the users of the supplies, and as such have relevance.



Participation

The level of participation in the improvement carried out was extremely low. This was especially so in Unyanga. None of the households had been involved in any way in the planning of either of the schemes. All households had, however, participated in digging trenches. It appeared that no health education had been given in connection with the installation of the supplies, nor any special instructions on the proper use of the supply. In Unyangwe only two households reported that they had received any specific information on the planned improvements before the construction began. Some instruction had been given on the correct methods of pumping with the foot pump, the necessity of keeping children from playing with the pump, and on prohibitions against washing clothes and bathing at the well sites. Unfortunately it was not always the women, the ones who utilize the pumps, who received this information directly. There did not seem to have been any special instructions on the relationship water-health-hygiene and such related issues as sanitation.

Complaints and suggested improvements

The main complaints in Unyanga were that the piped scheme had never been completed and that it was difficult to get the windmill repaired. In addition it was pointed out that the water supplied by one domestic point was not nearly enough for all the people wanting to use the improved supplies. It was suggested that more windmills or wells with handpumps should be installed, and bigger and stronger cattle trough should be designed. It was also felt that the number of taps at the domestic point (4) was insufficient, especially as often only 2 were working at a time. With regard to the uncompleted piped supply, the suggestion was firstly to finish it, and, if it was ever brought to completion (which people doubted), to install more domestic points so that it reached more people.

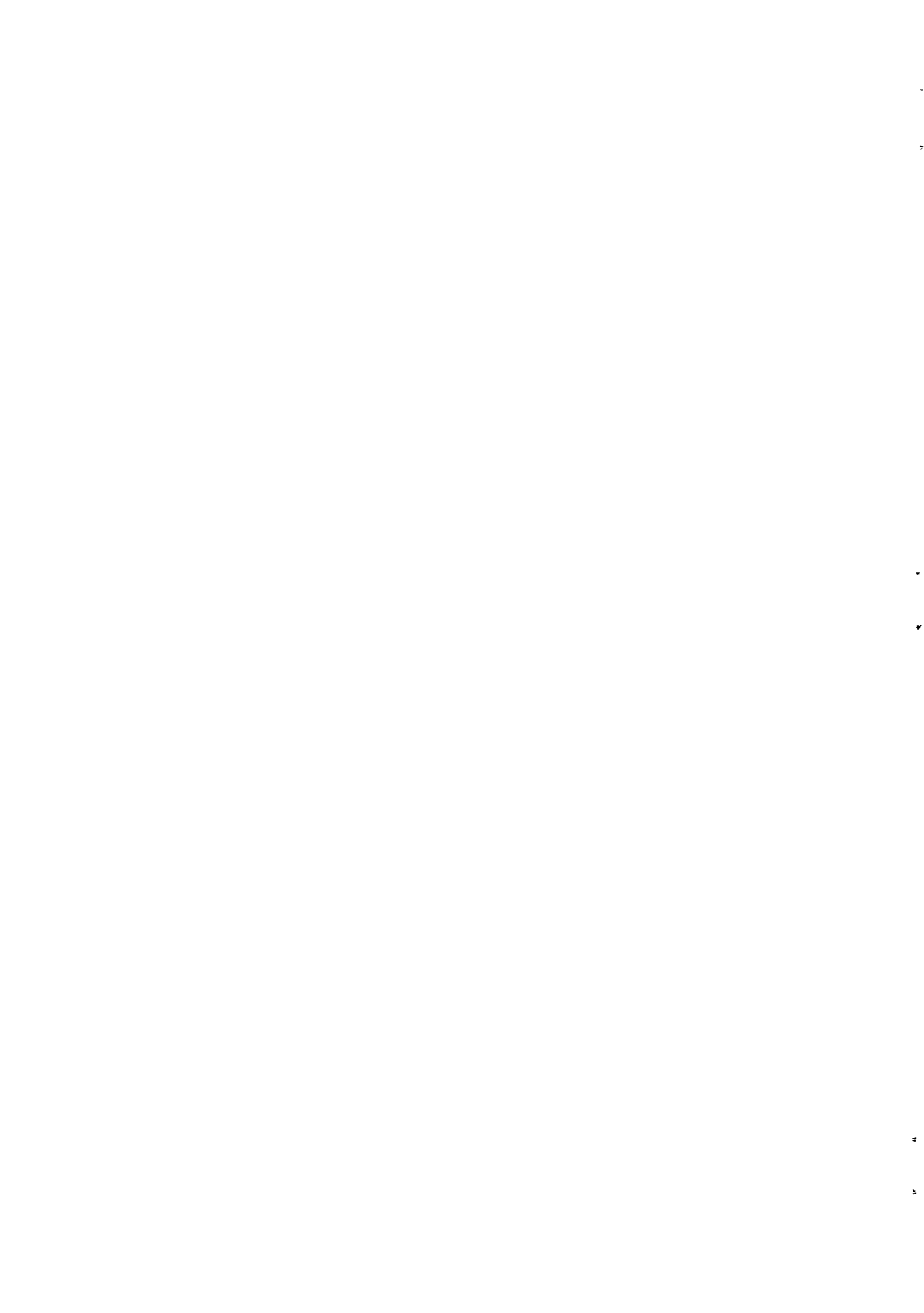
In Unyangwe the villagers complained mainly about the breakdown of the foot pump and the failure to repair and return it. There were also complaints about the bad taste of the water from one foot pump. It was considered more salty than water in traditional sources. It was suggested that water should have been taken from the river-bed instead. The need for more wells with hand or foot pumps was emphasized in order to bring water closer to more people. Another practical suggestion was for the construction of hedges around the wells to keep animals out. One household complained that people did not heed the instructions given about not washing clothes or themselves at the site, and others complained about the children playing with the pump.

b) Traditional sources

At the time of the fieldwork all villagers in Unyanga and Nkhoiree were using traditional sources. And the same could be said of the majority of households in Unyangwe, since only one foot pump was working.

In Unyanga and Unyangwe the traditional sources were hand-dug wells. These wells were unlined. They were dug down 1 - 1,5 metre. Poles were placed as steps at the entrance so that those collecting water could go down to the water level without danger of slipping into the well. The water in these wells was, at least to outward appearances, of poor quality.¹ It was often milky or green with algae. Such wells are unreliable, sometimes drying up completely in the dry season, or the recharge is slow so that women have to wait for hours for water to seep out. In addition new wells have to be dug whenever the old ones become too contaminated or cave in.

1. Attempts to carry out bacteriological tests of the water failed due to inexperience of staff at the regional water laboratory.



The villagers in Nkhoiree use the river as a source of water. In the dry season it is necessary to dig down several meters to get sufficient water. Several families help prepare such wells together. After the rains, when water is sufficient, it is only necessary to dig a small depression in the sand in the river bed. This fills quickly with "clean-looking" water. At this time of year a new hole is dug every time water is collected in an effort to get as clean water as possible. Some villagers also use a man-made dam, though it was pointed out that the water quality in the dam was very poor.

Opinion of the traditional sources

More than half the households considered that the water was of poor quality. It was blamed for the high frequency of stomach problems. Generally the taste was also considered bad. In Unyangwe particularly there were complaints about the salty taste of the water. Those who were using (or had used) improved supplies considered the quality and taste of the improved supply better than the traditional sources.¹ In only 2 cases did the households consider the taste of the improved supply to be bad.

Suggested improvements

Only 17% of households did not consider there was any need for improvement, or could not suggest any improvement. The improvements which were suggested by the remaining households are given in the following table.

Table 10 Suggested improvements to the water supply

Improvement	% of households			The 3 villages combined
	Unyanga	Unyangwe	Nkhoiree	
Well with handpump	60	60	56	59
Diesel-powered supply	24	0	20	15
No improvement needed	16	12	24	17
Simpler improvements to traditional wells	0	16	0	5
Repair existing improved supplies	0	12	0	4
	100%	100%	100%	100%

Perceptions of expected benefits

The households were asked what they considered the benefits would be from the improvements they suggested. 63% considered the main benefit to be improved water quality, which would result in better health, at least in terms of reduced incidence of stomach problems. The anticipated benefits are listed in the following table.

1. It appeared that people considered improved supplies automatically guarantee cleaner water, even if water was taken from the same source as the traditional supplies.

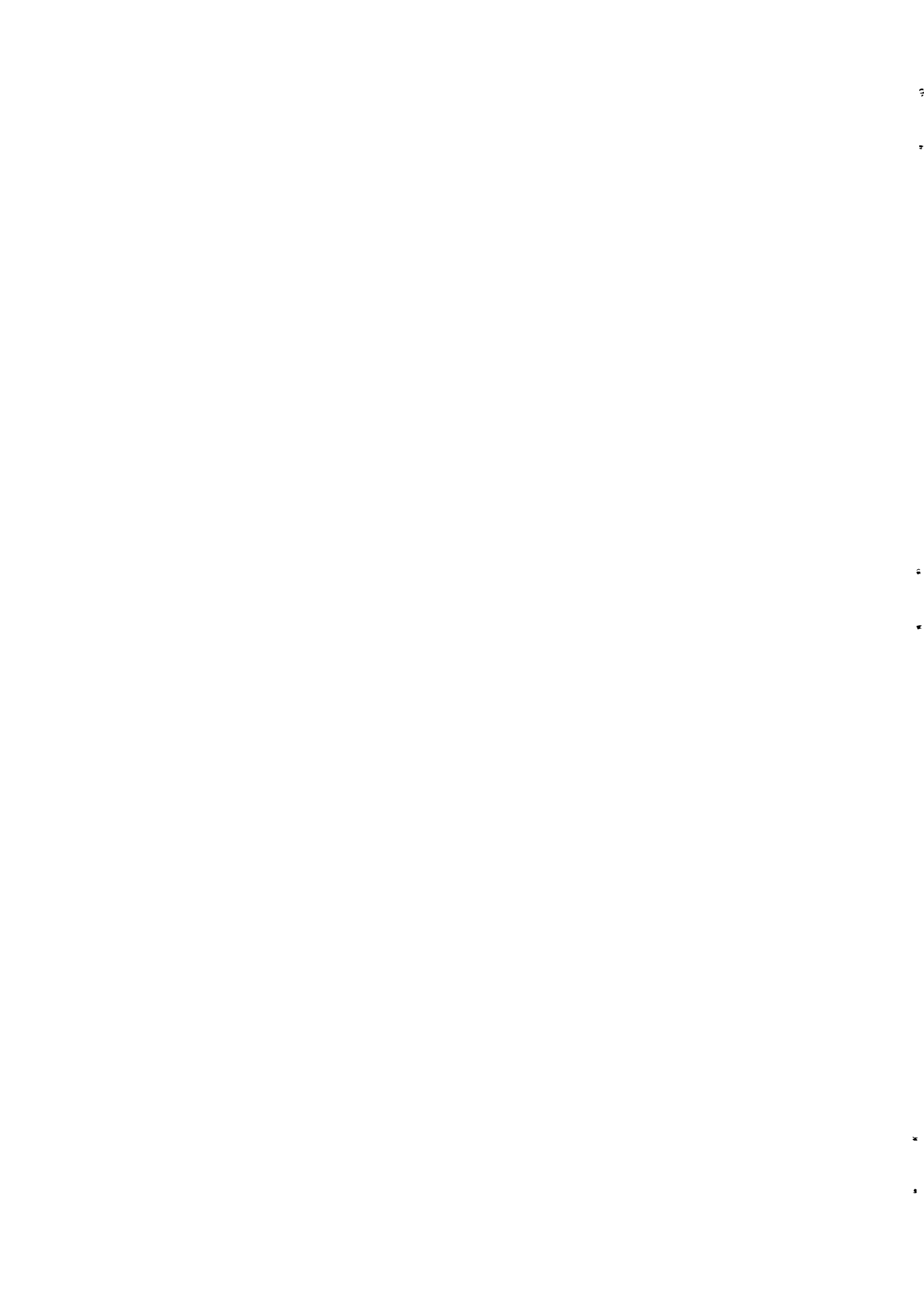


Table 11 Expected benefits from improved water supply

Benefits	<u>% of households mentioning</u>
Improved quality	65
Increased quantity	14
Saving of time	10
Increased convenience (lessening of burden)	7
More water for animals	4
	<hr/> 100 %

The households were then asked if they would use more water when the supplies were improved. 65% of the households gave a positive response. (This can be compared with the 14% of households who saw increased quantity of water available as one of the benefits from improvements in table 11.) 50% of households considered they would use this extra water for personal bathing. The uses mentioned are listed, according to the % of households mentioning them, in the following table.

Table 12 Activities for which more water would be used¹

Activity	<u>% of households mentioning</u>
Bathing	50
Washing clothes	45
Domestic uses (including cooking)	35
Drinking	9
Watering animals	5
Irrigating vegetable gardens	3

When asked directly if improved water supplies would entail a saving of time for the women, 80% gave a positive response. However this should be compared with the 10% who considered that a saving of time was one of the benefits to be anticipated from improved water supply (see table 11). The activities on which any saved time would be used are listed in the table below, according to the % of households mentioning the activities.

1. Note that some households mentioned more than one activity and as a result the total is more than 100%.

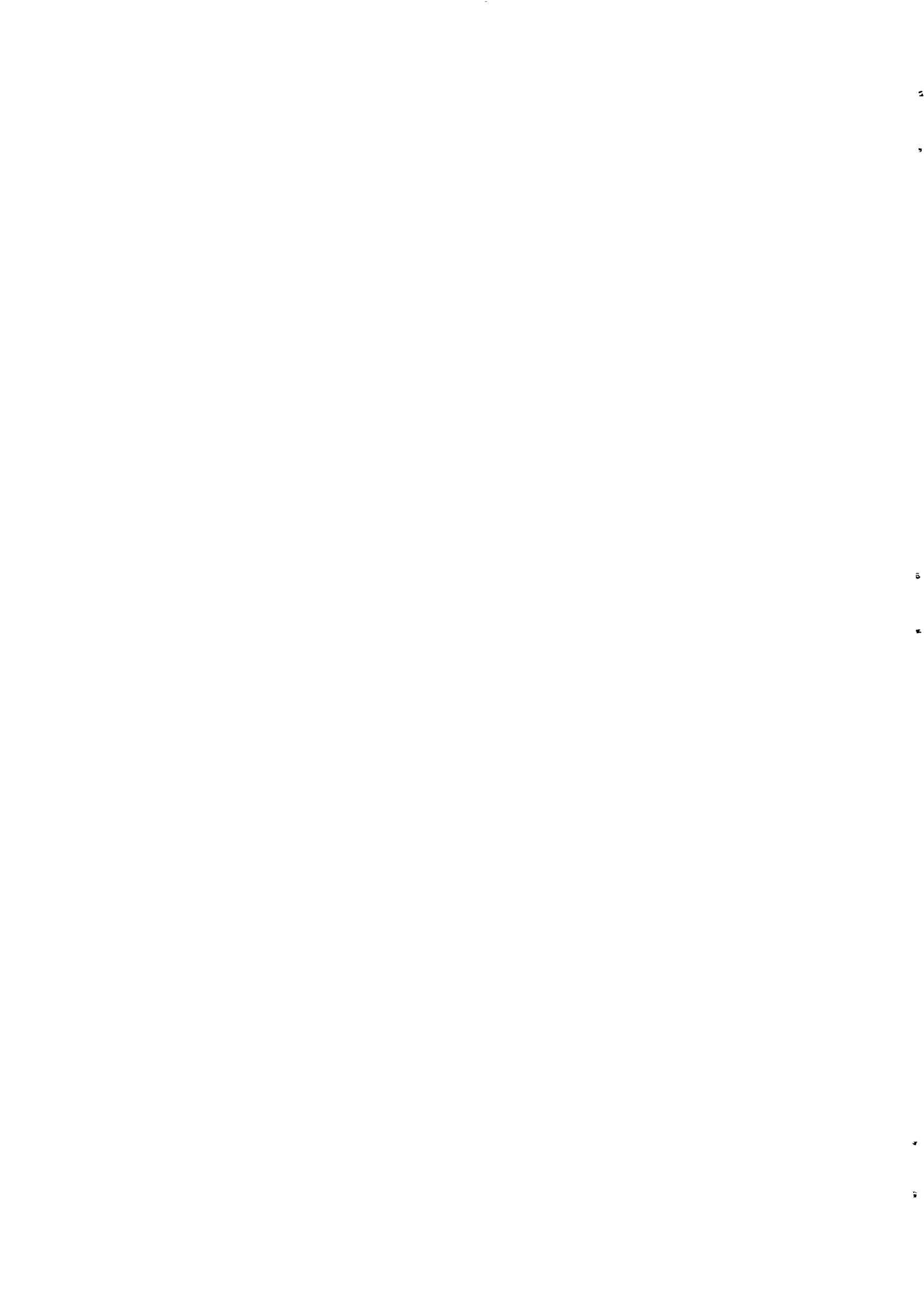


Table 13 Activities on which any saved time would be spent¹

Activity	<u>% of households mentioning</u>
Agriculture	39
Collecting firewood	36
Housework	27
Grinding	27
Collecting wild vegetables	19
Resting	8
Tending animals	1

Water collection and consumption

The average per capita consumption of water (PCC) for the three villages was 8.7 litres with a range of 2.6 to 20 litres.² The PCC for each village is presented in the following table.

Table 14 Average per capita consumption

	Unyianga	Unyangwe	Nkhoiree	All 3 villages combined
PCC (in litres)	6.4	8.0	11.6	8.7
Range	2.6 - 12	3 - 16	3 - 20	2.6 - 20

It is felt that the 20 litres per person in some households is too high a figure. It is interesting to note that the PCC was highest in the village which had not yet received any improved supply.

27% of households had girls under the age of 15 who regularly helped with water collection. Water was collected 2-3 times a day. In the dry season some households had to walk up to a distance of one hour from the house to find water. Normally the time required ranged from 10 minutes to 30 minutes. This does not take into account the time spent waiting at the well. It was reported that in the driest period it was sometimes necessary to wait up to 2 hours for enough water to seep into the bottom of the well.

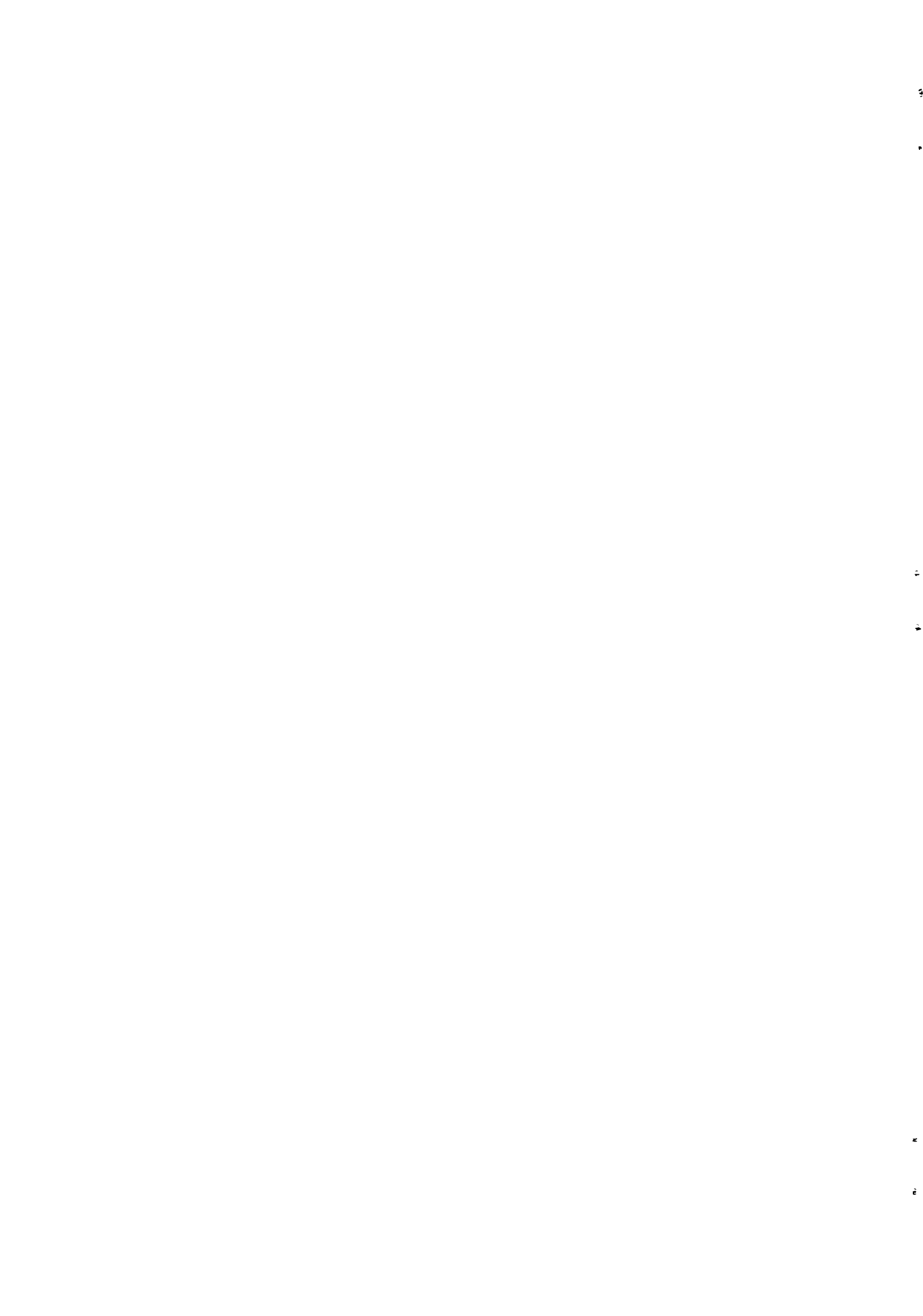
63% of households collected water in calabashes; 23% in iron buckets or debes; and 14% in plastic buckets. At the well a little water was scooped up in a calabash and all vessels washed carefully with sand and water before water was collected. The calabash was completely submerged in the water for filling, to prevent the obviously polluted surface water from entering. In Nkhoiree, where water was collected in small hand-dug depressions in the river bed, a scoop was used and the water poured into the calabash.

Drinking water

Drinking water was kept in clay pots in 40% of households. 44% kept the

1. Note that some households mentioned more than one activity so the total is more than 100%.

2. Much washing of clothes and some personal bathing is done at the source. The PCC figure above does not take this into account.



drinking water in the calabashes it was collected in. Plastic buckets were used as storage vessels in 9% of households and iron buckets in 7%. This means that of those collecting water in plastic buckets, 70% used the same buckets for storing the drinking water. 29% of those using iron buckets also used them for storing water. This would immediately imply that there is no difference between water for drinking and water for other uses, and that drinking water is probably not boiled.

63% of households claimed to keep the water covered at all times, though observation in the houses seemed to indicate that this figure is too high. Of those storing water directly in calabashes, 39% indicated that all household members drink directly from the calabash. In reality the incidence of drinking directly from the same calabash is probably higher. Of those using vessels other than calabashes for storage, 47% of households maintained that they used cups with handles for removing water for drinking. Those using other vessels, such as saucers, small tins, etc, have increased risk of contamination through submerging the hand in the water. This is especially so if small children are allowed to take water themselves. The possibilities for contamination of drinking water in the homes appear great.

When questioned about the boiling of drinking water, 24% of households claimed to boil the water. Attempts were made to take some samples from households which claimed to boil the water. However, either the households refused, or suddenly discovered there was no drinking water left in the house, or qualified their original statement by indicating that they did not boil the water all the time. This in combination with the fact mentioned above that many households store the water in the vessel it is collected in, would appear to indicate that the % claiming to boil the water is too high. It is unlikely that more than 1 or 2 households actually do this on a regular basis. Though during the cholera scare of 1981 it is possible that more families boiled water for a short period.

The reasons given for not boiling water are listed below.

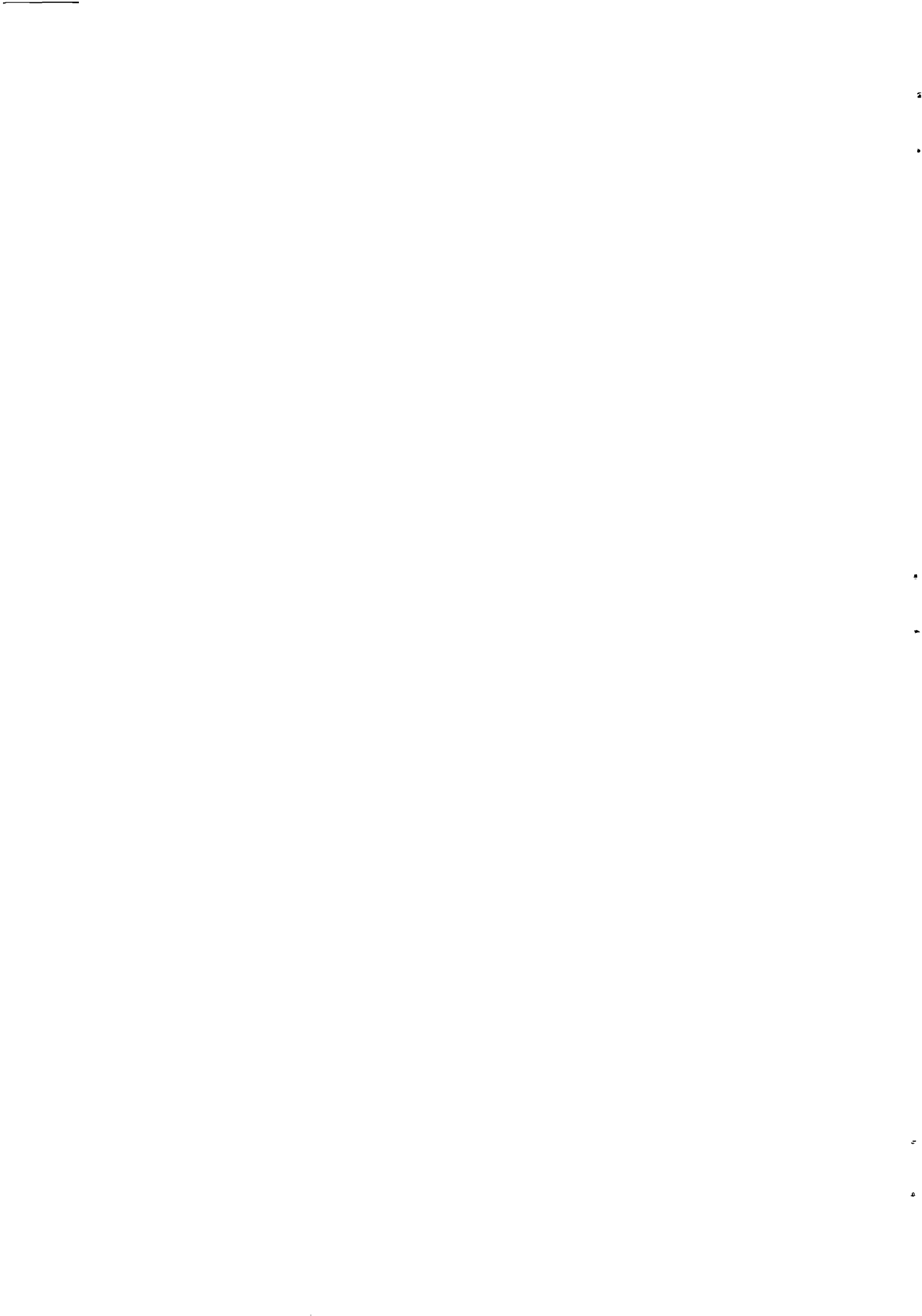
Table 15 Reasons for not boiling drinking water

Reasons given	<u>% of households</u>
Never done it (tradition)	31
Don't know why.	21
No time/too tired	18
No need to boil	14
Not enough containers	8
Bad taste	5
Too lazy sic	3

4.4 Health, hygiene and sanitation

Hygiene

The standard of personal hygiene in the sample households was not good. 41% of households stated that the washing of hands after using the latrine was not a regular practice. The fact that there is so little water available at the



house, and that water for all uses is stored in the same vessel, would appear to indicate that the % of households claiming to wash hands after using latrines is too high. (It must also be related to the aspect of actual use of latrines - if households are using the bush or fields instead of the latrines, the incidence of washing hands is probably very low.)

While all households washed hands before eating, only 5% of households used running water (i.e. poured water from a jug). All other households used one bowl with all persons eating together, using the same water. This facilitates the passing on of infectious diseases. Only 44% of women wash their hands before preparing food. In some cases women indicated that they only washed hands when they were obviously dirty, i.e. muddy after having worked in the fields. Others stated that they washed their hands when they washed the equipment they were going to use.

Bathing

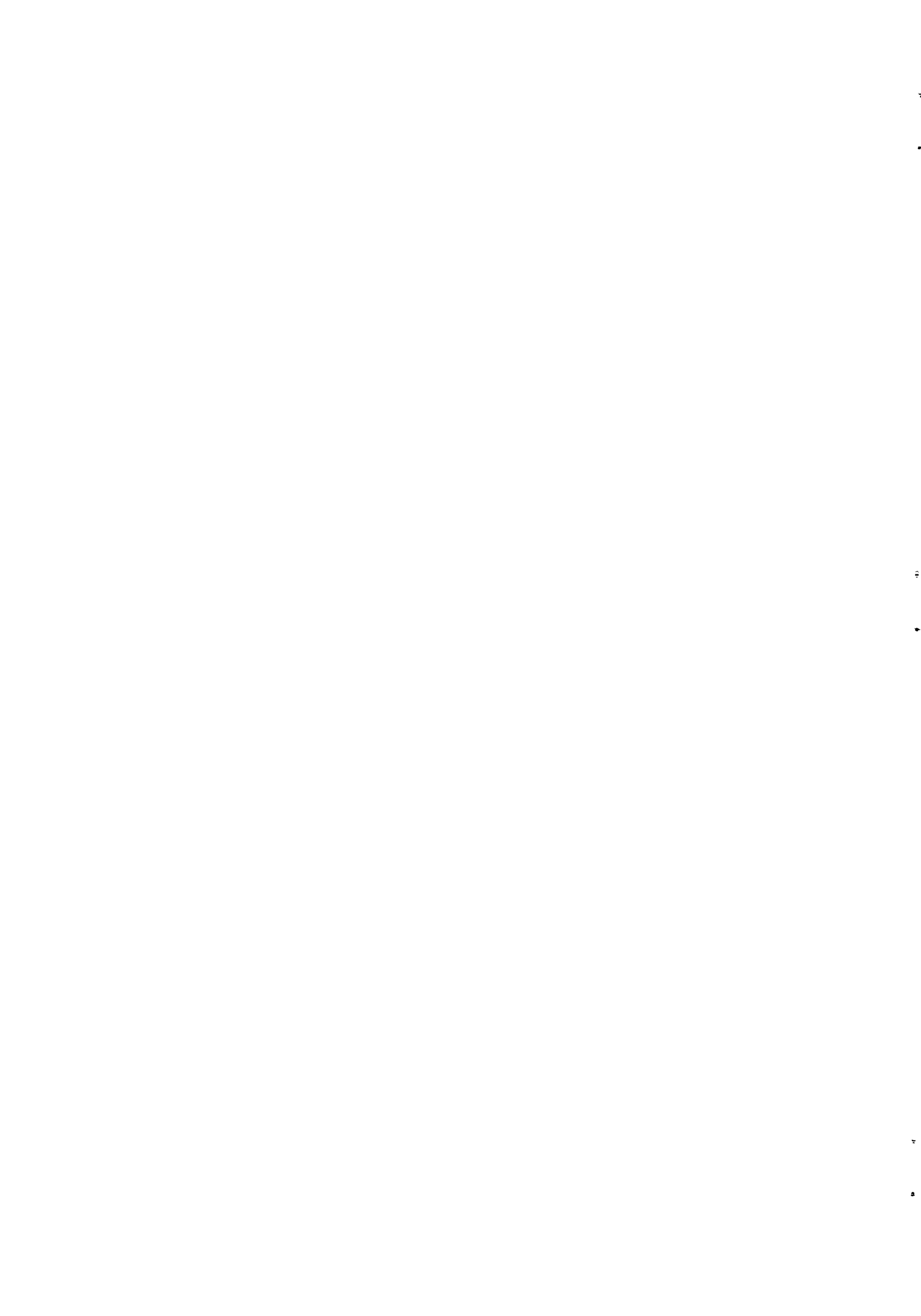
It was difficult to determine how often family members bathed as there was some confusion as to what bathing means. It appeared that face, hands, arms and legs were washed often, especially when apparently dirty. However complete baths were less common. The men washed more often than the women as they had the possibility to swim in the cattle holes or rivers. School children, particularly boys, often wash themselves at the river or water holes in a similar manner. The incidence of personal bathing probably varies according to the season. There are also individual factors to take into account. Some women consider they need to bath more in the peak agricultural season as they get more dirty. Others said they washed less often in that period as they were so tired after a long day's work. Others said they didn't wash as often in the cold season.

85% of women always bathed at home and 49% of men usually bathed at home. This meant that the women had to collect enough water for their own baths and almost half of the women had to also collect (and often warm) water for their husbands' bath. That women mainly wash at home is probably due to the fact that in many cases there is no privacy at the wells. As mentioned above, men and school children are able to use the pools. The incidence of bilharzia among school children can probably be related to this practice.

The scarcity of bathing soap is a problem. Only 15% of households had bathing soap at the time of the 2nd fieldwork period. Some families had been without soap for over 6 months.

Washing clothes

More than half of the households (52%) always washed at the source; 12% always washed at home (because it was possible to carry the extra water to the home); and the remaining 36% alternated between the source and home. It was difficult to ascertain how often the households washed clothes. This depended very much on the work load, the amount of water available, how many changes of clothes they owned and whether or not they had soap. It was not possible to determine any set pattern for the wet or dry season as individual factors also play a part. What can be said for certain is that the households are washing clothes less often now than when soap was readily available. 31% of households had washing soap at the time of the fieldwork, and the other households had been without for periods of up to 2 or 3 months. Many households had reverted to using traditional methods of removing dirt from clothes. Several different plants were mentioned in this context. In the 13 months between the two fieldwork periods there were indications that people



were much more poorly dressed than previously. This is also related to the fact that new clothes are not readily available and are very expensive. Children in particular were seen in torn, dirty clothes.

Waste water

In most households waste water, from washing hands, bathing, washing clothes or utensils, etc, appeared to be thrown anywhere in the compound. Some households used the cattle enclosure only. The muddy pools in the compound, and in particular in the cattle enclosures, constitute a health hazard for the families, especially because of the risk of mosquitoes. When water was taken to the latrine for cleansing and/or washing hands it was said to be thrown in the pit.

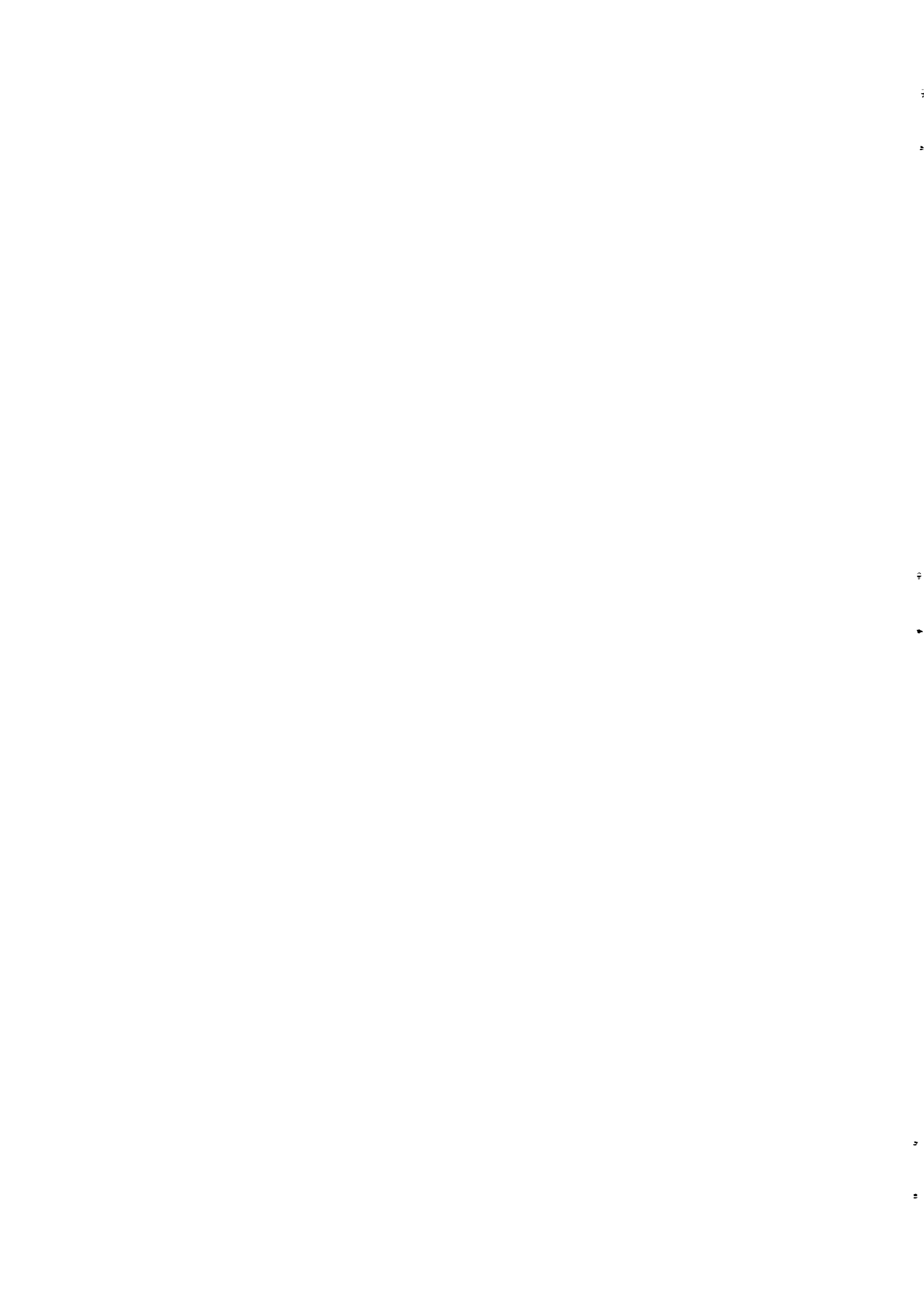
Sanitation

On the surface the sanitation situation in the villages appeared good. 63% of households had their own latrine. If one takes into account the households who had moved within the last 12 months and which had not had opportunity to construct a latrine, the figure is increased to 71%. Two households were also in the process of constructing a latrine. However in general the latrines were of very poor standard. They were often without roofs, doors or covers for the pit hole. The walls were mainly of mud and wattle. In very many cases the walls were falling down, reducing the privacy, and the slab structures were caving in, making the use of the latrines rather dangerous. The depth of the pits varied from 5 ft to 16 ft. In this area people cannot be highly motivated to spend a great deal of time and energy on construction of this type of unimproved latrine, since the life-length is short. After heavy rains both the super structure and the pit may begin to collapse. The latrine may be allowed to stand as it is for years, or until the household is forced to build another. But the incidence of use must, because of lack of privacy and security, be successively reduced.

An attempt was made to ascertain the actual usage of the latrines through observation of the state of the latrines. The aspects which were taken into consideration included the presence of a path, flies, dampness inside the latrine, smell, maggots in the pit, cover of the pit hole. In addition the privacy and safety aspects were taken into consideration. It could be said that at least 50% of the latrines were not used regularly by all household members, simply because of the bad state of the units. There was not enough privacy in many cases for the women to use them and they were often unsafe, especially for small children. Certainly not more than 25% were definitely used, indicated by the presence of the factors listed above, flies, smell, etc. It is likely that there is a seasonal aspect to the use of latrines as well. When the maize/millet in the shambas (fields) around the houses is high it is possible that the incidence of use drops as great privacy is afforded in the shamba.

The materials used for cleansing after excretion were many and varied, for example, leaves, straw, paper, husks, hard soil, old cloths, water or "nothing at all". This has implications for the planning of types of improved latrines in this area.

There was a noticeable difference in the condition of latrines between the first fieldwork period and the second. In 1982 there had been a campaign to force people to build latrines, following cholera outbreaks in the area.



In January 1984 it was noticeable that many of these latrines had not been maintained and were no longer useable. In addition those which had fallen down completely were not replaced.

Health education

37% of households claimed that they had not had health education, i.e. information on use of latrines, personal hygiene and the need to boil drinking water.¹ The remaining 63% had received information from varying sources, village leaders, CCM leaders, health officers, adult education teachers, and staff at the dispensary and hospitals. In general it appeared that the households did know that they should boil drinking water, that they should bath frequently and that they should use the latrines at all times. This indicates that some form of health education reaches them. What is obvious is that the education is not having the intended impact, in terms of changing patterns of living. The villagers know enough to be able to give the correct answers when asked about their handling of water, use of latrine, etc. But they are not receiving enough motivation to actually make the changes.

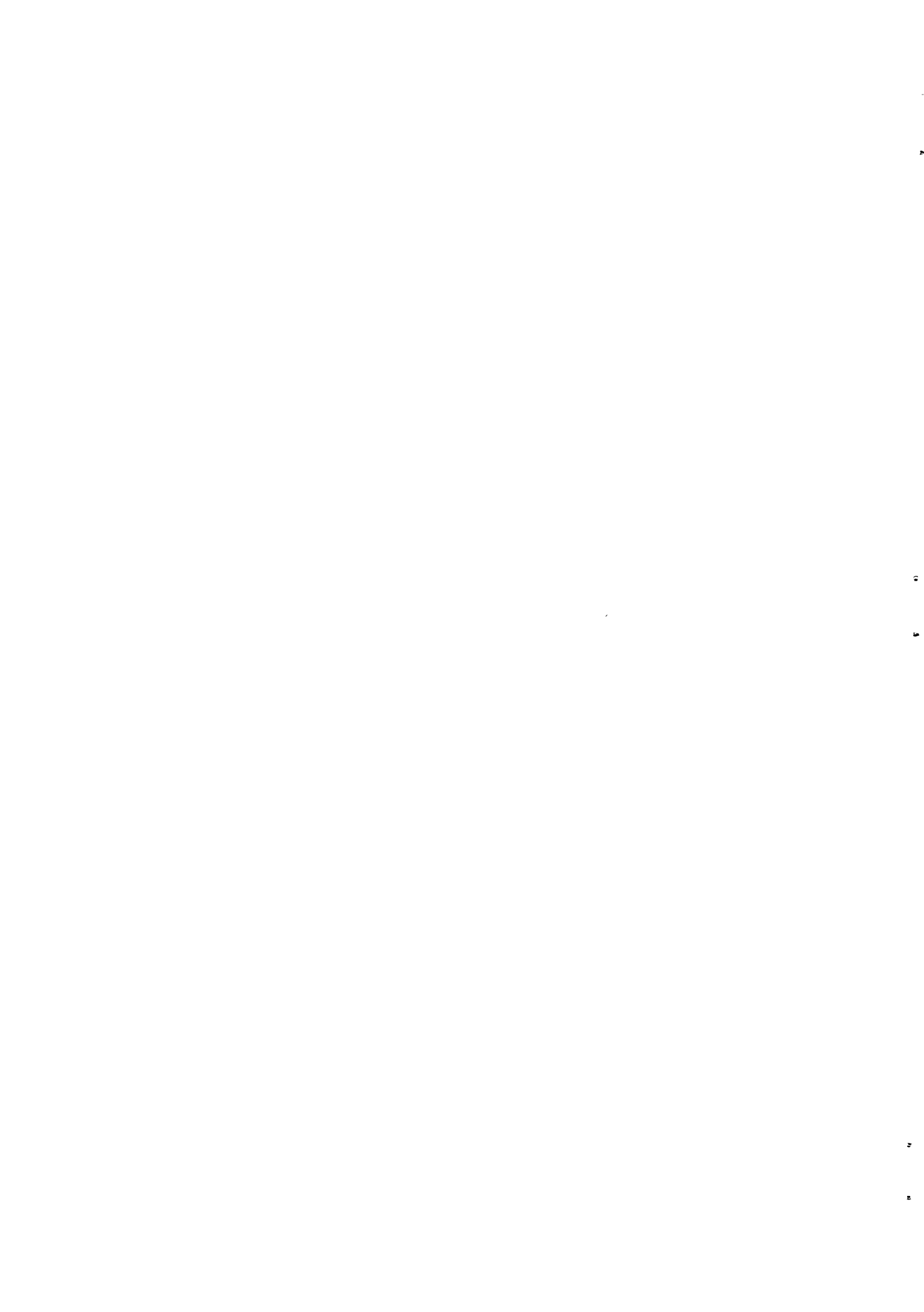
Water and health

The households were questioned about the main diseases of small children. The diseases are listed in the following table in order of priority (% of households mentioning this disease.)²

Table 16 Most common diseases of children³

Disease	% of households			All 3 villages combined
	Unyanga	Unyangwe	Nkhoiree	
Diarrhoea	23	38	47	23
Bilharzia	09	58	21	31
Malaria	36	21	37	31
Stomach problems	36	21	26	28
Fever	23	29	16	23
Measles	23	25	21	23
Eye problems	41	17	05	22
Coughs/colds	50	08	05	22
Chickenpox	09	04	16	09
Skin problems	09	04	0	05

1. While the leaders and health staff may claim that this is untrue, the fact that so many claim they have had no education is of interest. Either the health education has had little impact on them so that they have forgotten it, or the information is reaching the wrong people, and especially neglecting the women.
2. The validity of these perceptions of the main problems of children would seem to be confirmed by comparison with the statistics from Makiungu Hospital in Singida, which are presented in the report "Makiungu Hospital Singida Tanzania", 1984)
3. Note that many households mentioned more than one disease so the total is more than 100%.



29% of households could not name any diseases they knew were related to water supplies. This figure was quite a lot higher in Unyanga, 49%, in spite of the fact that they are closer to dispensary and Singida hospital. The diseases known are listed in the following table, according to the percent of households mentioning each particular disease.

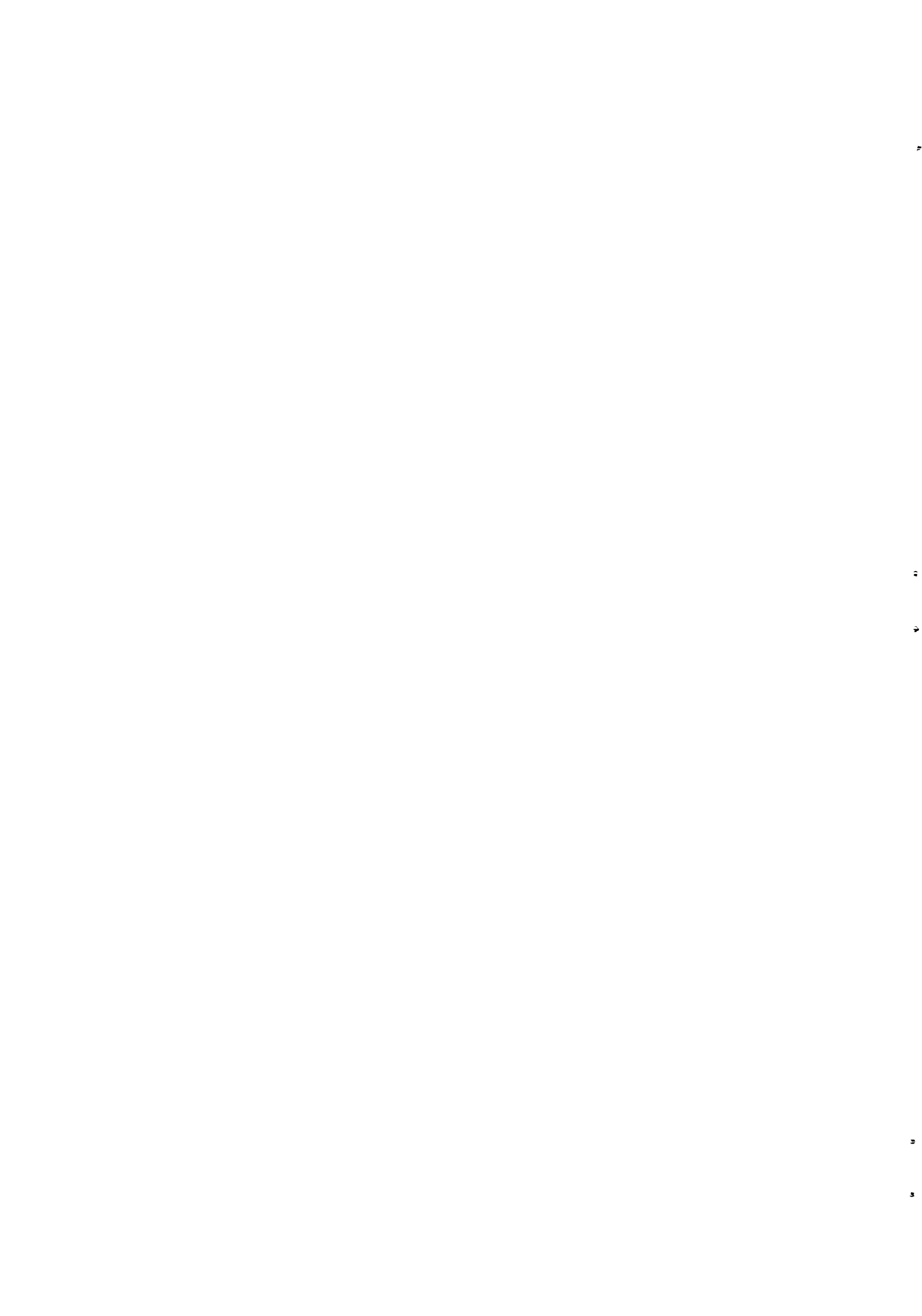
Table 17 Diseases known to be related to water¹

	% of households			All 3 villages combined
	Unyanga	Unyangwe	Nkhoiree	
Bilharzia	28	60	44	44
Diarrhoea	20	32	16	23
Stomach problems	24	20	28	24
Cholera	20	0	4	8
Malaria	4	4	12	7
Dysentry	4	8	0	4
Scabies	0	4	0	1

53% of households considered diarrhoea to be a problem when questioned directly (compare table 16) especially among children. Malaria was considered a problem by 68% of households. A smaller sample, 38 households, was questioned in more detail about the causes of diseases. 63% of these households did not know what the causes of diarrhoea were. Those who could give an answer mentioned dirty water, no latrines, flies, bad food and dirt. 66% of the households could not give the causes of malaria. Some people suggested it was unripe maize, wild fruits or strong winds. The results of this small survey were startling. If villagers are so badly informed as to the causes of disease, it is no wonder that such diseases prevail. It leads to a questioning of the quality of health education inputs, and also points to a lack of adequate information given to patients visiting dispensaries and hospitals for treatment.

Bilharzia was a problem in Unyangwe. 56% of households in the sample had one or more members with this disease. In Unyanga the figure was 8% of households and in Nkhoiree 16%. The number of bilharzia sufferers in the sample households was 28, which was 7% of the sample population. (In Unyangwe it was 14% of the sample population.) The sufferers were often youth, particularly boys over the age of 12. None of the smaller sample of 38 households asked about the causes of diseases could give the cause of bilharzia.

1. Note that some households could mention more than one disease so the total is more than 100%.



5. FUTURE DIRECTIONS - NEED FOR AN ALTERNATIVE STRATEGY

5.1 Limitations of the present strategy

Inadequate density of supply points

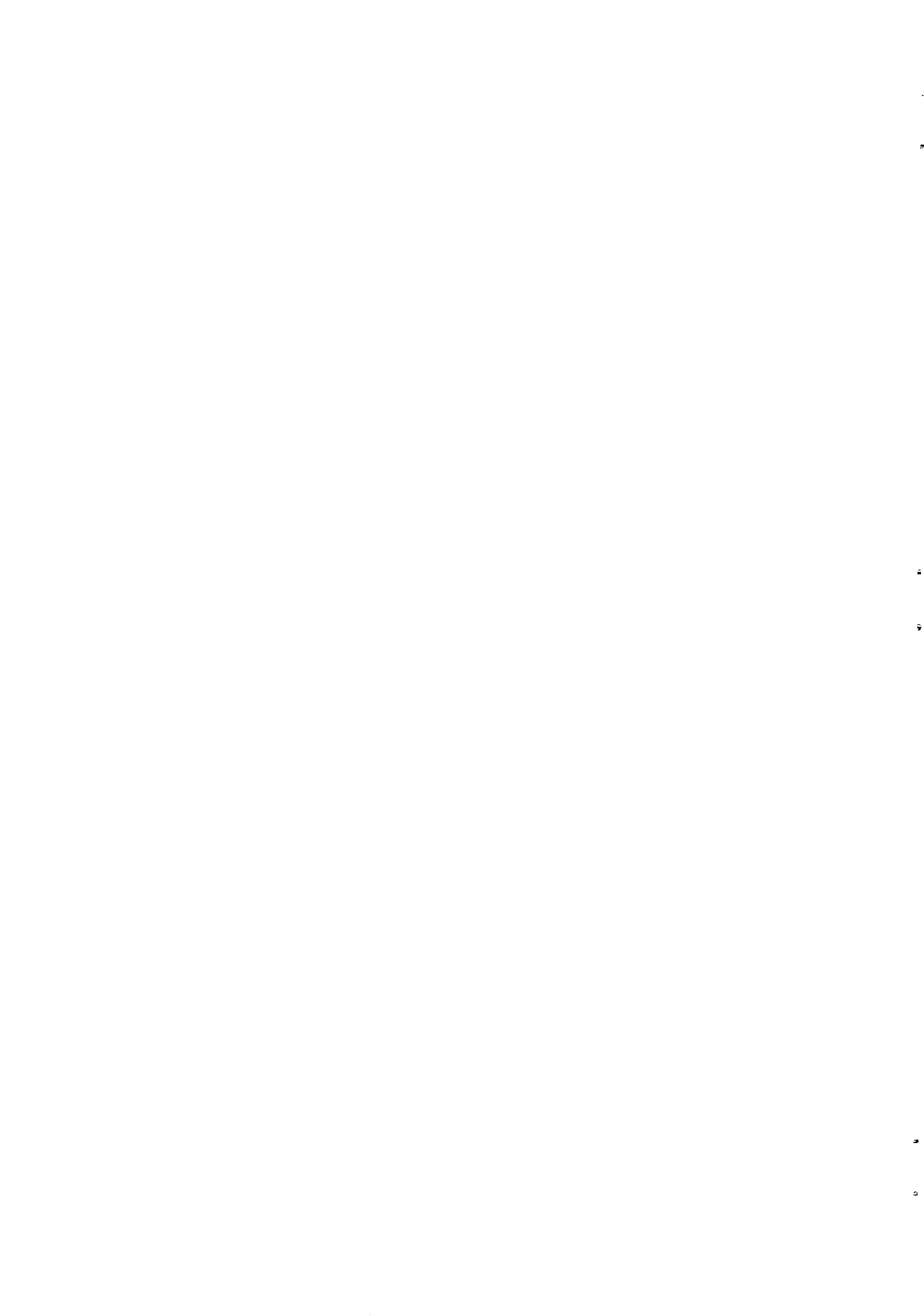
If any benefits are to be attained from a shallow wells with handpumps programme there must be a sufficient number of supply points in each village. The normal criteria for Tanzania is to estimate one well for 250 people. However the political and economic realities influence the actual performance in implementation. A serious constraint can be identified in the goal to reach all villages with at least some form of improved supply. The scarce financial resources must, for political reasons, be equally divided between districts, wards and villages. As a result there is usually a very low density of supply points in individual villages. Very few villages, if any, receive adequate coverage. While improved water supply inputs are equally distributed, each village receives so little that the impact can often be said to be non-existent.

For example in the villages studied, Unyanga with a population of 2158, received one windmill with one domestic point (4 taps). This is obviously inadequate in a village that size. Even when the supply is working, the impact can only be very slight. A very small percentage of the total population is being reached. Given the problems actually experienced with breakdowns the impact can well be measured as nil. In Unyangwe 2 foot pumps for a population of 1671 is also inadequate. This is especially so given the scattered character of the settlement. Again when the history of the breakdowns of one of the pumps is taken into account, it is difficult to discern any benefits in terms of improved health or ease of access in more than a very few households in the village. For optimum attainment of benefits the goal must be to reach as many households in the villages served, rather than to reach as many villages as possible with a thin spread of improvements.

In Nkhoiree village (population 1873) where improvements to water supply are still in the planning stage, it can be estimated that, for any real achievement of improvement to accessibility, reliability and quality/quantity, at least 7-8 shallow wells must be constructed. This leads to the problems of economics. The financial resources available are inadequate. The costs of construction, operation and maintenance, even of shallow wells with handpumps, and certainly of windmills, are rapidly increasing, It is not economically feasible, given the present economic realities, to envisage constructing the numbers of wells with handpumps which would be required in each village to give the density of supply necessary for any real impact.

Inadequate accessibility

Far too often the shallow wells with handpumps which are installed in the villages cannot compete with the traditional sources with regard to accessibility. This obviously has implications for the actual utilization of the wells, which in turn is related to the level of impact. Good accessibility is a crucial factor both for increased convenience and for the attainment of health benefits. The consumers assess the benefits of the improved supply by comparing it with the sources they have traditionally used. To be accepted and utilized the new supply must bring obvious advantages in terms of accessibility, reliability and water quality. While the consumers definitely appreciate improvements in water quality, the most important criteria, for very practical reasons, must be improved accessibility. The consumer's strategy is to use the best quality water available within a reasonable distance. Improved accessibility is highly appreciated and



facilitates acceptance and utilization of the improved supply.

In many cases shallow wells with handpumps are not more conveniently located than traditional sources, except for a few households in the immediate vicinity of the improved supply. Unless the improved supply is definitely closer than all other alternative sources in all seasons, there is evidence that the households will continue to use the traditional sources. Experience from Shinyanga region shows that while in the dry season there is good likelihood that the improved supplies will be used, during the rainy season, when the women are busy in the fields and there is an abundance of water nearby in traditional sources, the incidence of use of the improved source decreases (Andersson, 1982). If women can collect water at 200 metres from the homestead, it is unrealistic, given the enormous work burden they have to cope with, to expect them to pass that source and collect at 400-500 metres distance. Andersson (1982) further reported that households stated they were willing to walk up to 30-50% longer distance, but not more.

The results of the survey in Singida seem to support this. In Nkhoiree the households indicated they would be prepared to go a little further for water of better quality. However if they were asked to cross the river (the traditional source) they would be less likely to use it. In Unyanga and Unyangwe not all those using the improved supplies had completely abandoned traditional sources. Some used the improved supplies only when it was difficult to get water from traditional sources. Others still used the traditional sources for some purposes - bathing, washing clothes, washing utensils etc. In other cases, if the improved sources were further away, the traditional sources were used whenever the women were in a hurry. Obviously non-abandonment of unimproved sources negates the benefits of the improved sources. Certainly for any health impact the households must refrain from using contaminated sources completely.

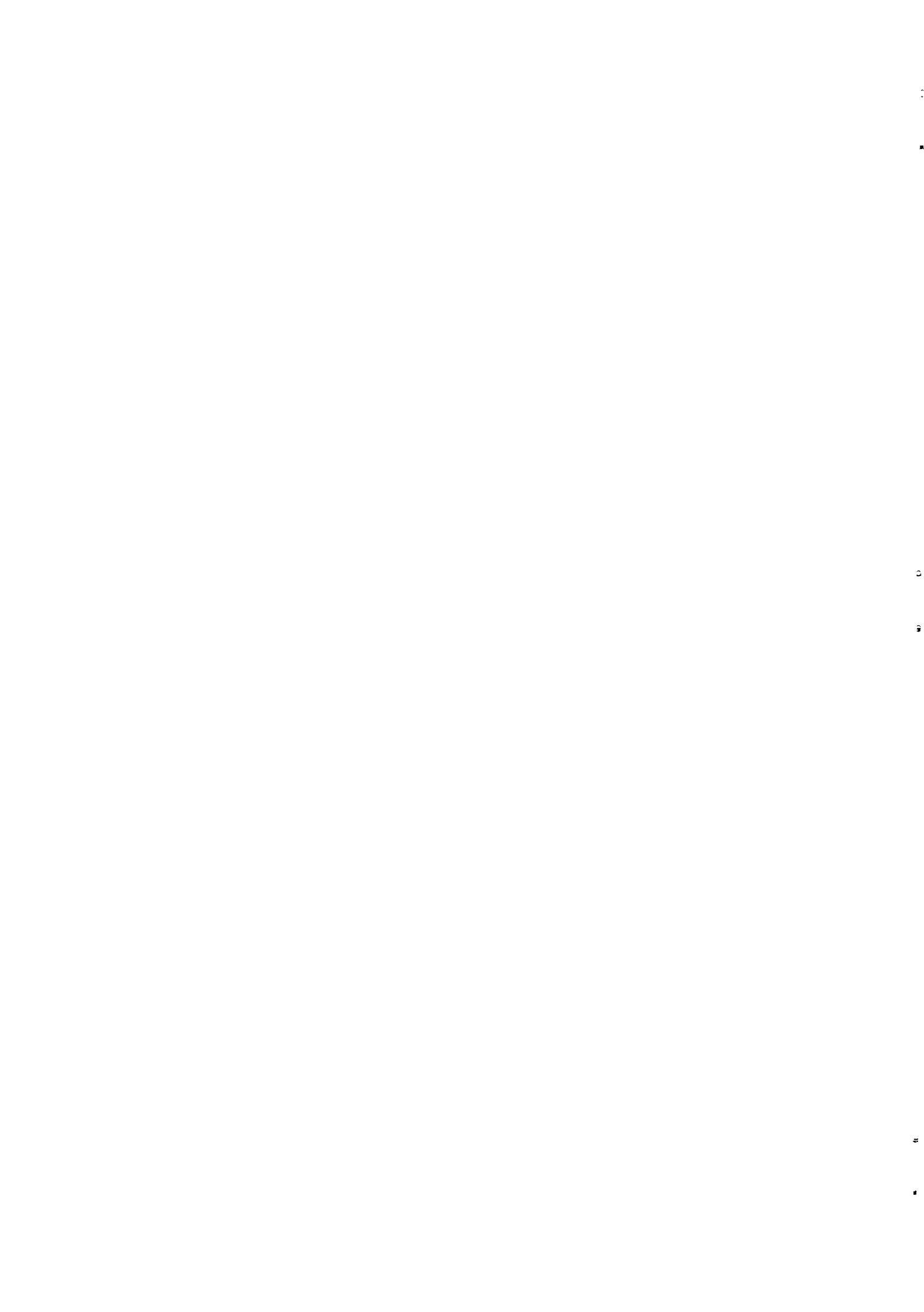
Problems of reliability

With regard to reliability, shallow wells with handpumps are certainly better than piped supplies which rely on supplies of diesel. However, breakdowns of wells with handpumps are common, and maintenance is far from adequate. This was very evident in Unyangwe, where one footpump has been out of order since shortly after it was installed. The windmill in Unyanga had also been out of order for long periods. If hundreds of shallow wells with handpumps are dispersed over a whole region, the problems of maintenance become enormous for a central organization. To date the maintenance infrastructure has proven inadequate, as evidenced by the long delays experienced in Unyanga and Unyangwe. The solution often proposed, to hand over the responsibility for maintenance to the village, is not in itself a simple solution. Even given adequate training inputs, the problems of spare parts for so many wells is daunting.

Breakdowns in all types of improved water supplies are inevitable. It is usually stated that, in the event of a breakdown, the consumers should use other protected wells until the source in question is functioning again. This, however, presupposes a certain density of supply points which is reached in very few, if any, villages in Singida. When the improved supplies are not working the consumers have no choice but to revert to the traditional polluted sources for long periods at a time.

Impact of improved supplies in the three villages studied

In summary, the results of the survey showed that the impact of the improved



supplies constructed in Unyianga and Unyangwe was negligible. Many of the households who actually used the improved sources maintained that they had noticed a reduction of stomach problems. However those actually using the improved source were only a small percentage of the total population, since so few improved sources had been constructed. In addition the problem of breakdowns negated the benefits for these few households.

A comparison¹ between the two villages with improved supplies, and Nkhoiree where households relied wholly on traditional sources, showed no significant difference in water consumption, water-use behaviour or the health, hygiene and sanitation conditions. This would seem to suggest that the socio-economic impact had been non-existent. This is not surprising since the involvement of the communities had been very slight. They had received almost no information at all on the planned improvements and no health education in connection with the improvements. Their only involvement had been with the digging of trenches. Impact in terms of stimulating other developmental efforts cannot be expected under such circumstances.

What conclusion can be drawn?

The limited impact of the improved water supplies programme in Singida (as in other regions in Tanzania) can be related to problems of reliability and accessibility (inadequate density and location of supplies). In order to achieve the expected benefits of improved health and increased convenience, the improved schemes must be able to compete with the traditional sources in terms of both these factors. Otherwise there are no advantages for the consumers, except for the small minority who happen to be close to the few improved supplies installed. The shallow wells must be located to ensure ease of access and there must be sufficient density of wells so that all members of the community benefit, and all polluted sources can be abandoned completely. Nowhere have these conditions been met and it seems unlikely that there will, or can, be any improvement in the immediate future, given the limitations of the strategy as implemented at present. What is needed is an alternative strategy which can guarantee accessibility and reliability.

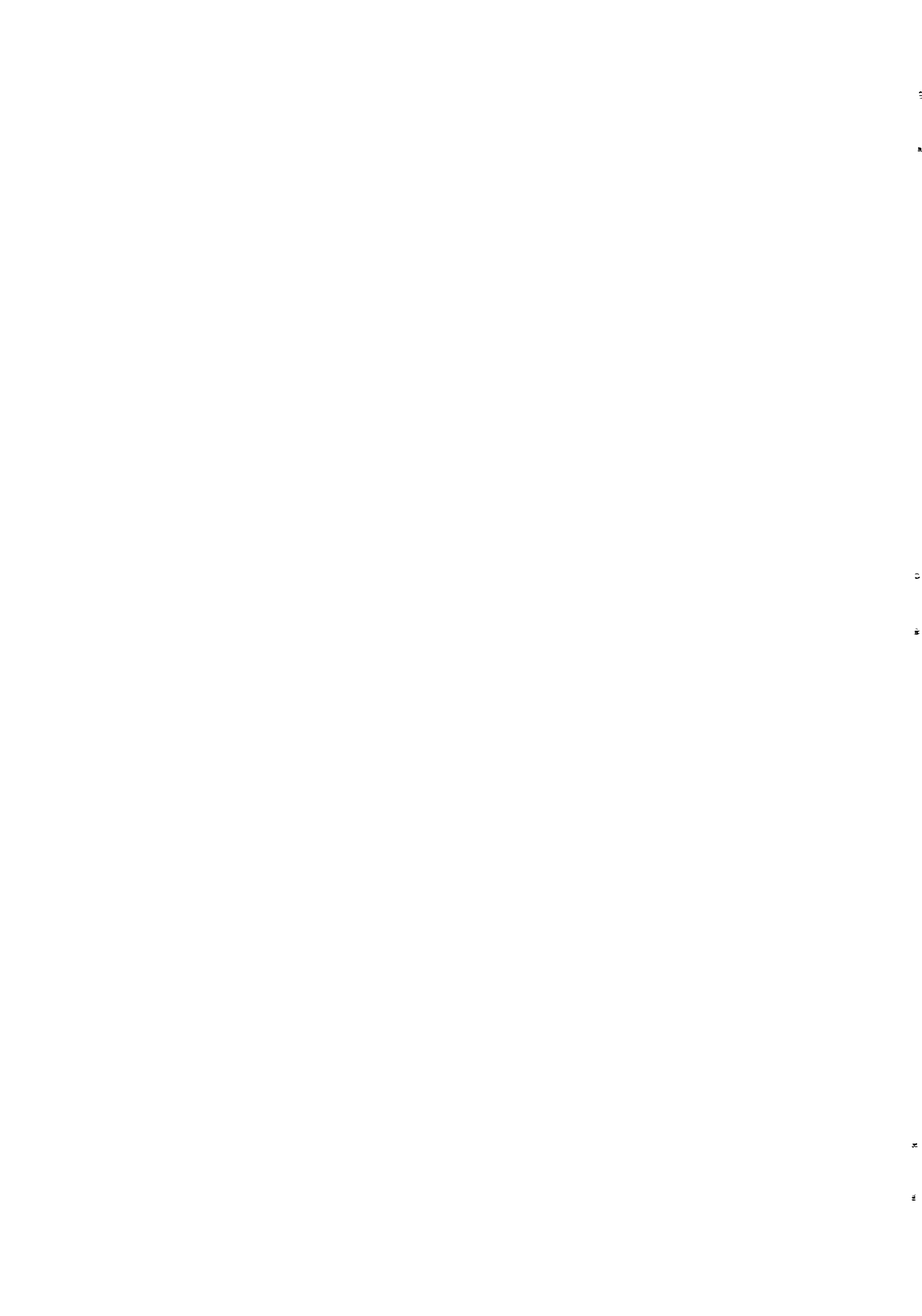
5.2 An alternative proposed: Improvement of traditional sources

Given the economic situation and political goals on one hand, and the necessity to improve the water supplies for all members of a community on the other, it would appear that a more appropriate strategy would be the improvement of existing traditional sources. The starting point for water supply improvements would be an inventory of the traditional sources already in use. Implementation would be concerned with establishing how many of these can be improved to give water supplies of better quality, quantity and reliability. Improvement could be of many different types - deepening and lining wells, installing aprons, and where absolutely necessary installing hand or foot pumps. This strategy does not completely reject shallow wells and handpumps, but rather sees it as one possible alternative for improvements.

Improvement of traditional sources and the "user-choice" approach

Improvement of traditional sources is conducive to the implementation of a "user-choice" approach. The concept of "user-choice" as a main vector of diffusion and acceptance in improving water supplies was introduced by Whyte (1976) and Whyte and Burton (1977). A distinction is made between "community

1. It is admitted that a sample of 25 households in each village is a small one, and is perhaps an inadequate basis for comparisons.



participation" and "community choice". It is suggested that one of the reasons for the failure rate of improved supplies is that, even when community participation is attempted (usually in the form of self-help activities or formation of water committees), *"the projects are still conceived and implemented in the framework of the 'delivery philosophy' and the choices available to the communities are in terms of detail rather than fundamentals."* (Whyte and Burton: 1977) Real choice is a basic prerequisite for an effective user-choice approach. It means allowing the users to decide, as far as possible, the type of improvement to be installed or whether, in fact, there is a need for improvement at all. It involves self-determined rather than imposed social change.

The current trends to emphasize appropriate low-cost technology, community involvement, and integration with other developmental inputs such as health education and sanitation improvements, can be seen as important steps towards the development of an innovative user-oriented approach to rural water supplies. The improvement of traditional sources is a logical development of these trends towards a user-choice approach.

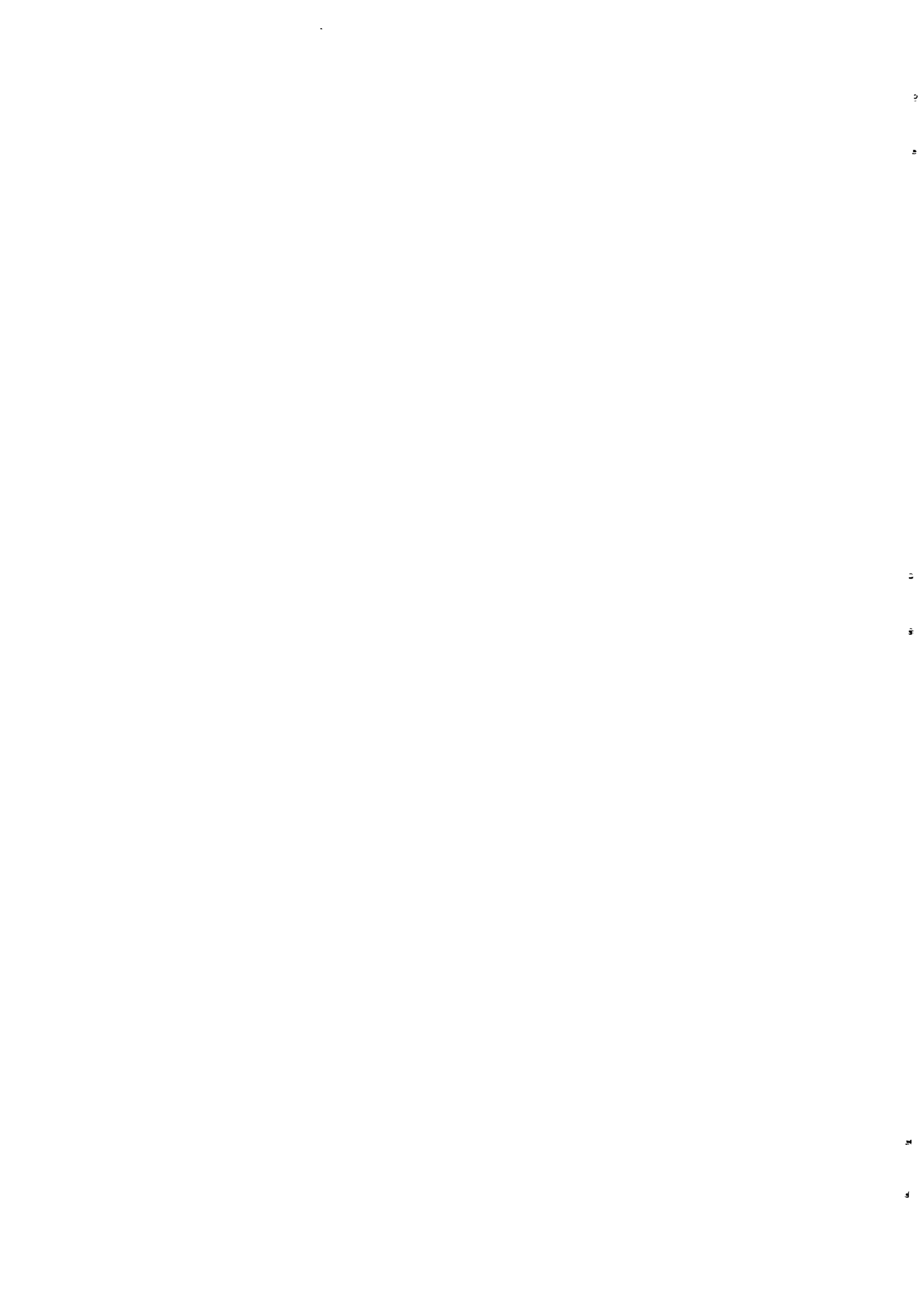
Each community has developed a traditional user-choice system which is adapted to the physical, economic and social context in which it exists. Any improvement of water supplies should therefore begin with an examination of the system already functioning. An improved system should be based on an understanding of water-use, water organization and water-values. As pointed out by Whyte (1976) traditional water-use systems are *"characteristically multi-source"* in response to the constraint of no single source being adequate for all needs. Thus it is a means of reducing risks in an uncertain environment. Where alternative sources are utilized, aspects of water quality, water quantity and convenience of location are included in the user-choice criteria for water for different uses. An understanding of the environment, its uses and the users' perceptions is an essential starting point.

Where communities are already using several water sources, and making choices as to which source is best for the different domestic and non-domestic uses, it would be advantageous to consider improving the water supply from these existing sources, rather than planning to construct a completely new supply. Such a strategy would be based on existing user-choices and opportunity would be given to the consumers to make meaningful choices and contributions.

Motivation for such a strategy

The strategy of improving traditional sources would be in keeping with the criteria for bringing about change as outlined in section 2.5. There are many reasons for suggesting that it would be realistic and appropriate. For example:

- a) It would appear to be the only way possible to achieve any impact of improved water supplies - i.e. to bring about benefits to all or as many as possible in the community.
- b) It is in keeping with the traditional patterns of water-use. Many sources are already known and in use. There is a natural risk-eliminator in the multi-source practices, which can be retained.
- c) It is a least-cost technology - in keeping with the political and economic realities at present in Tanzania.
- d) It facilitates community involvement, in particular of the women.
- e) It is possible to improve sources for non-domestic uses.
- f) It could facilitate diffusion to other communities.



a) Only way to achieve impact

The non-impact of improvements to water supplies is a big problem. Apart from anything else, valuable financial and material resources are wasted when supplies are not used as intended - either because they are rejected or because they break down. The benefits expected cannot be achieved if the supplies are not functioning. Even where improved supplies do function and are actually used, the percentage of consumers reached is very small. The improvement of traditional supplies guarantees that accessibility will not be worsened, while quality, quantity and reliability can be improved to varying degrees. There is a greater chance that the improvements will be accepted and that benefits will be achieved. Since it is a low-cost technology, all sources can be improved and all consumers can be reached - which must be the overall goal of improving domestic water supplies.

b) In keeping with traditional patterns

All settlements exist because there is water available - sufficient at least for the very minimum required to sustain human life and support livestock. The groundwater sources in most areas are already well known and utilized by the local population. Most communities in Singida have multi-source practices, as a way of eliminating the risk of supplies drying up completely in some periods. Not all sources are utilized for domestic purposes. The households use the sources which are most conveniently located to them making of course, choices concerning water quality, at least for water for drinking, and sometimes for cooking. If the ease of access is not considered good enough, the households will dig new wells at a more convenient location, if this is possible. It cannot be over-emphasized how vital a factor convenience (as related to density and location of sources) is to the consumers. It must always be taken into account when planning improvements. The strategy proposed, to improve traditional sources, does not involve changes in density and location and does not worsen the ease of access. In some cases it may be possible to improve convenience.

By building on something already existing, and making small, comprehensible changes, there would be more chance for acceptance of the improvement and its success. There are problems involved when communities with multi-source practices are expected to switch to using one source only. This is complicated by the fact that the alternative traditional sources continue to exist. The unreliability of the improved sources, be it handpumps or windmills, forces the consumers to continue to rely on traditional sources in times of breakdowns. Improvement of traditional sources eliminates these problems. The communities are not asked to change existing practices, only to improve on them.

c) A least-cost technology

From the point of view of the political goals of equality between villages and within villages this strategy should be very acceptable. Improvement of traditional sources is possible within all villages, and if all feasible sources are improved, the benefits reach all the members of the community, and not just a small minority as is the case at present.

This strategy is more in keeping with the economic realities as well. Firstly the economic requirements are relatively modest. Traditional sources can be improved by quite simple means. A spring can be protected, an open well lined and covered etc. Local materials and local know-how can be utilized to a greater extent than at present. All stages of the implementation are



within the capabilities of the villagers, and operation and maintenance can be entrusted to the village level. A complicated and expensive maintenance infrastructure would not be necessary. With simpler technology the present problems of maintenance and spare parts could be lessened. By lowering the unit costs it would be possible to improve all the sources and thus increase the possibility of achieving health benefits.

d) Facilitates community involvement - especially of women

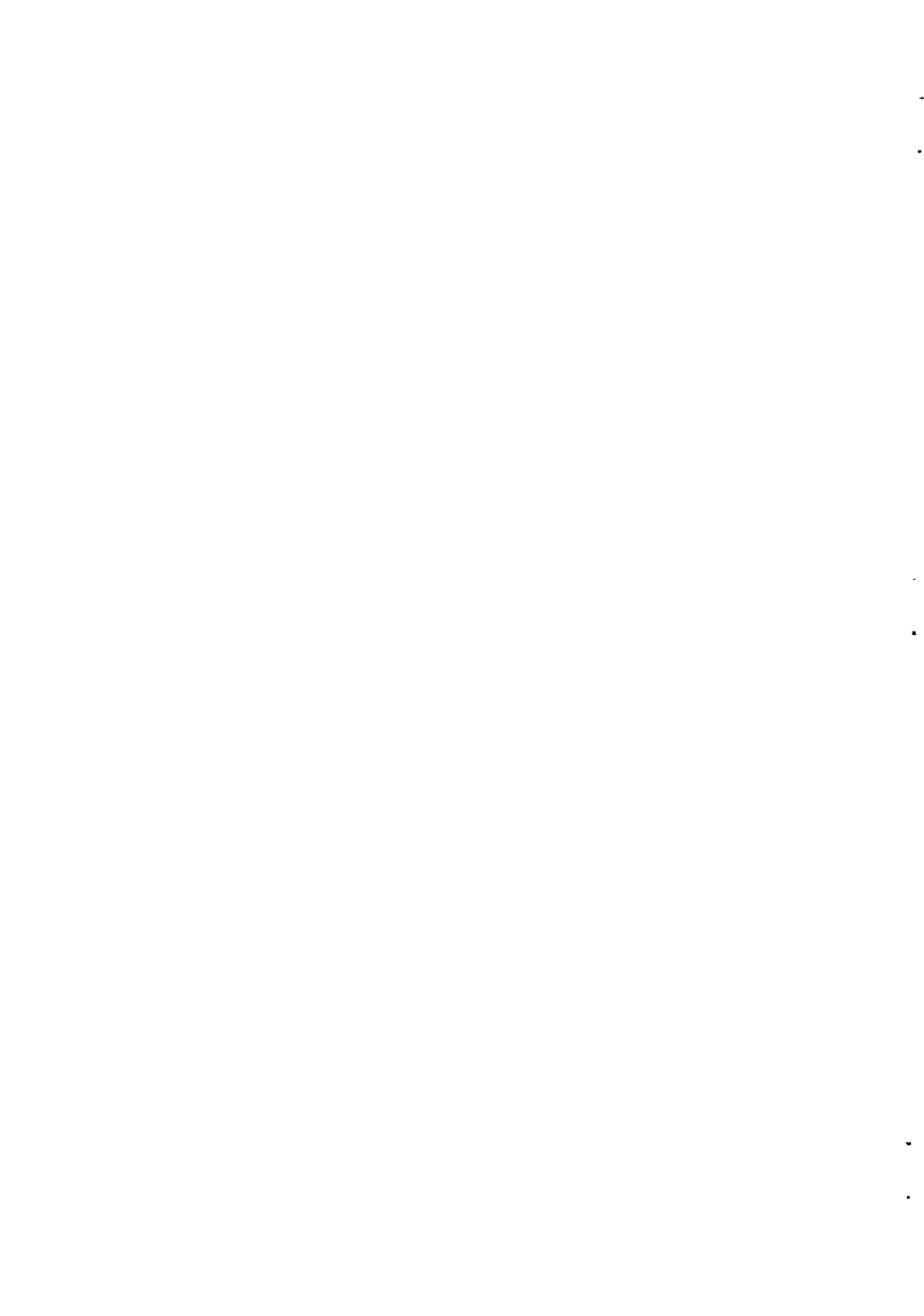
Such a strategy involving a minimum of resources and limited input from outside lend themselves to community participation and real "self-help" practices, in the positive sense of the "user-choice" approach as outlined earlier. The water sources are already in use by the consumers and thus the problems of trying to make the villagers accept and identify with the improved sources are not relevant. The women's links with these sources are already established and thus their participation in planning, implementation, operation and maintenance can be facilitated. The women can, in a very natural manner, be involved in expressing their felt needs, and in indicating the limitations of existing sources and possible improvements. The women's active involvement can hardly be opposed by the men since the improvements are to resources already existing and utilized by the women.

It has been suggested by Hannan-Andersson (1984a) that the reduced capacity for high-level technology in improving water supplies may be a positive trend from women's point of view. The introduction of high-level technological innovations usually result in benefits primarily for the men. Men receive information and training, while women remain marginal to the changes. If the improvements to water supply are not technically advanced men may be less interested in dominating and women may have the opportunity to participate fully in an area which concerns them vitally.

The women are not being asked to radically change existing practices - e.g. to abandon the traditional sources and walk further to a supply point where there is probably a long queue because of the inadequacy of such points. The women are asked to improve on existing practices. In most cases the changes would be small and comprehensible and many may be suggested by the women. In addition, many of the changes could be implemented and maintained by the women themselves. Through women actively participating in a developmental effort in the community there should be some stimulation of self-confidence, and perhaps a better acceptance by men of women's increasing involvement in community life.

e) Possibility to improve sources for non-domestic uses

Because of financial constraints it is impossible for shallow wells with handpumps strategy to even fulfill the needs for water for domestic purposes in the communities served. An advantage of the improvement of traditional sources is that those sources which are rejected for domestic uses can be considered for non-domestic purposes, such as livestock watering or irrigation of small vegetable gardens. Small improvements could be undertaken to ensure greater reliability etc. The improvements of sources for livestock would be greatly appreciated by communities in Singida since livestock is an essential element in the Nyaturu society. Similarly the possibility to start or expand vegetable gardens would be a great assistance to women in their efforts to increase their cash income. Hopefully consumption of fruit and vegetables in their own households could also increase.



f) Diffusion effect

Enthusiasm for improvement to water supplies could be diffused to surrounding communities. Through the improvement of traditional sources the chances of meeting felt needs and achieving benefits for the communities are enhanced. Success in one village could encourage other villages to seek assistance to carry out further improvements. Because the improvements are simple and low-cost the delays in implementation should be shortened, and impact achieved at a faster rate. At present the slow rate of construction and the high failure rates of constructed improvements hinder the generation of enthusiasm within communities and between communities. By involving the women as fully as possible the diffusion effect may be enhanced since they have ties with other villages, and information and enthusiasm can be spread in that manner.

The role of shallow wells with handpumps

It is important to note that this strategy does not imply a total rejection of shallow wells with handpumps as inappropriate. The ideal situation would, of course, be where all communities could receive sufficient wells with pumps to cover all their needs. However, as pointed out earlier, because of the existing constraints this is impossible. Therefore wherever possible traditional sources will be improved with simpler, less expensive measures. Handpumps are only one of several options available. In cases where other simpler techniques are inadequate, pumps will have to be installed.

In fact, the end result may well be that each village receives one or two handpumps, as is the case now. The important difference is that, instead of leaving the traditional sources untouched, all utilized sources will be improved to ensure that all water consumed is of best possible quality.

How realistic a proposal?

While it is considered that this is the most realistic strategy for Tanzania at present, there would doubtless be much hesitance and opposition before it could be accepted. This could come from both the planners/administrators and the consumers themselves.

The political goal has been to provide clean drinking water as a free basic service. The consumers have learnt to expect that it will be free (constructed and maintained by the government) and that it would be at a fairly high technological level. Initially the demand was for piped supplies. There has already been a lowering of expectations from piped supplies to wells with hand and foot pumps, and now it is suggested that there should be a further lowering of standards to improvements to traditional sources.

However it is expected that the consumers could learn to accept and appreciate this strategy. If they can see that these simple improvements do not imply a lowering of level of service, but rather the only way improvements to level of service can be achieved, their acceptance of the strategy can be assured. In addition, as pointed out earlier they can be actively involved in all aspects of the improvements and the changes are within their comprehension and control. The fact that sources for non-domestic purposes will also be attended to, will increase their enthusiasm.

The main opposition may well come from planners/administrators and



implementators. It will certainly be initially difficult to accept since it requires a change in basic attitudes. It may not be easy for technicians to accept small and imperfect improvements to existing sources when their training has geared them towards construction of new systems, of a high technical standard.

Unfortunately the very term "traditional" is likely to stimulate negative responses even before the proposed strategy is outlined or discussed. However, as pointed out by Whyte (1976) tradition should be recognized as a positive force, a progressively changing body of beliefs and practices designed to adapt itself to the needs of the social group - that is, a process rather than a form. Tradition can be adapted to or used to bring about desired social change as a movement which is indigenous and therefore more likely to succeed.

In spite of the inevitable opposition and hesitancy, it is considered that this strategy is a realistic one. In fact it is the only feasible solution for Tanzania at this point in time - the only way a reasonably acceptable level of service can be provided and maintained. However before it can succeed a lot of attention has to be given to aspects of practical implementation.

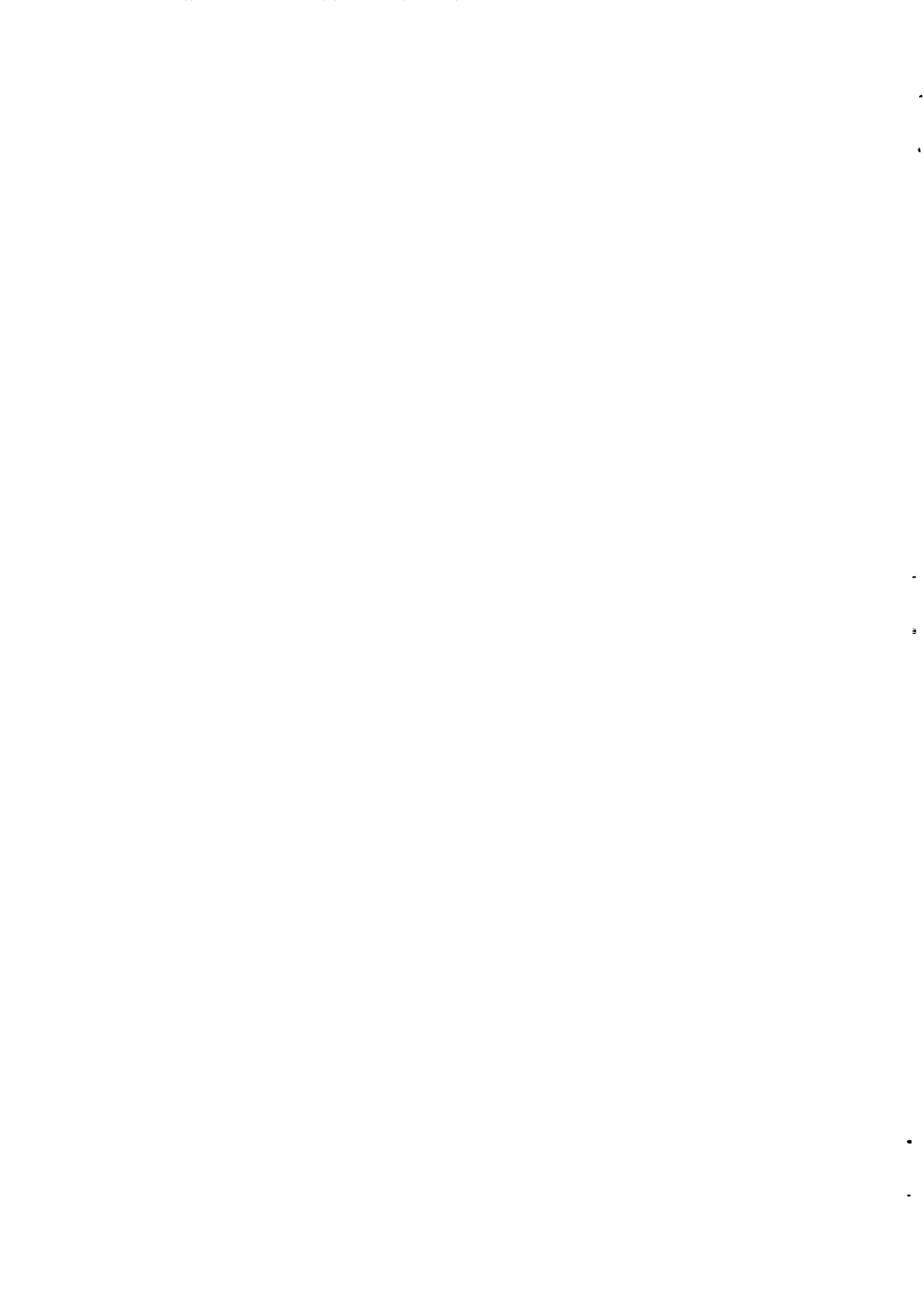
5.3 Practical implementation

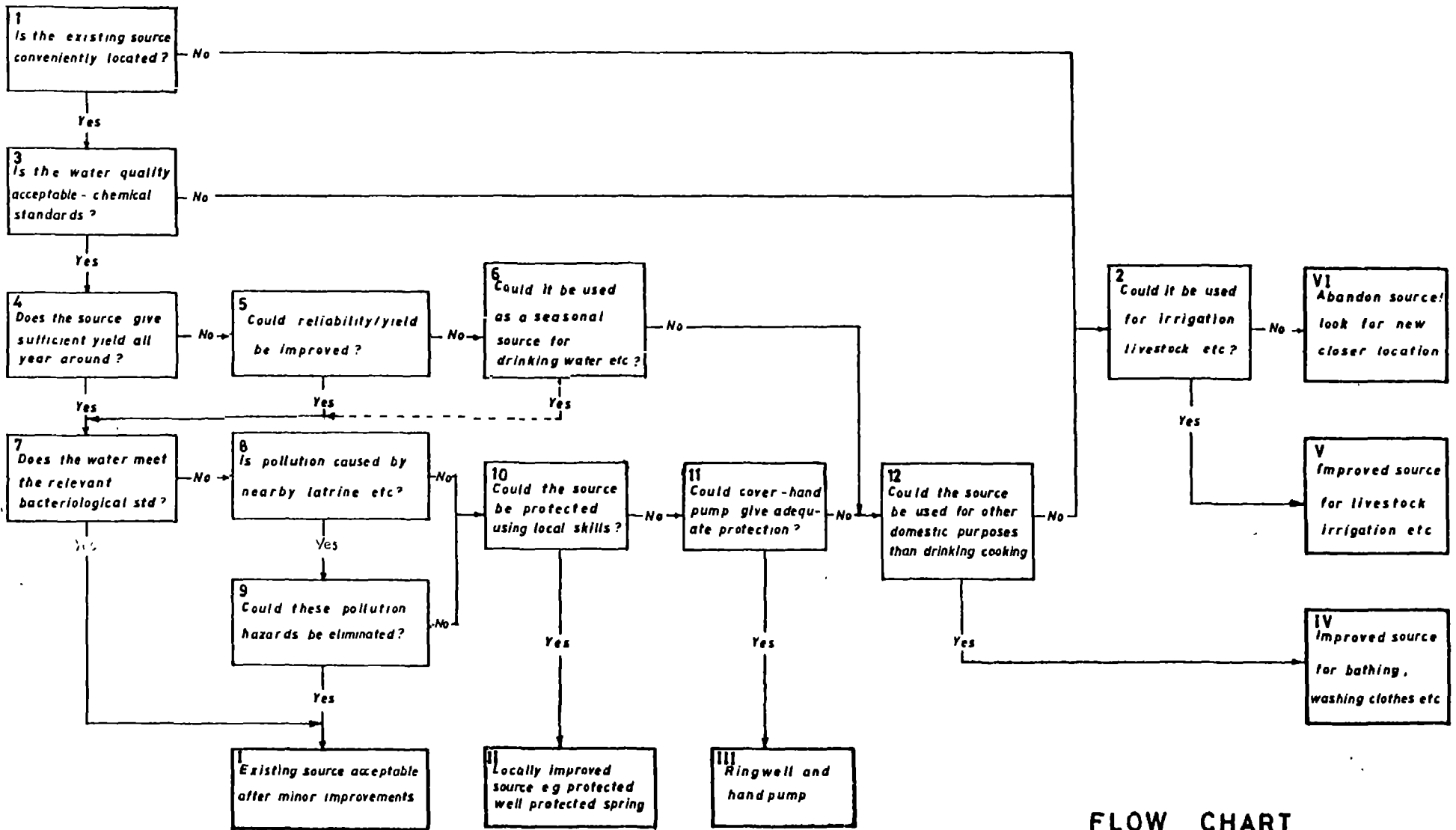
A model for implementation is presented in the flow chart on the following page (figure 3). The starting point is to assess the suitability of the source from the point of view of accessibility for domestic uses. If ease of access is acceptable, the next consideration is chemical standards of water quality. If the water is chemically suitable the reliability of the source is investigated. Given adequate yield the bacteriological standards are assessed. If the source meets all these criteria it can be considered for water for domestic use.

If the source fails to meet the conditions for acceptable accessibility or chemical standards and is thus ruled out for domestic use, it can be considered for non-domestic purposes, such as watering livestock. Where reliability is the problem, it may be possible to improve it for domestic uses, using a variety of measures. Or it may be accepted as a seasonal source of drinking water. Where bacteriological standards are not met it is necessary to determine the cause of the pollution and the possibilities for eliminating it. If no protection can be assured the source can be considered for domestic purposes other than drinking, e.g. bathing or washing clothes.

The different steps in the flow chart are elaborated further below.

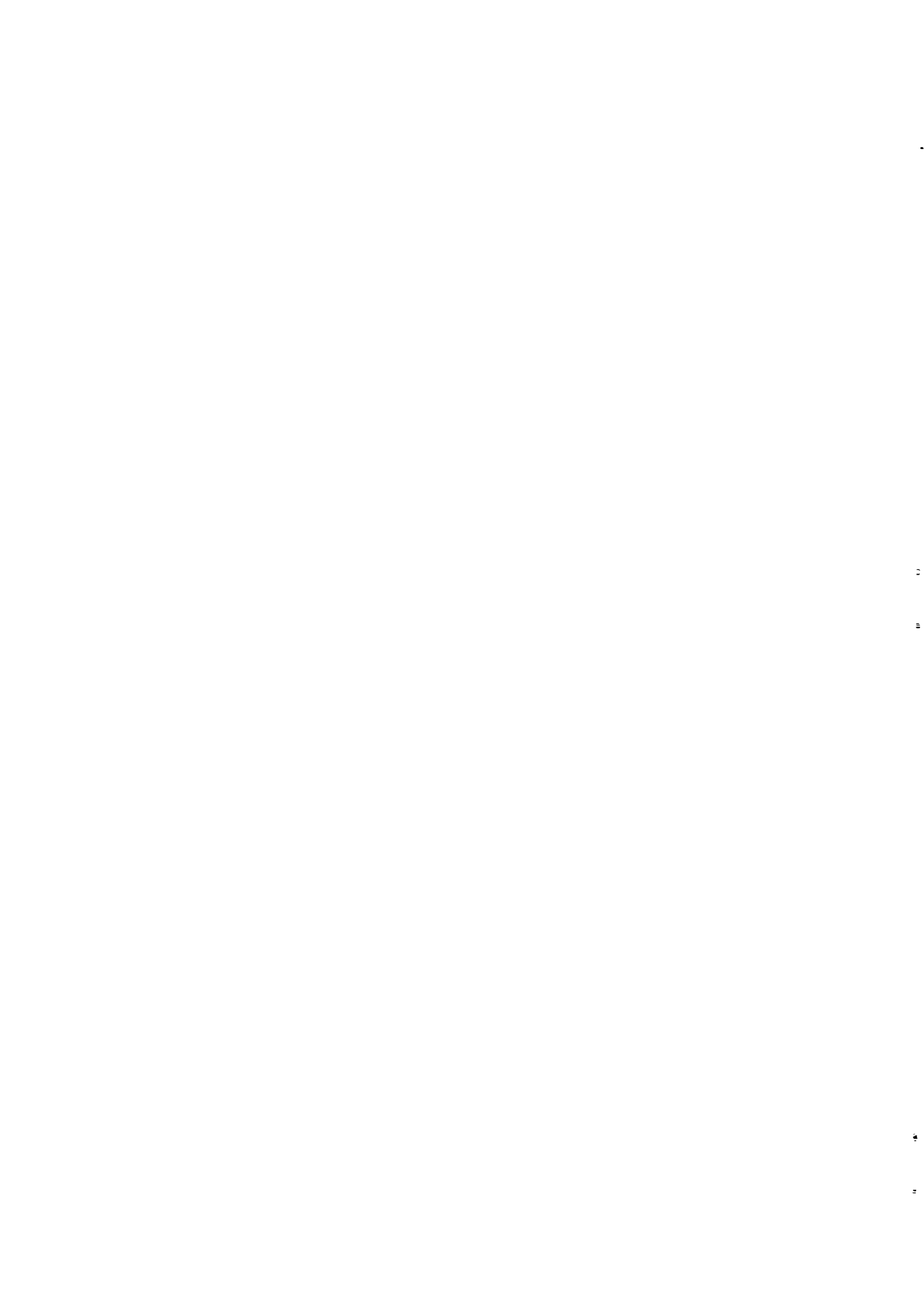
- Step 1: Convenience is the vital factor if the source is to be utilized at all times. New locations must be explored if convenience is not adequate. Medium depth or deep boreholes and other relevant technologies could be considered.
- Step 2: A source which is not conveniently located and/or which is of poor quality can be considered for non-domestic purposes such as livestock watering or irrigation. Only when the source is of very poor quality should it be abandoned and its use prohibited.
- Step 3: Chemical standards must be investigated at an early stage to eliminate risks of high fluoride and/or conductivity. Chemical tests can be carried out on the spot using a simple field kit. Water which is unsuitable for domestic uses can be considered for non-domestic uses.





FLOW CHART
STRATEGY FOR IMPROVING
RURAL WATER SUPPLIES

Increasing need for external input
 ← →
 decreasing participation options
 ← →



- Step 4: Reliability of the source has to be determined. The consumers must be guaranteed adequate quantity at all seasons of the year. The consumer's own local knowledge about the sources is necessary to determine whether the source is reliable enough throughout the year.
- Step 5: If the yield is not sufficient possibilities for improvement should be explored. For example deepening the source, arranging storage etc.
- Step 6: If the source is unreliable during the dry season it can be considered for a seasonal source of drinking water and other domestic uses. A wet season source more conveniently located than the normal source would always be appreciated. Alternative uses as a source for washing and bathing can also be considered.
- Step 7: The bacteriological standards as specified in the Tanzanian legislation are very difficult to meet. In fact very few rural water supplies are up to standard. Realistic criteria on acceptable levels of bacteriological pollution must be set. The goal of supplying completely safe water is not feasible at present. For the foreseeable future the rural population will have to use water containing organic matter. Pollution can, however, be reduced and efforts must be made to eliminate contamination as much as possible.
- Step 8: Pollution caused by poor environmental sanitation can often be prevented. Knowledge of existing ground conditions is essential to determine the risk-zone for contamination.
- Step 9: Some pollution can be eliminated. If pit latrines are hazards, other techniques with less risk of leakage could be investigated.
- Step 10: Local know-how, skills and materials should be considered and should be utilized wherever possible. A well can be provided with a water-proof lining for the top few meters. Construction of head walls, drainage aprons and soak-away will lower the risk of dirty surface water running into the well. Pulley and windlass could be introduced on an experimental basis. Removeable covers could further eliminate the hazards. Local masons and bricklayers are often available. The practice of making burnt bricks is common in some areas of Tanzania and this should be capitalized on, since the lining need not necessarily be of cement. Other alternatives should also be investigated. Additional materials such as cement and reinforcement bars would have to be provided by the project, as well as some supervision, but the actual work should be done by the villagers.
- Step 11: The most effective method of protecting a shallow well is to install a handpump on a covered well. However to eliminate pollution hazards the workmanship must be of a high standard, and inputs from outside are crucial. There is less possibility for participation of the community as a result. Inputs from outside will also be required to keep the supply in good running condition (spare parts, tools, transport etc.).
- Step 12: In cases where not even a protected well with handpump is considered sufficient to prevent contamination, the possibility of using the source for other domestic purposes than cooking and drinking should be considered. It could, for example, be used for bathing and washing clothes. Various improvements could be considered here, for



instance washing slabs, shelters for bathing to provide privacy etc. If no domestic use can be considered the possibility of other non-domestic uses should be investigated.

The solutions for supplying water for domestic use, as presented in the flow chart, are listed below in order of simplest technology, least external inputs and greatest potential for local participation.

- I The existing source is accepted as a source of domestic water after only minor improvements.
- II The source is accepted after local improvements, e.g. protected well or protected spring.
- III A ring-well and handpump is constructed. This involves more external inputs and restricted participation.

Where the source is not suitable for drinking and cooking, the following solutions are proposed.

- IV The source is improved for bathing and washing clothes.
- V The source is rejected for domestic uses but is improved for non-domestic purposes.
- VI The source is rejected for all uses and is abandoned.

Thus 3 types of sources would be found in the villages - those for all domestic uses; those for washing and bathing only; and those for non-domestic purposes only. Obviously a crucial factor is the acceptance of the necessity to utilize the sources as intended. Adequate information and education is essential.

In the event of insufficient traditional sources existing which are suitable for improvement, other methods of improving the water supplies will have to be utilized. It is suggested that the priorities in choice of technology should be as follows:

- a) Hand-dug lined shallow ringwells with or without handpumps
- b) Hand-drilled wells with handpumps
- c) Machine-drilled wells with handpumps (medium depth)
- d) Other technologies - gravity, hydram etc.

5.4 Some areas for further discussion

What was presented above is a proposal for implementation of improvements to traditional sources. This proposal must be developed further. Suggestions for aspects which must be investigated further are given below.

a) Adequate planning

Even though the methods of improving the supplies are often simple, the whole operation must be well planned to avoid as many difficulties as possible. Costs must be worked out beforehand - financial costs and contributions of labour and material - so that the communities can be well informed and well prepared for what is expected of them right from the start.



One aspect of importance which must be given adequate consideration is the seasonality factor. Labour for self-help activities is only readily available in the less intensive agricultural periods. If a relatively good rate of delivery is to be achieved this must be taken into account. Even self-help labour in the form of digging of wells etc. requires some organization and planning. Otherwise it is possible that the initial enthusiasm of the community may wane if their scarce resources of time and energy are not utilized efficiently.

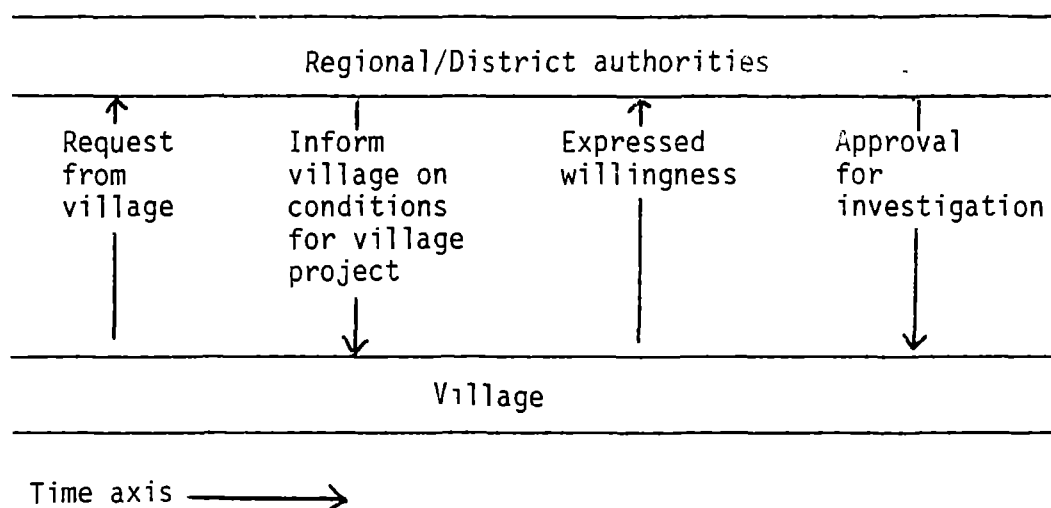
The procedure for planning with the villagers also requires preparation, i.e. the initial discussions with village leaders and village assemblies. Special efforts must be made to reach all groups in the community, and especially the women. Efforts must also be made to mobilize the staff at hospitals, dispensaries, MCH clinics, women's groups and schools.

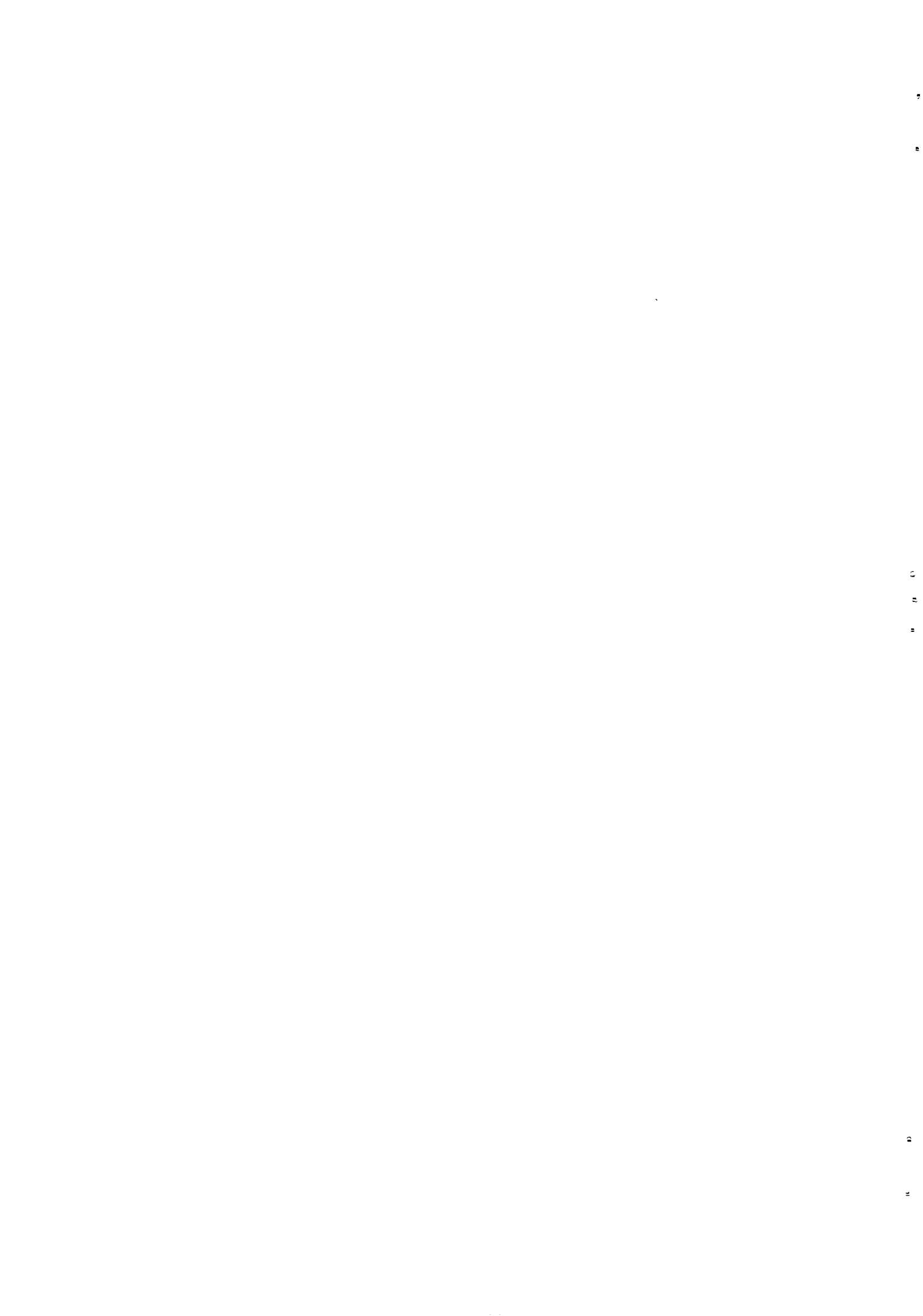
Other aspects which need to be more thoroughly investigated are those of priority, felt need and ownership. With regard to ownership, procedures for hand-over must be well worked out. The communities must be well versed in the advantages and also the liabilities. They must be prepared for the probability of breakdowns and recurring expenses, and assisted to work out appropriate methods of coping with forthcoming problems.

The aspects of felt need and priority are difficult to tackle. The project team is usually left to assess as objectively as possible which villages are "priority", i.e. which ones have the most obvious need for improved water supplies. However it does not necessarily follow that these villages have the appropriate "felt needs". They may have other priorities and accept the water supply situation as it is. It is necessary, through promotion, to try to stimulate "felt need" and enthusiasm for the project, especially if a request from the village is to be the impetus for getting a project underway.

The ideal situation is illustrated in the following figure. However such a situation will probably be difficult, if not impossible to attain. Cases where the need is obvious to outsiders but no request is forthcoming, even after promotion, are difficult ones to solve. Some kinds of guidelines should be worked out as the project gets underway, since there are practical problems involved once the project is running and a certain rate of delivery and level of efficiency has to be maintained.

Figure 4 The village selection process





b) Flexible organizational set-up

The organizational set-up and management system proposed must be flexible. to be able to take into account the varying conditions in the communities. It is true that to date, along with the imposition of technology from outside, *"there has been a somewhat comparable standardized delivery of management systems."* (Whyte and Burton: 1977) Because of the organizational and social differences between communities the chances of a stereotyped set up succeeding are limited. Whyte (1976) points out that *"the texture of organizational and social differences within an area may be very fine. It is thus difficult to generalize and a standardized approach to the organization of rural water is as unlikely to succeed as an inflexible technical 'package'"*.

There is a risk of such organizational inflexibility in Tanzania since the normal solution is to organize "committees" for all developmental projects. Given the numbers of these committees which have been set up for one purpose or another, and the normally limited achievement, the local populations may not be mobilized by the setting up of "water committees". Alternatives should be sought which can guarantee action and benefits.

Some proposals which have been suggested in other contexts include:

- pump attendants
- well caretakers

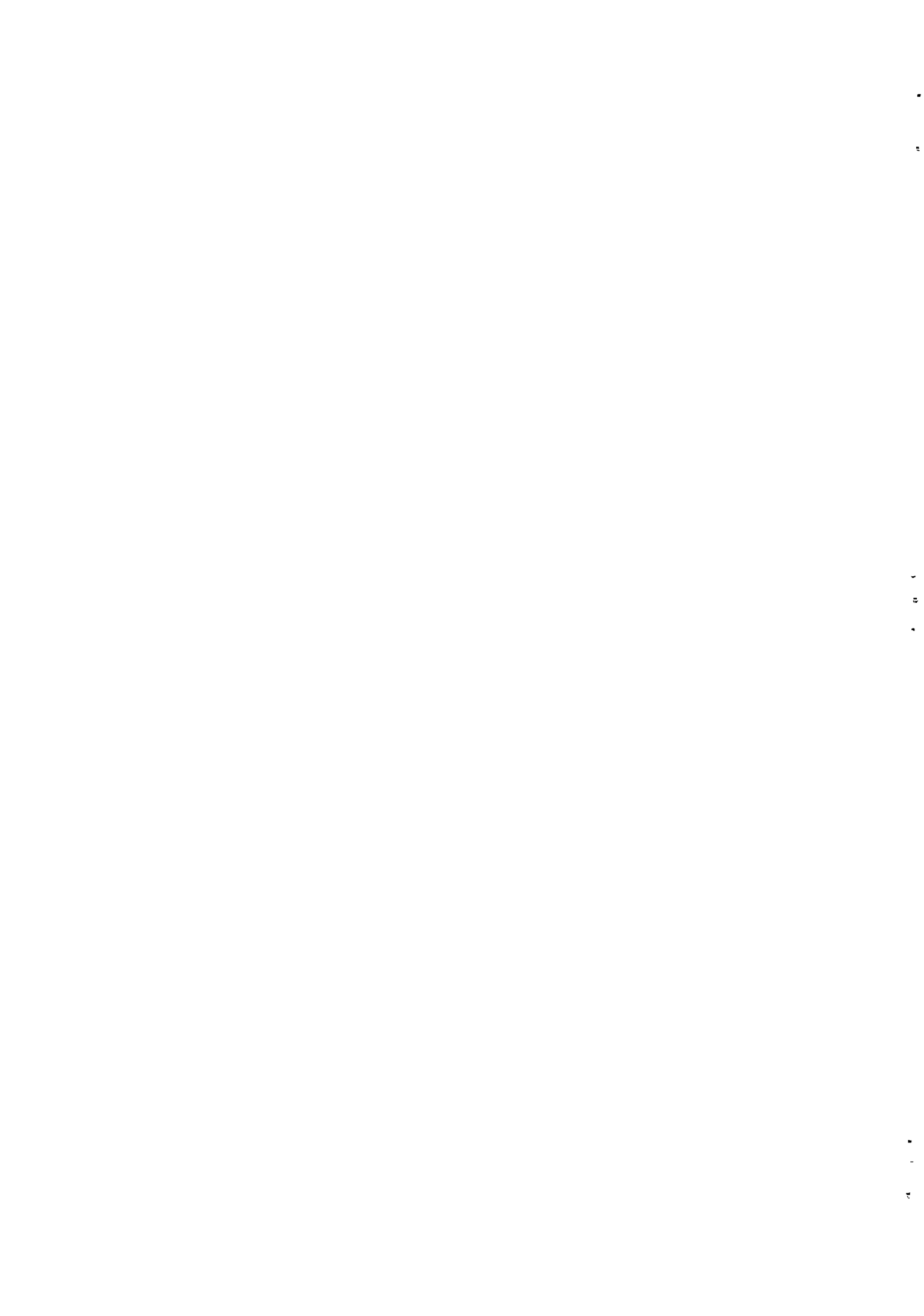
Other methods of involving the community should be worked out, based on knowledge of the local conditions and using imagination. The use of special women's groups and dance and drama groups should be investigated and experimented with (Hannan-Andersson: 1984c). Above all there must be flexibility in planning to allow for inputs from the community at the design stage of the project.

c) Management/maintenance aspects

It is easy to presume that since the improvements of traditional sources recommended are relatively simple and do not require great numbers of staff, expensive equipment, complicated maintenance infrastructure etc, that the improved sources will function by themselves without problems. On the contrary there are bound to be problems, and some inputs may be required resulting in cost and effort being expanded by the communities. There must be a well-thought-out proposal for regular inspections, reporting of problems, cleaning operations etc. More complicated maintenance systems will have to be established if handpumps have been installed.

d) Integration with health education/sanitation/other inputs

These are aspects which require much thought and preparation. Since the water quality can only be improved to a limited extent, through measures such as spring protection, lining of wells, construction of barriers for animals etc, there is a greater need to ensure adequate health education. An integral part of any programme to improve traditional sources must be a health education/sanitation component. It can be argued that inputs in these areas would have a very good chance to succeed, if the level of participation mentioned earlier can be achieved.



The health education component must be well thought out. Most communities in Tanzania have already had a great deal of health education, with limited impact on health standards. Where health education efforts have been made they have not been based on an understanding of local conditions. In addition they have usually involved attempts to change people's patterns of living without providing adequate motivation. As a result there has been too much reliance on establishing regulations and restrictions, and not enough on ensuring an understanding of the linkage water-health. (Hannan-Andersson: 1983) This has led to the situation where people know what is expected of them, and when necessary claim to follow the advice given, whereas in reality they carry on as they have always done. There is a need for a rethinking of the aims and methodology of health education inputs.

With regard to sanitation inputs the local conditions must be well understood before any programme is undertaken. The physical conditions in Singida limit the lifetime of latrines, if they are not of an improved type. The general standard of housing must also be taken into consideration before households are expected to construct improved latrines. Availability of materials is the biggest constraint in latrine campaigns. Efforts must be taken to research the most appropriate local material available and the best method to increase the life-length - and thereby the privacy and safety of the latrines. This campaign must be linked with the health education inputs, otherwise latrines will certainly be built, but their use may not be assured.

With regard to integration with other inputs, in communities which are experiencing other urgent problems - e.g. livestock management, afforestation problems - water supply projects should help the communities investigate way and means of solving these problems. In some communities it may be necessary to cooperate in meeting these other needs before there is a possibility that water supply improvements can be considered by the community. Water supplies must always be seen in the context of the total needs of the communities.

e) Need for an adequate knowledge base on local conditions

Much of the failure of improvements to water supplies can be attributed to lack of knowledge of the details of everyday life in rural societies, knowledge which should be the starting point for planning improvements to living standards. An adequate knowledge base on such areas as traditional beliefs and practices concerning health, nutrition, child-rearing, personal hygiene etc. is absolutely essential if meaningful inputs are to be made in rural societies, and if there is any chance of these inputs being accepted and assimilated. Concerning the improvement of water supplies in particular, it is clear that without more knowledge of traditional attitudes and beliefs relating to water and water-use patterns it will be impossible to achieve the intended benefits, even with the strategy of improving traditional sources. An adequate knowledge base is a basic prerequisite for the planning of an appropriate improvement, the achievement of community participation and effective health education and sanitation inputs.

of the communities had been minimal and almost no information at all (on planned improvements, use of improved supplies or health aspects) had been received. There was no integration at all with health education or sanitation inputs. Given these conditions it is not surprising that there is little impact.

The percentage of households actually using the improved supplies (when they are working) expressed satisfaction with the quality of the water. They claimed that stomach problems had decreased while the supplies were working. The main complaints about the improved systems were that they were inadequate for the needs of the community. There were also many complaints about the slow maintenance when the pumps or windmills broke down. The suggested improvements were to build more wells with handpumps so that they are closer to all households. Only a small percentage of households in Nkhoiree (which had not yet received any improved supplies) expected the government to deliver a piped supply.

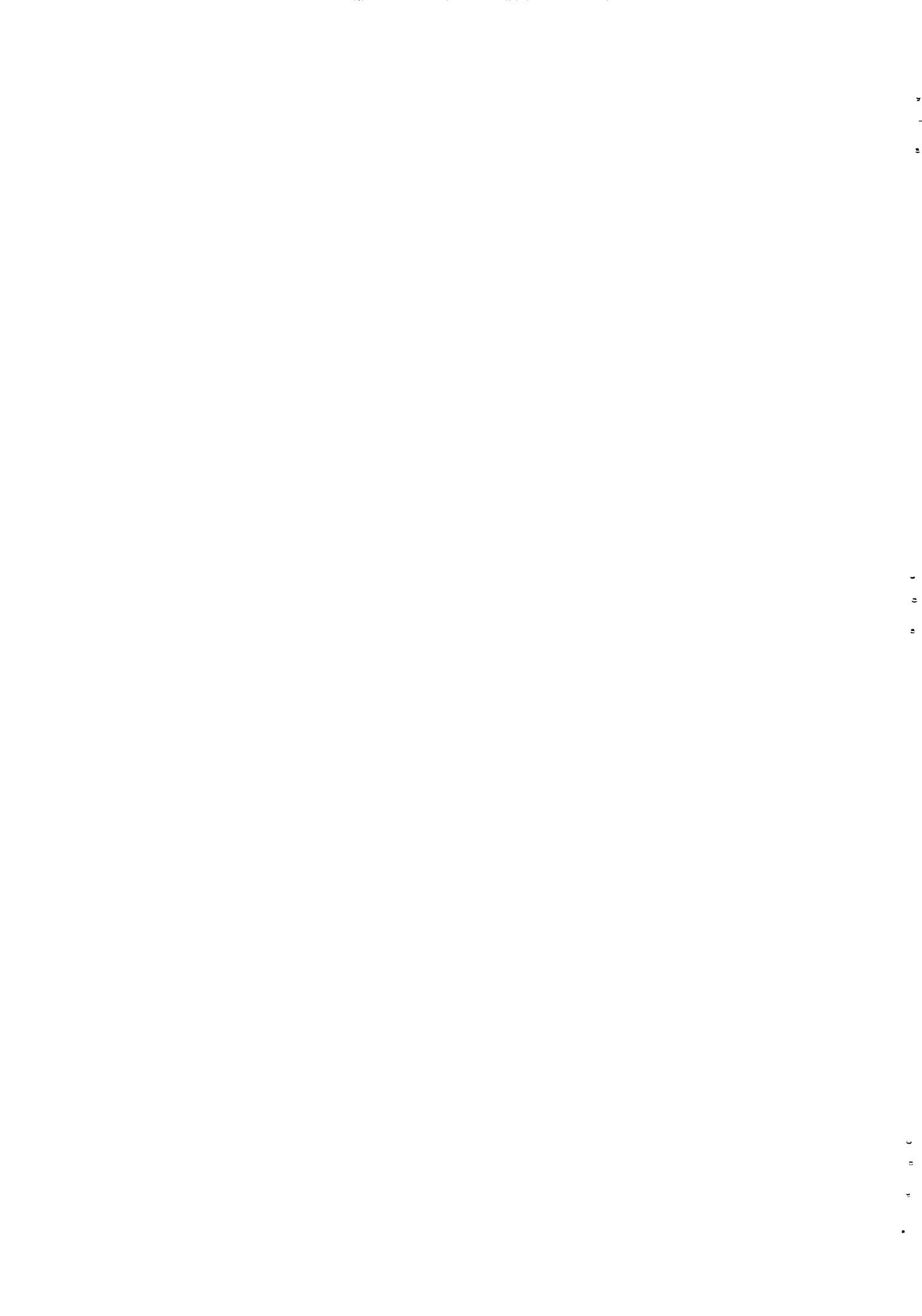
The households in all 3 villages carried home very small amounts of water for domestic use. The average PCC was as low as 8.7 litres per person per day (with a range of 2.6 - 20 litres). However it must be noted that most washing of clothes was done at the wells and the amount of water used for this activity is thus not included in the PCC calculations above. In addition some personal washing was also done at the sources. However, even allowing for these additional litres the PCC is still a far cry from the recommended 20 litres.

In addition to very low consumption, which did not appear to change noticeably when households were using improved supplies, the handling of water in the homes left a great deal to be desired. Standards of personal hygiene were very poor. Sanitation aspects are still unclear, as it is difficult to accurately estimate the actual usage of latrines in a short survey such as this one. However it is presumed that household members use the bush as much as they use the latrines, especially since many latrines were neither private nor safe enough for regular use. The standard of the latrines is very poor, in keeping with the general standard of housing. It was obvious that inputs in health education on relation of health to water, personal hygiene and sanitation are urgently required. Such inputs must be in conjunction with the improvement of the water supplies.

The health situation as revealed through the interviews with the 75 households is not good. There were lots of stomach problems experienced in the area, as well as bilharzia, malaria and some skin and eye diseases. Diarrhoea is also a problem though not all households considered it an important one. This must be related to the varying standard of personal hygiene in individual households, since diarrhoea is probably very often passed from one household member to another through poor hygiene - for example in preparation and serving of food, in the practice of all washing hands in one bowl of water before eating, in drinking from the same calabash or submerging hands in drinking water, and not washing hands after excretion.

The present strategy in Singida

The present strategy in Singida is to emphasize shallow wells with pumps. This is in keeping with the trend to concentrate on appropriate low-cost technologies. However it is suggested in this report that this strategy has limitations which prohibit its implementation on a wide-scale. As one



alternative within a programme for improving water supplies it has great value. However if it is the only strategy used the benefits achieved will be limited. Inherent in such a strategy is a low level of accessibility, partly because of the physical conditions which govern the location of sites but also because the political ideology which stresses equality of distribution between villages as opposed to adequate coverage within individual villages. Financial constraints also play a role in limiting the inputs. For the attainment of benefits in terms of improvement of health and increased convenience for the consumers it is essential that all members of the community are reached. However the constraints imposed by the political goals and the economic realities in Tanzania today make the attainment of goals with the present strategy well nigh impossible.

Experience from Singida seems to indicate that the two crucial problems are location and density of supply points. There are not enough wells in the villages to serve the whole community and the location of the wells does not always ensure an improvement of access. In many cases the reverse is the case. The only advantage offered to the consumer is the improved quality. However the relatively low reliability of the improved supplies (related to the inadequacy of the maintenance system) means that not even water quality is guaranteed. When the wells are out of order the consumers are forced to revert to using the more polluted traditional sources.

As a result of these problems the impact of improved water supplies programme as implemented in Singida region seems limited. As long as the new systems cannot compete with the traditional sources in terms of ease of access and reliability there can be no "total conversion" to the improved supplies. Traditional sources will continue to be used and any health benefits will be negated. As long as there are not sufficient improved supply points to cover the total needs of the communities, the maximum benefits in terms of improved health and increased convenience cannot be achieved.

An alternative strategy: improvement of traditional sources?

Given the economic situation and the political goals on one hand, and the necessity to improve the water supplies for all members of the community on the other hand, it would appear that a more appropriate strategy would be the improvement of existing traditional sources. The starting point for water supply improvements would be an inventory of the traditional sources already in use. Implementation would be concerned with establishing how many of these could be improved to give water of better quality, quantity and reliability. Improvements could be of many different types - deepening and lining of wells, installing aprons, and where absolutely necessary installing hand or foot pumps. This strategy does not completely reject shallow wells and pumps, but rather sees it as one possible alternative for improvements.

The motivation for such a strategy can be summarized as follows;

1. At the present point in time it would appear to be the only way possible to achieve any impact, i.e. to bring about benefits to all or as many as possible in the community in terms of meeting felt needs, lessening the burden of water collection and improving health.
2. It is keeping with the traditional patterns of water-use and retains the natural risk-eliminator in the multi-source practices.
3. It should facilitate community involvement, and particularly the involvement of women.

4

4. It is a least-cost technology and as such is in keeping with the political and economic realities in Tanzania today.
5. It would be possible to improve sources for non-domestic uses, including water for livestock.
6. Finally if maximum involvement and maximum input can be attained it should facilitate diffusion to other communities to create "felt need" and the impetus necessary to stimulate the involvement of communities in solving their own problems.

The benefits for the consumers should be many. Accessibility would not be altered (unless to improve an unacceptably low accessibility) and water collection patterns would be basically the same. The consumers already identify with the sources since they have been chosen by the villagers themselves as the best possible in the area, and many have been in use for long periods of time. Any improvement by simple measures would certainly be appreciated. The main advantages offered to the consumers are in terms of greater reliability and improved water quality. The villagers could participate in the planning and implementation of the improvements and the operation and maintenance are within their capabilities. A complicated and expensive maintenance system would not be necessary. Since local resources in terms of know-how, manpower and materials are utilized, participation in terms of the "user-choice" approach can be facilitated and costs kept to a minimum. The fact that attention can be given to sources for cattle would be greatly appreciated by the Wanyaturu.

Although the improvements involved are simple there is nonetheless a need for adequate planning. In particular attention must be given to aspects such as priority of felt needs, costs and contributions, ownership etc. Management aspects are crucial and the organizational set-up must be flexible, taking into account local conditions. The health and sanitation components of such a programme must be given adequate attention and adapted to local conditions. Much of the failure of improvements to water supply to date can probably be partly attributed to a lack of knowledge of the details of everyday life in rural societies, knowledge which should be the starting point for planning improvements to living standards. Thus adequate knowledge base is a basic prerequisite for the planning of an appropriate improvement, the achievement of community participation and effective health education and sanitation inputs.

BIBLIOGRAPHY

Ahman, Ingvar. 1981

World Health Organization and the decade, Geneva: World Health Organization, Global Promotion and Cooperation for Water Supply and Sanitation, Division of Environmental Health, 15 p.

Andersson, Ingvar. 1982

Wells and handpumps in Shinyanga Region Tanzania, Dar es Salaam: BRALUP, University of Dar es Salaam, 65 p. (Research Paper No 77)

Andersson, Ingvar. 1983a

Wells and handpumps - the Shinyanga experience, 12 p.
(Paper presented at the Seminar on Water Master Planning in Developing Countries, Study Case Water Supply and Sanitation in Tanzania, 17-21 July 1982, Telemark, Norway.)

Andersson, Ingvar. 1983b

Improvement of traditional sources: a realistic alternative, 13 p.
(Paper presented at a seminar held in Linköping, Sweden, May 29 - June 4, 1983 "Water for All. Coordination - Education - Participation.")

Hannan-Andersson, Carolyn. 1983

The ideal vs the reality: health benefits of improved water supply. How to bridge the gap?, 18 p.
(Paper presented at a seminar held in Linköping, Sweden, May 29 - June 4, 1983 "Water for All. Coordination - Education - Participation.")

Hannan-Andersson, Carolyn. 1984a

Development of domestic water supplies in rural areas: women the targets, 12 p.
(Paper presented at a Water Supply and Low-cost Sanitation Course held in Dar es Salaam, 9 January - 3 March, 1984)

Hannan-Andersson, Carolyn. 1984b

Development of domestic water supplies in rural areas: How to involve village women, 10 p.
(Paper presented at a Water Supply and Low-cost Sanitation Course held in Dar es Salaam, 9th January - 3rd March, 1984)

Hannan-Andersson, Carolyn. 1984c

Development of water supplies in Singida Region, Tanzania. The realities for for village women, Dar es Salaam: Institute of Resource Assessment.

Institute of Resource Assessment and Water Master Planning Coordination Unit. 1984

Rural Water Supply, Sanitation and Health education programme for the Lake Regions. Principles and procedures for community participation, health education and sanitation, Dar es Salaam, 43 p.

Jellicoe, Marguerite. 1978

The long path. A case study of social change in Wahi, Singida District, Singida, Nairobi: East African Publishing House, 383 p.

Makiungu Hospital, Singida Tanzania

(General report of services and activities), Singida, 1984, 19 p + appendix.

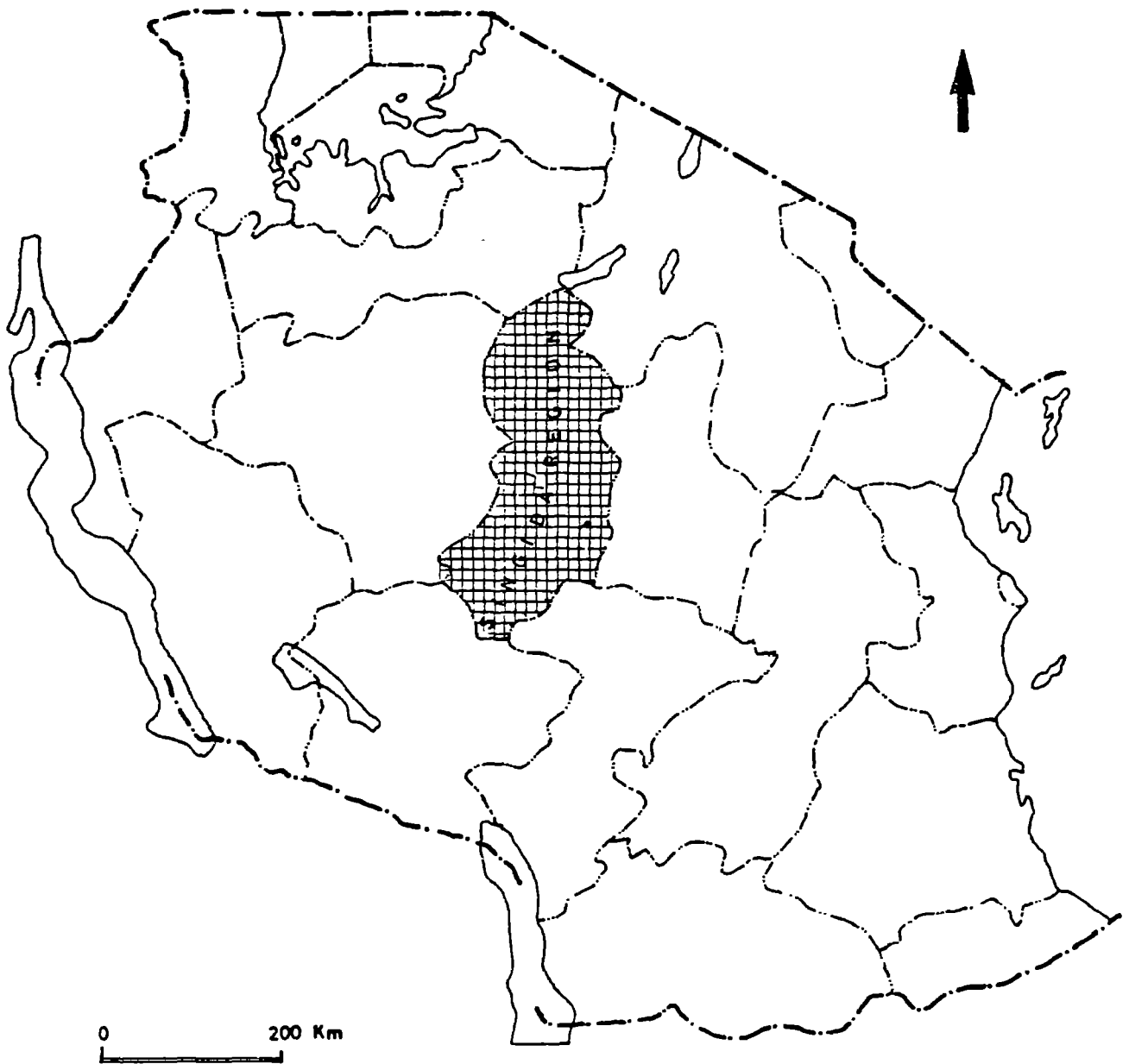
Mchinja, Abdulla Juma. 1976

Food grain production: The case of Singida's persistent deficits, Dar es Salaam: University of Dar es Salaam, Economics Department. (MA Thesis.

- Mwangu, M.A. 1982
Problems of food production: A case study of peasant experiences in two villages in Singida District, Dar es Salaam: University of Dar es Salaam, Institute of Development Studies. (MA Thesis)
- Schneider, Harold K. 1970
The Wahi Wanyaturu. Economics in an African society
 New York: Wenner-Gren Foundation for Anthropological Research, 180 p.
- von Sick, E. 1916
Die Waniaturu (Walimi), Berlin: Baessler-Archiv. (Vol. V)
- Tanzania. Ministry of Water, Energy and Minerals. 1980a
Tanzania Water Development Project Stage 2 and 3. Technical Progress Reports July 1977 - June 1980, (Prepared by Snowy Mountains Engineering Corporation), Singida.
- Tanzania. Ministry of Water, Energy and Minerals. 1980b
Tanzania Water Development Project, Stage 4. Technical Progress Report July - September 1980, Singida. 13 p. + annexes
- Tanzania. Ministry of Water, Energy and Minerals. 1983
Tanzanian Village Water Development Project Stage 4. Technical Progress Report January - March 1983, Singida. 12 p.
- Tanzania. Ministry of Water, Energy and Minerals. 1984
Tanzanian Village Water Development Project Stage 4. Technical Progress Report October - December 1983, Singida. 19 p. + annexes
- WHO. 1983
Minimum evaluation procedure (MEP) for water supply and sanitation projects, Geneva, 1983. 51 p.
- Whyte, Anne. 1976
Towards a user-choice philosophy in rural water supply programmes
"Assignment Children" 24 April - June 1976:28-45
- Whyte, Anne and Burton, Ian. 1977
Water supply and community choice
 In: Feachem, Richard et al, eds. *Water, wastes and health in hot climates*, Chichester: John Wiley and Sons, pp. 113-219
- Berger, Peter. 1976
Pyramids of sacrifice: political ethics and social change, London: Penguin Books.

Map 1

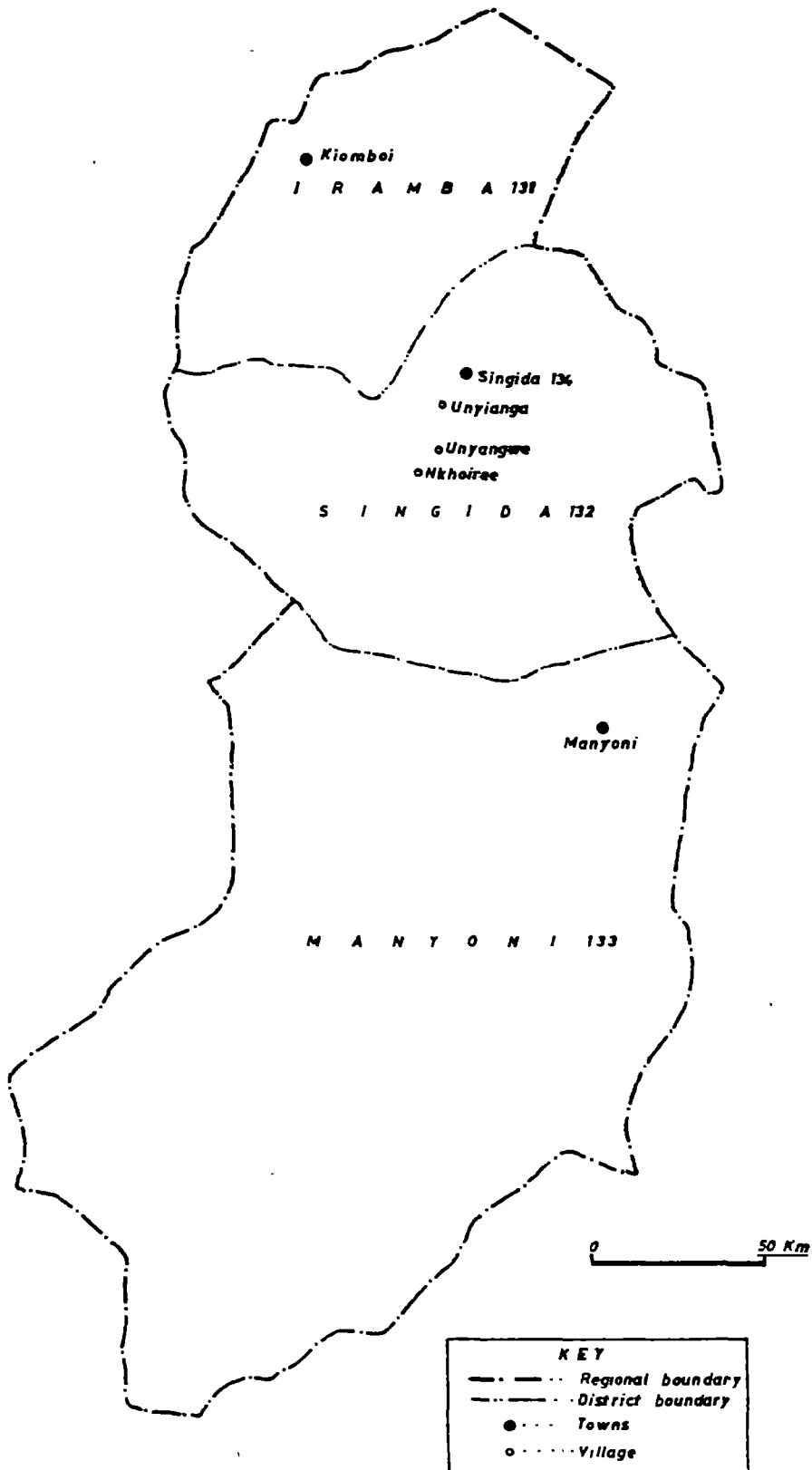
TANZANIA ADMINISTRATIVE AREAS 1982



--- International Boundaries
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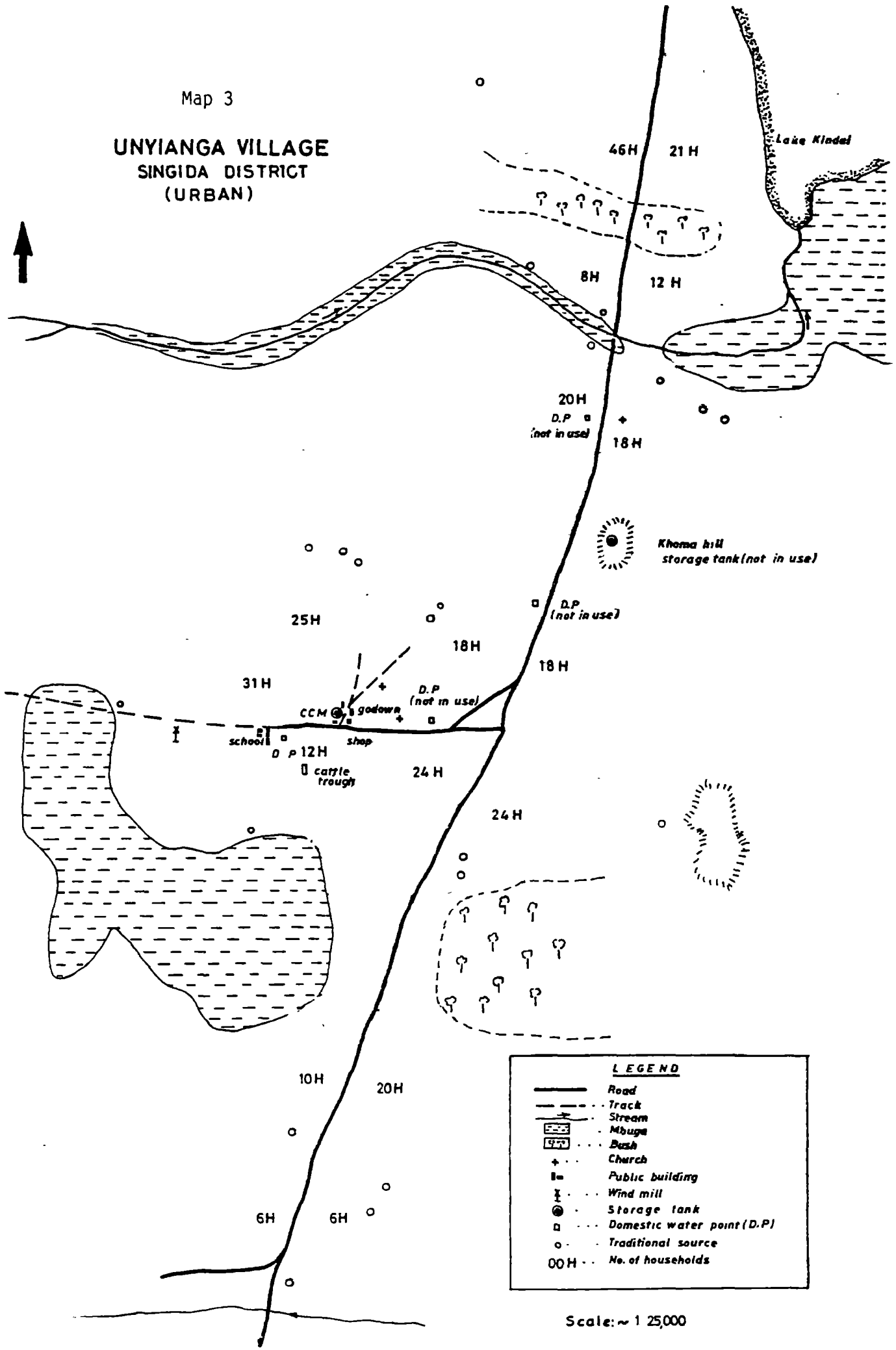
Map 2

SINGIDA REGION



Map 3

UNYIANGA VILLAGE SINGIDA DISTRICT (URBAN)



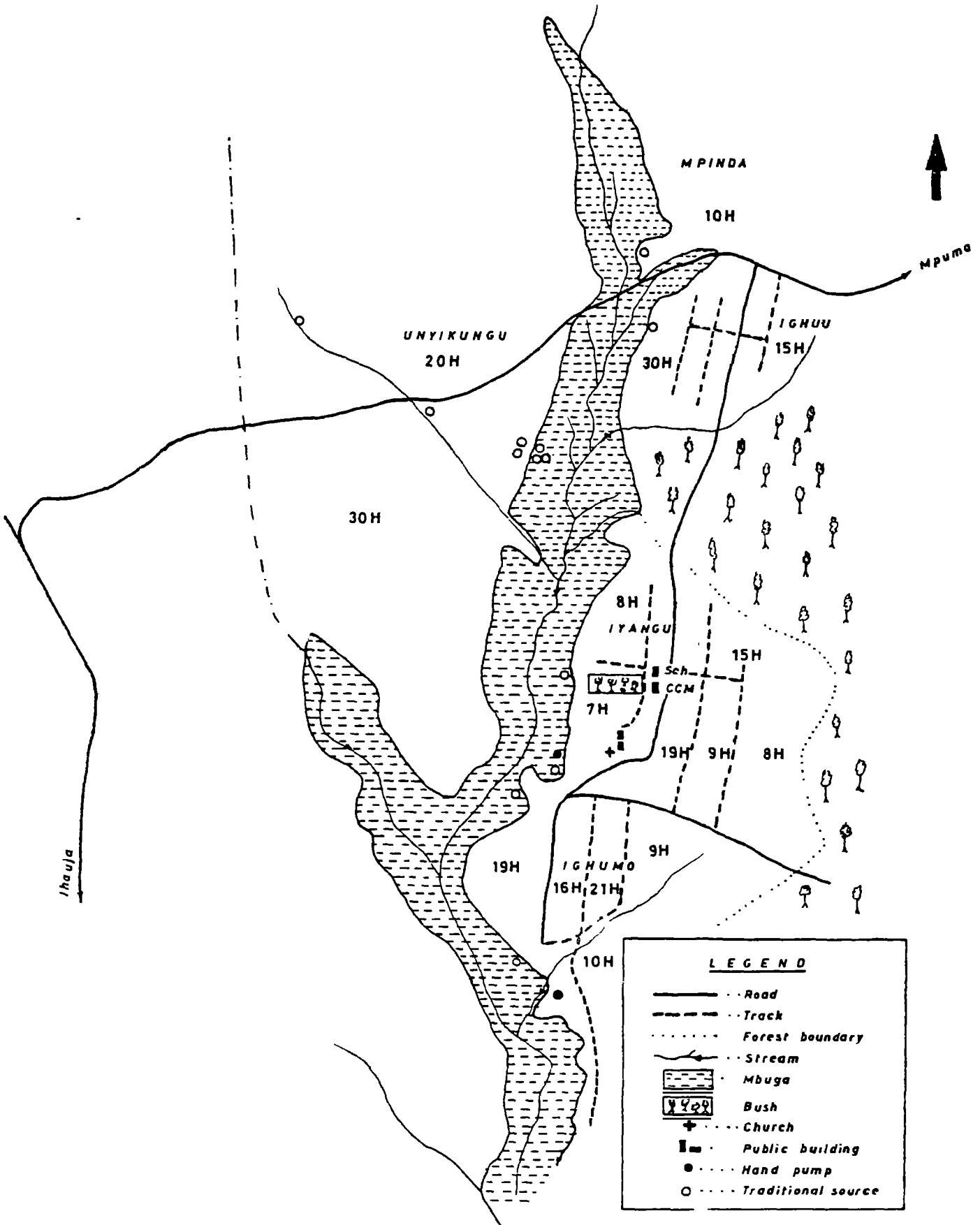
LEGEND

- Road
- Track
- Stream
- Mbugu
- Bush
- Church
- Public building
- Wind mill
- Storage tank
- Domestic water point (D.P)
- Traditional source
- No. of households

Scale: ~ 1 25,000

UNYANGWE VILLAGE
SINGIDA DISTRICT

Map 4



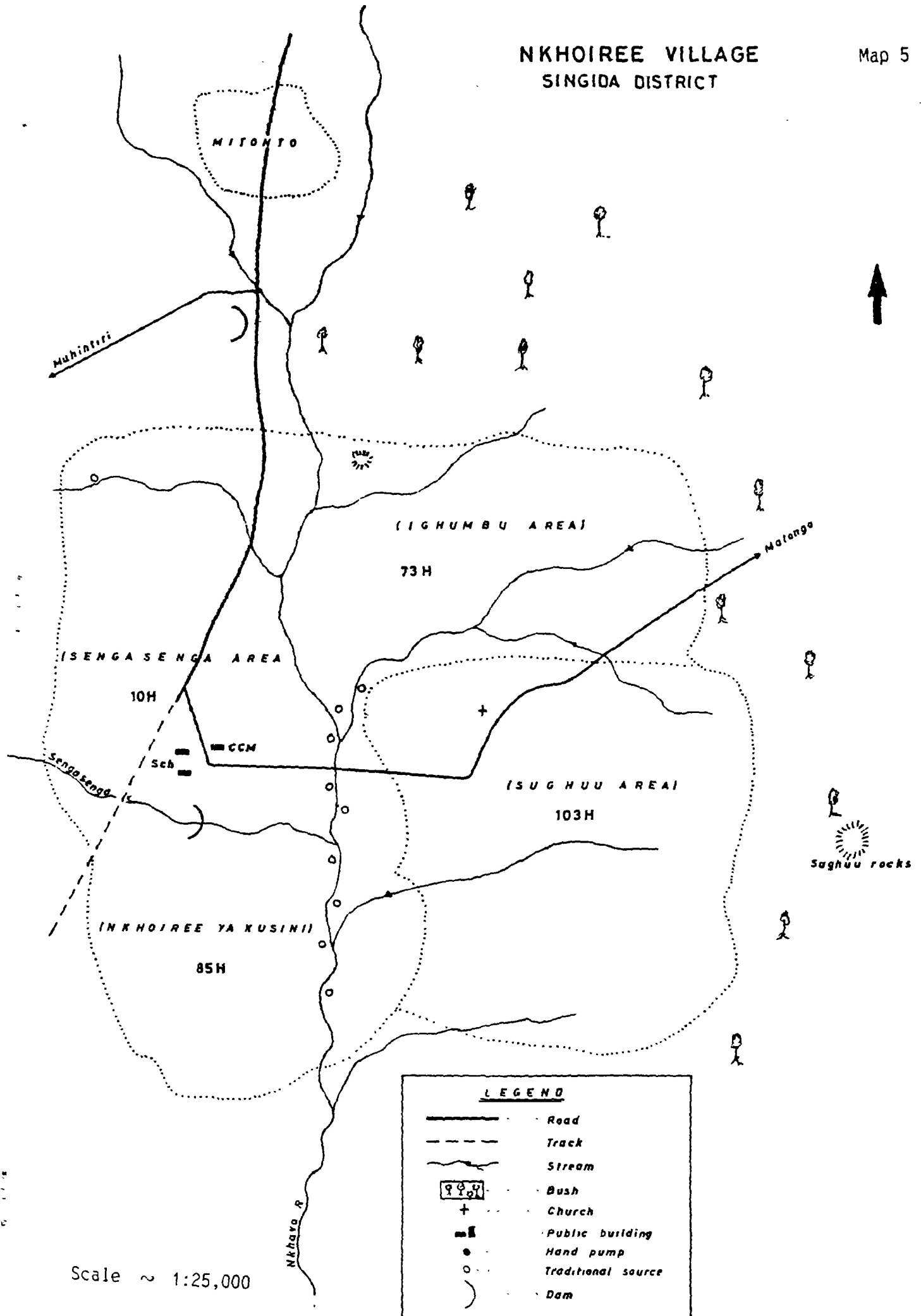
LEGEND

- Road
- - - Track
- Forest boundary
- ~ Stream
- [Hatched] Mbuga
- [Cross-hatched] Bush
- + Church
- [Rectangle] Public building
- Hand pump
- Traditional source

Scale ~ 1:25,000

**NKHOIREE VILLAGE
SINGIDA DISTRICT**

Map 5



Scale ~ 1:25,000

LEGEND	
	Road
	Track
	Stream
	Bush
	Church
	Public building
	Hand pump
	Traditional source
	Dam

