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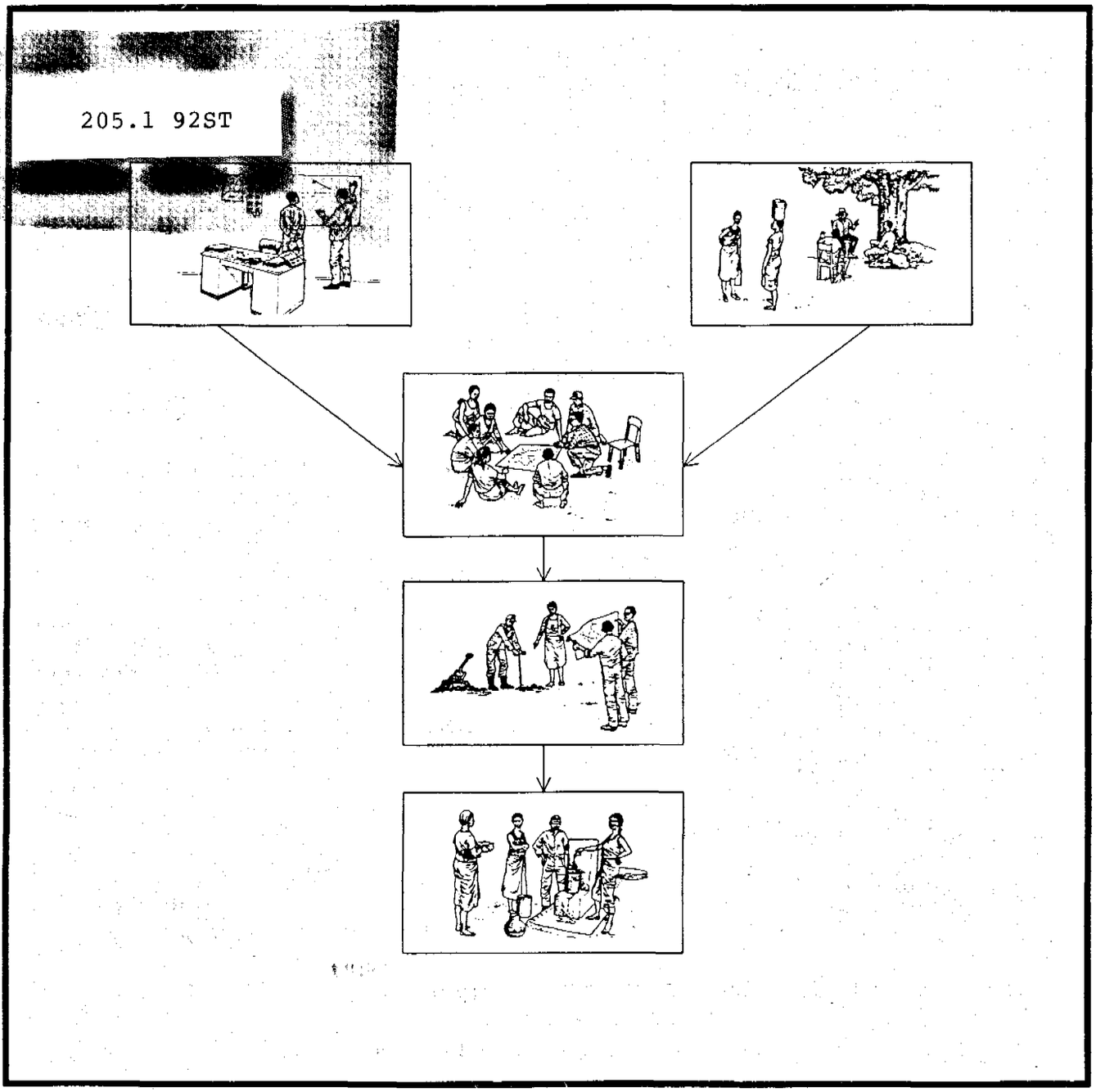

Strategies for System Sustainability of larger W/S Systems

With references to case studies in Nepal

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STRATEGIES FOR SYSTEM SUSTAINABILITY OF LARGER WATER SUPPLY SYSTEMS -WITH REFERENCES TO CASE STUDIES IN NEPAL

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ABSTRACT

The poor level of operation and maintenance of water supply and sanitation (WSS) services in developing countries is one of the major problems in the sector. Community management of services backed by measures to strengthen local institutions in implementing and sustaining WSS programmes is universally seen as the solution to this problem.

The experience with community management in relatively larger size w/s projects in Nepal has not been encouraging. The author's experience in involving the communities in a Danchhi water supply project was disappointing too. The project was initiated at the request of some community members, but after construction the community refused to take over the responsibility of operation and maintenance of the system.

To achieve a deeper understanding of factors contributing to a satisfactory level of community management, a six months study was carried out. The study consisted of a literature review, key interviews with WSS professionals from various countries, an analysis of a successful case of community management in the Philippines, and a comparative field study of four WSS projects in Nepal, including Danchhi.

The study revealed that community management is more likely to be successful when:

- a water supply scheme is based on a general felt community need. Especially the willingness to pay for operation and maintenance seems to be related to felt need.
- community leadership is well established and accepted by the various population groups covered by one water supply scheme.
- a Water Users Committee is well established, with its members selected through a democratic process.
- the whole community participates - both directly and through the WUC - in the decision making process. This is especially important in the planning stage when major decisions have to be taken with respect to technology level, and project management and cost recovery issues.
- the water agency takes up the role of promoter, rather than provider, and feels committed to a community management approach. Community development/motivation and health awareness building are important ingredients of the agency's new role.
- training support is given to both community and agency levels.At the community level, training have to be organised to develop managerial and technical skills. At agency level, the need is felt to train the water agency's personnel on software support aspects like personal communication skills, understanding social or behaviourial characteristics of the community etc.

CONTENTS

Abbreviations

CWSS	-	Community Water Supply & Sanitation
DWSS	-	Department of Water Supply & Sewerage
FMIP	-	Farmer Managed Irrigation Project
HH	-	Households
HMGN	-	His Majesty's Government of Nepal
LWUA	-	Local Water Utilities Association
MPLD	-	Ministry of Panchayat & Local Development
MLD	-	Ministry Of Local Development
MHPP	-	Ministry of Housing & Physical Planning
MOH	-	Ministry Of Health
O/M	-	Operation and maintenance
PST	-	Public Stand Posts
RWSA	-	Rural Water Supply Association
SSNCC	-	Social Services & National Coordination Council
VMW	-	Village Maintenance Worker
WD	-	Water District
W/S	-	Water Supply
WSS	-	Water Supply & Sanitation
WSST	-	Water Supply & Sanitation Technicians
WUC	-	Water Users Committee

CHAPTER I - INTRODUCTION

1.1 Background

The necessity of the community involvement in any of the developmental activities for a sustained development had been realized during the early 70's in Nepal,especially in WSS activities.A national water agency namely The Department of Water Supply & Sewerage (DWSS) was established in 1972 to gear up the pace of development in this sector.DWSS was made responsible to take up water supply in communities with population size more than 1500 both in rural & urban areas.For the development of small projects for smaller communities,the local development department (LDD),a multi sectoral agency for local development was made responsible particularly in the rural areas.

The **Public Administration Act 1973** stressed the need for the share of the beneficiaries in the construction & operation & maintenance.It was made obligatory to the local government to take over the completed schemes and the beneficiaries to share some of the project cost in the form of the voluntary labour or local material support.DWSS then tried to enforce the voluntary labour contribution in all of the projects that were under implementation and also to handover the completed schemes to the local government body.The experience was that it was difficult to obtain voluntary contribution specially from a larger communities.Also the completed schemes,after handing them over to the local bodies were not properly maintained due to lack of the financial,technical or even managerial capabilities within the local institutions.

This initial experience on community involvement during 70's led DWSS to follow the usual/traditional approach of involving outside contractors to construct the projects without any involvement of the community, whatsoever.The projects completed were thus operated & maintained by the DWSS with financial & manpower support.

The **Decentralization Act 1982**[1],in order to institutionalize the community organizations,emphasized on a bottom up planning approach and clearly defined authorities & responsibilities of the Users Committees.Even after the Act was enforced limited efforts were made on community involvement in the different stages of the development of the DWSS projects.

In the mean time because of the earlier experience,UNICEF together with new Ministry of Panchayat & Development(MPLD,earlier LDD) continued its earlier efforts to promote participation in the community water supply & sanitation (CWSS) projects.They were relatively successful in getting the users

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1 - The summary of the Decentralization Act is given in Appendix - I

organised to contribute voluntarily to the capital cost and to operate and maintain the schemes in CWSS projects.

After the amalgamation of the water supply & Sanitation (WSS) activities of UNICEF through the then MPLD with DWSS under a newly formed Ministry of Housing & Physical Planning (MHPP) in 1988,then it was realized the need for an unified approach in the development of the WSS sector.The **Directives 1989**[2] as it is called,made it obligatory to involve the community in all WSS projects under execution and stressed on the need for handover of the completed schemes to the user groups at the earliest possible time.The formation of WUC,selection & training of village maintenance worker (VMW) & member of WUC's has been made obligatory at all levels of the project.

From the above,it was noticed that the previous Acts/Legislations supporting community management were not enforced effectively.The unwillingness of the community to shoulder upon the o/m responsibility as envisaged by Directives 1989,has surfaced already in many of the DWSS projects.This reason could be the unpreparedness or incapacities of the communities to handle relatively larger water supply projects.It could also be the inadequacies in the support activities from the agencies.To enforce Directives 1989 effectively,there is a need to highlight such factors.A case study of a project where the author had an experience,is taken up to analyze and recommend the strategies.

1.2 PROBLEM IDENTIFICATION - A Case History

During the transitional phase of the sectoral reorganization in 1988,when the new ministry was born,the author was designated with the responsibility of the Danchhi water supply project,which was meant to supply water to 10000 inhabitants of the Danchhi & Bhadrabas village on the outskirts of Kathmandu.The project was initiated on the directives of HM the King of Nepal,who was stopped en-route by the local villagers and had demanded for a water supply project for the village.
The need of the involvement of the community for the future sustainability of the system,was realized & thus a 39 member committee by the name project assistance committee was constituted.The committee was chaired by the Chairman(Pradhan Pancha) of Danchhi village and consisted of ward chairman,social workers.

A system of regular communications with the community committee members was maintained during the project construction phase by means of the regularly arranged meetings of the committee.The committee was involved in making important decisions like the voluntary labour contributions by the communities,location of the public stand posts.A works supervisory sub-

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2 - Appendix - II gives the summary of the Directives 1989.

committee from the members of the assistance Committee was also formed to ensure a clear understanding with the community.

The project was completed within the stipulated time of one and a half years.The communities participated in terms of voluntary contributions in digging trenches for the distribution pipe lines ,the value of which was about 5% of the total project cost.

Danchhi Water supply project,is a typical gravity fed scheme from a stream 5 kms.away and the water is distributed through two RCC overhead tanks of 225 & 100 cu.m capacity with a design capacity of 1000 cu.m per day.There was a provision of some 300 house connections & 110 public stand posts.The project was thought to be technically simple to manage and operate because it does not require any external source of energy and there were no mechanical moving parts. Therefore it was believed to be within the local capabilities to sustain.

Adequate efforts were shed in motivating the committee members to take over the responsibility for operation and maintenance of the completed system.They were just reluctant to take over the responsibilities but were equally eager to share the benefits from the project.

The case of Danchhi,where the important members of the community were involved since the early stage of the project,where project was initiated on their own initiative,where the people did participate in voluntary contributions,but then refused to take over the responsibility of operation and maintenance of the project, raises certain questions on the reasons for the failure in getting people organised in o/m of the project such as :

- Were the socio-economic characteristics in the village different from those in other communities where operation & maintenance of water supply system is being successfully done by the community itself?
- Has the magnitude or the size of the project something to do with it? In other words,is there a limitation to a community's capacity in handling projects up to a certain magnitude only?
- Were deficiencies in the communication approach employed by the water agency during the construction? If yes,what were they?
- What are the other efforts needed so that the community would develop the capability towards the sustainability?

These questions arise from the Danchhi experience but also from other DWSS projects of larger magnitude.[1]

Taking the problem issue of Danchhi w/s project as a general problem in many of the w/s projects of bigger magnitude,there may be a need for the development of an appropriate strategies for larger projects so that the

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1 - Drinking Water Supply & sanitation Sector Review & Dev.Plan(1991-2000) (ref no.42)

community's as well as the support institution's capacity can be prepared better for the establishment of a successfully community managed system.My research is intended to contribute to this goal.

1.3 Objectives of the Study

From the problems identified as above,the objective of my study is to find community management approaches to enhance system sustainability of larger rural WSS schemes like Danchhi in Nepal.On the basis of the Institutional models or approaches as being applied in other countries and with review and analysis of the experiences in Nepal over the projects involving different communities,the objective of my study is

- To visualize the reasons for non-sustainability of Danchhi water supply project by the communities.

- To recommend strategies to enhance system sustainability of such future projects on the basis of the findings.

To fulfil the said objective,the aspects that would be specifically looked at,are outlined as follows:

- Review & analyze the successful experiences with community participation for larger community water supply projects in other developing countries.

- Study of difference in the community management approaches between the Smaller & larger community projects,comparing eg UNICEF assisted community water supply & Sanitation(CWSS)project's approach with those of other sector agencies in Nepal.

- Analyze the possible correlations between system sustainability and a community's specific characteristics,its magnitude, the size of the community served and the level of support activities by the agencies.

Limitations

A fixed period(six months)was allocated for the study and therefore due consideration was given to complete the study within the time frame.There was also a limitation of the author's education background and inexperience to conduct a study like this.

1.4 Methodology

Based on the set objectives as above,the methodology & approach of study has been conducted in two parts.

Part I. Desk Study & Consultations

- A review of literature in the libraries of IHE,TU & IRC on the subject was done in order to study & review the community participation or community management policies,strategies and approaches being practised in other countries, and found to be appropriate and successful in terms of providing sustainable systems.

- Consultations with participants from various countries have been undertaken to find their personal assessment of community management practices in their country.

- A review of the literature on the community management practices in UNICEF assisted CWSS programmes and farmer managed irrigation systems in Nepal was done .

Part II Field Study

The strategy was thought essential to be in harmony with the community's characteristics and behaviourial aspects.Therefore to understand the community's socio economic characteristics and the participatory actions,field study was conducted. It was also thought essential to asses the influence on the level of operation or maintenance of the water supply systems due to the differences in the community's socio economic characteristics, size, participation level,institutional support,felt need and willingness to pay.

Selection of projects for study

As the time for the proposed study was limited,it was not possible to visit projects scattered far apart.Therefore it has been intended to concentrate on the study of projects nearer to Kathmandu.

Criteria for selection of projects

The projects for study are selected on the following criteria.

- to represent the community management approaches of the different agencies.
- to select a larger community project as far as possible.
- to select a technically simple gravity schemes to represent similar systems that could be sustained by communities.

The following water supply projects were chosen for study.

Project Name	District	Population	Total HH	Agency	Hypothesis on system sus - tainability
Danchhi	Kathmandu	7738	1161	DWSS	Low
Kappan	Kathmandu	5168	880	MPLD	Med
Nakhel	Bhaktapur	1951	336	UNICEF /MPLD	Med
Bhattedanda	Lalitpur	1631	268	UMN	High

DWSS : Department of water supply & sewerage
MPLD : Ministry of Panchayat & local development
UMN : United Mission to Nepal(NGO)

Based on the author's experience in the area,the hypothesis on the system sustainability by the community was in the order as shown above in the table.The sustainability was assumed to be higher in Bhattedanda & lower in Danchhi.

Household survey on the developed questionnaires was done in the selected project for 8 weeks in Nepal.The development of questionnaires and the sampling techniques have been dealt in detail in Chapter IV.

The comparative evaluation of the results is done in Chapter V.

Based on the findings,the strategies are recommended in Chapter VI.

CHAPTER II

SUSTAINABILITY THROUGH COMMUNITY MANAGEMENT - **Concepts & its applications**

This chapter deals with the discussions in the concepts of the sustainability,community participation and community management based on literature reviews in the first part.The second part reflects on the community management strategies and approaches in WSS sector in the Philippines in the form of a case study.

2.1 LITERATURE REVIEWS

2.1.1 Background

One of the key lessons from the past UN Water Decade as identified in the background paper of the global consultations on Safe Water & Sanitation for 2000 in New Delhi highlights the need for

" **Building Capacity - The promotional role of the government** "

"*Government to concentrate less on direct interventions in providing services and more on the enabling public and private institutions to deliver the services.(lesson 2,page viii)"*

It quotes further "The lack of sustainability in the case of the centrally provided and maintained Water supply services both in the rural or urban areas in the developing countries has awakened the sector on the appropriate approach of the development.In the urban areas the weakness in providing the clear mandate on the autonomy of the W/S services in the managerial & financial aspects have been found to be the cause of the concern as a clear correlation has been established between the performance of the utilities and the degree of the independence of the direct interventions from the government.Whereas in the rural areas,the lackness in the part of the government to set up an enabling environment for the development of a system of management of WSS services through effective community participation is seen as the reason for the failures as far as sustainability of the system is concerned".

The **New Delhi Statement** (ref-32) as it is known,appealed to all Nations for concerted action to enable the people to obtain two of the most basic human needs - safe drinking water & environmental sanitation and has outlined four guiding principles.One of the guiding principles is **Community Management of services backed by the measures to strengthen the local Institutions in implementing & sustaining water & Sanitation programmes.**

2.1.2 Sustainability

Definition

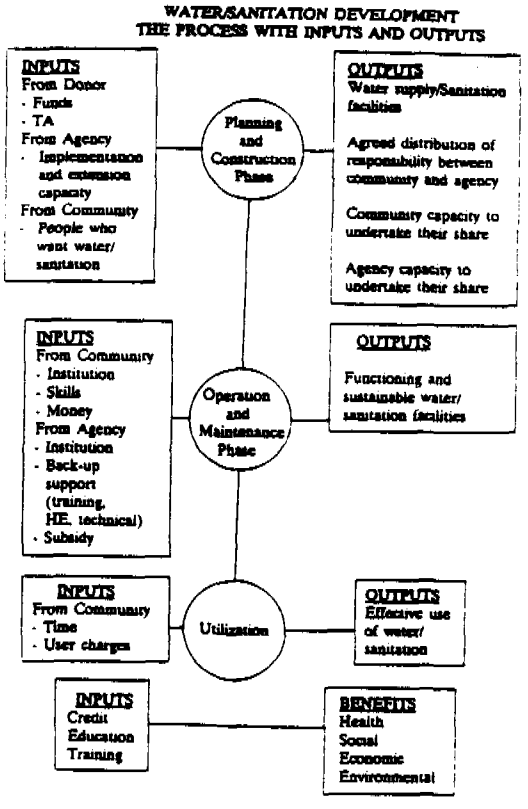
According to **Deepa N.Parker**(1990 ref - 11),sustainability refers to the ability to perform effectively and continuously after the donor or agency's assistance(managerial,financial & technical) is withdrawn.It is the development of problem solving capacities in the communities and in water agency to anticipate & resolve problems.

WHO report(1988 p.4 ref 31) defines a water supply system to be sustainable when it is affordable,appropriate(technology) and continues to deliver high level of water related benefits after the completion of the project.

WASH report(1990 p.5 ref -38) highlights that the development of WSS facilities would be realized when the facilities continue to function after the aid agencies depart and the communities are in control of their own affairs.It adds further that the sustainable development is more likely to occur if each of the key participants(community & agency) recognises and assumes its appropriate role and shoulders its responsibility.The paper highlights the key variables that determine the sustainability are institutions,human resources,technology,o/m procedures and financing plan.The general reason for non sustainability of w/s services in the developing countries in their experience are due to :

- inadequate established institutions.
- lack of manpower & finance.
- inappropriate technology.

The process with the inputs & outputs in the development of water supply sector as described by **Deepa N. Parker** in her paper titled **Participation Tools for managing change in Water & Sanitation** (1991 ref-12)is shown below.



The figure highlights that sustainability begin at the planning stage itself as proper linkages are established with the o/m and utilization phase at this very stage.A sustainable system shall have a financial plan that allows it to generate enough water revenue to pay for o/m stage.It shall also require a plan to develop the personnel to operate and maintain the system.So an agreement for sharing responsibilities at the planning stage between the community and the agency is necessary.

Sustainability Indicators

Deepa N.Parker in her paper **Sustainability & the Human Factor** (ref-11),quote "the sustainability is just not the measure of the system function at a time or failure at others.That is just the static measures.Sustainability is rather the measure of the changing atmosphere eg in matters of increased confidence,competence,pride,ability to self diagonise,ability to take new initiatives and so on.The dynamic measures is a subject to change depending on the type of programme,& the political,economic & institutional context."

The indicators to evaluate sustainability as discussed in the same paper are as follows.

- **Functioning Systems**
  - a.Quantity & Quality
  - b.Breakdown & repairs
  - c.Cost sharing & unit costs.
- **Human Capacity Development(Individuals in community & Agency)**
  - a.Management abilities,decision making and execution
  - b.Knowledge & Skills

c.Confidence & Self-concept

- **Local Institutional capacity(community organization)**
  a.Autonomy
  b.Supportive leadership
  c.Confidence & self concept
- **Environmental Conservation**
  a.Water sources protection
  b.Watershed protection
- **Interorganizational Collaboration(community/agency)**
  a.Planning
  b.Activities

From the definition and the indicators of the sustainability of a system,it could be realized that judging the system sustainability on the basis of its functioning or level of service is minimum.It is a complex study requiring much effort and time.

It was also noted that a participatory approach between the community & the implementing agency is realized as the first & foremost need for the system sustainability of any scheme.It was thus thought essential to highlight on the community participation aspects too.

2.1.3 Community Participation /Community Management

Definition

Dr.Whyte(1986 ref-20)defines community participation by the active involvement of the local population in decision making concerning development projects or in their implementation.This type of involvement requires identification with the movement,which grows out of involvement in thinking,planning,deciding,acting and evaluating.

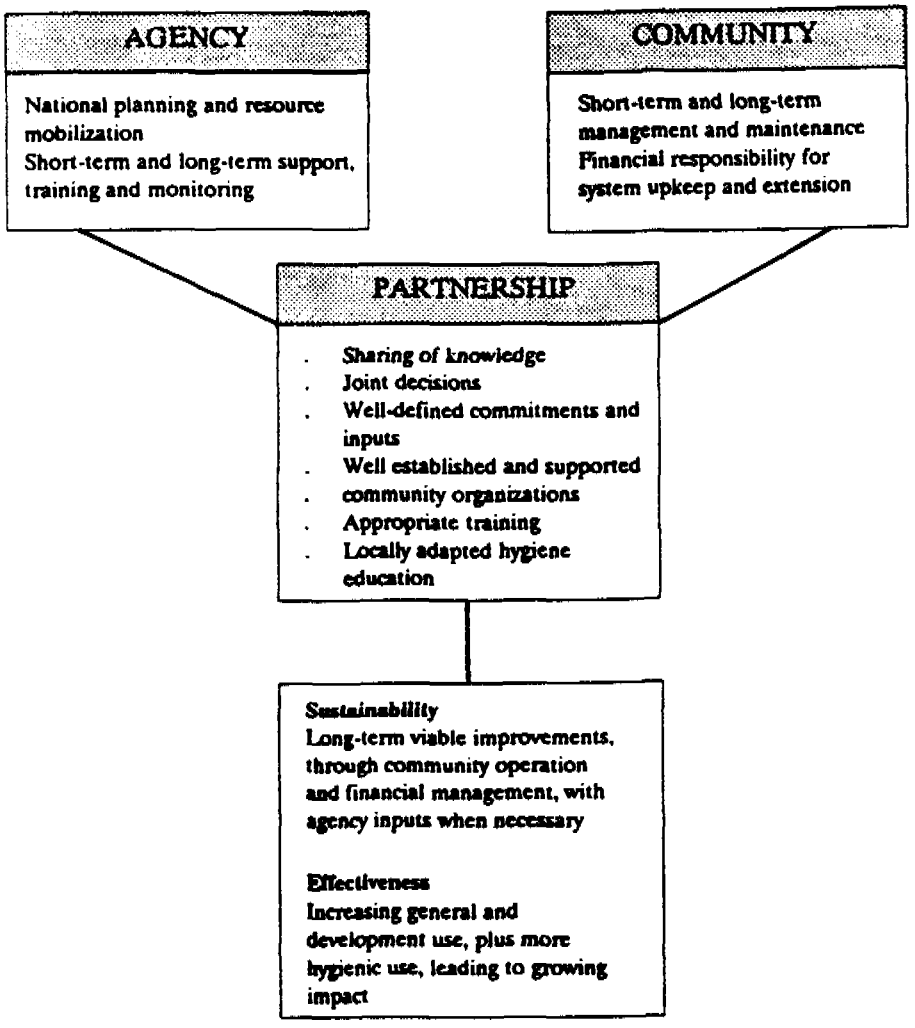
The realization of the need for the involvement of the community in the process of development grew more & more with the time as the sustainability of the systems built came into question.As highlighted in the Background paper in New Delhi Global Consultations(ref-32),the traditional thinking of the community as a passive beneficiary to which a new system or infrastructures have been built up and it was then up to the community to use,operate & maintain it as best they could have resulted in many abandoned or poorly managed or operated systems.Recognition of this fact and many other needs of the successful system,has led to the concept of a **Partnership Approach.** The community takes the primary responsibility for identifying their own development needs & for organising themselves to respond to these felt needs of their own.The external supporting agency or the water agency whereas,play the role of the promoter only.

The IRC Tech.paper **Partners for Progress** (ref-21) quotes the partnership

approach thus.

"A well set & well designed co-relationship between the community and the agency shall presumably help in attaining the desired sustainability of any project.The partnership approach for improved water and sanitation between the community and the water agency may be obtained through the fulfilment of the preconditions set out in the figure below.Throughout the project ie from the feasibility stage to the operation and maintenance stage in matters like the selection of type of the service level/technology,location of public stand posts, aspects on cost recovery shall be decided mutually through the continuous dialogue or discussions with the prospective users of the new system & the implementing agency".

Agency and community partnership for improved water supply and sanitation



Source: IRC Publication **Partners for Progress(ref-21).**

When the community is to be prepared in dealing with the different stages of developments of the projects,community's capabilities in the different aspects of management functions like planning,organising,coordinating,reviewing and so on needs to be developed.Carolyn et al(1990,ref 7 p-9) gives emphasis on linking responsibility to sustainability and suggests that participation requires to be redefined as the learning process by which communities control and deal with technology,change and development.This local management participatory process is said to be the means of achieving community management.

Carolyn et al (1990,ref 7 p-9) also refers that sustainability depends on more than community participation alone.Community participation does appear to provide the environment required for successful community management, generally referred as the enabling environment.Generally community participation in significant decision making may be seen as one pre-condition for community management.In WSS systems,community management means that the community exercises the responsibility for decision making and control over the subsequent execution of these decisions during project development.

The important preconditions for the successful community management outlined by the authors in the same paper are follows.

* There must be the community demand for an improved system ie,needs to be strongly felt by the community.

* The information required to make informed decisions must be made available to the community.

* Technologies and levels of the service must commensurate with the community's needs and the capacities to finance,manage & maintain the system.

* The community must understand its options and must be willing to take the responsibility of the system.

* The community must be willing to invest in the capital(may be part of it) and the recurrent costs.

* The community must be empowered to make decisions to control the system through means of adequate legislation/acts.

* The community must have the institutional capacity to manage the development and operation of the system.

* The community have the human resources to run these institutions.

* There must be a policy framework or guidelines to enhance & support the community management.

* Effective external support services are provided by the public/private sectors.

2.1.4 Requirements of Community Management Approach

To fulfill the above mentioned preconditions,the fundamental approach outlined in the Global Consultation background paper(ref -32)are dealt below.

Good Communication Approach

The communication is to be seen as a process of changing human behaviour through mutual exchange of information and ideas.The interaction between the agency and the community should be based on sharing and learning at all phases of the mutual respect & support.The participatory approach of communication as it is called is characterized by joint decision making with all beneficiaries or the chosen representatives,which will ultimately enhance the problem solving capabilities within the community.

The essential requirements for the successful communication as referred in the paper is to understand:

- community organizations and their decision making process.
- community perception of needs,priorities and expectations.
- current water fetching practices and use.
- community means of subsistence.
- health beliefs and practices.
- willingness to pay and spending patterns.
- cooperative & credit system of financing.
- formal/informal channels of communication and its effectiveness.

Extension Supports

Outreach support is a pre-requisite for sustaining community managed WSS services.The support assists both in problem solving on demand and managerial skills at both the community and agency level.The level of extension has to be a continued process,though the level shall lessen at the o/m stage.

Training Support

Training is considered to be an important element in the promotion of community management and is required at both the agency and community level. Training needs for the community is to develop their skills and knowledge on management of planning,financing,construction and o/m of the WSS services.

2.1.5 Conclusion

Community management as such has great potential for sustained operation and maintenance of any WSS services as they ensure internal support and thus reduce the high rates of misuse,breakdowns,which are a common phenomenon in most of the WSS systems in the developing countries.
Community management requires significant investment in the software supports like extension services,training,continued follow up.

If the sustainability can be achieved, the Government shall be able to accelerate its activities in the expansion of the WSS services to the unserved,as lesser resources need to be devoted to the already existing systems.

However there is a word of caution too.Community management is emphasized in all aspects of the infrastructural development projects in the rural areas in the developing countries.The additional burden on the poorer section of the society may overstretch the available internal resources.For such reasons income generating activities should go hand in hand with this process of participatory development.

2.2 Specific Country Approaches & Strategies in Community Management

2.2.1 Introduction

During the Nineteen Eighties,substantial progress has been achieved in some countries in promoting the community management in WSS sector.The learning on the approaches,strategies and the experiences in the other countries where the practices have been successful,will be helpful in formulating appropriate strategies for Nepal.
In order to gather information on the subject,two approaches were taken up.The first one was to have consultations with IHE participants from various countries to learn about the issues,constraints in practising community management.The other approach was to gather information from the available literature on the subject.
For the consultations with the IHE Participants, a checklist was prepared in order to maintain the track on the required information.The participants with whom the consultations were made have been listed in the Appendix V.

From the gathered information,the way of community management practised in Philippines was found to be useful for the subject of study and is summarized below in the form of a case study.

2.2.2 Case Study - Philippines

From the literature reviews(ref-52,53,63) and from the participants interview,the community management strategies & approaches in WSS sector in The Philippines is summarized as follows.

2.2.2.1 Background

Philippines has a total population of 63 million of which nearly 60 % live in the rural areas.The population is increasing at a rate of 2.3 % per annum.The per capita GNP is estimated to be US $ 727 and the GDP is growing at a rate of 3.0 % per annum.
Literacy rate is 88.7 % .The average life expectancy for 1987 was estimated at 63.7 years.The infant mortality rate is 40 per 1000 births.Water borne diseases are among the leading causes of morbidity & mortality in the Philippines.
As of 1989,about 78 % of the total population have access to water supply systems of which 22 % are served with doubtful water sources ie,open

dugwells or unprotected springs.Regarding sanitation 72 % have access including sewerage,septic tanks,pour flush toilets,VIP latrines.15 % of the population have insanitary toilet facilities whereas 13 % of the population have no toilet facilities at all.

2.2.2.2 Sector Institutions

Primarily the following Institutions are responsible for the provision of water supply in the Philippines.

a. The Metropolitan Water Works & Sewerage System(MWSS): It concentrates its operation in Metropolitan Manila.
b. The Local Water Utilities Adminstration(LWUA): Earlier responsible for water supply in the urban area only,LWUA has now been shouldered with the responsibility for piped water supply and water borne sanitation development in the Philippines excluding Manila.
c. Ministry of Public Works & Highways(PW & H) responsible for non piped water supply.
d. Ministry of Health(MOH) has been made responsible for the water quality surveillance & sanitation activities.

LWUA,primarily a specialized lending institution established in 1973 for the development of provincial urban water supply provides technical,financial & institutional development assistance to the Water Districts.A Water District is an organisation of the need based community groups an its formation is a prerequisite to qualify for registration with LWUA.The Water Districts manage & operate the local water supply systems.

Recently the LWUA experience has further been extended to the rural areas by promoting the formation of rural water supply associations(RWSA).Thus LWUA has been the sole National agency to administer the water supply needs of both the rural & urban areas in the Philippines.

2.2.2.3 Community Management Approaches

Formation of Water Associations

Rural Water Supply Association(RWSA)is a non profit organisation of the community that shall construct, own,operate & maintain the w/s systems.It comes into existence only after the community members organize themselves into an association & register with LWUA.A RWSA is composed of community members who elect from among themselves a board of Directors to decide on the associations policies.A management staff,from the community itself,handles the day to day affairs of operation & maintenance.

- **Characteristics of RWSA:**
  - It shall operate & maintain the community w/s project.
  - Management is exercised by a set of officers duly elected by the members.
  - Each user HH is represented by a HH number.
  - It is entitled to technical,financial & institutional development

- The members shall contribute atleast 10 % of the project cost as local equity in terms of cash or kinds.
- The member users shall pay monthly service fee sufficient to operate,maintain & amortize the project.

Categorization of the level of service

The categorization of the w/s projects is done on the basis of the level of service it provides to the communities.A RWSA should decide on the level of service it will have or rather it can afford.There are three levels of service and the level of the financial grant varies with the type or level of the service the community is going to choose.

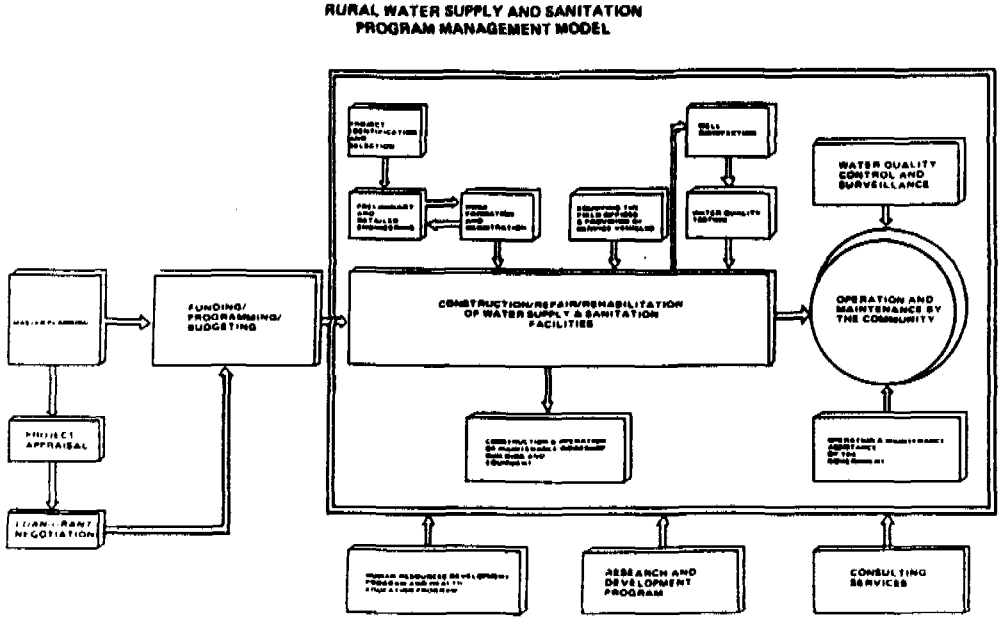
Level I. - It is a point source system like a well,a spring or rain collector.This level is intended for areas where houses are too scattered.For this type of service,the community shall have to bear only 10 % of the capital costs as 90 % is provided by the government in the form of grant.

Level 2. - It is a communal faucet system which is intended for areas where houses are clustered.It includes a pipe distribution system with each faucet serving 4-6 HH.Loans are provided up to 90 % of the total project cost at an interest rate of 4 % per annum payable in equal monthly amortization for a period of 20 years.

Level 3. - It is an individual HH connection system with pipe distribution network and at least a faucet for every HH.Loans are provided as per the level II system.

2.2.2.4 Project planning Process.

For an effective project planning process,the model adopted is as follows(ref-63).



The process is generally practised in two ways.

- A request is formulated by the intended beneficiaries.
- As part of the routine functions of LWUA, potential projects are identified.

The priorities in selecting water supply projects have been based on the following considerations.

A.Community Commitment & Capacity

As a pre-requisite to the financing & undertakings of a water supply program,the perspective beneficiary HH must signify their intent to form themselves into a RWSA and to discharge the responsibilities expected of it.This requires the commitment and capacity the RWSA to put up the required equity to the cost of construction and to raise the monthly service fees covering the loan amortization payments as well as o/m expenditures.

B.Community Needs

- In adequacy of w/s systems.
- High priority is being given to the communities with acute shortage of water,particularly those who do not have even a level I service system.
- Prevalence of water borne diseases.

C.Community Development Level & Potentials

- Poor or depressed areas with economic potentials shall be given priority.The average family income has been used as the index factor.

D.Capital Cost

- The project which entail a low capital cost per capita to be served for a given level of service will be given preferential attention.

2.2.2.5 - Involvement of Community

- **In Planning & Decision Making Process**
  All HH are involved in planning through a series of meetings.The programme staff emphasizes on the responsibilities which the users shall be taking on,rather than the benefits they are going to have from the system.By way of these discussions,the level of service is adopted to the community needs & payment capacities.
  A pre-organizational teach in program is held in the Barangay(Smallest adminstration unit in Philippines) to teach the community in organizing RWSAs and also a "pre-operational training" is organized for the board of directors & its employees.
- **In Construction**
  Generally the people are paid for the labour but occasionally during the planning process the Barangays may decide to contribute voluntary labour instead of raising the funds.
- **In Operation & maintenance**

After completion,the water systems are handed over to the RWSA,that is fully responsible for its upkeep.

- **Training Supports:**

In order to increase the capabilities of the RWSA community members,the training programmes are organised by LWUA.The training are given mainly on the concept of cooperation,discipline & self reliance.

The 2 day Techno Clinic as it is called for the training conducted to a group of atleast 10 RWSA in the Region has the following objectives to fulfil.

- Identify & Analyze the problems encountered by the RWA in o/m.
- Develop approaches & strategies for improving operation & management.
- Identify resources,agencies,officers & persons who could assist the individual RWSA in its operational/managerial problems.

- **Monitoring & Evaluation**

The **Managing the Managers** experience(ref - 45)being adopted by LWUA by the establishment of a management advisory group within itself,is basically to provide adequate support so that the individual WD or RWSA develop their own capacities after some time.

In order to raise the level of efficiency,effectiveness & motivation of staff,LWUA started a personal assistance scheme to the managers of the RWSA through the Management Advisory services.A Management adviser(an Engineer or MBA graduate)is sent to every RWSA in a Region.He or She visits the RWSA,meets with the Board of Directors at least quarterly and evaluates the development on the basis of 56 indicators identified by LWUA.

The management advisory services are provided during the infant stage of RWSA.The type of assistance provided by the services are in the field of

- Feasibility Studies.
- Construction Activities.
- Operation & Maintenance.
- Water Quality Controls.
- Evaluating Capital Improvement projects.
- Accounting practices & procedures.
- Development of an information programme to the clients for creating good public image & strengthen contacts with customers.

The additional cost to LWUA of the advisory services is small(3 % of the total loan repaid only)as compared to the loan repayment collected from the RWSA.The improvements in the managerial capacities of the WD or RWSAs is however immense through this services.

2.2.2.6 Problems Experienced

From the discussions with the participants & from the literature reviews(ref-49)it has been realized that though the Philippines model on community management has been a good approach,however the success is not one hundred percent.The general problems observed are as follows.

- **Low Collection Efficiency of the loan amortization**
  This is mainly related to the attitude of the rural people because the general feeling in the rural areas is that it is the obligation of the government to provide water free.Sometimes it is also due to the low level of interactions with the community.
- **Low level of o/m by RWSA**
  In some cases even the level I system also are not maintained properly by RWAs.This problem is also seen as the deficiency in the level of consultations & adequate level of monitoring & evaluation.
- **Lack of Knowledge or Ability of promotion staffs**
  The lack of the communications skills & knowledge on the part of the staffs has been identified for the reasons of low level of loan repayment & interactions with the community.

Conclusions

From this study of the Philippines model or approach of community management,adequate weightage seems allocated on the demand of a WSS to be generated through the need based community with the formation of their associations.A system has been well developed to provide adequate support to such community organizations through the advisory & financial services at all stages of development.This has been a good learning and shall be taken into consideration while developing strategies.

CHAPTER - III

COMMUNITY PARTICIPATION IN WSS PROJECTS - AN EXPERIENCE IN NEPAL

This chapter deals with the information on country's background and the community participation in WSS sector.The approach of community management in the farmer managed irrigation systems in Nepal has also been discussed in the following sections.

3.1 Country's Background

Nepal is a landlocked mountainous country situated in the lap of The Himalayas in South Asia in between China in the North & India in the South.The total area of the country is 141000 sq.kms.The total population is about 19 million and is increasing at the rate of 2.7 % per annum.The socio -economic indicators for the country reveal it to be among the least developed countries in the world.The present level of GNP is estimated to be US $ 180 and GDP is growing at about 2.5% each year.The economy is based on agriculture and 90 % of the people living in the rural areas depend on it.The income distribution is heavily skewed seen to the fact that over 46 % of the income is earned by only 10 % of the population.

Inadequate access to safe & reliable water & sanitation facilities coupled with the ignorance on the personal hygiene practices has revealed a high incidence of illness.Diarrhoea and dysentery are leading causes of morbidity (40 per 1000)and child mortality (16.5 % of total deaths).

The estimate is that the water supply coverage has reached 34 % in rural areas and 66 % in the urban areas.The total population coverage was estimated 37 % at the end of 1990.

Sanitation coverage is much more difficult to estimate,since with the exception of a sewerage system in the core area of Kathmandu, on site sanitation practices are adopted on an individual basis with septic tanks or the leachate pits which are not reliably monitored.Even then,the estimate on national coverage on sanitation is estimated to be 6 % only.

3.2 Sector Institutions & their approaches of community participation

A look over the past two Decades at the development of participatory approaches in Nepal shows that first community participation was viewed in terms of voluntary contributions during the construction only.Participation was based on idea of generating the feeling of belongingness among the beneficiaries through the token voluntary contributions of labour material & time.This narrow understanding of community participation has broadened over the years and the government,planners & policy makers have felt the importance of involving the community in the decision process as well.

The major agencies involved in the task and the approach implied on community participation are discussed in the following sections.

3.2.1 Department of Water Supply & Sewerage(DWSS)

DWSS is a national water agency responsible for the implementation of water supply in both urban & rural areas in Nepal except a few major towns including Kathmandu where the responsibility lies with the Nepal Water Supply Corporation(NWSC).After the reorganization of the Ministries in 1988,the UNICEF assisted CWSS activities under the Ministry of Local development(MLD) has been shifted over to the DWSS.

As discussed earlier in chapter I,the concept of community participation was not regarded as the crucial factor for the success of the DWSS water supply project before the reorganization of the Ministries in 1988.The selection of project sites was not based generally on the felt needs of the people but rather on the political influences.The role of DWSS as a provider of facilities resulted in poor sustainability of systems built.As the number of the completed schemes grew every year,the additional manpower and finance that was required to sustain the new systems was increasingly becoming a burden.

On the basis of the CWSS experience(see below),where in most of the cases the community were maintaining the system by themselves,was encouraged to follow the same approach as in CWSS projects.The Directives 1989 forced DWSS to follow the participatory approaches of development at all stages of the project,be it in rural or urban areas.

Present organogram of DWSS is shown in Appendix -1.

Community Water Supply & sanitation (CWSS) projects

The UNICEF assisted CWSS projects,under DWSS since 1988 dates back to 1971 when the development of small scale gravity water supplies mainly in rural areas was started.During these past almost 20 years,CWSS programmes

has given due attention to community involvement and the systems are relatively better sustained[1].
The extent of the involvement of the community will be discussed separately in section 3.3

3.2.2 Grant Aid Projects

With the intention of a speedy development of small scale projects in the various sectors like water supply,irrigation,road construction etc particularly in the rural areas through effective community participation Grant Aided Projects were initiated through the then local government bodies like District panchayats(DP) or the village panchayats(VP).The approach or the ideology of such development was to utilize the local resources to the optimum for a sustained & speedy development.The community were primarily responsible for the construction of such projects with the support of the local government in the matters like:

- Technical guidance & support.
- Support with materials to be brought from outside.
- Cash payments for skilled labour components.

Enough time & resources were spent on these grant aided projects but due to the lack of adequate followup,monitoring & control activities,the systems were neither properly built nor operated and maintained by the communities [2].

3.2.3 Non -Governmental Organizations(NGO) projects

Some NGO's have been effectively organising community participation in many of their activities including water supply.Though the projects are of small in size,their approach of development with effective linkage of sanitation & health education with water supply and emphasis on the involvement of women,has been able to develop some sustainable systems.Social Service & National Coordination Council(SSNCC)is responsible for coordinating or directing the various INGOs or NGOs active in Nepal.

3.3 Community Participation Approaches in CWSS Projects

The approaches employed in CWSS projects in effective Community participation are discussed in the following section based on the field observations & personal experience & through literature reviews on the subject.

1- A Socio Economic Analysis on Drinking Water & Sanitation situation in Nepal.NEW ERA,Sep.1990.(ref - 43)

2 - Sector Study Report on drinking water & Sanitation(1991-2000) (ref -42)

3.3.1 Involvement of the community in the planning phase

The planning phase of the w/s activities involves the activities like the project identification,and the feasibility studies.Successful community participation was obtained in CWSS projects by adapting following procedures.

- The requests for any CWSS projects were identified by the community members in the beginning & a final requests for the scheme were submitted invariably by the beneficiary group indicating the level of participation (in terms of voluntary labour in construction and take over the o/m responsibility after completion)they will incur in the project.
- During the feasibility of the scheme,a careful analysis on the socio-economic & cultural characteristics of the community group like the homogeneity of the group,their past traditions or behaviours on organising community is done.
- Special attention is given on the limiting the length of pipe lines or size of the project during the selection of the source as the greater the length of the project the sustainability of the project is considered to be lower(in view of increasing maintenance).Special consideration shall be made during the source selection. Higher priority is given to a nearby source with lesser capacity than to a farther one with higher capacity,in view of the expected system sustainability.
- The pipe alignment route,location of public stand posts shall be decided during the feasibility survey involving the community.

Boot & Heijnen(1988 p -21)state that the success of the CWSS projects depends on the level of community involvement in the planning stage. 10 out of 44 projects suffered because the projects were not the felt needs of the people.**CEMAT**(1989 ref-64) has reflected that projects with the people's involvement during the feasibility stage were more sustainable than those that did not involve the community during this stage.

3.3.2 Community Involvement In Implementation Stage

For initiating any construction in the project,a pre-requisite is the formation of some sort of association or group of the beneficiaries.Through these water users committees (WUC) members,the decision shall be made on the construction schedules,mobilization of local voluntary labour,and the systems of management after completion of the scheme.

Formation of WUC

In all CWSS projects WUC is formed prior to the construction of the project.The members are generally selected through consensus by the villagers.The Decentralization Act has identified however,the constituents of the consumers group,which shall be generally chaired by the village ward chairman.In CWSS projects special care has been focused to include female members in the WUC to represent the real users of water.The members of WUC are given orientation training on the general management aspects of the WSS services before the construction starts.

3.3.3 Participation during Construction

The participation in the form of voluntary contributions in labour or local materials has been made obligatory in all CWSS projects.The local material support generally shall be in the form of collection of stones and sand (if not far),digging trenches for pipes and transportation of the pipes from the motor head to the project site.**CEMAT**(1989) has found that the level of community participation in the form of the voluntary contributions ranged from 10 to 32 percent of the base costs of the scheme.**Boot & Heijnen**(1988) have revealed that the sustainability depended directly on the level of participation during the stage of construction of the project.

Appointments of a Village Maintenance Worker(VMW)

The transformation of the skills & knowledge at the local level during the construction phase has led to the system sustainability in CWSS schemes.The concept of the appointment & training of the village maintenance worker(VMW) as generated in CWSS projects,has developed the confidence among the community to operate & maintain the schemes.

The appointment of VMW in all the CWSS projects before the construction starts has been made obligatory.The VMW is basically a member of the same community,literate if possible,and is a person who has lower chances of leaving the village for further opportunities else where.Priorities have been given to women and there are cases where women VMW'S are imparting their duties successfully.The number of VMWs in a project depended on the size of the system,but usually two person are trained for the purpose of an alternative choice too.The VMW is trained for the job through the regular training organised for a group of VMWs but he usually learns the skill through the on the job training during the construction of the project.

3.3.4 Community Participation during O/M Phase

The formation of a tap stand committee on water & sanitation for each of the PSTs was established in the CWSS projects.The idea behind the formation of the committee,the preferred members of which are women in the neighbourhood,is to promote the effective & hygienic use of water as well as environmental sanitation.The tap stand committee members are given orientation training on these issues.

This phase generally includes the arranging of VMWs refresher training,establishment and development of stores,mobilizing local participation for the minor repairs,development of the system of major repairs and smooth o/m of the scheme.A system of continued monitoring & evaluation of the level of the community involvement during the maintenance phase is carried out through the regular visits of the Maintenance Sanitation Technicians(MST)based at the District centre.During these visits the effectiveness of WUCs and VMWs in system maintenance,quantity of spares etc are monitored and reported by the MSTs.From the evaluation of these reports,non existent or ineffective WUCs are replaced through the meetings with the community again.

CEMAT(1989) & **Boot & Heijnen(1988)** in their observations have cited that where the CWSS projects had arranged training courses for the village maintenance worker(VMW),the VMWs were found actively involved in o/m of the schemes.They had observed that the VMWs were paid certain amount by the users either in cash or in kinds.The collection of the fee from each HH is done by the VMW himself or herself.

3.3.4 Sanitation/Health Education & Women's Involvement

As the ultimate aim of a CWSS project is to benefit the health of the people through the reduction of the incidence of the water borne diseases CWSS has emphasized on the need for an effective linkage of water, sanitation & health.Women & children are the main target group within UNICEF's programme. For the promotion of health education,water & sanitation special attention are given to the involvement of women in CWSS programme.

3.4 Community Participation Approach in Irrigation Sector

Case studies of 25 farmer managed irrigation systems in Nepal found these to be well sustained (1991 ref -40) and it was felt appropriate to learn their strategies and approaches.

In Nepal,about 90% of the irrigable land are irrigated by the farmer managed system most of which are in continuation from the traditional experiences.Through proper irrigation,the agriculture productivity is

increased and thus the income of each member in the community,which stimulates the community to sustain the project by themselves.

The general approach of community participation learned from Irrigation Development Strategies 1988 & Policies,Procedures,Guidelines 1989 for Irrigation in Nepal(ref-58,59)are described in the following sections.

Institutionalization of the WUC

- Farmers organise themselves to form a Water Utilization Committee(WUC),the members of which shall be beneficiary community members.For the management of day to day affairs a 11 member irrigation managing committee(IMC)is elected amongst the WUC members.
- General body meeting of the WUC
- It is called at least twice a year prior to the seasonal cropping.
- It can be called at the request of the 50 % of the WUC members.
- The general body meeting will be held null & void if 50 % of the WUC members are not present at the first call.However at the second call 25 % attendance is sufficient to continue the proceedings further
- The decisions in such meetings are made on majority basis.

Authorities,Duties & Responsibilities of WUC

- To prepare procedures for the construction and the o/m of the irrigation system.
- To elect members for the irrigation managing committee amongst WUC members.
- To approve the annual programme,budget of the forthcoming year & also to approve the audit report.

Irrigation Management Committee(IMC)

The constituents of such IMC are as follows.

- They are elected amongst the WUC members.
- It shall have 11 members and have a term of 2 years.
- **Authorities,Responsibilities & Duties of IMC**
- To implement the plan & programmes as approved by WUC.
- To spend the budget as per the approved programmes & rules/regulations.
- To prepare & submit the financial statement,plan & policies,budget for approval to WUC.

Classification of the Project

The projects are classified to small,medium or large on the basis of the command area for ease of differentiating or quantifying the level of community input in these projects.

Classification	Command Area (ha)
1.Small Irrigation Project	In Hills - 50
	In Plains - 500
2.Medium Irrigation Project	In Hills - 50-500
	In Plains - 500-5000
3.Large Irrigation Project	In Hills - > 500
	In Plains - > 5000

Selection Criteria of the Projects

The selection of the projects are based on the economic criteria as follows.

- Priority are given to those projects with higher Internal Rate of Return(IRR).The minimum IRR to make a project economically feasible is 10 %.
- Per Hectare Cost of irrigation is the another basis of selection.Due consideration is given on the topography as there would be substantial difference in the unit costs.
- The annual recurrent costs of any project are evaluated in the beginning & would be implemented only the sustainability is ensured.

Institutional Arrangement

The role of a supporting Institution in the community managed irrigation systems was realized & thus the following arrangements are made.

- A national level coordination committee is established for formulation of policies & programmes.
- The Department of Irrigation & Agriculture Dev.Bank has been identified as the principal implementing agencies.A central level coordination committee is formed to enhance coordination,technical assistance & establish exchange of information between these agencies.
- The technical assistance to the WUC shall be provided by the District Irrigation Office.

Participation by WUC in Construction & o/m

The participation from the community in any project depends on the classification of the project as dealt below.

- In Large projects.
  - WUC for each tertiary channel serving more than 50 ha & sub committee for each 10 ha shall be made responsible for the o/m of their part of channel.
  - The Channel serving more than 50 ha shall be operated & maintained by implementing agency.
  - The land for the construction of channels serving an area of 50 ha or less shall be boned by the community.
  - In Small & Medium Projects.

    There is a variation in the percentage of costs to be shared by

the communities to a range of 7-25 % based on the project unit cost.A cash contribution within a range of 1-5 % have been made obligatory,also based on the unit cost.The rest of the community contribution shall be raised either through the voluntary labour contributions by the community or through the credit facilities obtained through the Agriculture Development Bank.

The sharing of costs are outlined thus.

Project Unit Costs NRs per Hectare	Percentage Share		
	Govt/Donor	Community	
		Cash	Labour/Credit
< 10000	75	5	20
10 - 20000	85	2.5	12.5
20 - 40000	91	1.75	7.25
> 40000	93	1.0	6.0

- Responsibility of raising of Water Tariff
  - Large & Medium Projects
    The policy is to raise the total o/m costs from the users.Depending on the recurrent o/m costs,25 % of the Water Tariff is given to the WUC for o/m of their part of the total system.
  - Small projects
    In such systems,the responsibility of o/m lies completely with the WUC & they have been authorised legally to raise water tariff that meets the annual recurrent costs.

Conclusions

From the experience in water supply,it has been noticed that the community most of the times demand a higher level of service irrespective of their capacity to sustain or afford.This was noticed more pronouncedly in the Terai plains in the southern Nepal where reasonably good quality ground water can be obtained through hand tubewells.But the people do demand for a piped system in such a case too.The approach of the categorization of the projects according to their size and different level of participation based on these classification seems the right approach to be adopted to restrict such community high demands.The effort of the institutionalization from the beginning of the project of the WUC is also noticed from the study.These learning shall be taken into consideration while formulating strategies.

CHAPTER -IV

4.0 Field Study on Comparative Evaluation of Community's Characteristics & system Sustainability

4.1 Development of the Field Questionnaires

In order to obtain the quantitative information from the field study,an open ended questionnaire was developed to interview members of the randomly sampled HH in the selected project areas.The selection of the questions were guided by the evaluation objectives,criteria and methods and by the considerations on the time constraint.The questionnaire thus aimed to collect the following data:

- project's achievement such as functioning level of WSS facilities.
- community's socio-economic characteristics,traditional selp-help habits & approaches.
- Assessment of the felt need,community's willingness to pay.
- Assessment of the level of participation before,during & after construction of the project.
- Assesment of level of institutional backup support by water agency.
- Assessment of the level of community awareness on Health.

The selection of the questions to reflect on the different aspects mentioned above,are discussed in brief for each aspects.

4.1.1 Functioning Level of WSS systems

Sustainability of a system as discussed in 2.1.2 is seen as a measure of several variables like operational(physical)sustainability,Inter organizational capacities like technical,financial,managerial and above all the effective uses of the system.

Poor service level of the systems is a primary concern in many WSS projects in Nepal.The effective use of the system is therefore a variable to be looked only when the service level is improved.The study has limited itself to the operational sustainability of WSS systems.

To evaluate the operational sustainability of the projects,the following questions were thought important.

- the service level of the present system like
  - supply hours,annual system breakdowns,adequacy on repairs. (Q.8/a,b,c,d)
  - quality & quantity of supply (local enquiry & observations).
  - % of non functioning taps(local enquiries)
  - appointment of the VMWs and their training level.(Q 8/e - j)
  - adequacy of the annual revenue for the o/m expenditures. (enquiries with WUC/water agency)

4.1.2 Community's socio-economic characteristics

The following characteristics was considered important (Q.2 - 4).

- number of people living in the HH
- HH type,composition
- Source of income and income distribution
- groups according to class,religion,caste
- local community organization
- traditional & current practises or behaviours on organised community activities.

4.1.3 Community's Behavioural Characteristics - Felt needs/willingness to pay

To assess the community needs & willingness to pay,the following issues were seen important.

- Need Identification by communities.(Q 5/a,b)
- Time spent by the HH to carry water before the commencement of the project or during the system breakdowns.(Q 5 /f,g)
- The effective use of time saved & the change the system brought to their life.(Q 5/i,j)
- the willingness to pay for public or private stand posts.(Q 5/k)

4.1.4 Community participation issues

Community participation issues seem interrelated to the agency's approach & backup support.From the discussion in section 2.1.3,the following issues have been incorporated to asses community participation level.

- Establishment of a community organization like WUC and its effectiveness.(Q.8e/Q.7f,g)
- voluntary labour contribution by total HH members in mandays(Q.7d)
- percentage share in capital costs.(enquiries)
- appointment of a VMW for repairs and mode of the payment.(Q.8/f,g)
- The extent and nature of participation by the various socio-economic groups.(Q 7/c,e)

4.1.5 Level of Institutional Support

The following issues are considered important to asses the institutional support to the communities or community organizations as discussed in section 2.1.4.

- to what extent & in which phases was the community involved in decision making.(Q.6/a-f)
- Institutional Support

The institutional backup support was assessed through the focused interviews(with the help of check lists),& personal observations by the author on the following aspects.

- system development on tools spares availability.
- development of manuals/guidelines for o/m
- Human Resources development.(local enquiries)
- Health awareness

To account for the level of Health Awareness amongst the communities,the following issues were incorporated.

- Awareness level on health consequences of drinking polluted water. (Q.9/a)
- Existence of a sanitary latrine & reasons for its non existence (Q. 9/b&c)
- Existence of a village health promotional worker & his visits to the houses.(Q 9/e,f)

The developed questionnaire is shown in Appendix - III.
Apart from the survey questionnaire,some specific answers have been obtained through focused interviews with different persons from the local community organizations and from water agencies.The interviews were conducted to bring out the issues which could not arise from the survey with the community members like trainings level of VMW or financial position of the WUC or water agency etc.
Thus a checklists was prepared to ensure that all required information was obtained.The check lists is shown in Appendix - IV a/b.

The list of the persons met during the interview is listed in Appendix VIII.

4.4 Sample Design

The authenticity of any survey data depends on the approach or methods applied on the proper sampling of the selected parameters like the size of the sample,& selection criteria for the sample.In order to assess the socio-economic & cultural characteristics,it is even more important that the total community shall be represented in the sample.For this reason the following approach has been undertaken.

4.4.1 Size of the sample

To decide on the number of the samples,the Small Sampling Theory was applied as the sample needed to be small for reasons of time constraints.

In the Small Sampling Theory of the statistics, the confidence limits shall be represented by

$$X \pm Tc\frac{S}{\sqrt{N}} -$$

where the values of t_c called the critical values or confidence coefficients depending on the level of confidence desired and the sample size.The value of t_c is also dependent on the constant which is called the number of degrees of freedom.For a certain level of confidence,the value of t_c decreases with the value of ie to say that the higher the number of samples taken in the beginning the value is lesser.
The confidence interval or deviation d thus can be written as

$$d=X \pm Tc\frac{S}{\sqrt{N}} -$$

where,

X = Average value of the sample
S = Standard Deviation of the Sample
N = Number of Sample.

4.2 Hypothesis for Sampling

The voluntary labour contribution made by each member of HH in terms of mandays during the construction of the project shall be taken as the basis of the quantification of the required number of the samples in a project area under study.The hypothesis thus shall be that all the HH community have either participated or not participated and the distribution of the frequeny of these are normal.For an accepted margin of error of 95 % (confidence limit of 95 %)and the degrees of the freedom of 2, the sample size that is required in a certain project area shall be estimated.To check the validity of this hypothesis,the actual number of required samples would be calculated from the total sample mean & standard deviation of the total sample.

4.4.3 Type of respondents

Generally, a typical HH in the rural society in Nepal,is headed by a male member who enjoys the domination in most of the households affairs.The female members learn about the developmental activities through the male member of the family or through other female in the neighbourhood.It was thus decided that the interview shall be undertaken with the head of the HH.However due consideration was given to reflect in the interview also the female members of the HH;therefore at least 10% of the total sample size are selected to learn about the perception of the local women.

4.2.4 Methodology of Sampling HH

A field survey was conducted in the selected project areas during the period 5th october to 25th November 1991.The time for the survey varied depending on the size of the sample ranging from 10 days in Danchhi to 6 days in Nakhel.The method of sampling HH also varied because the houses were not numbered in all the project areas.

For the selection of 10 samples in the beginning,the method adopted was to divide the total lists of HH by 10 to find the interval.The corresponding HH falling under each interval was then selected for interview.Similar method was adopted to select the corresponding HH for survey after the decision was made on the total sample size.The specific difference in approach for the selection of the samples in the four project areas is described below.

Nakhel

The selection of the sample was based on the list of the HH,served from each public stand posts.Care was taken to represent at least one sample from the HH served by an individual stand posts.

Kappan & Danchhi

The recent voters list was used for the selection of the sample.In Kappan,due care was given to select the corresponding HH from the areas covered by the project only (part of the 4 villages were covered).

In Danchhi,5 samples from each of the 9 wards of Danchhi & Bhadrabas covered by the w/s systems were selected.The possibility of misinterpretation of the required information was realised as in this case the researcher himself conduct the survey(many respondents know him personally),the survey was conducted with the help of enumerators or numerators hired for the purpose.

Bhattedada

The list of the HH insured with the local health posts was used for sampling purposes.About 85 % of the total HH were enroled in the medical insurance scheme run by community health development project(CHDP).Rest 15 % were not insured mainly due to the reason

that the HH were nearer to the other health facilities.There was no difficulty in the selection of the HH in the project area for the reason that all HH were covered with the yard connection.

4.2.5 Decision on Number of Samples

The preliminary decision on the required number of the samples was based on the small sampling theory as discussed in 4.2.2.Data on 10 random samples of the voluntary labour contribution made by each HH(mandays)was taken as the controlling parameter to decide on the number of samples.The value of the mean standard deviation and the correspondingly required number of

samples for a degree of freedom of 2 and confidence limit of 95 % is shown in the following table.

Table 4.4.5.1-Preliminary no.of required Samples

Project Area	Total HH	Mean $\bar{X}$	S.D(S)	t_c	Reqd. samples
Nakhel	268	11.9	5.04	2.26	34
Kappan	880	13.8	5.30	2.26	27
Bhattedanda	336	16.0	4.76	2.26	30
Danchhi	1161	12.2	6.13	2.26	49

The actual required number of samples,calculated from the data on the total samples is given below.

Table 4.4.5.2 - Actual no.of required samples

Project Area	No.of actual Samples	Total Mean $\bar{X}$	S.D.(S)	t_c	Reqd.no of samples
Nakhel	40	13.1	5.13	2.26	35
Kappan	45	13.5	4.57	2.26	28
Bhattedanda	35	15.5	5.36	2.26	38
Danchhi	90	11.2	6.20	5.36	51

This result indicates that the number of samples mostly satisfies the earlier assumptions.

4.5 General Findings from the Survey.

The general findings from the field survey & observations are discussed separately for each project in the following sections.

4.2.1 Case - Nakhel w/s project.

Introduction

Nakhel is a village at 15 kms.North East of Kathmandu and lies on the Kathmandu-Kodary (China-Nepal border) Highway.The village is a dispersed rural settlement as generally found in rural mid-hills in Nepal with scattered group of dwellings and basically an agrarian economy.

At the initiation of the local people,the project was started in 1977 by the then Ministry of Panchayat & Local development(MPLD) together with UNICEF assistance.The system is a gravity flow type with a stream as a source and was designed to serve 168 HH through 21 PSTs.Fig. L- 1 shows the layout plan of the scheme.

Community Characteristics

Nakhel has a more homogeneous community socially in the sense that 87.5 % of the community belong to the same caste and family.Agriculture has been the main occupation and the service(employment) is seen as the subsidiary occupation.37.5 % of the community are illiterate and majority(70 %) are poor.

The felt need for water is relatively medium as the majority spends 15 to 30 minutes to fetch water before the project and presently in case of system breakdowns.There was the practice to go to the same old source in case of system breakdowns which are the nearby springs or stream.

On an average a HH is paying NRs 10.93 for the service of water supply through PSTs.

The existence of a health worker in the village was realized(70 % responded positively).However there was no regular health promotional activities to be noticed because 70 % responded no visits by these health workers.Only 37.5 % of the HH have been found with adequate latrines.

- Extent of Peoples Participation

Prior experiences

The communities have raised money for the construction of a primary school in the past by playing Deousi(cultural tradition - visiting the houses in the villages and singing a special song meant for the day).Cash was also donated by the affluent members of the community.This gives an indication of the communities willingness to organise for the common benefit.The role of the local community leadership is also realized in such activities.The community leader later represented the District to the national legislative and did play an important role in local community development activities.

Community involvement in w/s project

In planning

A 9 members User committee was formed prior to the construction of the scheme. The WUC made a formal agreement with the implementing agency committing itself to the voluntary labour contributions in some of the unskilled jobs during the project construction and also to the upkeep of the project after completion.

In construction

The users contributed in the form of paid labour & voluntary labour.Unskilled jobs like transportation of pipes,cement,collection of local construction materials like sand,stone etc were done by the beneficiaries and were paid for the job.The digging of the trenches,excavation of the reservoir,& construction of PSTs were part of the voluntary contributions.

The community's share in the construction costs was estimated to be 14.5 % of the total cost.From the survey,the average HH voluntary contributions was calculated to 14.31 mandays.

In operation & maintenance

It was realized that during the tenure of the WUC headed by a village leader(pradhan pancha) some 40 additional yard connections were distributed to the affording community members.The system inadequacies then led to no flow in the high lying water taps and the service level was poor.In 1989,with the active role of the community leader,a mass gathering of all the users was called and a new WUC was elected by general consensus in the meeting.It was also decided to cut off all the additional yard connections distributed by the earlier WUC.

The new WUC developed a system of maintenance of their own.A sub-committee for each of the 40 PSTs was formed and is chaired by one of the user HH,who would be primarily responsible for the raising of the water tariff and upkeep of the standposts.Two VMWs were appointed for the general maintenance of the intake & the pipes.

The water charge was decided by the general consensus as NRs 50.0 for each PST.It is irrespective of the number of HH using the water from the particular tap(varies between 3 - 11 HH).A card system of collection has been developed to collect the water tax from the particular PST through the chairman of the subcommittee and a system of penalty for late payment is also practised.Each VMWs are paid NRs 550.0 per month and have no complain in getting their salaries in due time.

Agency's role

This project though had UNICEF's support on the supply of external materials like pipes or cement,it could not be confirmed whether it was built under the CWSS regular activities or was assisted with only material support by UNICEF.The lack of support activities during the operation & maintenance phase by the concerned agency was however realized.A general arrangement for maintenance support was that the public works district office(under MPLD) would provide assistance to completed projects. Insufficient technicians & inadequate funds in these District offices has caused a lack of support to the completed schemes.

Conclusion

The homogeneity in the community's social characteristics and the good community leadership is noticed as the factor for the community getting organised for the common cause.The democratic process adopted in the selection of WUC members and making important decisions by involving all whole users,has been realized as the cause for the effectiveness of the present WUC.This process might have developed the sense of responsibility amongst both WUC & users.

4.5.2 Case - Kappan w/s Project

Introduction

Kappan is more or less a suburb of Kathmandu,located on a hill & linked with a fair weather road.The settlement pattern is dispersed & not regular.The strategic location of the village being nearer and commanding nice view of Kathmandu,has accelerated the process of urbanization.

The project was initiated as a special programme by MPLD in 1983 through the influential approach of the local people and was meant for supplying water to parts of the 3 villages and some parts of Kathmandu Municipality.The project design seems ambitious as the area covered by the system is large compared to the availability of water in the source.

The project was designed to serve 5168 population serving 880 HH.It is a gravity system fed by 3 springs from a distance of 5 kms.The use of water upstream of the reservoir by people living by the side of the transmission route has made the system grossly inadequate to meet the required demand of the service area.At present only 168 HH are being served through 21 PSTs & 31 private yard connections.The system is serving only 20 % of the designed population.

Fig-L.2 shows the layout plan.

Community characteristics

The community in the project area consists of a mixed society with majority(60 %)caste of Chhetrys.The main occupation is agriculture and employment is seen as the subsidiary occupation.Literacy is 60 % and 55 % of the community are poor.

The water need is medium as 78 % of the community has to spend 15 to 30 minutes to fetch it.The present system is grossly inadequate to meet the local water demand and the people depend on the traditional nearby springs. The community has a greater willingness to pay for water.67 % are willing to pay to a range of NRs 20 -50 for yard connection.

All the HH in the project area confirmed on the non-existence of any health worker in the village.Only 31.1 % of the total HH have adequate latrines.

Extent of community participation

Prior experiences

The previous experiences on community participation activities in the project area could not be realized during the survey.

Community involvement in w/s project

In planning

A 11 member WUC was constituted on the recommendation of the then local government unit(panchayat) which had a formal agreement with MPLD on the provision of the voluntary labour contribution for the unskilled work and also to take over the responsibility of the upkeep of the system after completion.The project seems initiated at influence of local politicians and this could be the reason to extend the project beyond the capacity of the source.

In construction

The beneficiaries from all the four villages had participated enthusiastically in digging trenches for the pipes & reservoir.The value of such contributions by the community works out to 9.3 % of the total cost.The average voluntary labour contribution from each HH was calculated to be 13.85 mandays.

The project was left incomplete(only 70 % complete)by the implementing agency as some conflict arose between the members of the WUC & the project staff.The incomplete project as such was handed over to the then WUC for completion.

In operation & maintenance

3 VMWs have been working in the project at the moment who belong to the same community.They are untrained,and have learnt the skill by work experience. The responsibility of collection of the water tariff(fixed at NRs.10.0 per HH per month) is left to the VMW themselves.The VMW complained that the collection is only 40-50% of their due share for the obvious reason that the consumers do not receive sufficient water.

The general problem encountered in o/m as explained by the VMWs are the choking of the intakes,pipe breakages,lack of handling tools & spares.At the time of major repairs,the VMWs inform the WUC chairman and their experience is that the communities with greater hardships of water only gets organised for the repairs.

Agency's role

The role of the agency to support the operation & maintenance phase in Kappan was not to be noticed.It was also meant to be supported by the public works District office as mentioned in the case of Nakhel.The technical under design of the system could have been due to the unavoidable political pressures to the agency.The mistrust & misunderstandings about the project staff was seen developed in this project during construction. This case of Kappan also indicates that during the planning stage itself the implementing agency was least concerned about the system sustainability in future.

Conclusion

There is a felt need of water amongst the community in Kappan and have a greater willingness to pay for the services.The problem arising in sharing of water compounded with the inappropriate technical design,was realized to be beyond the community's capacity to solve.Adequate support from the concerned agency at o/m stage would have improved the performance of the system.

4.5.3 Case - Bhattendanda w/s project.

Introduction

Bhattedanda is located at the South of Kathmandu valley and can be reached with 2 hours walk from the motor head during winter whereas during monsoon one has to walk for 6 hours.The Southern part of Lalitpur District,though

nearer to the Capital,is not easily accessible due to the steep mountain terrain and the majority of the people in the area are living with difficult conditions.

Realizing this,United Mission to Nepal(UMN) an International NGO selected this area for the upliftment of the health status of the people through the Community Health Development Project(CHDP) since 1971.The project has emphasized on the participation of the communities with due regard to expressed & demonstrated needs so that their potentiality for solving their own problems and meeting their own needs through the fullest utilization of local resources & manpower,can be realized.The project aimed to cash in the eagerness of the communities to take initiative to organise themselves in the matter of their particular interest like agriculture,water supply,non formal education for other important development aspects like health development,sanitation,income generation & so on and thus an integrated approach have been undertaken.(ref - 14)

The CHDP programme has focused on the inter disciplinary approach for the socio-economic development through the non-formal education,food technology agriculture,water & sanitation,nutrition & so on.

Bhattendanda is an unique w/s project in the sense that each & every HH in the village have their own 24 hours water supply at their yard and have individual HH latrines which are reasonably clean & well maintained.There are altogether 9 smaller gravity schemes in the total village.The biggest scheme covers 50 HH & the smallest covers 14 HH.The water sources for the 8 schemes are local springs and one scheme in ward 8 has a stream source.The layout is shown in fig L-3.

Community characteristics

Bhattedanda too has a mixed form of society with majority community as Brahmins(40 %).The second majority is Tamangs (28.5 %).The settlement of the community groups in the different wards when compared (table 2 b)revealed that there are varying mixtures od different caste groups within a ward too.

Agriculture is the main occupation(80 %) and employment is seen the subsidiary occupation.The literacy is relatively low(51.4 %) than other studied projects.The poverty is also relatively highest as 71.4 % community are poor.

Higher felt need of water is realized because 66 % of HH responded their need to spend 30-60 minutes to get water when there was no project.In case of system breakdowns too,the community depend upon the old sources due to limited water sources in the area.

All the community were enjoying the facility of a yard tap,the willingness to pay was not obtained.

The level of health awareness seems relatively higher.During survey 91.4% responded on the existence of a village health worker and 57.1 % answered on their often(within 2 months) visits to their house.65.7 % of adequate latrines also highlights on the better health awareness in Bhattedanda.

Extent of Peoples Participation

Prior experiences

Each HH in the community contributed cash and voluntary labour for the construction of a High School before the construction of the water supply project.The school is one of the biggest in southern Lalitpur District and has a hostel facility too.The local enquiries confirmed the dynamic role of the local community leader(ex village leader) to be crucial in the construction of the school building.The ex village leader belonged to the minority community (Chhetry)and is a retired military sergeant.

Community Involvement in the project

In planning

A 5 member WUC committee was formed in each ward of the village which was primarily responsible for construction & o/m of system of their ward.
Each HH in the community contributed to the maintenance fund within a range of NRs.50 - 200 to meet the pre-condition set by CHDP to initiate the project.Average contribution from a HH for the maintenance fund was NRs 69.70.
The communities were convinced to contribute for this fund in the organised community meetings by the respective WUCs during this stage.

In construction

The support to the project by CHDP was in the form of supplying outside materials like pipes,fittings & cement up to the motor head and the technical assistance.The rest of the requirements like collection of local materials,skilled & unskilled labour work were borne by the community.The share in the total cost of the project by the community is estimated to be about 19.85 %. The average labour contribution from a HH is calculated to 20 mandays.

In operation & maintenance

The responsibility of operation & maintenance of all the 9 schemes lies with users.The community are maintaining their systems by themselves except the biggest one for ward 5 & 8.A VMW has been appointed and paid by the community for his services(NRs 5 per month/HH)in this scheme.In the beginning of the project 2 person from each of the 9 wards were identified & trained for 6 days by the project trainers.

Agency's role

The concerned agency's approach of development in Bhattedanda seems participatory.The need identification in the beginning to intervene through the expressed need of communities (water supply) is seen important for the communities support to the project.The agency have involved the community members as a whole in making important decisions at different stages of the project.The continued awareness on the health by local health volunteers could have added to the better understanding on the importance of water.
Apart from an integrated approach,the practice of rewarding the HH which has fulfilled the pre determined indicators and also penalizing those HH which did not meet the primary requirements like construction of

latrines,seems to have been effective.The local enquiry with the CHDP staff supported that the leadership role of the local village leader in these activities had a greater impact.

Conclusion

This study has led to the conclusion that the community's need assessment in the beginning of any project is very important.Community involvement at different stages of the development of the project was seen important too.Community health awareness and the role of local community leadership will also have an impact on the project sustainability.

4.5.4 Danchhi w/S project.

Community characteristics

The three major caste groups are identified as Brahmins(47.7%), Chhetrys(23.3 %)and Newar(16.8 %) in Danchhi.The distribution of these main groups in the different wards when compared(table 2a)reveals homogeneity in some wards in Bhadrabas(nearby village served by the system).In Danchhi,the settlement is a mixture of all these groups.

65 % of the community are mainly based on agriculture.41 % of these communities do have service as a secondary occupation.

Literacy is seen to be 64.5 % and 54.4 % of the people can be classified in the poor category.

The survey showed that the community have a relatively low felt need.78.9 % of the HH responded that they can fetch water within 15 minutes.

The willingness to pay for water obtained through PSTs or yard connections was seen as NRs.6.26 & 16.08 respectively.

None of the respondents answered positively on the existence of health worker in the village.24.5 % of the HH only have adequate latrines.

Participation in the project

Prior experiences

The community had contributed voluntarily in the earth work during construction of the village fair weather motor road.No additional information could be gathered.

In planning

The project,as mentioned during problem discussion, was initiated at the request of some community members.The community were not involved in the decision of the source,service level or technology by the water agency.

In construction

As discussed before,a project assistance committee had been formed prior to the construction of the project under the chairmanship of the former village leader of Danchhi.Matters relating to different aspects of the project like works supervision,site location of PSTs & arranging voluntary labour in digging the trenches for the distribution pipes were solved through the committees support.Each HH in the community contributed an

average of 9.3 mandays voluntary labour during construction.The Community's share on the total cost of the project was estimated to 4.9 %

In operation & maintenance

The water supply systems in Danchhi is still being operated & maintained by the implementing agency ie DWSS.8 numbers of staffs have been provided and an average of Rs. 150,000.00 is being spent annually for the upkeep of the project.The users are getting free benefit of water through the PSTs.The private yard connections are yet to be distributed because of the continued unwillingness of the community to take over the o/m responsibility.

Conclusion

From the study it has been certain that the prerequisite for a successful community approach ie,the involvement of the user communities at different stages of the project was not followed in Danchhi.The contact was seen limited with the important community members that too before construction.Though the project was initiated with a Royal Directive,no prior commitment was obtained by the beneficiaries to sustain the project after completion.

The different community characteristics together with the project salient features for each of these projects has been summarized in tables 1 to 14.

CHAPTER V - EVALUATION OF THE FINDINGS

OVERVIEW

The following section deals with the comparative evaluation of the functional sustainability of the water supply systems in the four study areas.The different aspects of interests like community's socio - economic characteristics and community's behaviourial aspects like felt need and willingness to pay have been analyzed and compared with the system functional sustainability to see whether any correlation exists between them.

The important aspects like community participation and the level of agency's community management approach and support have also been analyzed in the following sections.Any influence of these aspects with the system functioning has also been correlated.

To have an overview of the whole situation,all these comparison is summarized in table 5 a.The relative ratings of the different aspects of interests have been done with the Score Card Analysis Technique.The colour ratings have been done as follows.

Colour	Condition for system sustainability
Green	Favourable
Voilet	Unfavourable
Yellow	In between these

The criteria for judging of some socio-economic parameters on the system sustainability are clarified below.

Literacy - No literature was found to support the supposition that a higher literacy enhances community participation and thus system sustainability.However the general perception (mine too) is that it is easier to convince communities with higher literacy.Higher literacy is thus rated as favourable.

Poverty - The low economy of the community is considered to be unfavourable for system sustainability for the reason that such communities shall have lower affordability to pay for sustaining the systems.

Felt Need - The ratings on felt need for water is based on the time they would require to fetch a pitcher of water during systems breakdowns.The rating of these felt needs was done as follows.

V.High	> 60	minutes	Favourable
High	30 -60	"	|
Medium	15 -30	"	|
Low	< 15	"	Unfavourable ↓

The adequacy on repairs have been defined thus:

Adequate - System repaired within 24 hrs.of breakdowns.

Inadequate - System repaired after more than 24 hrs.

Discussion of these comparative findings are done in the following sections.

Table 5a -Overview

Characteristics or Indicators	Project Areas				
	Nakhel	Kappan	Bhattedand	Danchhi	Data sourc
Project Features					
Population served	1632	5168	1951	7778	Enquiry
No of Schemes	1	1	9	1	do
No of taps Public taps Yard taps	10	90	0	144	do
Pipe Lengths(kms)	8	27	53	25	do
Community's Socio-economic character					
Caste Groups					
Larger Group %	Chhetry 87	Chhetry 60	Brahmin 40	Brahmin 48	Survey
2nd Larger group %	Newar 13	Brahmin 21	Chhetry 17	Chhetry 23	do
Occupation					
Main Subsidiary	Farmer Service	Farmer Service	Farmer Service	Farmer Service	do
Literacy %	62	[illegible]	49	61	do
Av HH Size	6.62	6.58	6.08	6.25	do
% of Poor	70	55	71	[illegible]	d0
Ranges of Annual Income NRs'000	3 - 48	6 - 72	3 - 50	3 - 107	d0
Majority House	Pucca	Pucca	Kuchha	Pucca	do
Community's Behaviour - al Aspects					
Felt Need					
Water	med	med	[illegible]	low	survey
Current Need					
Priorities					
Ist Priority %	Hosp. 29	water supply 93	electri -city 40	metalled road 54	do
2nd Priority %	Road 27	-	Road 34	Treated water 27	do
Rating Felt need	3	2	1	4	
Willingness to Pay					
Av.willingness for PST supply	10.93	[illegible]	NA	[illegible]	survey
Av.willingness for yard supply	[illegible]	32.71	NA	[illegible]	do
Av.ability to pay for yard tap	45.07	47.92	38.18	61.28	Analysis
% difference ability to willingness	10.9	31.7	NA	73.7	do
Willingness Rating	1	2	NA	3	
Functional Sustai-nability					
Responsibility on o/m	[illegible]	[illegible]	[illegible]	AGENCY	Survey
No of Av.Breakdowns Annually	16	[illegible]	[illegible]	7	do
Adequacy on Repairs	[illegible]	[illegible]	[illegible]	[illegible]	Enquiry
Av.Supply Hrs/day	[illegible]	[illegible]	[illegible]	7	survey
Quantity of Supply lpcd	dry-10 wet-106	[illegible]	[illegible]	85	obs/enq
Supply Quality	satisfac -tory	[illegible]	[illegible]	Turbid in flood	do
% of non function-ing taps	5	42	[illegible]	4	Enquiry
Rating of Sustainability	2	4	1	3	

of Findings

haracteristics or ndicators	Project Areas				
	Nakhel	Kappan	Bhattedada	Danchhi	Data
evel of Community articipation					
lanning Stage					
ormation Of WUC	yes	[illegible]	[illegible]	No	Survey
greement on cost harings	yes formal)	yes (formal)	[illegible] (trust)	No	do
onstruction Stage					
oluntary contribu tions(mandays)/HH	14.31	13.85	[illegible]	9.3	do
Share in capital Costs	14.5	9.3	[illegible]	4.9	Enquiry
er capita share on Vol.contributions	37	39	[illegible]	52	do
uring O/M stage					
er capita share in /m fund	none	none	[illegible]	none	survey
ffectiveness of WUC	[illegible]	non eff.	[illegible]	NA	survey
mployment of VMW	[illegible]	[illegible]	[illegible]	NA	do
of annual costs aised	70	30	[illegible]	0	enquiry
ating level of om.participation	3	2	1	4	
nstitutional pproach/support					
ommunity involvement					
lanning Level					
eed Identification	no	no	[illegible] PHC	no	enquiry
ecision on ervice level	no	no	not confirmed	no	do
ecision on ost sharings	formal Ag with WUC	Formal Ag with WUC	[illegible] ag.mutual trust	no	do
onstruction tage					
eview & iscussions	partly with WUC	Partly with WUC	with [illegible]	Partly with Asst committee	survey
/M Stage					
valuation monitoring	no	no	[illegible] CHDP	Limited by agency	enquiry
ackup Support					
se of community otivators	no	no	[illegible] promoters	no	do
xistence of upport centres	no	no	no	no	do
ystems dev.on vailability of pares/tools	none to limited	one to imited	limited	limited	do
evelopment of uidelines/manua ls on o/m	limited	limited	limited	limited	do
ystem dev.on redit facilities	none	none	none	none	do
R Development(HRD)					
t community level					
rientation of local eaders	no	no	no	no	surv/enq
raining of WUC embers	no	no	no	no	do
MW training	no	no	[illegible]	NA	do
raining of health orkers	no	no	[illegible]	no	do
t Agency level					
ev.of cadres with ommunity dev.skills	limited	limited	[illegible]	no	enquiry
ystem dev.on orien tation of staffs to oftware approaches	limited	limited	[illegible] yes	no	do
alth Awareness					
sesment of health areness in begining	none	none	[illegible]	no	do
alth awareness camp ign during cons.	none	none	[illegible]	no	do
ystem dev.on health omotion during o/m	none	none	[illegible]	none	survey
erall Rating of s.Supports	2	2	1	3	

5.1 Evaluation of System Functional Sustainability.

The sustainability as realized from the earlier discussions in 2.1.2,is a function of many variables eg functional (physical) measures like service level,managing capacities within the community organization on technical,financial & managerial aspects and above all the effective uses.As discussed in 4.1,the study is concentrated to the functional sustainability only.

The functional sustainability of a w/s project is also seen as the measure of many sub-variables like the number of system breakdowns,the service level eg quantity or quality of water,supply hours & pressures,adequacy & promptness of repairs etc.Attempt has been made in the following sections to have a relative comparison of the functional sustainability in these four projects on the basis of the possibly quantifiable indicators discussed in 4.1.

Table 5.1.1 - Comparative Analysis of the functional sustainability

Indicators	Project Areas				Data source
	Nakhel	Kappan	Bhattedanda	Danchhi	
1.Responsibility on o/m	VMW/ Community	VMW/ Community	VMW/Comm.	Agency	survey
2.No.of Breakdowns of the system					
a.Adequacy on repairs	Adequate	Inadequate	Adequate	Adequate	obs.
b.Av.Breakdowns/year	16	52.7	6.3	7.0	surv
3.Av.supply hrs/day	24(wet) 10(dry)	0.5	24	7	d0
4.Quantity of supply (lpcd)	106(wet) 50(dry)	10.5	100	85	enq/obs
5.Quality of supply	Turbid for short period	Good	mostly good some turbid in flood	turbid	do
6.% of non functioning taps	5.0	42.2	0.0	3.5	surv

The tools developed for the relative measurement of the functional sustainability of a W/S project by the identified indicators as discussed in 4.1(ref appendix - VI) has rated the degree of the operational sustainability in these four projects as follows.

Table 5.1.2 -Operational Sustainability Rating

Project Area	Sustainability Rating	Full Sustainability %
Nakhel	4.2	80
Kappan	1.4	28
Bhattedanda	4.5	90
Danchhi	3.9	78

Conclusions.

From this analysis,Bhattedanda seems relatively a better sustainable project then followed by Nakhel & Danchhi.The gross inadequacy of the supply has affected on the system sustainability in Kappan.In Danchhi,the o/m responsibility lies with the implementing agency and still it is not found to be fully sustained.The misappropriation of the system by the community members by having illegal house connections by themselves(it is easier because the distribution pipes are of high density polythene pipes) is exemplary of a situation where responsibility lies with the agency alone!

This findings on the level of operational sustainability shall be compared with the other characteristics in the following sections.

5.2 Socio-Economic characteristics & its correlation to Sustainability

5.2.1 Socio Cultural Characteristics

The following table highlights the comparative analysis of the community's socio-cultural characteristics in the four projects.

Table 5.2.1.1- Comparison of Community's Social Characteristics

Characteristics	Nakhel	Kappan	Bhattedanda	Danchhi
Average HH size	6.62	6.58	6.08	6.25
Largest Caste Groups & %	Chhetry 87.5	Chhetry 60.0	Brahmin 40.0	Brahmin 47.7
2nd largest Caste Groups & %	Newar 12.5	Brahmin 31.1	Tamang 28.5	Chhetry 23.3
Literacy Level %	68.5	84.3	48.6	64.5

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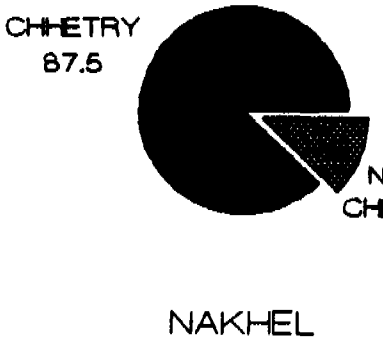
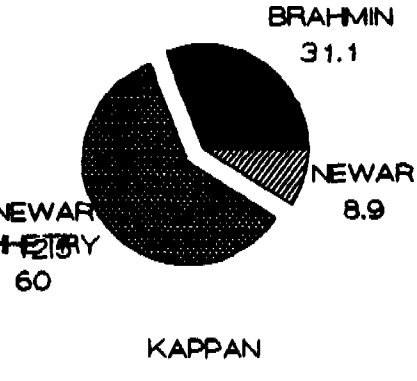
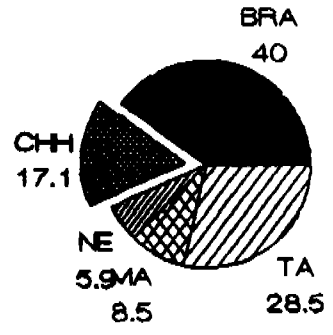


NAKHEL

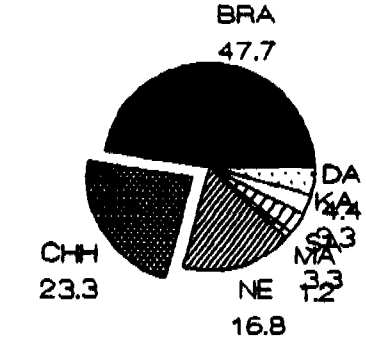
CASTE DISTRIBUTION



KAPPAN



BHATTEDANDA



DANCHHI

The comparison has shown that the society as such in all the projects are a similar mixed society with varying caste & ethnic divisions.There are more Brahmins in Danchhi & Bhattedanda whereas there are more Chhetrys in Kappan & Nakhel.In Nakhel there is a substantial majority(87.5%) belonging to a particular caste ie Chhetry.In Danchhi,where largest caste groups are the Brahmins,experience in working with the community shows that the second group ie Chhetrys were seen more influential and dominant in the local decisions.

The analysis of the distribution of different caste groups in the different wards in Danchhi & Bhattedanda (ref table 2a & 2b)indicated that the distribution is more or less mixed in both the villages.This analysis showed that there was a social heterogeneity(caste wise) in different wards of Bhattedanda too,where the system is relatively better sustained. The main occupation in all the areas is agriculture.Employment is realized the secondary occupation in all the areas.

The level of education is relatively higher in Kappan as compared to others.

The average HH size varies between 6.08 to 6.62 in Kappan & Nakhel respectively.

Conclusions

The high level of operational sustainability in Bhattedanda with the similar community in Kappan or Danchhi indicates no direct relationship between the heterogenous society (in caste,education,occupation) and the functional sustainability of the system.

From my personal experience in Danchhi,the community characteristics is seen divided amongst the communities mainly(political reasons) and would even criticize the community welfare activities of opposing groups.In

Bhattedanda or Nakhel too,such community divisions could not be denied as the political culture has been a part of the society.
In such community divisions,it is realized that the community leadership would play an important role to minimize such community differences as seen in the case of Bhattedanda or Nakhel.In Danchhi,the leadership(village chairman) though belonged to the largest community group (Brahmin),it lacked the necessary drive to lead the community.In contrast to it the leadership though occupied by a third larger community group in Bhattedanda (Chhetry),could lead better the largest groups too.In Nakhel also the community leadership has played an important role in the organised community efforts.From these observations,it is realized that community leadership shall have an important role in community developmental activities.
With reference to IRC paper(1981 p 122-135 ref -22) community divisions with different interests like in Danchhi,are to be expected more prominently in larger communities and therefore cohesiveness and solidarity amongst them is not easily to be obtained.It further adds that willing cooperation may be achieved for common purposes within each of these,any cooperation between them,probably if it is to be voluntary,shall be based on a clear calculation of pros & cons by them.
The paper further adds that in larger communities where there are higher chances of community divisions due to many interests,deeper involvement of the implementing agencies is required for a successful community participation.The minorities should be involved in the decision making process at all stages.The role of the influential society or majority group should not be ignored either.
These suggestions would be analyzed during the evaluation of the institutional support aspects and also shall be taken into consideration while formulating strategies.

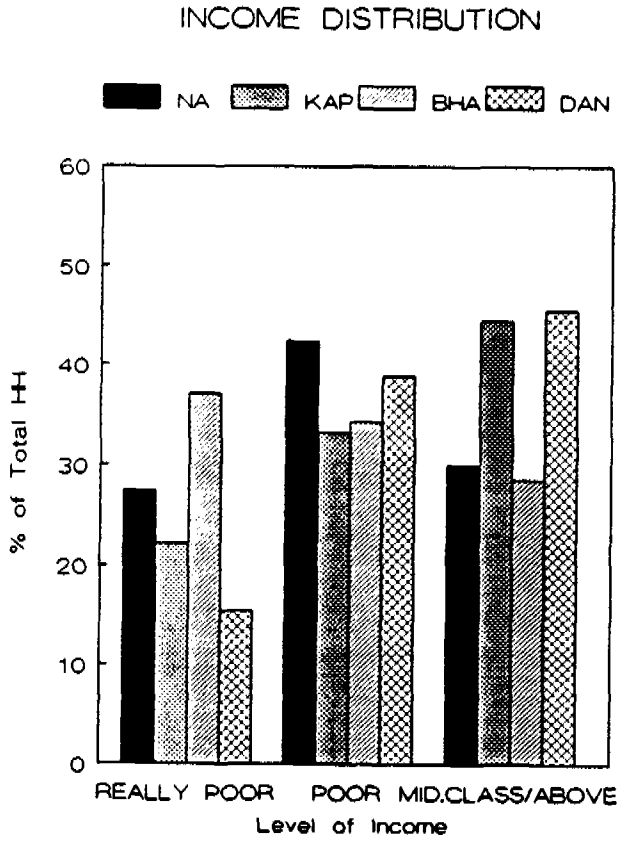
5.2.2 Economic Characteristics

The level of economy in the four project areas was evaluated on the basis of the total family income from the land holding,subsidiary occupation (ref -Q 2) .The income distribution has been divided into three categories ie,really poor,poor & middle class & above.The divisions are based on the criteria developed by the National Planning Commission(NPC) during the programme preparation of the Basic Minimum Needs Programme in 1989.(ref-56)
The comparison are as follows.

Table 5.2.2.1 - Comparison of Economy Level

Economic Indicators	Nakhel	Kappan	Bhattedada	Danchhi
Total Poor(% of HH)	70	55.5	71.4	54.4
Ranges in HH Income (Annual in NRs'000)	3 - 48	6 - 72	3 - 50	3 - 107
Majority of type of House	Pucca/til -ed roof	Pucca/tile CGI roof	Kuchha/hat -ch roof	Pucca/til -ed roof

Pucca - Houses made with burnt bricks.
Kuchha- Houses made with raw or unburnt bricks.
CGI - Corrugated Iron Sheet.



The comparison in the economy of the community in the area shows that the majority of the community are poor and the level of poverty is relatively high in Bhattedanda (71.4 %) and low in Danchhi (54.4 %).The comparison of house types confirms that the majority of houses in Bhattedanda are made of raw bricks and roofed with straw. The variation in the ranges of annual income is seen to be highest in Danchhi & Kappan to that of Nakhel or Bhattedanda.Danchhi & Kappan,which are nearer to urban centre ie Kathmandu, could be related to this reason.

Conclusions

The common situation in all the area under study is that there are larger economic disparities within the community between eg land owners or traders and the poorer people.The relatively poorer communities in Bhattedanda & Nakhel,who have better sustained the system,signifies that the level of one's economy,poverty or the economic disparities within the society does not restrict the community for being organised for the fulfilment of a common benefit.

With reference to IRC Paper (1981 p 121 -135 ref-22),in such a case of economic disparities within the community,the need identification in the beginning would highlight the degree or the level of the consciousness of the community and would eventually help in determining the level of additional interactions desired for working with such communities.The disparity in level of economy though,shall have an adverse effect on the poorer section of the community when they realize the distribution of equal contribution to a project which they value to a lessor degree.The best approach in such a case may be for the agency to avoid open confrontation taking advantage of a general public commitment ensuring that the benefit reach to the poorer sections.In such a society, it is believed that the problem of inequity shall be lessened to some degree, if the community committees are democratically chosen,with the representation of all the economic or disadvantaged group.

These suggestions has a strong correlation to the approaches & support from the concerned agencies in community management.This will be taken into account while formulating strategies.

5.3 Community's Behavioural aspects & its correlation to Sustainability

5.3.1 - Sustainability Correlation with the Felt Needs

The felt need of the community was assessed by the survey on the basis of time they used to spend to get a pitcher full of water when there was no project or in case of the systems breakdowns.In all the projects it was noted that the community go to the same old source at the time of breakdowns.The reason for this could be due to:

- non-availability of other source.
- the previous source is equally good.
- low level of health awareness.

These could not be established from the survey.

The need assessment based on the time the HH will take in case of system breakdowns(Q.5/f) are compared in the table below.

Table 5.3.1.1 - Water Need Assessment

Project Area	Water Carrying Time in minutes Total				
	< 15	15 - 30	30 - 60	> 60	
Nakhel	15.0	57.5	22.5	5.0	100
Kappan	13.3	77.7	6.7	2.3	100
Bhattedanda	0.0	14.3	65.7	20.0	100
Danchhi	78.9	18.9	2.2	0.0	100

It has been observed that 65.7 % of the people in Bhattedanda had to spent 30-60 minutes for carrying water before the construction of the project whereas in contrast to it in Danchhi,78.9 % of the total HH used to spend less than 15 minutes for the same purpose.In Nakhel & Kappan,majority ie 57.5 % & 77.7 % respectively used to spend 15-30 minutes for it.
Similarly from the survey results on the community's perception of the vital developmental needs of the area(Q.5/a),the result were thus obtained.

- In Nakhel,29.5 % & 27 % opted for the Hospital & village road as their first & second priority.14 % of the community also demanded for an w/s extension as the system was inadequate during dry season.
- In Kappan,93.5 % of the community identified the first priority of w/s signifying for the hardships & the gross inadequacy of the present system.
- In Bhattedanda,majority(40%) identified electricity in the village as their first priority & the motorable road as the second one.None opted for water supply which signifies their level of satisfaction from the present system.
- In Danchhi,majority(54.4%) of the community's priority was on metalled road in the village.26.7 % of the community also identified the need for the treatment of the present water supply as turbidity was a common problem during monsoon period.This could also be possibly one of the reason for community's unwillingness to sustain the project.

Conclusions

From the survey relatively low felt need was noticed in Danchhi.It is surprising because some members of the community had demanded for water expressing higher need in the village.My own perception was that too.There were not adequate springs or dug wells and some of them dries during summer.The low felt need as observed from the survey could be due to:

- low value judgement of the community on the present system to that of the traditional one.
- adequate sources around.
- dissatisfaction over water quality(expressed during survey)

From these observations,I have come to the conclusion that the need identification is not possible by the physical outlook or through a survey questionnaires like this.The need identification rather requires deeper study of community's behaviour,awareness on health,existing sources and water collection patterns etc.It was realized that it was not possible to high light this important community behaviourial aspects in a short study.

5.3.2 - Sustainability Correlation with Community's Willingness to pay.

The willingness to pay for public and yard connections were obtained through the survey questionnaires (Q 5/k) and are tabled in 9.1 & 9.2 respectively.

In all the projects except Danchhi,the communities are already paying for the services through PSTs.Willingness to pay for the private or the public stand posts in Bhattedanda could not be obtained as they were having yard tap at their premises already.

The correlation between the willingness to pay for the public or private yard tap are observed thus.

Table 5.3.2.1 - Willingness Ratio

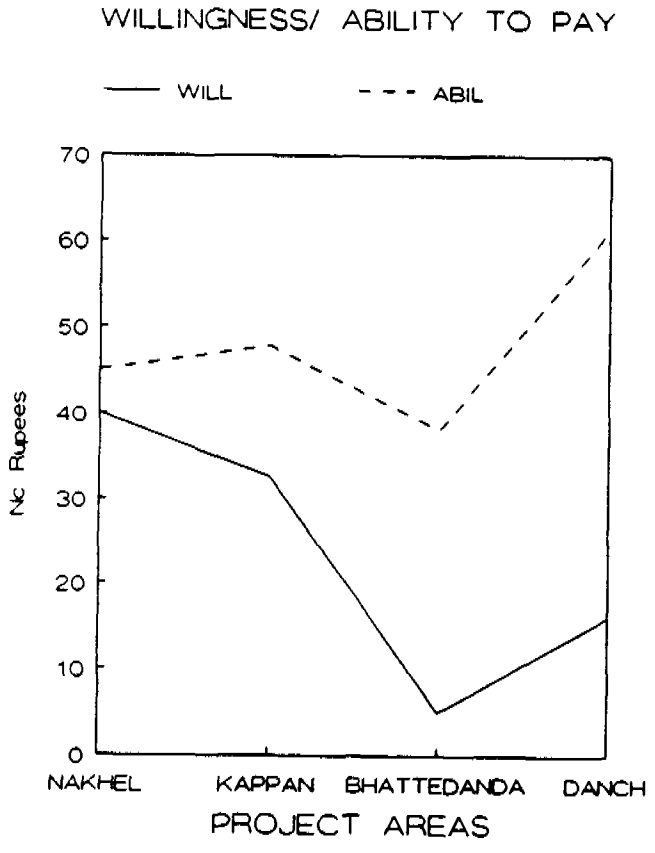
Project Area	Av.willingness for PSTs	Av.willingness for yard tap	Observed Ratio
Nakhel	10.93	40.12	1:3.7
Kappan	11.80	32.74	1:2.8
Bhattedanda	NA	NA	NA
Danchhi	6.26	16.08	1: 2.6

On an average the willingness to pay for the private yard connection in the study areas is noticed to be 3 times to that of the willingness for the public stand posts.

The ability to pay for the private yard connection is calculated on the basis of the annual income.In one of the studies for the Dhulikhel municipality in Nepal(1990 ref -52),the communities ability to pay for yard connections has been assessed as 4 % of the families gross annual income.Based on the study assumptions,the ability to pay for the rural areas has been assessed on a varying ranges of 2-3 % depending on the level of annual income.The following table gives an indication of the trend in the study areas.

Table 5.3.2.2 - Willingness to Ability to pay

Project Area	Average Ability to pay(NRs)	Average willingness to pay(NRs)	% difference to willingness	Relative Felt need
Nakhel	45.07	40.17	10.87	med
Kappan	47.92	32.74	31.70	med
Bhattedanda	38.18	NA	NA	high
Danchhi	61.28	16.08	73.7	low



It is realized that the % difference between the communities ability to pay to their willingness to pay is much higher in case of Danchhi,the reason for which may be due to the low value judgement place by the communities because of the low felt need.

Conclusions

When the system functional sustainability is compared to that of the community's willingness to pay for the system,higher willingness is seen in Nakhel.It could be due to the higher faith they had or have on the present w/s systems.Whereas in contrast in Kappan,the higher felt need is seen to be the main reason for a higher willingness inspite of the mistrust they have on the present w/s systems.The low felt need as seen in Danchhi could be the reason that the people have a lower willingness to pay inspite of relatively better sustainable system.

In conclusion,it is realized that the system sustainability has little impact on the willingness to pay.There shall be a greater willingness to pay when the community have a higher value judgement due to greater hardships.

5.4 Level of Community Participation & its correlation to Sustainability

The level of participation was analyzed on the basis of the answers on the questionnaires developed for the purpose as discussed in 4.1.

The participation from the communities in the four projects under study has a variation as far as the voluntary labour contribution or the percentage share of the total capital costs is concerned.The approach or the policy adopted by the various agencies in seeking the level of participation (voluntary contributions) during the construction or the o/m stage is also different as shown in Table - 5.4.1.

This comparison shows that there was a variation in the policy adopted by the different agencies.For example in Bhattedanda only external material support like cement,pipes were the donors component whereas in Danchhi the approach undertaken was limited to the voluntary labour in digging pipe trenches.Likewise,a obligatory advance cash contribution from the beneficiary communities to establish o/m fund was adopted in Bhattedanda where as there were no such compulsions in any of the other three projects.

Table 5.4.1 - Community Participation Approach

Project	Donor/Agency's Share	Community's Share
Nakhel	- External material support & skilled labour + some skilled labour(paid) - At o/m stage,committed to help during major repairs.	Unskilled labour partly operation & minor repairs.unskilled labour(partly)
Kappan	- External material support & skilled + some unskilled labour(paid) -At o/m stage,committed to help during major repairs.	do
Bhattedanda	- External material support only. - at o/m stage,external material support at time of need	Local materials + skilled & unskilled material costs(fully) Full responsibility of o/m of the system.establishment of o/m fund in the beginning
Danchhi	- Supply of all materials skilled & unskilled works done through contractors - No commitment on o/m was made in beginning	Unskilled labour in digging trenches for distribution pipes only No commitment sought at the beginning/not willing to share the o/m responsibility.

The analysis of the respondents answers of their judgement on whose initiation the project was started,the answers were thus obtained.

Table 5.4.2 - Need Identification by Communities

Project	Community's Judgement(% of HH)					
	Govt. %	Pol. leader %	Donor %	Communi -ty's demand %	Dont Know %	Total
Nakhel	0	93	0	7	0	100
Kappan	84.5	11.5	0	0	4	100
Bhatedada	0	48	34	0	18	100
Danchhi	95	0	0	0	5	1

This assessment indicates that the community in Danchhi & Kappan do have a perception that the project was a gift from the government.In Bhattedanda & Nakhel,the majority of the community feel that it was initiated for their benefit by the community leader.

For our analysis, the level of community participation in the projects are rated using the Score Card Analysis technique thus.

Table 5.4.3 - Level of Community participation

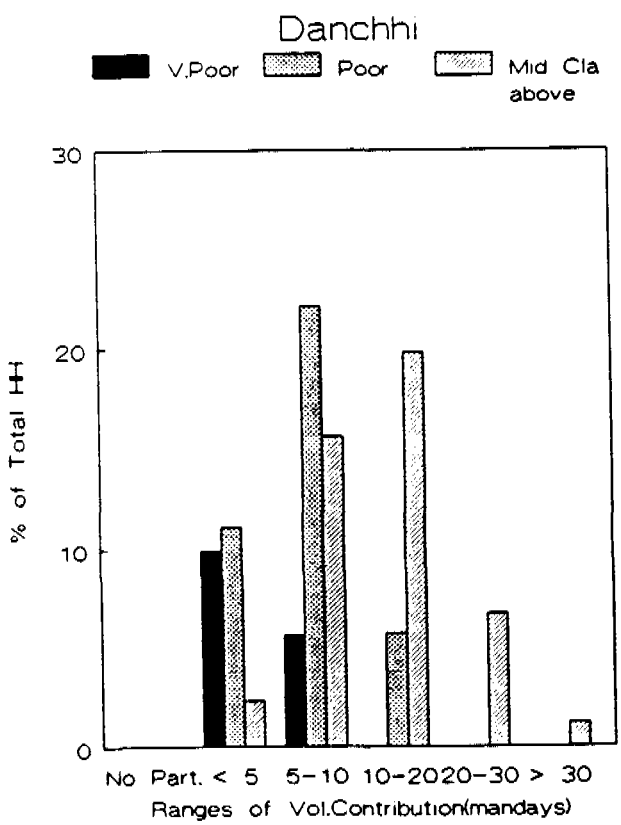
Participation Indicators	Nakhel	Kappan	Bhatteda -nda	Danchhi	Data/ source
At Planning Stage					
a. Attendance in meetings	limited	limited	yes	no	survey
b.Establishment of a community org.	yes	yes	yes	no	do
At cons.stage					
a.Av.HH voluntary contribution (mandays)	14.01	13.85	20.00	9.30	survey
b.% share in Capital costs	14.50	9.30	19.85	4.90	Enq.
c.per capita share (vol.contributions)	37.00	39.50	68.00	52.50	Analys
During o/m stage					
a.Per capita share in raising o/m costs(NRs)	none	none	8.50	none	survey
b.Effectiveness of WUC	effect - ve	not eff.	eff.	NA	do
c.Appointment of VMW	yes	yes	yes	NA	do
d.Raised funds for annual o/m costs %	70	30	80	0	Enq.

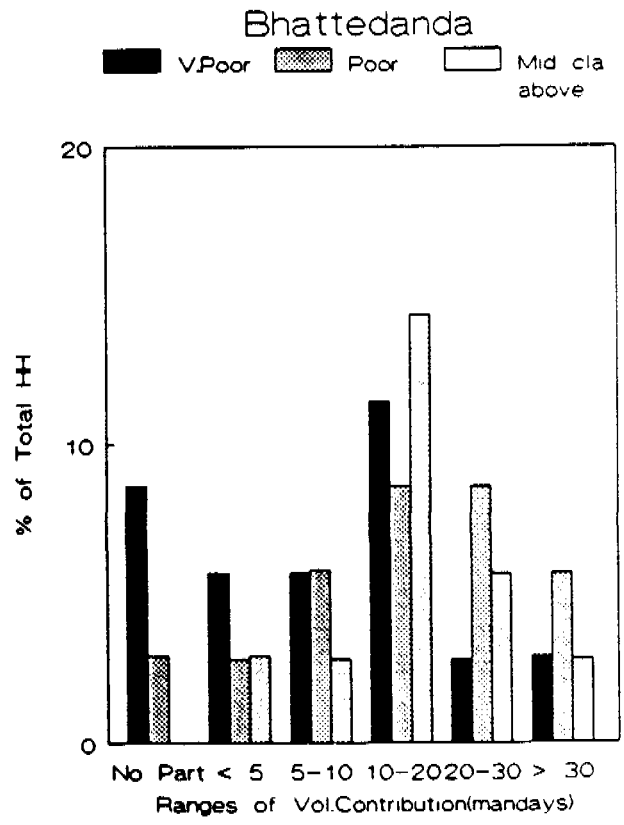
The above comparison shows that the highest level of community participation through the community involvement in different phases of project development has been in Bhattedanda.Lack of these involvements could have been the lower participation in Danchhi(confirmed in section 5.5 too).

To judge on the different level of community participation within the different social & economic group,a comparative analysis has been made for Bhattedanda & Danchhi as under.

Table 5.4.4 -Assessment of community's economy to participation Level

Economy Level	Voluntary Labour Contribution in mandays(% of HH) Ranges of Contribution						
	No Part.	< 5	5-10	10-20	20-30	> 30	Total
Bhattedada							
V.Poor	8.6	5.7	5.7	11.4	2.8	2.9	37.1
Poor	2.9	2.8	5.8	8.6	8.6	5.7	34.4
Mid.Class & above	0	2.9	2.8	14.3	5.7	2.8	28.5
Total	11.5	11.4	14.3	34.3	17.1	11.4	100
Danchhi							
V.Poor	0	9.9	5.6	0	0	0	15.5
Poor	0	11.1	22.1	5.7	0	0	39.9
Mid.Class & above	0	2.3	15.6	19.8	6.7	1.2	28.5
Total	0	23.3	43.3	25.5	6.7		100





The findings are as follows.

- In Danchhi,the level of community participation(voluntary contribution) is seen directly related to the level of economy because majority of very poor have contributed to 5 mandays,poor to 5-10 & middle class & above contributed to 10-20 mandays.
- In Bhattedanda,the level of participation amongst the different community economy group seems almost uniform.

The above findings relate that in Bhattedanda,the community whether poor or rich have identified the benefit to the same level and thus contributed equally.In Danchhi,the level of community participation is more or less proportional with the level of economy would raise issues like:

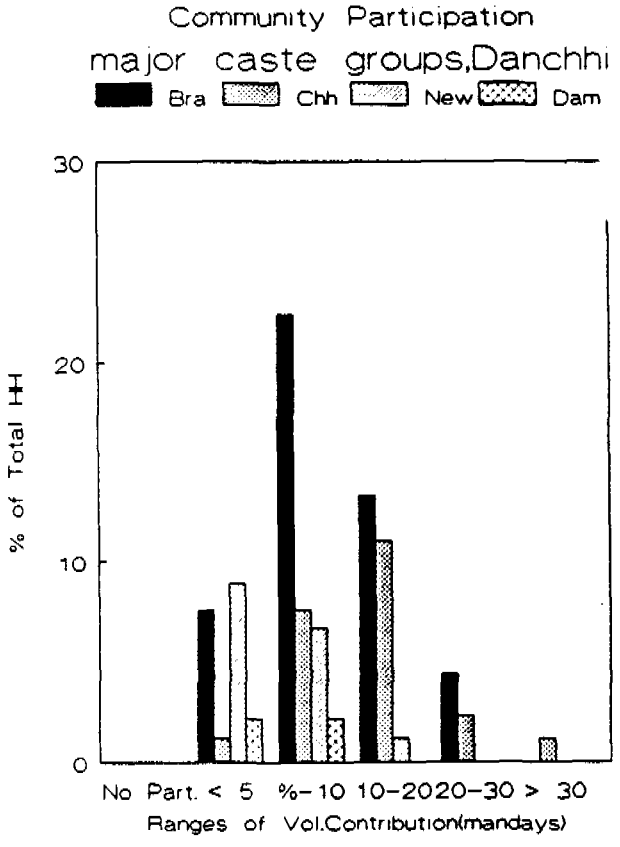
- did some sections in the community not see the benefit from the project in Danchhi?
- Was there a lackness in communication approaches employed by the concerned agency or ignored some sections of the community?

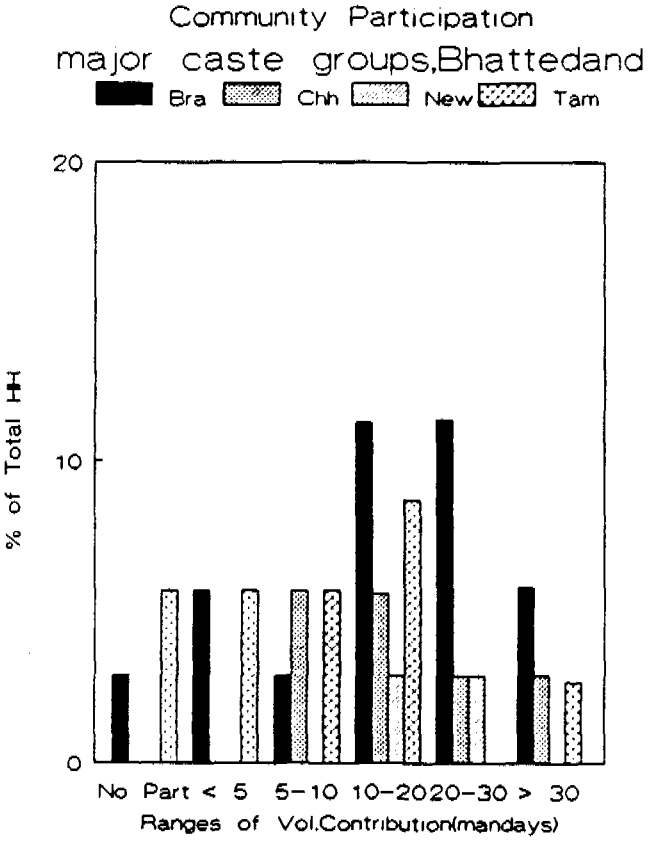
These aspects too,shall be confirmed after the analysis of the institutional approaches and support aspects to come to a definite conclusion.

Similarly the following table highlights the distribution of community participation amongst the different caste groups.

Table 5.4.5 - Community participation amongst Caste Groups

Caste Divisions	Voluntary Labour Contribution in mandays(% of HH) Ranges of Contribution						
Caste Divisions	No Part.	< 5	5-10	10-20	20-30	> 30	Total
Bhattedanda							
Brahmin	2.9	5.7	2.9	11.3	11.4	5.8	40.0
Chhetry	0	0	5.7	5.6	2.9	2.9	17.1
Newar	0	0	0	2.9	2.9	0	5.8
Tamang	5.7	5.7	5.7	8.7	0	2.7	28.5
Magar	2.9	o	0	5.7	0	0	8.6
Total	11.5	11.4	14.3	34.2	17.2	11.4	100
Danchhi							
Brahmin	0	7.6	22.4	13.3	4.4	0	47.2
Chhetry	0	1.2	7.6	11.0	2.3	1.2	23.3
Newar	0	8.9	6.7	1.2	0	0	16.8
Sarki	0	2.2	1.1	0	0	0	3.3
Damai	0	2.2	2.2	0	0	0	4.4
Kami	0	0	1.2	2.1	0	0	3.3
Magar	0	0	0	1.2	0	0	1.2
Total	0	23.3	43.4	25.5	6.7	1.2	10





From this analysis,no definite correlations was to be noticed on the voluntary labour contributions amongst the different Caste groups in Danchhi and Bhattedanda from this analysis.

Conclusion

In summary,the following conclusions are drawn.

- The non uniformity in approach in seeking different level of community participation amongst the sector institutions was to be realized.This kind of different approach,I believe would lead to demotivation of the neighbouring enthusiastic communities.
- The different level of voluntary contributions amongst different economic groups was to be noticed in Danchhi.Uniformity in such contributions in Bhattedanda was realized.This could be due to the involvement of all economic groups of the community in making important decisions.
- No definite correlation was noticed on voluntary labour contributions by different Caste groups in Danchhi & Bhattedanda.

There is a definite correlation to be noticed of the above findings with the institutional approaches & support level again.The following section deals on concerned agency's approaches.

5.5 Level of Institutional Backup Support & its Correlation to Sustainability

From the conclusions drawn in 5.4,a strong correlation between the community participation to the Institutional approaches/support was noticed.To analyze the level of support and approaches,the findings of the different indicators as discussed in section 4.1,has been summarized in table 5.5.1.

To asses on the level of the involvement of the communities during the different stages of development of the project was analyzed as follows.

Table 5.5.2 -Attendance in the organised meetings

Project	No.of Attendance during construction stage(% of HH) Attendance Ranges						
	No Attend	1-3	3-5	> 5	dont know	others	Total
Nakhel	82.7	3.4	0	0	13.8	0	100
Kappan	58.0	13.3	6.5	0	16.2	0	100
Bhatted	8.0	58.0	16.0	0	8.0	12	100
Danchh	100	0	0	0	0	0	10

It was not possible from this analysis to distinguish at what stage the communities were involved!Appropriate modifications in the questionnaires requires in future to bring out these important aspects.Even then this analysis reflects high level of community involvement in Bhattedanda as compared to others.In Danchhi,no involvement of the communities was confirmed.

The concerned agency's approaches & backup support level has been analyzed below.

Support during planning stage

- In Bhattedanda community's need identification was done and based on the findings intervened in water supply.No such need identification was seen conducted in any of the other three projects.
- Community organization like WUC was established in the other three projects except Danchhi.The assistance committee in Danchhi was formed prior to construction only.In Nakhel,the democratic process adopted in the selection of the WUC members by general consensus of the users is seen as an important factor for effectiveness of WUC and thus the system functioning.
- Though WUCs had been formed in the three projects ,the communication by the agency was with the members of WUC only.In Bhattendanda

Table 5.5.1 - Assessment of Agency's Approach & backup Support

Characteristics or Indicators	Project Areas				
	Kappan	Nakhel	Bhattedada	Danchhi	Data
Institutional Approach/support					
Community Involvement					
Planning Level					
Need Identification	no	no	yes for PHC	no	enquiry
Decision on Service level	no	no	not confirmed	no	do
Decision on cost sharings	formal Ag with WUC	Formal Ag with WUC	No formal ag.mutual trust	no	do
Construction stage					
Review & Discussions	partly with WUC	Partly with WUC	with Community	Partly with Asst committee	survey
O/M Stage					
Evaluation & monitoring	no	no	Partly by CHDP	Limited by agency	enquiry
Backup Support					
Use of community motivators	no	no	yes,health promoters	no	do
Existence of support centres	no	no	no	no	do
Systems dev.on availability of spares/tools	none to limited	one to imited	none to limited	limited	do
Development of	limited	limited	limited	limited	do

Guidelines/manua -ls on o/m					
system dev.on credit facilities	none	none	none	none	do
HR Development(HRD)					
At community level					
Orientation of local leaders	no	no	no	no	surv/enq
Training of WUC members	no	no	no	no	do
VMW training	no	no	yes	NA	do
Training of health workers	no	no	yes	no	do
At Agency level					
Dev.of cadres with community dev.skills	limited	limited	yes	no	enquiry
System dev.on orien -tation of staffs to software approaches	limited	limited	partly yes	no	do
Health Awareness					
Assesment of health awareness in begining	none	none	yes,CHDP	no	do
Health awareness camp -aign during cons.	none	none	yes,CHDP	no	do
System dev.on health promotion during o/m	none	none	yes,CHDP	none	survey
Overall Rating of Ins.Supports	**2**	**2**	**1**	**3**	

communication was made directly with the users of the system through the organised meetings.

- A formal contract agreement was made regarding the cost recovery for construction & also a commitment was obtained from the members of WUC on the o/m of the projects in Nakhel & Kappan.In Danchhi no such commitment was obtained prior to the construction,eventhough the project was initiated with a Royal Directive.In Bhattendanda,no such formal agreement was made,but a clear understanding was obtained from the users in matters like the expected level of participation from the communities during the construction & o/m.
- In none of the projects detailed cost of o/m of the project was either analyzed,explained or discussed on the means or ways to counter it during the formal agreement.In Danchhi,the alternative proposals for different water tariff structure for private or public tap was prepared and discussed with the assistance committee at a later stage of nearing completion only.

- Support during Construction stage.

- In Bhattedanda,practice of a regular meeting was maintained(from the survey)during this phase.In other projects,the meetings were seen limited to some members of the community only(WUC/Asst.committee)
- In Kappan,a misunderstanding developed between the implementing agency & the member of WUCs themselves and the incomplete project was handed over to the WUC for completion.The backup support since then was virtually negligible.

- During O/M Stage.

- In Danchhi,the responsibility of o/m still lies with the implementing agency.
- In Nakhel,there was virtually no backup support established and the project was left completely to the user.There was no follow up,monitor or evaluation systems developed to check or support the performance of the project or the effectiveness of the WUCs.
- In Bhattedanda,the w/s projects are monitored through the CHDP health staffs during the house to house visits to promote preventive medical care(which was also established through survey).

The Institutional support to the community organization in the important aspects like the and Health Education,have been assessed as follows.

- Support on Health Activities.

- A continued & regular promotion of Health awareness is seen practised in Bhattedanda through CHDP.No such health promotional activities was undertaken during the project construction by the concerned agencies.In Nakhel,there is a government health post

where there is a village health worker but the promotional activities as part of his/her duties is hardly noticed during survey.

The following table highlights the level of health promotional activities in the project areas.

Table 5.5.3.1 - Assessment of Health Promotion

Project Area	Existence of a village health worker Existence Level(% of HH surveyed) Yes	No	Total
Nakhel	37.5	62.5	100
Kappan	0	100	100
Bhattedanda	91.4	8.6	100
Danchhi	0	100	100

Table 5.3.3.2 - Households visit by health workers

Project Area	Number of Visits(% of HH surveyed) Very often < 2 months	Once a while 2 -6 months	Never	Total
Nakhel	5	25	70	100
Kappan	0	0	100	100
Bhattedanda	57	34	9	100
Danchhi	0	o	100	100

- Human Resources Development.

- In none of the projects the development of Human Resources in order to enhance the community's capabilities was thought of except in Bhattedanda where two identified VMWs fr except each wards were trained for 6 days by the project technician and also some identified volunteers from the project area were specifically trained for the promotion of the community health awareness activities.

Conclusions

From the findings the success of Bhattedanda water supply project is attributed to the appropriate community management approaches followed by the concerned ageny such as:

- the need identification in the beginning and the approach of intervention through the community's expressed needs.

- the involvement of the user communities at different phases of the project in making important decisions.
- use of the community health workers to promote or motivate communities through them.

For a system to be sustainable,the general requirements of a community management approach as discussed in section 2.1 did not seem followed in Danchhi by the concerned agency.In Bhattedanda these aspects were given due considerations.

The role of the concerned agency in Danchhi was seen to be of a provider and not that of a promoter of WSS services.The Directives 1989 demands for a committed community management approach to be followed by the water agency.To reach to the goal as envisaged by the Directives 1989,there seems a first and foremost need for shift in general thinking of DWSS from the role of a provider to that of a promoter by means of orientation & skills development on community development approaches of the DWSS personnel.It should be followed by an appropriate amendments on policies/procedures & correspondingly institutional strengthening.

5.6 Summary of Findings

The overall findings from the field study are summarized as follows.

Communities Socio Economic Characteristics

- The community in Danchhi do not have a significant dissimilar socio-economic characteristics(like caste,religion,literacy,occupation, economy) to that of the community where the system is relatively better sustained.
  No direct relationship between the heterogeneous society and the functional sustainability of the system was noticed.
- The role of the local community leadership is seen important in associating the different community groups from the experience of two projects.The requirement of such community leadership seems more vital to associate larger community groups like in Danchhi.
- Variation in the level of community participation amongst the different economy groups are realized in Danchhi.Uniformity in such participation amongst the same group was noticed in better sustained projects ie in Bhattedanda.
- No direct correlation was noticed of community participation to that of caste groups.

Community Management Approach/Support

Communication Approach

- There was a social need identification by the concerned agency in Bhattedanda prior to the construction of the project & through this

reflected needs,intervened on water supply.No such need assessment was made in the other three projects.

- Surprisingly low felt need was noticed in Danchhi.Felt need is thus realized not as a subject that could be judged by having a survey alone.It rather requires a deeper study of community's behaviour,health awareness,existence,type of water sources & their water collection pattern etc.
- The democratic process is seen adopted in Nakhel & Bhattedanda for the selection of members of WUC & for making important decisions through the community consensus in the organised meetings.This has helped in developing the sense of responsibilities on both WUC members & the users.
- There was a formal agreement by the concerned water agencies with the WUC in Nakhel & Kappan for voluntary labour contribution during the construction & handing over the o/m responsibility.No community committment was sought in Danchhi in any form or the other.In Bhattedanda an environment of mutual trust seemed developed amongst the community & the agency through greater interactions and did not require such agreements.
- Communities in Bhattedanda were involved in making important decisions through the organised meetings whereas no such meetings were seen organised in the other three projects.
- A system of periodic evaluation of WSS was builtin in Bhattedanda through the primary health care(PHC)activities.No system of evaluation was noticed in any of the other three projects.

Extension Support

- No community motivators or the promoters were seen to be employed to motivate the community whereas in Bhattedanda the Health development volunteers had played the role of the promoter.
- There was no support centres or referral centres identified within communities reach to acquire supports on technical or logistics support for all the projects.
- No assessment on the level of health awareness in the beginning or during the construction of the project was conducted in any of the three projects.In Bhattedanda this was given a priority being a health development project basically.
- Health awareness through formal or informal education to the communities in Bhattedanda was a priority where as no such awareness activities was taken up in the other three projects.

Training Support

- No consideration was given on the human resources development in the community level in the other three projects.In Bhattedanda,priority was given to this consideration.

The study has established the following correlations.

- The experience in Bhattedanda showed that greater felt need provide an effective entry point for further community developmental activities(also supported by WASH studies no 44 ref-39).
- The system sustainability will have little impact on the community's willingness to pay.Rather willingness is seen more or less related to the felt need of the community.The average ratio between the community's willingness to pay for private & Public tap in the studied areas is noticed to be 3:1

In a nutshell,it is concluded that the concerned agency in Danchhi did not seem fully committed to the community management approach and the role was more of a provider to that of a promoter.To fulfil the demands envisaged by Directives 1989,there seems a first & foremost need of full commitment from the water agency.This would be possible through development of human resources within the agency through orientations or training and further improvements on the current policies & strategies.Correspondingly institutional strengthening to fulfil the community management requirements as discussed in 2.1.4 seems the need too.

The subject of my concern ie, finding the strategies for the sustainability of larger w/s systems like Danchhi would therefore be based on the above conclusions in the following sections.

CHAPTER VI RECOMMENDATIONS OF STRATEGIES FOR SYSTEM SUSTAINABILITY

6.0 Recommendations

From the study,it has become certain that sustainability of a system shall be attained only when the need based users are effectively involved in the decisions at the different stage of the project.The involvement of the users seem more important at the planning stage when the base of the future financing,managing and building up the local technical capabilities to sustain the system is to be decided.These findings relate to the conclusion that my community management approaches was inappropriate & inadequate in Danchhi and was possibly the one of the reason for its non- sustainability.So for working with a community like in Danchhi in future,I have learned the following strategies to be important.I thus recommend to DWSS in Nepal for the appropriate amendments on the current policies,strategies & approaches.The recommendations are based on the observed deficiencies to the requirements of a community management approach as discussed in section 2.1.3/4.

To meet the requirements of a good Communication Approach

1.Establishment of a Need Based Community Organization

Remarks

The better sustainability is also seen related to the democratic process adopted in the selection of WUC members in Nakhel or in Bhattedanda.Such process have been limited by the Decentralization Act. There is a prerequisite arrangement in the Decentralization Act 1982 vide clause 19 (Appendix- I)to form a community organization(WUC) by identifying its chairman.The formation of a WUC is at the implementation stage.These provisions in the Act might have limited the process of selection of the constituents in a democratic way.The formation of WUC at the stage of implementation too limits the involvement of the communities right from the planning stage.

The prerequisite arrangement of the formation of RWSA in the Philippines by the needy community members to qualify in obtaining the support from LWUA seems a positive approach in the development of the community organization to an autonomous institution from the very beginning of the project. The CWSS approach of inclusion of the women community members in the formation of WUC is also seen as the positive approach to include the representation of the community with higher needs.

Recommendations

Thus the first & foremost need for a successful community management approach is realized to create a conducive environment through appropriate amendments on the present Act.Such provisions would motivate the community to organise themselves for their felt needs and come forward for acquiring support from the water agency.

Priority Actions

DWSS should play a lead role to prepare & recommend appropriate amendments in current Act/Legislations,policy or guidelines to support on the establishment of an autonomous need based water user committees from the beginning of the project.

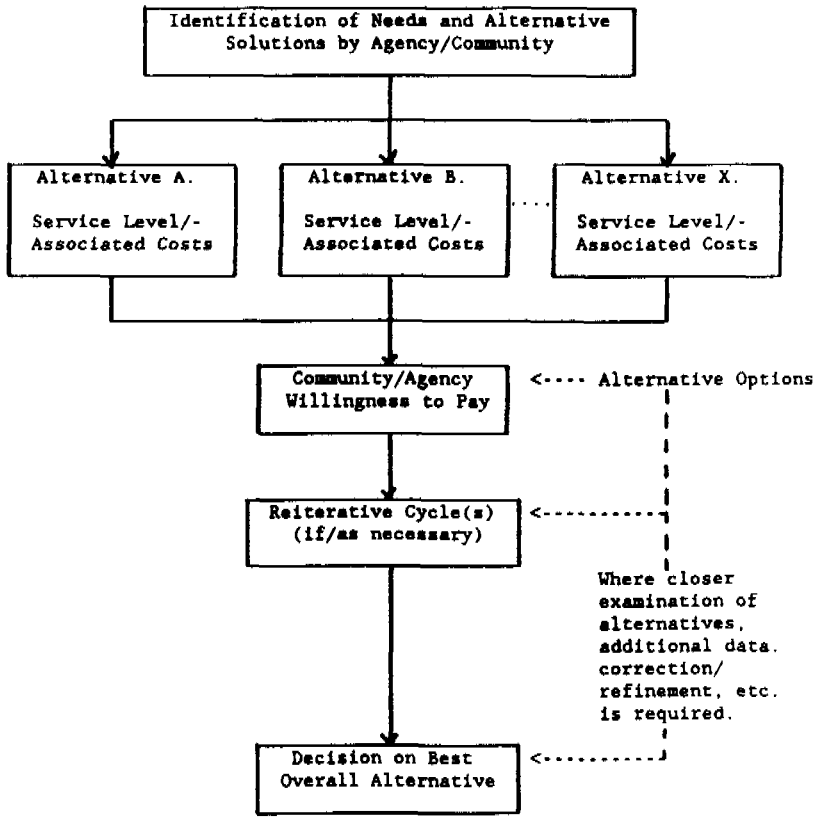
2.Categorization of level of Projects

Remarks

In view of system sustainability,the type of the service,and the community's capacity to manage,operate or afford to pay for the services seem more important.For this reason,the categorization of the water supply system based on the different level of service as practised in The Philippines and in farmer managed Irrigation systems in Nepal seems an appropriate approach.

Recommendations

The categorization of different level of subsidy in the capital cost of the project for the different level of service would also discourage the community to demand for a higher level of service which they can not afford at the end. An important concept in such an approach is that the community members are actively involved in the decision making process specifically that they themselves discuss different options and the implied level of service & costs,level of cash & in kind commitments they are willing to bear etc & select the alternatives best suited to them.This type of decision making process is schematically represented below.



Source: WHO/CWS/89.6 (ref No - 31)

Priority Actions

DWSS should play a role to:

- prepare and recommend a proposal for categorization of the project based on Nepalese socio-economic & geographical context.The following could be the guiding factors in the categorization.
  - Type of scheme ie point source or piped system.
  - service population.
  - length of transmission pipes.
  - technical complexities.
- develop the clear cut procedures to classify a certain project to decide on its category.The criteria for such category is to be based on:
  - felt need of the community.
  - willingness to pay.
  - affordability to sustain.
- develop and recommend varying level of subsidy to be allocated on the construction costs to different classification of the project.

3. Social Need Identification.

Remarks

The community need assessment prior to the initiation of the project in Bhattedanda has led to define community's needs & priorities & the project was designed accordingly. The community base line survey in the Indo-Dutch assistance Clean Ganges Action Plan Project in Mirjapur & Kanpur,India(ref-50) had the same objectives to fulfil.

Recommendations

Such community need survey in an area like Danchhi should include the following activities with the communities.

- Visit community for introduction to leaders/established Institution.
- Plan & Implement joint base line survey through observations, interviews & group discussions to visualize on social needs.The following community characteristics and behaviour needs to be looked at specifically.
    - Local leadership strengths.
    - Community diversification if any and reasons for it.
    - Study of type & existing water sources and the water collection pattern.
    - Health awareness level of community.
- Map behavioural data & relate it to the needs.

The **CEP technique**[1] (ref fig - 1) is thus recommended to be followed for this purpose.

To identify such community needs,adequate lead time or preparatory phase is to be allowed for any project to facilitate appropriate level of interactions between the communities & the agency.

Priority Actions

Appropriate amendments in the Directives 1989 is to be recommended by DWSS to include social need identification.It should be made the basis to select project for implementation.

Extension Supports

1. Establishment of Referral Centres

Remarks

The Decentralization Act 1982 vide clause 17 (Appendix I)has rightly envisaged the establishment of permanent Service Centres within a District to provide technical,financial or logistics support within community's outreach.Though some of the Sectors like Agriculture or Health have shed efforts to institutionalize such referral centres within their organizations,no efforts whatsoever,have been undertaken to institutionalize the service centres within DWSS organizational hierarchy.

Furthermore,the discussion in section 2.1.3 also emphasizes on the need for providing adequate authority and responsibility to the community organization for a successful community management.

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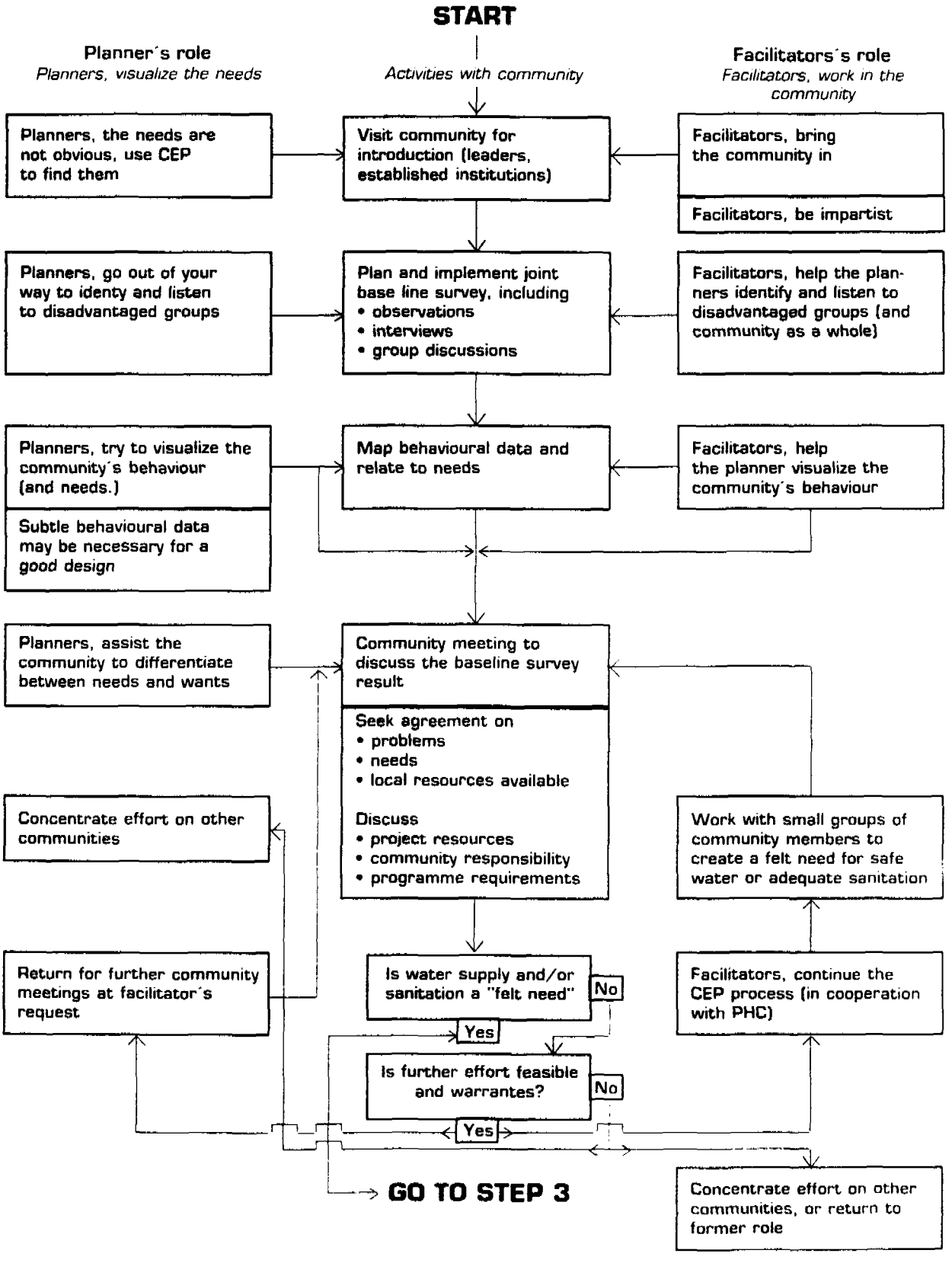
1 -Guidelines for Planning Community Education & Participation activities in WSS projects by Anne Whyte.(ref -17)

USE COMMUNITY EDUCATION AND PARTICIPATION (CEP) TO FIND NEEDS

FIG - 1



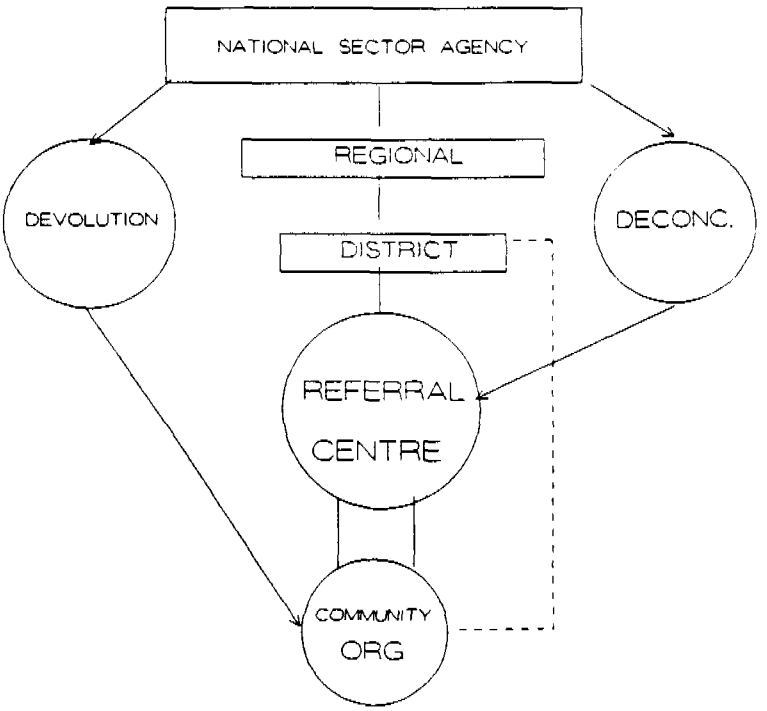
Recommendations

Thus there is a need for further expansion and elaboration on the present authorities and responsibilities defined in the Decentralization Act to the community organizations.The deconcentration of the present level of the District organization to the community's reach in the form of a referral centre is also seen vital.

The full fledged establishment of such referral centres with multi sectoral support services would facilitate coordination amongst the intra sectoral field agencies too.The establishment of such centres & the support the community would visualize to get from such Institutions,would presumably enhance the confidence of the community to sustain the systems.Such referral centres shall provide supports to projects of other agencies too. These recommendations are explained in the figure below.

DECENTRALIZATION

DEVOLUTION & DECONCENTRATION



Priority Actions

DWSS should start immediately in the phasewise establishment of referral centres within its organization.The DWSS staffs currently working in the different completed projects(about 350)could be shifted to these proposed referral centres.This arrangement, I believe would not create much financial burden.

2.Provision of a Facilitator or Promoter.

Remarks

The role of the community health volunteers or the health workers of CHDP project in Bhattedanda to aware & motivate the community through house to house visits,has awakened the different community groups on the need of potable water.

The role of the community development worker like WSSTs in case of CWSS schemes and facilitator or promoter in the Columbian experience (ref - 56) have been seen crucial in motivating the community.

Recommendations

The present organisation of DWSS would therefore require such promoters educated or trained with community development skills to promote the software activities like:

- Identify & listen to the disadvantaged group & the community as a whole.
- Help agency to visualize the community's behaviour.
- Work with small groups of community members to generate the felt need of safe water & Sanitation amongst them.

These promoters are to be stationed in the proposed referral centres and would be an effective linkage medium between the community & the District organisation of the agency.

Priority Actions

DWSS should start recruiting such community promoters.I would rather suggest to employ the experienced and promising water supply and sanitation technicians (WSST) from CWSS projects to the job of a promoter.These promoters should be stationed in the proposed referral centres and should be given the responsibility of managing it.

3.Participatory Evaluation.

Remarks/Recommendations

A joint monitoring & evaluation of the w/s systems by the community & the Agency members are to be carried out periodically to judge on the system's performance status and try to overcome the deficiencies jointly.The continued monitoring and evaluation of WSS services in Bhattedanda by the community health workers during their house visits to promote preventive health care has also contributed to system sustainability.

The **Managing the Managers** experience in the Philippines with the establishment of a qualified & trained personnel in the Management Advisory Group is realized essential in providing services to the systems serving a larger community.Such measures or steps would eventually help in building up the community's confidence to manage & operate the project on their own.

Action Plan

For this reason a good Management Information System(MIS)is to be established within the agency for regular monitoring & evaluation.
The facilitator could be made responsible to take up the task of the participatory evaluation.

4.Integrated Approach.

Remarks

The approach in other community development activities to work through the medium of the generally higher felt need ie water supply is seen practised in PHC interventions in Bhattedanda. This approach of development should be cashed in by the water agency for getting support from the other intra sectoral agencies wherever possible.The higher level of poverty would also demand to increase the community's economy through additional income generation activities.Such activities would increase their affordability to sustain the systems built.

Recommendations

The generally identified area of acquired support is in the following sectors.

- Banking through credit facilities
- Health Sectors in the promotion of general health awareness,Household & Environmental Sanitation,water quality surveillance etc.
- Education Sector in developing appropriate curriculum for the formal/informal education as per the local needs & priorities.
- Other appropriate sectors related to the income generation activities in the area.
- Establishment of a formal link with NGO both local or international,active in the area and try to use their influence for motivating the community.

Priority Actions

This would be possible with effective interactions & coordination between the intra sectoral institutions at all levels,more particularly in the field level.The establishment of a coordinating body at the National/Regional & at the District level with the representation of the concerned sector agencies would promote such interactions & coordination.The establishment of the referral centres would also promote coordination at the field level.DWSS should develop policies/strategies to work in an integrated manner.This could be started in a pilot scale in some of the projects to see the result.

Training Support

1.Human Resources Development

Remarks

The development of an appropriate cadre of VMWs & Health workers amongst the community members in Bhattedanda has led to the system sustainability.HRD within the agency or the community has been a regular activity within the CWSS and has an effective role on the system sustainability.The "Techno Clinic" as practised in the Philippines by LWUA to train the board members of WD/RWSA's has developed their skills & capabilities to manage & perform better.

Though of late,some efforts is being allocated in the HRD within the community and the agency by DWSS,it does not seem adequate to meet the demand envisaged by the Directives 1989.

Recommendations

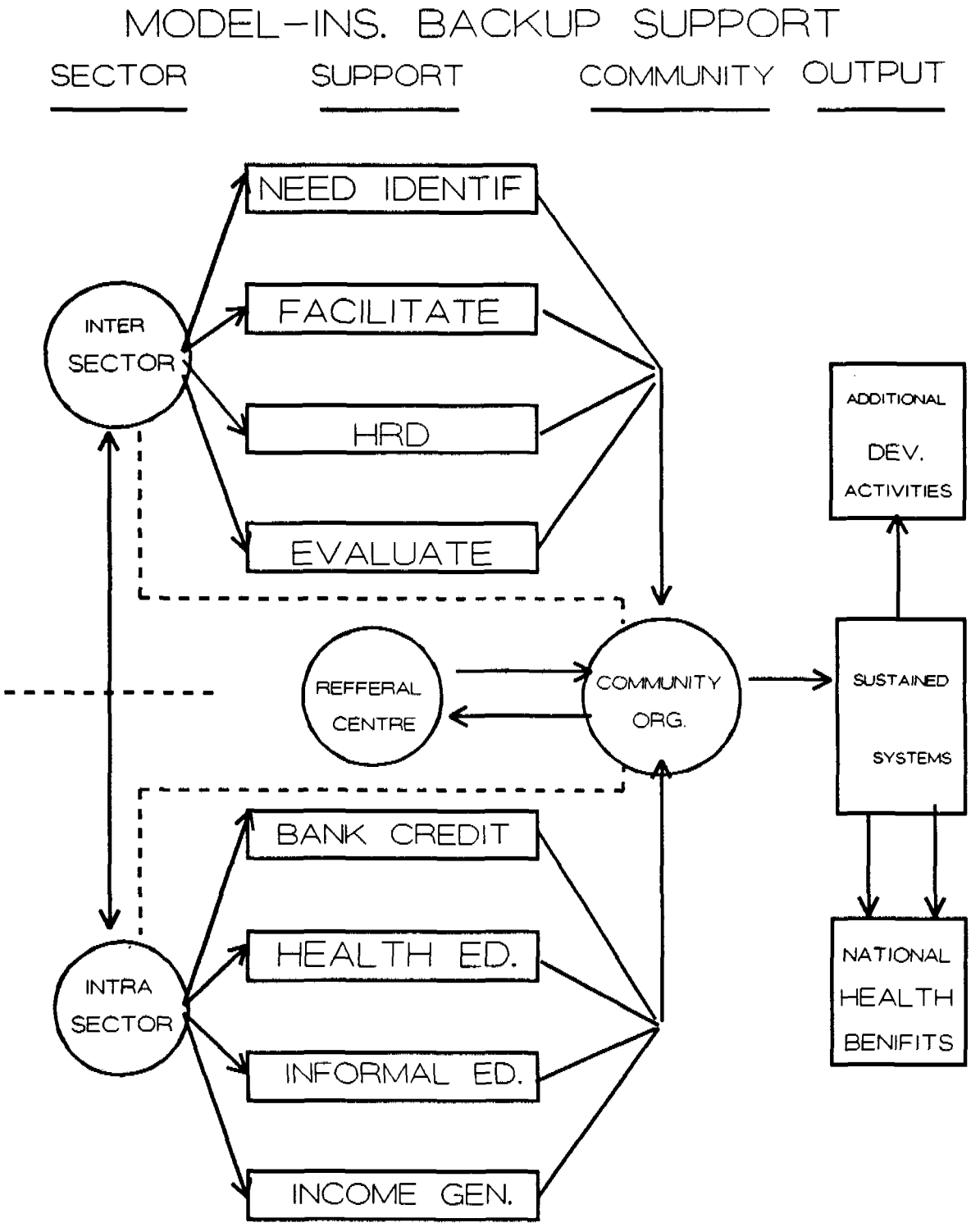
The need for the HRD at the community & the Institutional level is thus recognised and should form an integral part of the programmed activities within the organisation.At the community level,the community's capacity have to be built up by appropriately designed training on managerial,administrative & technical skills to the community members like WUC members, opinion/ traditional leaders,systems caretakers,VMW's,women workers/volunteers etc.

At the Agency level,the HRD is specifically needed to the Hardware core groups(Engineers,overseer)in the development of their skills on community development software aspects like personal communication skills,understanding social or behaviourial aspects of the community & so on.

Priority Actions

DWSS should expand its HRD activities within the community and agency level.Establishment of a national training unit,development of cadres of trainers in the Districts seems vital.

The Schematic Diagram of the Institutional Backup Support to the community organizations is diagrammatically expressed in figure 2.


MODEL-INS. BACKUP SUPPORT
SECTOR
SUPPORT
COMMUNITY
OUTPUT
NEED IDENTIF
FACILITATE
HRD
EVALUATE
INTER SECTOR
ADDITIONAL DEV. ACTIVITIES
REFFERAL CENTRE
COMMUNITY ORG.
SUSTAINED SYSTEMS
BANK CREDIT
HEALTH ED.
INFORMAL ED.
INCOME GEN.
INTRA SECTOR
NATIONAL HEALTH BENIFITS

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List Of Tables

Table 1. Average Family Size Of The Projects

	Project Area	Av.Family Size	Av.Children Size
1	NAKHEL	6.62	2.89
2	KAPPEN	6.58	1.50
3	BHATTEDANDA	6.08	2.68
4	DANCHHI	6.26	2.34

Table 2. Caste Distribution Of House-Hold Heads In The Project Area

PROJECT	*CASTE IDENTIFICATION (HH)*									
AREA	BRAHMIN	%	CHHETRY	%	NEWAR	%	MAGAR	%	TAMANG	%
NAKHEL	0		35	87.50	5	12.50	0		-	
KAPPEN	14	31.10	27	60.00	2	8.90	0		-	
BHATTENDANDA	14	40.00	6	17.10	2	5.90	3	8.50	10	28.50
DANCHHI	49	47.70	21	23.30	15	16.80	1	1.20	-	

PROJECT	*CASTE IDENTIFICATION (HH)*							
AREA	SARKI	%	KAMI	%	DAMAI	%	TOTAL	%
NAKHEL	-	-	-	-	-	-	40	100
KAPPEN	-	-	-	-	-	-	45	100
BHATTENDANDA	-	-	-	-	-	-	35	100
DANCHHI	3	3.3	3	3.3	4	4.4	90	100

Table 2(a) - Wardwise Caste Distribution
Danchhi

Wards	Caste/ethnic groups								
	Brahmin	Chhetry	Newar	Damai	Sarki	Magar	Tamang	Kami	Total
Danchhi									
1	3	55.5	25.4	6.3	4.7	-		5.1	100
2	17.6	34.2	24.5	11.4	12.3	-	-	-	100
3	32.6	35.8	23.6	4.0	2.4	-		1.6	100
4	27.0	55.0	14.2	1.8	-	-	-	-	100
5	51.0	26.7	19.7	-	1.6	1.1	-	-	100
6	49.3	41.1	2.7	5.5	-	1.4	-	-	100
7	28.1	52.1	4.1	7.3	4.1	-		4.3	100
8	17.6	33.8	23.0	12.1	10.8	1.3		1.4	100
9	59.2	17.6	12.8	1.6	16.8	-	-	-	100
Total	34.0	34.8	17.0	5.3	6.5	0.3	-	1.0	100
Bhadrabas									
1	87.5	8.3	4.1	-	-	-	-	-	100
2	100.0	-	-	-	-	-	-	-	100
3	84.1	15.9	-	-	-	-	-	-	100
4	50.0	19.7	27.2	1.5	-	-		1.6	100
5	79.6	13.6	6.8	-	-	-	-	-	100
6	63.7	13.6	13.6	9.1	-	-	-	-	100
7	100.0	-	-	-	-	-	-	-	100
8	25.0	65.0	10.0	-	-	-	-	-	100
9	44.0	56.0	-	-	-	-	-	-	100
Total	79.1	20.5	8.7	0.1	-	-	-	0.6	100
G total	47.7	23.3	16.8	4.4	3.3	1.2	-	3.3	100

Table 2 b - Wardwise caste distribution
Bhattedanda

Project Area	Caste/Ethnic groups								
	Brahmin	Chhetry	Newar	Damai	Sarki	Magar	Tamang	Kami	Total
Bhattedanda									
1	**38.5**	**5.7**						**55.8**	**100**
2	21.1	21.0	29.0					28.9	100
3	22.9	1.7						75.4	100
4	69.1	10.5						20.4	100
5	60.0	40.0							100
6	25.0	8.3					4.2	62.5	100
7	64.2	21.4						14.4	100
8	21.8	20.9	6.9		4.8		16.3	29.2	100
9	71.4	17.1						11.5	100
Total	40.0	17.1	5.9	-	-		8.5	28.5	100

TABLE 3 OCCUPATIONAL DISTRIBUTION OF HOUSEHOLD ACCORDING TO MAIN OCCUPATION OF HEAD OF HOUSEHOLD

PROJECT AREA	OCCUPATIONAL DISTRIBUTION (HH)							
	FARMERS'S & RELATED WORKER		PUBLIC SERVICE		COMMERCE		PRODUCTION LABOUR WORKERS	
	HH	%	HH	%	HH	%	HH	%
NAKHEL	22	55	12	30	2	5	3	7.5
KAPPEN	21	46.7	12	26.7	10	22.2	_	_
BHATTENDANDA	20	57.2	9	25.7	4	11.4	2	5.7
DANCHHI	29	32.2	37	41.1	7	7.8	6	6.7

PROJECT AREA						
	PROFESSIONAL WORKERS		COTTAGE INDUSTRY		TOTAL	
	HH	%	HH	%	HH	%
NAKHEL	_	_	1	2.5	40	100
KAPPEN	_	_	2	4.4	45	100
BHATTENDANDA	_	_	_	_	35	100
DANCHHI	3	3.3	8	8.9	90	100

Table 4. LEVEL OF EDUCATION

PROJECT AREA	EDUCATION LEVEL									
	ILLITERATE	%	READ/WRITES	%	SCHOOL PA	%	GRADUATE	%	TOTAL	%
NAKHEL	15	37.50	15	37.50	8	20.00	2	5.00	40	100
KAPPEN	7	15.70	26	57.70	7	15.40	5	11.20	45	100
BHATTEDAND	18	51.40	12	34.30	4	11.40	1	2.90	35	100
DANCHHI	32	35.50	50	55.50	5	5.60	3	3.40	90	100

Table 5. TYPES OF HOUSEHOLD

PROJECT AREA	HOUSEHOLD TYPE & DISTRIBUTION									
	PUCCA WITH CGI/RCC ROOF		PUCCA WITH TILED ROOF		KUCHHA WITH TILED ROOF		KUCHHA WITH HATCH ROOF		TOTAL	
	HH	%	HH	%	HH	%	HH	%	HH	%
NAKHEL	5	12.50	18	45.00	11	27.30	6	15.00	40	100
KAPPEN	17	37.80	15	33.30	9	20.00	4	8.50	45	100
BHATTENDAN	4	11.40	5	14.30	11	31.40	15	42.90	35	100
DANCHHI	30	33.30	27	30.00	23	25.50	10	11.20	90	100

Table 6.ANNUAL AVERAGE FAMILY INCOME

PROJECT AREA	LEVEL OF INCOME											
	REALLY POOR		POOR		LOWER MID CLASS		MIDDLE CLASS		HIGHER MID CLASS			
	<Rs.10000 Annum		Rs.100 - 24000		Rs.24000 - 48000		Rs.48000 - 720(		>Rs.72000		TOTAL	
	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%
NAKHEL	11	27.50	17	42.50	9	22.50	3	7.50	—	—	40	100
KAPPEN	10	22.20	15	33.30	19	42.20	1	2.30	—	—	45	100
BHATTE	13	37.10	12	34.30	9	25.80	1	2.80	—	—	35	100
DANCHHI	14	15.50	35	38.90	30	33.30	11	12.30	—	—	90	100

Table 7. WATER NEED ASSESMENT

PROJECT AREA	WATER CARRYING TIME									
	<15 MIN.		15 - 30 MIN.		30 - 60 MIN.		>60 MIN.		TOTAL	
	HH	%	HH	%	HH	%	HH %	%	HH	%
NAKHEL	6	15.00	23	57.5	9	22.50	2	5.00	40	100
KAPPAN	6	13.30	35	77.7	3	6.70	1	2.30	45	100
BHATTENI	0	0.00	5	14.3	23	65.70	7	20.00	35	100
DANCHHI	71	78.90	17	18.9	2	2.20	0	0.00	90	100

Table 8. ABILITY TO PAY FOR PVT. YARD CONNECTIONS

PROJECT AREA	RANGE OF ABILITY TO PAY									
	UPTO Rs.20		Rs.20 - 40		Rs.50 - 100		Rs.100 - 200		>Rs.200	
	HH	%	HH	%	HH	%	HH	%	HH	%
NAKHEL	11	27.5	17	42.5	9	222.5	3	7.5	—	0.0
KAPPAN	10	22.2	15	33.3	19	42.2	1	2.3	—	0.0
BHATTEDANDA	13	37.1	12	34.3	9	25.8	1	2.8	—	0.0
DANCHHI	14	15.5	35	38.9	30	33.3	11	12.3	—	0.0

PROJECT AREA		
	TOTAL	
	HH	%
NAKHEL	40	100
KAPPAN	45	100
BHATTEDANDA	35	100
DANCHHI	90	100

Table 9. WILLINGNESS TO PAY

9.1 FOR PUBLIC STAND POSTS

PROJECT AREA	RANGES OF WILLINGNESS									
	NOTHING		UPTO Rs.5		Rs.5 - 10		Rs.10 - 20		Rs.20 - 30	
	HH	%	HH	%	HH	%	HH	%	HH	%
NAKHEL*	0	0	10	25	21	52.5	7	17.5	2	5
KAPPEN*	0	0	1	2.2	22	48.9	22	48.9	0	0
BHATTEDANDA#	--	--	--	--	--	--	--	--	--	--
DANCHHI	0	6.8	42	53.3	30	33.3	3	3.3	1	1.1

PROJECT AREA							
	>Rs.30		DON'T KNOW		TOTAL		AVERAGE WILLINGNESS
	HH	%	HH	%	HH	%	Rs.
NAKHEL*	0	0	0	0	40	100	10.93
KAPPEN*	0	0	0	0	45	100	11.80
BHATTEDANDA#	0	--	--	--	--	--	--
DANCHHI	0	0	2	2.2	90	100	6.26

** -> Actually Paying for Posts # -> Not Applicable as there are yard connections to every HH*

Table 9 WILLINGNESS TO PAY

9.2 FOR PRIVATE YARD CONNECTIONS

PROJECT AREA	RANGE OF WILLINGNESS TO PAY									
	UPTO Rs. 20-0		Rs. 20-50		Rs. 50-100		RS. 100-200		>200	
	HH	%	HH	%	HH	%	HH	%	HH	%
NAKHEL	11	27.5	14	35	4	10	3	7.5	0	0
KAPPAN	11	24.4	30	66.7	4	8.9	0	0	0	0
BHATTEDANDA	-	-	-	-	-	-	-	-	-	0
DANCHHI	78	86.7	10	11.1	2	2.2	0	0	0	0

PROJECT AREA					
	DON'T KNOW		TOTAL		AVERAGE WILLINGNESS TO PAY
	HH	%	HH	%	40.17
NAKHEL	8	20	40	100	32.74
KAPPAN	0	0	45	100	5
BHATTEDANDA	-	-	-	-	-
DANCHHI	0	0	90	100	16.06

TABLE 10 COMMUNITY PARTICIPATION

PROJECT AREA	RANGE OF MANDAYS OF VOLUNTARY CONTRIBUTION									
	NO PART		UPTO 5		5 - 10		10 - 20		20-30	
	HH	%	HH	%	HH	%	HH	%	HH	%
NAKHEL	0	0	4	10	11	27.5	18	45	6	15
KAPPAN	-	0	0	0	14	31.1	29	64.4	2	4.5
BHATTEDANDA	3	8.6	4	11.4	5	14.3	12	34.3	6	17.1
DANCHHI	-	0	4	23.3	39	43.3	23	25.5	6	6.7

PROJECT AREA							
	>30		DON'T KNOW		TOTAL		AVERAGE
	HH	%	HH	%	HH	%	
NAKHEL	-	0	1	2.5	40	100	14.31
KAPPAN	-	0	-	0	45	100	13.85
BHATTEDANDA	4	11.4	1	3	35	100	20.00
DANCHHI	1	1.2	0	0	90	100	9.30

TABLE 12 NO OF SYSTEM BREAKDOWNS

PROJECT AREA	RANGES OF ANNUAL BREAKDOWN									
	NO ANS		UPTO 6		6-12		12-24		24-36	
	HH	%	HH	%	HH	%	HH	%	HH	%
NAKHEL	1	2.5	11	27.5	7	17.5	18	45	3	7.5
KAPPAN	1	2.2	-	-	-	-	14	31.1	22	48.9
BHATTEDANDA	4	11.4	4	11.4	7	20	15	42.9	4	11.4
DANCHII	2	2.2	36	40	45	50	6	6.7	-	0

PROJECT AREA				
	>36		TOTAL	
	HH	%	HH	%
NAKHEL	-	0	40	100
KAPPAN	8	17.8	45	100
BHATTEDANDA	1	2.9	35	100
DANCHII	1	1.1	90	100

TABLE 13 NO OF HOUSEHOLD LATRINES

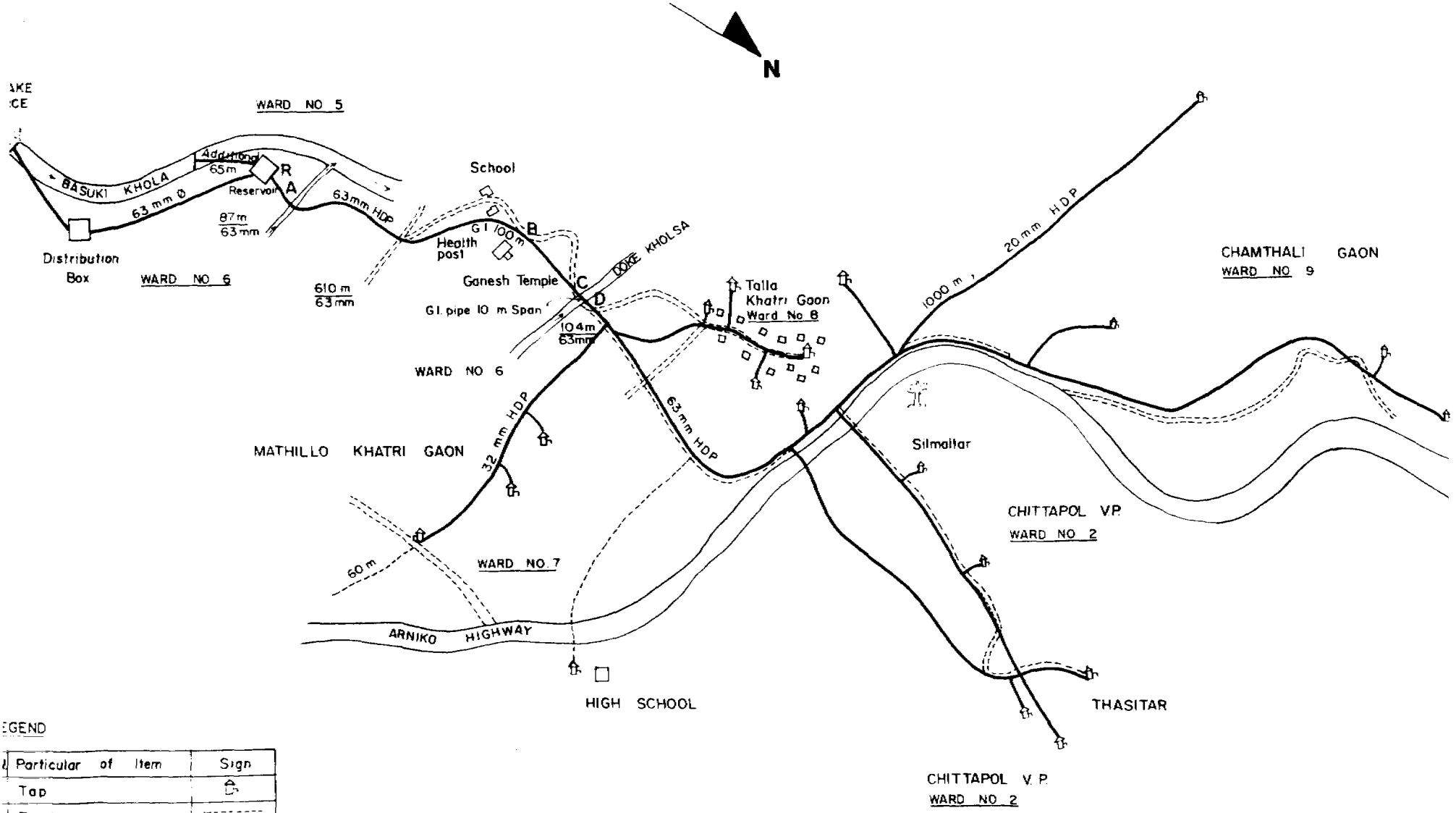
PROJECT AREA	LATRINES EXIXTENCE					
	ADEQUATE LATRINES		INADEQUATE LATRINES		NO LATRINES	
	HH	%	HH	%	HH	%
NAKHEL	15	37.5	11	27.5	14	35
KAPPAN	14	31.1	10	22.2	21	46.7
BHATTEDANDA	23	65.7	8	22.8	4	11.5
DANCHHI	22	24.5	9	10	59	65.5

PROJECT AREA		
	TOTAL	
	HH	%
NAKHEL	40	100
KAPPAN	45	100
BHATTEDANDA	35	100
DANCHHI	90	100

Table 14. COMPARATIVE ANALYSIS OF THE PROJECTS

PROJECT NAME	PROJECT SALIENT FEATURES					
	YEAR OF START	YEAR OF COMPLETION	TYPE OF SYSTEM	TYPE OF SOURCE	POPULATION SERVED	TOTAL CAPACITY M3/DAY
NAKHEL	NOV.1997	JUNE 1978	GRAVITY	STREAM	1632	173
KAPPAN	JULY 1983	JUNE 1985	GRAVITY	SPRINGS	5168	216
BHATTENDAND	1986	1988	GRAVITY	SPRINGS	1951	195
DANCHHI	1986	1988	GRAVITY	STREAM	7778	564

PROJECT NAME							
	PIPE LENGHTS KMS	NO. OF TAPS		TOTAL COST OF THE PROJECT '000Rs.			
		PVT(YARD)	PST	GOVT	DONOR	VILLAGERS	TOTAL
NAKHEL	8	--	40	154 (37.2)	200 (48.30)	60 (14.50)	414 (100.0)
KAPPAN	27	--	90	1985 (90.7)	--	204 (9.3)	2189 (100.0)
BHATTENDAND	53	336	--	--	537 (80.15)	133 (19.85)	670 (100.0)
DANCHHI	24.9	300	144	7806 (95.1)	--	403 (4.9)	8209 (100.0)



EGEND

Particular of Item	Sign
Tap	
Track	
Pipe Line	
Kholsa	
House	

NANKHEL W/S PROJECT

LAYOUT PLAN, BHAKTAPUR

NOT TO THE SCALE

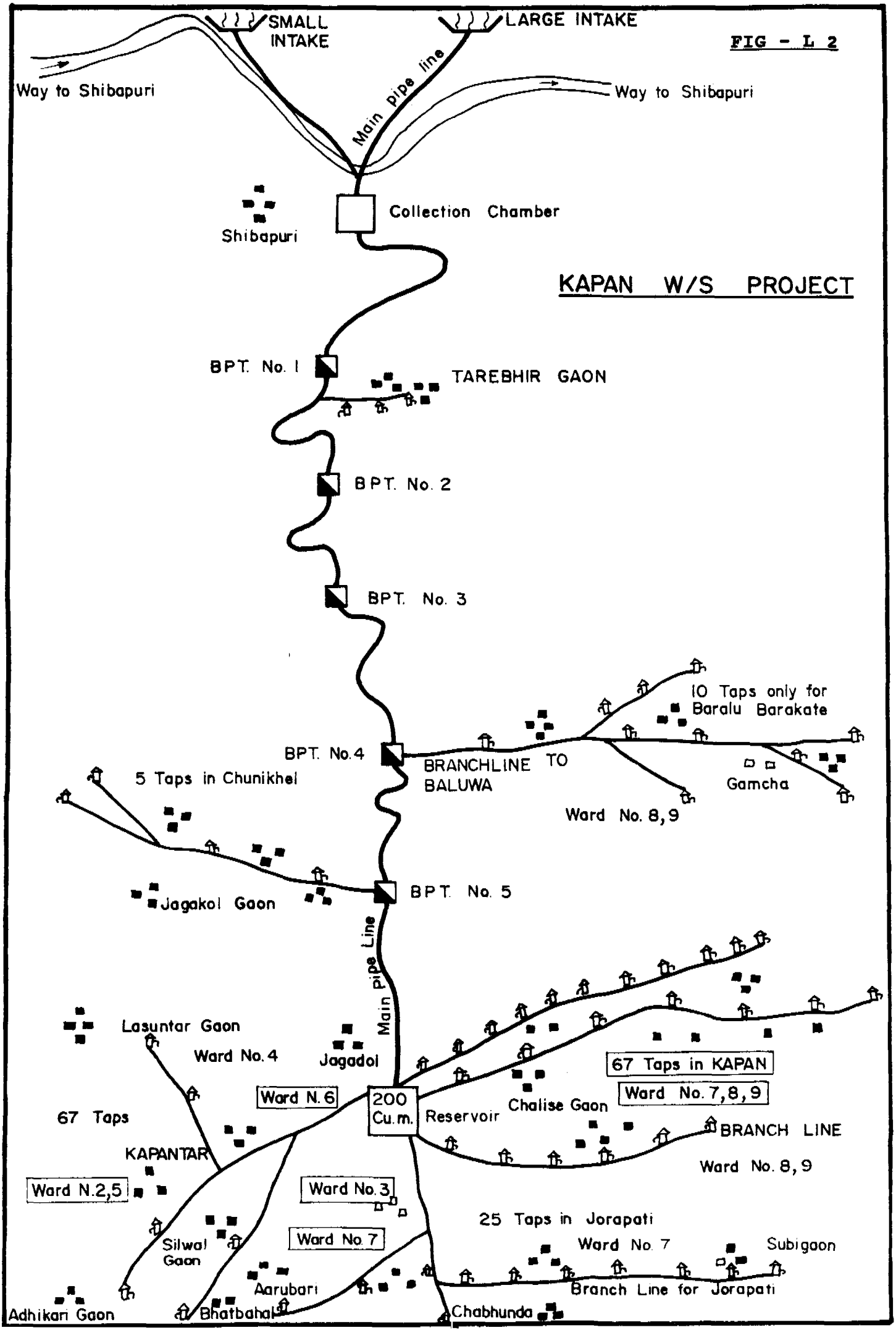


FIG - L 2
SMALL INTAKE
LARGE INTAKE
Way to Shibapuri
Main pipe line
Way to Shibapuri
Collection Chamber
Shibapuri
KAPAN W/S PROJECT
BPT. No. 1
TAREBHIR GAON
BPT. No. 2
BPT. No. 3
10 Taps only for Baralu Barakate
BPT. No. 4
BRANCHLINE TO BALUWA
Gamcha
Ward No. 8, 9
5 Taps in Chunikhel
Jagakol Gaon
BPT. No. 5
Main Pipe Line
Lasuntar Gaon
Ward No. 4
Jagadol
67 Taps in KAPAN
Ward No. 7,8,9
Ward N. 6
200 Cu.m. Reservoir
Chalise Gaon
67 Taps
BRANCH LINE
Ward No. 8, 9
KAPANTAR
Ward N.2,5
Ward No. 3
25 Taps in Jorapati
Silwal Gaon
Ward No. 7
Ward No. 7
Subigaon
Aarubari
Branch Line for Jorapati
Adhikari Gaon
Bhatbahal
Chabhunda

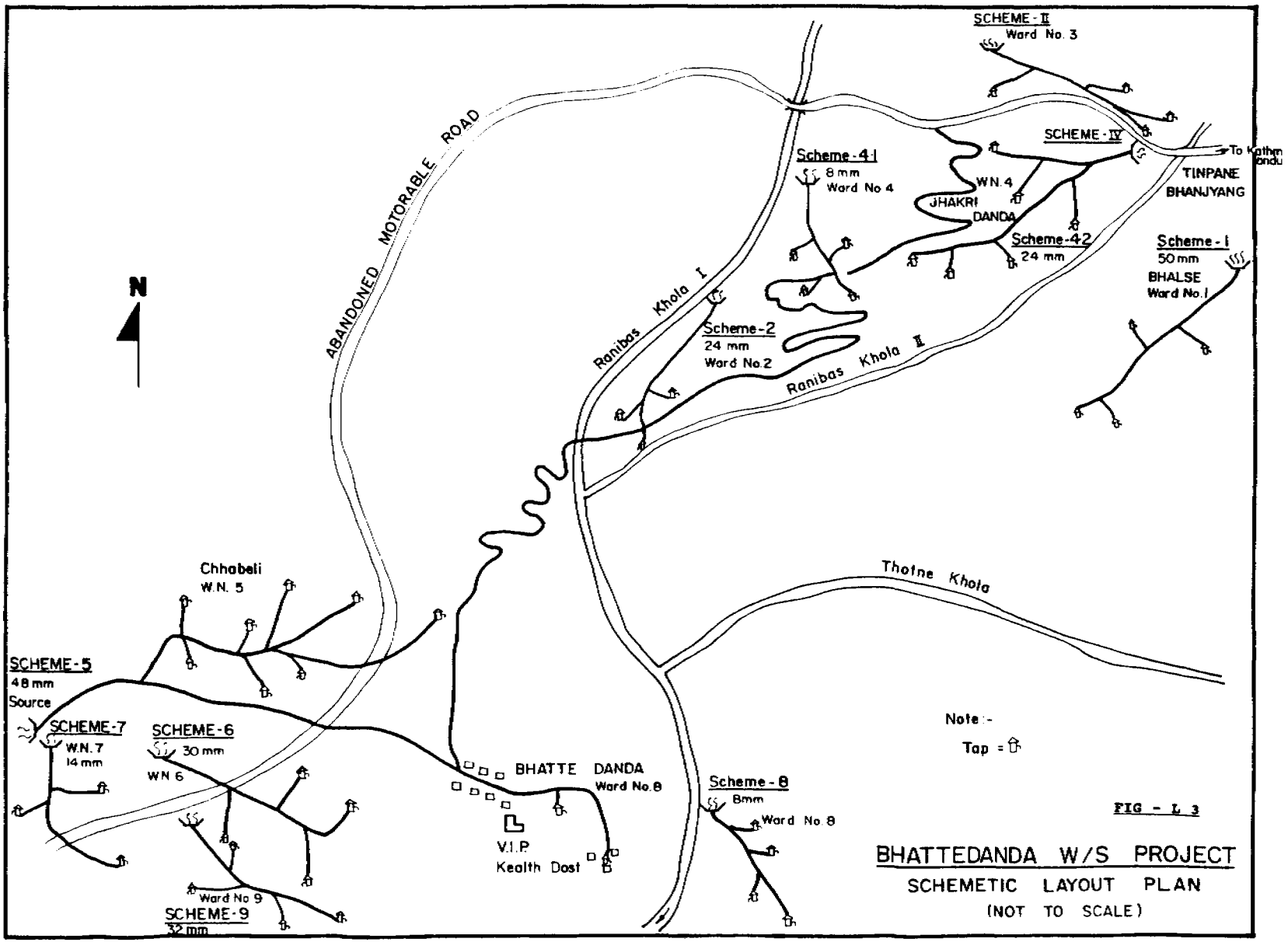
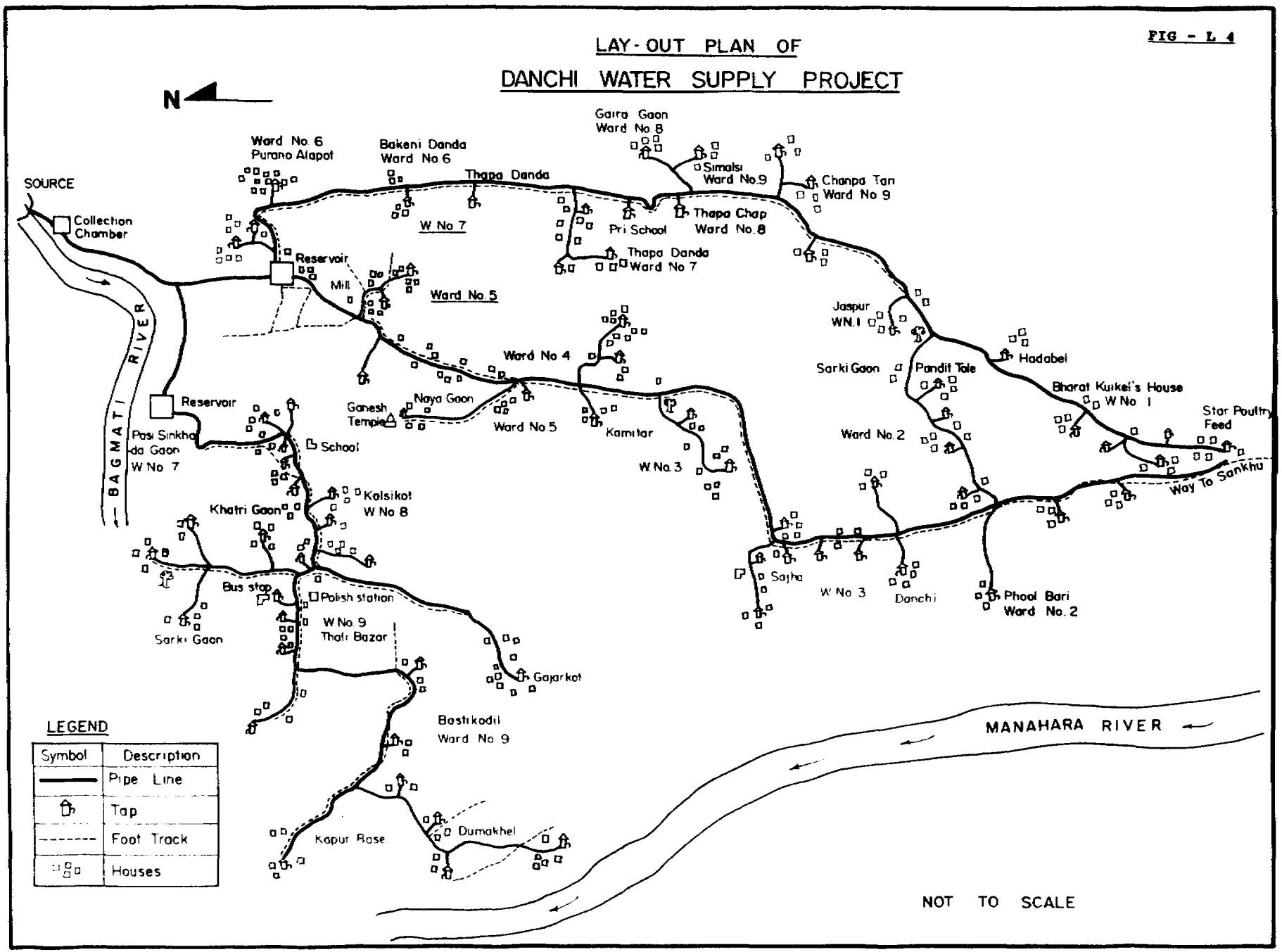

SCHEME - II
Ward No. 3
SCHEME - IV
To Kathmandu
TINPANE
BHANJYANG
Scheme - 4 I
8 mm
Ward No 4
W.N. 4
JHAKRI
DANDA
Scheme - 4 2
24 mm
Scheme - I
50 mm
BHALSE
Ward No. I
ABANDONED MOTORABLE ROAD
Ranibas Khola I
Ranibas Khola II
Scheme - 2
24 mm
Ward No. 2
N
Chhabeli
W.N. 5
Thotne Khola
SCHEME - 5
48 mm
Source
SCHEME - 7
W.N. 7
14 mm
SCHEME - 6
30 mm
W.N. 6
BHATTE DANDA
Ward No. 8
Note :-
Tap =
Scheme - 8
8mm
Ward No. 8
V.I.P
Kealth Dost
Ward No 9
SCHEME - 9
32 mm
FIG - L 3
BHATTEDANDA W/S PROJECT
SCHEMETIC LAYOUT PLAN
(NOT TO SCALE)

FIG - L 4

LAY-OUT PLAN OF
DANCHI WATER SUPPLY PROJECT



LEGEND

Symbol	Description
———	Pipe Line
	Tap
- - - - - - -	Foot Track
	Houses

List Of Appendices

Appendix - I

Summary of Decentralization Act 1982

Consolidated Text

Preamble:

Whereas it is expedient to ensure wide public participation in the appropriation of resources and balanced distribution of the fruits of the development with the objective of establishing a society free from exploitation so as to promote people's welfare as envisioned by the Partyless democratic Panchayat system.
whereas it is expedient to establish an effective system for the formulation and expansion of plans at the local level according to the situation of regions & areas,and promote at the local level itself efficiency needed for the performance of such tasks so as to derive maximum advantage out of the country's geographical,economic and cultural diversities in the task of the National development,in as much as the talent,potential and requirements differ according to the diversities.
Whereas it is expedient to develop democratic practice from the lowest levels of the partyless panchayati democratic system and ensure institutional growth of local panchayats so as to enable them to think in terms of all round development of the people of their respective areas and assume responsibilities.
And whereas it is expedient to decentralize authority in order to enable the people to make decisions and make arrangements themselves in matters relating to their day to day needs & in matters affecting public life.

Authority of Local Government.

The Act vide clause 3 defines the extent of authority of local Governments.It states that all district level developmental activities are intended to promote the advancement of the district and enhance the interest and well being of its people.Sub clause 2 further provides thta the local governments shall have the jurisdiction over planning,resource mobilization and its allocatiob,supervision,operation and evaluation of all categories of local level
developmental programmes and construction of activities to be implimented within the framework of the District development Plan.

Planning Process:

The District Development Plan in turn is defined,vide clause 6.as the totality of all the following projects & construction activities to be implimented at

the local level.

- Projects funded by the Government and designated for implimentation by the development -related district level government agencies with government resources,through the district level government at the local level.
- Projects to be implimented with the resources of the local Government or with supplements from the Government resources or grants.

These principles have been reiterated also in clause 75 of the decentralization Bylaws,which have tried to elucidate them by specifying three more criteria for the inclusion of projects or developmental works within the District Development plan as follows.

- Projects whose area of influence is limited to the concerned District.
- Projects that can be completed with the technical capability available in the District.
- Projects whose utility is generally limited to the concerned district.

The bylaws further require the projects which are being directly implimented by the Government to be categorised to two level of project either central or District level.The provisions in the bylaws are

- To remain committed for the expansion & improvements of the project.
- To convene an assembly of the beneficiaries at leas once a year and to submit to the general meeting the progress report as well as to submit to it for consideration the balance sheet & to execute the suggestions proferred by it.

Formation of Users Committes

The Act vide article 19,for local management of the systems through the formation of Users Committes(UC).It states that if the project to be operated by local government falls within one ward only,the concerned panchayat shall constiute a user committe under the chairmanship of the chairman of the ward consisting of a maximum of seven member representing the direct bebeficiaries of the project.Should the project encompass more than one ward,the local Government shall consttute the committee with a maximum of nine members from amongst the
users under the chairmanship of one of the chairmen of the relevant wards.
However,should a local project encompass more than one town or village,the didtrict government shall constitute the User Committee of a maximum of elevel members representing the beneficiaries of the project under the chairmanship of one of thre village chiefs of the concerned town or villages.
Additionally,the Act,vide clause 33,state that the local government should constitute the UC according to the clause as above.However,should the local Government fail to form such a committee,the local government one step ahead should intervene and form it.Such a committee can also be formedin the case of projects preceeding the promulgation of the Bylaws.
Furthermore,clause 84 of the Bylaws deals with the implimentation process and provides under its sub clause 4 that the local Government or the district

office of the agency should ensure the formation of the UC for the implimentation of projects to be funded by the local Government.All these provisions unequivocally testify to the premium placed on the inalienable role of the benificiaries in the management of local systems.

Collection Rights of Revenues.

Clause 85 makes the provision for the collection of fees and states that the agency responsible for the fee fee collection.Fees,it is said,should be assesed based on the nature of the service rendered,magnitude of investment,and o/m expenditure.

Provision of Service Centres

For the purpose of supporting the UC with the material & technical cooperation in regard to the development work,clause 17 makes a provision of service centres,to be located centrally to provide services to the surrounding communities.It further adds that it shall be the lowest form of institutions of HMG Nepal.

The sub clause 3 defines the functions & responsibilities of the service centres as follows.

- To provide necessary services in the formulation,implimentation and review of plans for the development of villages.
- To help in the establishment and smooth operation of UC in the area.
- To make available technical services as and when required to UCs.
- To help & ensure the availability of necessary financial & material resources to the villages.
- To make periodic reviews of the development efforts of the villages.
- To convey the problems & needs of villages to the higher level and arrange for their inclusion in plans.
- To encourage competition among the villages within its juridictions in developmental matters and arrange area level meetings,conferences and inspection visits to enable them to exchange views on each others problems & experiences.

Summary of the MHPP Directives for Construction and Management of Water Supply Projects 2047

1. Request for new projects

1.1 Requests for new water supply systems will be considered on the recommendation of the concerned Village Development Board (VDB) or Town Development Board (TDB).

2. Preliminary study

2.1 Preliminary study of projects recommended by VDBs/TDBs will be conducted by the technical staff of the respective DWSS offices (DWSOs).

3. Formation of Users Committees

3.1 A users committee will be formed for each project before a feasibility study can be completed. Each UC will comprise nine members. It is preferred to have at least two women members in each users committee. The technical staff of DWSOs should actively participate in the process of forming users committees.

3.2 For larger systems, sub-committees can be formed to manage sub-systems in order to facilitate the construction and O & M of the system as a whole.

3.3 Responsibilities of the Users Committees

3.3.1 Submit formal request for a WSS project;

3.3.2 Assist the DWSO staff to conduct a feasibility study of the proposed WSS project:

3.3.3 Settle any disputes over access to the water source;

3.3.4 Mobilize community participation and actively participate in the construction of the project.

4. Feasibility Studies

4.1 A feasibility study of a WSS Project will be undertaken only after the formation of a UC and the subsequent endorsement by the VDB or TDB. The study will be conducted either by DWSO staff or by a consultant under DWSO supervision.

4.2 The study report should include the following:

4.2.1 Preliminary design of sub-systems, taking into consideration the sources of water and the settlement patterns of the benefitting community;

4.2.3 Estimated O & M costs for the project as a whole and for each sub-system;

4.2.4 Assessment of the types, quantities and cost of all local materials that will be used during the beneficiaries;

4.2.5 Use of simple, appropriate technologies in the system design that are manageable and affordable by the beneficiaries;

4.2.6 Implementation plan and investment plan for each sub-system.

4.3 Generally, project implementation will being within two years of its conception by a Users Committee. Preparatory work such as securing commitment from the community through the UC and completing the feasibility study for the project will be undertaken during this two year period between the time of project conception and the commencement of construction.

5. Prioritization of Projects

5.1 The following criteria will be used to prioritize the planning and implementation of WSS projects:

5.1.1 Projects with a relatively low per capita cost will receive high priority;

5.1.2 Projects with relatively high levels of community participation and substantial contributions of local inputs in the form of cash or materials will be given a high priority;

5.1.3 Priority will be given to project in hardship areas.

6. Implementation

6.1 An agreement will be signed between DWSOs and Users Committees for the implementation of WSS projects. The agreement will clearly define the responsibilities of each of the signatories for the implementation of the project.

7. Recruitment and Training of Village Maintenance Works (VMWs)

7.1 A VMW will be recruited from the benefitting community at the recommendation of the UC. The VMW will work on the project during construction to become thoroughly familiar with the design, construction and operation of the system. The DWSO will arrange and carry out a training program for VMWs.

8. Construction

8.1 Users Committees will have lead responsibility for implementing projects that serve populations of 1000 people or less (base year population). DWSOs will play the lead role for projects covering larger communities. Construction of major structures for projects in larger communities will be executed in accordance with the Financial Rules of HMG/N.

9. Operation and Maintenance

9.1 An agreement will be signed between DWSOs and Users Committees which define the respective responsibilities of each of the signatories for operation and maintenance of completed schemes. A Project Ownership Certificate will be given to each UC following the signing of the agreement.

9.2 UCs will raise funds from beneficiaries in the form of a service charge to pay the wages of the VMWs and for routine operation and maintenance expended.

9.3 UCs will ensure that accounting and financial management of the WSS project is undertaken in accordance with established norms, rules and regulations. UCs will submit a statement of account and related financial information at a general meeting of beneficiaries at least once every six months.

9.4 UCs will be fully responsible for rectifying any damages to the project which occur as a result of poor; management and/or lack of routing maintenance. HMG/N will undertake any repair work that may be required as a result of natural calamities or other unavoidable circumstances.

10. Training and Follow-up Actions

10.1 Orientation seminars will be organized for all district engineers to inform them of their roles in all aspects of project planning, implementation, and operation and maintenance, and to provide in service training a may be required. Refresher seminars will be held on an annual basis.

10.2 Training and refresher courses will be conducted regularly to impart skills to VMWs.

10. Training will also be conducted for other basic level technical staff on WSS projects so that they will be able to function effectively as motivators for community participation and eduction for WSS projects.

10.4 DWSOs will monitor and support the activities of UCs through regular visits by staff to the USc.

11. Coordination

11.1 DWSOs will assume a lead role in coordinating all WSS development activities within their service areas. All agencies involved with WSS projects will liaise with and obtain clearance from their respective DWSOs before implementing a project.

12. Budget Allocation and Revolving Fund

12.1 An adequate budget will be allocated for each project to ensure that construction can be completed within a three year period. revolving funds will be established to facilitate procurement of construction materials in a timely manner.

APPENDIX III

FIELD QUESTIONNAIRE

Project Name: W/S Project. Survey HH No:

Household type:

1.Identification

Sex: M F Age: * below 15 yrs. * 15-45 yrs. * above 45 yrs.

Village: Ward:

2.Economy Level

Occupation:

Ownership of the house: * Rented * Own

Land holding(Ropanis)[1] Bari: Rp. Khet: Rp.

Monthly Av.Income: Rs./month.

Total family No: No of children:

3.Education

Illiterate/reads & writes/completed school/graduate

4.Social characteristics

Religion: Caste: Traditional Group:

Years of living in the village:

---

1 - Local measurement terms.

5. Need asessment

a.Can you identify the main three problems in your village?

1. 2. 3.

b.Do you think that W/S project was needed for the village?

* Yes * No * Dont Know * No response

c.Do you know which agency constructed the W/S project?

d.Where do you used to collect water before the project?

Where do you collect now?

e.Who collects water in your house:

f.How long does it take you to fetch a Gagro[1]?

* <15 min * 15-30min * 30-60min * >60min

g.How much gagro do you need in a day? Gagros.

h.Now,where do you go to get water in case of system breakdowns

i.How do you spend your leisure time?

* Sleeping & gossiping * Work in the feild

* Spent on cottage industries * others

j.What change the water supply project has brought in your daily life?

k.How much are you willing to pay per month for water supply?

* If it is to be served through Public stand posts only? Rs.

* if it is to be served through private house connections? Rs.

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1 - A local name of pitcher used for carrying water(18 ltrs.approx)

6.Communication approaches

a.Do you know who initiated the W/S project in the village?

* local political leaders. * local social/traditional leaders.

* community decisions. * Gift from the Gov

b.Who decided about the water source?

*Project technicians * Technicians & local leaders * Community member

c.When did you learn about the commencement of the project?

* During planning * During survey * During construction * others

d.How did you learn about the project work?

* through the local leaders * Through the member of the family
* Through community meetings/social gatherings.
* others.

e.If through community meetings who organised the meetings?

* local village chiefs * local water agency * social workers * others.

f.How many times did you attend such meetings?

* none * 1-3 times * 3-5 times * above 5 times

7.Community's perception on Community participation

a.Do you have Selp-help experiences in the other developmental activities?

* yes * no * dont know * no response

If yes,in what activities?

& in what form? * voluntary labour * Local material support
*Cash contributuion * local o/m activities

b.Is there a practice of traditional or current organised activities in your village?

* yes * no * dont know * no response

If yes,in what activities?

& in what form?

c.DId you participate in the W/S project work?

* yes * no * dont know * no response.

If yes, what did you do?

IF no, Why did you not participate?

d.What shall be the total value of contribution (voluntary,material & cash)?

e.Were the communities involved in the location of the public standposts?

* yes * no * partly

If yes,how was the decision made?

* in community meetings * decided in the field among the users
* local leaders decided it * water agency fixed the location

f.Do you think it was appropriate to form WUC? * yes * no * dont know

if yes give reasons.

g.If the members of the WUCs are not effective can you replace the members?

* yes * no * difficult * dont know

8.Level of service of W/S project

a.Are you satisfied with the water system you have? yes no partly

b.How many hours in a day you get water? hrs.

c.No of breakdowns of the system in a year? nos

d.Reasons for the usual breakdowns?

Problems in water source/pipelines/landslides/reservoirs/others

e.Who is operating & maintaining the water system?

* WUC * Govt.water agency * Both * None

f.Is there a village maintenance worker(VMW) assigned for the repairs?

* yes * no

g.Is the VMW being paid? * yes * no

If yes,how much is he being paid? Rs.per month:

mode of payment: Cash/kinds/both

When is he paid? monthly/bimonthly/seasonally/anually

h.How much money you are paying per month?

* for house connections: Rs.

* for public standposts users: Rs.

i.Who collects the water tarrif? VMW/WUC/Water agency/others

j.What happens to those who do not pay their share in time?

9.Level of Health awareness

a.Are you aware of the consequences of drinking polluted water? yes no

b.Do you have a latrine at home? yes no

if not, where do you go for defecation?

c.Why dont you have a latrine?

* cant afford
* did not feel the need
* did not have land to built
* not used to it

d.Do you know how much it costs to built a latrine? yes no

if yes,around how much? Rs.

e.Do you have a village health volunteer/community health worker?

* yes
* no
* dont know

if yes,how often he/she visits your house?

* very often
* once a while
* never

f.What do you learn from the Health volunteer/community worker?

* personal hygeine
* child nutrition
* family planning
* environmental sanitation
* others

g.Where do you go for treatment if somebody is sick?

* traditional witch doctor
* local medical practicener
* nearby Healthposts.
* others.

Appendix -IV(a)

CHECKLISTS

1.Village Chairman/opinion leader/traditional leaders

- Self-help activities in the village
  - traditional approaches/current approaches
- System of organising communities
  - Who/How/system of payment(token if any)
- Ownership of the W/S provision?
- Existence of WUCs & its constituents
  - method of selection/replacement
  - effectiveness of WUCs
    - if effective,why?
    - if not why?

2.Water Users Committee chairman

- Form of community participation in the project(sharing of costs)
- General problems faced during construction?
- General problems in o/m?
- mechanisms of collection of water tarriffs/collection ratio
- role of VMWs in system repairs
- availability of spares
- support activities from water agencies
- trainings/materials or financial support/evaluation

3.Village maintenance worker(VMW)

- level of education & training
- renumeration ie how much & when?
- problems in repaie & maintenance.
- availability of spares
- system of organising community in case of major breakdowns.

4.Village Health Worker/volunteer

- Educational/training background.
- promotional activities on health
  - how,what & when
- what is his/her perception on level of health awareness.
- does he/she promote water & sanitation activities
- if not do they require further trainings?

Appendix IV(b)

CHECKLISTS

5.Water Agency

-Project salient features

- year of start & completion/total population,HH covered
- capacity/pipe lengths/reservoir capacity type,& nos.
- total cost of the project:Rs.
  - sharing of costs: sharing %

Government;	Rs.	
Donors:	Rs.	
villagers:	Rs.	
voluntary	Rs.	
material collection	Rs.	

- Number of PSTs
  - constructed no:
  - functioning no:

Number of yard connections
proposed no:
connections no:

- Quantity of water being supplied ltrs/day:
  - % of the design capacity: %
- Annual o/m costs:

sharing agencies	% of share
benificiary	
government	
donor	

- Assesment of training level
  - whom/how long/when
- built in system of monitoring & evaluation
  - is there any system? if yes,who does it ? when?how?& what?
- Assesment of health awareness.
  - number of HH/communal latrines ,its type & condition

Appendix V

List of IHE Participants Consulted

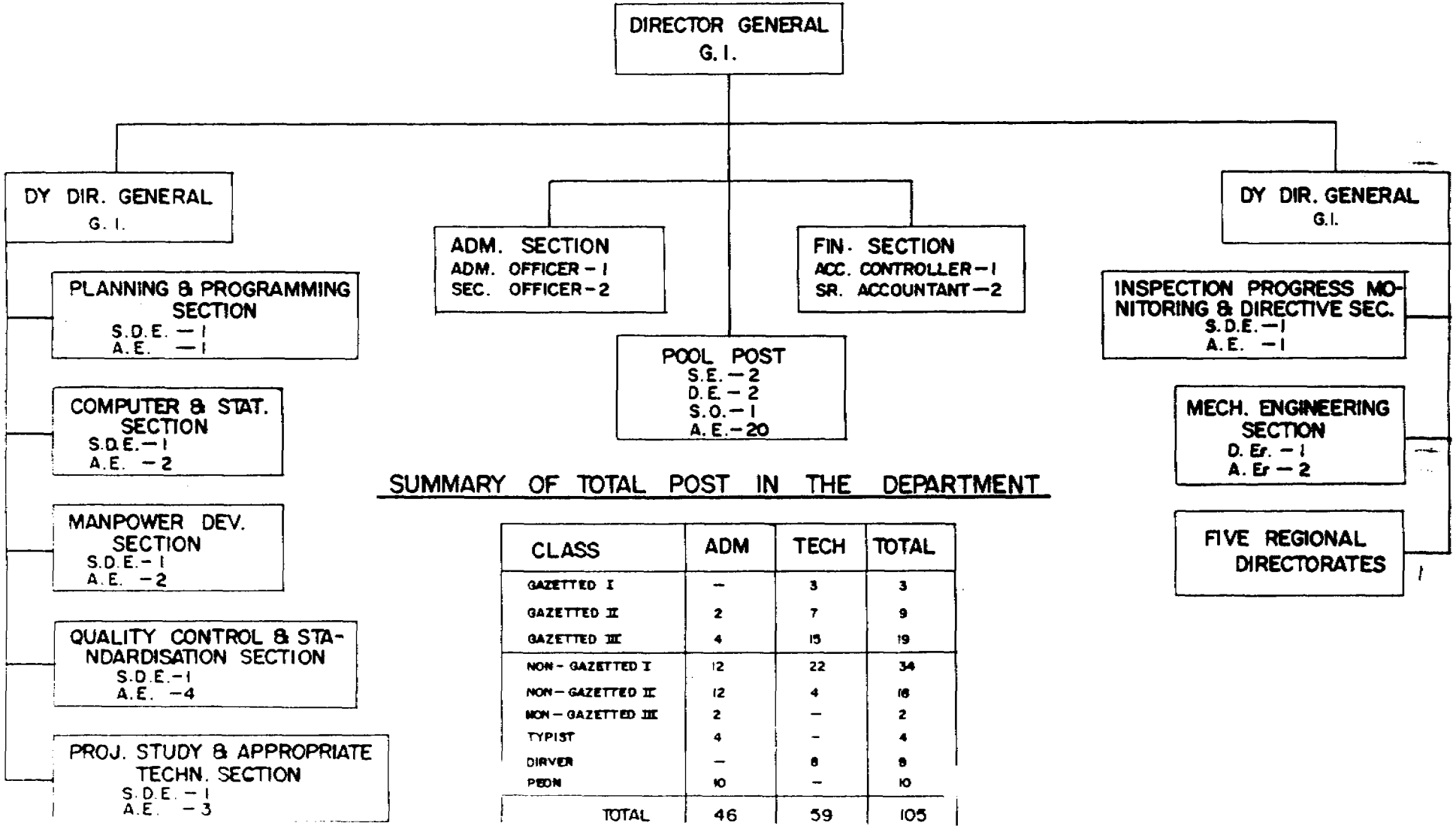
NAME	COUNTRY	PARTICIPANT's BACKGROUND
SYLVIA C.AMIT	PHILLIPPINES	Sr.Chemical Engineer Trainer for Sanitation.
ALTAREJOS P.KENN	PHILLIPPINES	Civil Engineer/Trainer,ITN
JOSHI Dr.	UP,INDIA	Expert,Community Development, Assigned to Indo-Dutch Env.Sanitary Engg.Project.
MATHUR	UP,INDIA	Executive Engineer,UP JAL NIGAM.
T.PRABHAKAR	AP,INDIA	Civil Engg/Asst.Executive Engineer,Panchayat Raj Engg Deptt.AP,INDIA
JANI B.K	GUJRAT,INDIA	Dy.Executive Engineer, Gujrat W/S Board.
MEHT	GUJRAT,INDIA	Gujrat W/S Board.
ABUL BASHER	BANGLADESH	Engineer,AQUA Consultant & ASSociates.
PARRA	COLUMBIA	Civil Engineer,Pvt.Company.
AMIEN M	INDONESIA	Civil Engineer,Directorate of Water Supply.
FREDA AYUDIA	INDONESIA	Sanitary Engineer,Provincia Public Works.
GOGH YOEPIH	INDONESIA	Civil Engineer,Teaching in Engineering Institute.

HIS MAJESTY'S GOVERNMENT

MINISTRY OF HOUSING AND PHYSICAL PLANNING

DEPARTMENT OF WATER SUPPLY & SEWERAGE

EXISTING ORGANIZATION CHART



SUMMARY OF TOTAL POST IN THE DEPARTMENT

CLASS	ADM	TECH	TOTAL
GAZETTED I	—	3	3
GAZETTED II	2	7	9
GAZETTED III	4	15	19
NON - GAZETTED I	12	22	34
NON - GAZETTED II	12	4	16
NON - GAZETTED III	2	—	2
TYPIST	4	-	4
DIRVER	—	8	8
PEON	10	—	10
TOTAL	46	59	105

Appendix - VII

Criteria for Assesment of Level of Functional Sustainability

The sustainability is seen as a function of various parameters.All the parameters can not be judged in a short period of the study and moreover there are some parameters like health benifit through the effective & proper use of water can be evaluated after some years of study only.For the sake of the study,the evaluation shall be concentrated on the measurement of the functional Sustainability or the service level only.

The following indicators shall be taken into account to have a relative comparison of the sustainability of the four projects.

- no of systems breakdowns annually and the adequacies on repairs.
- hrs.of supply in a day
- percentage of non functioning taps
- quantity of water supplied
- quality of water supplied
- collection of water tarriffs(% of the annualo/m costs)

Equal weightage has been allocated to each of the identified indicators,though in reality the community may have different perceptions on these values.The individual parameters shall be rated as follows.

a.Annual number of breakdowns.

As the systems breakdowns in a year directly affects the total beneficiaries not only in terms of the difficulty in the access of water but it shall have adverse implications on health due to the consumers general tendency to go to the traditional water source.

The grading shall be done on the basis of the criteria as follows:

Annual no.of breakdowns	Grading
no breakdowns	5
1	4
2	3
3	2
>3	1

b.Supply hours in a day

The number of supply hours in the village where most of the supplies are through the PST only the communities suffer due to less supply hours as they do not have larger storage tanks in the households as well as there is a danger of deterrioration in the quality of water due to cross contamination in case of intermittent supplies.The grading shall be done as follows:

18-24 hrs.	4
12-18 hrs.	3
6-12 hrs.	2
< 6 hrs	1

c.Percentage of non functioning taps

The percent of non functioning taps shall distinguish the level of o/m & the effectiveness or the efficiency of the responsible organisation for maintaining the system as a whole,and are graded thus.

% of non functioning taps	grading
0	5
<10	4
<15	3
<20	2
>20	1

d.Quantity of water supplied.

In the rural areas of Nepal,45 lpcd has been found to be the average day demand and therefore most of the systems are designed on that basis.In some projects where there is a constraint in the source supply systems have been designed for a lower value too.It shall be quantified as follows.

Quantity of water supplied (lpcd)	grading
>60	5
45-60	4
30-45	3
20-30	2
<20	1

e.Quality of water.

The quality of water from the high springs in the mountains are generally free of any contamination.However where there is a supply from the unprotected streams there shall be the possibilities of contamination and a common problem of turbidity during the monsoon period is experienced.The quantification shall be done as follows:

Quality of the water in the tap	grading
- good throughout the year	5
- Turbid during the monsoon otherwise good without any possibility of contamination	3
- Turbid during monsoon possibility of outside contamination	1

f. % of annual o/m costs raised.

The sustainability of the project through the community participation can be achieved only when the beneficiaries pay in time their due share of the water tariff.The collection ratio is the ratio of the raised water tariffs in the year to the annual o/m costs of the project(including the depreciation + 10% extra for the system extensions & improvements).Thus the collection ratio is also a measure of the financial sustainability by the

community at o/m phase and shall be rated on the following assumptions.

Collection Ratio	grading
1.0 & above	5
0.8-1.0	4
0.6-0.8	3
0.4-0.6	2
<0.4	1

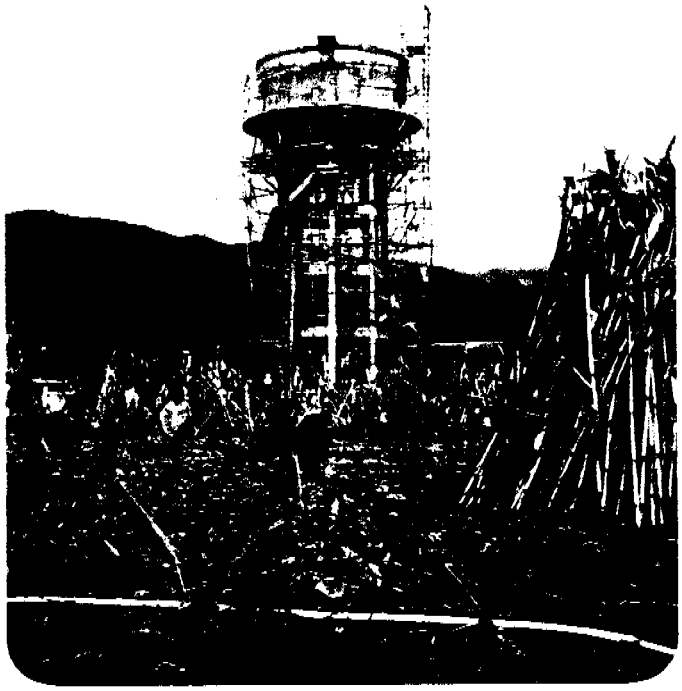
Appendix -VIII

List of Persons met during Field Survey

Project Area	Name of Person	Designation
Nakhel	Mr.Khadga B.Khatry	Chairman,WUC
	Mr.Dhruva B.Khatry	Member,WUC
	Mr.Gokul B.Khatry	Member,WUC
	Mr.Rajendra B.Khatry	Consumer
	Mr.Surendra KC	do
	Mr.Bed B.Mahat	VMW
Kappan	Mr.Atma Ram Poudyal	Chairman,WUC
	Mr.Ram Saran Adhikary	Vice Chairman,WUC
	Mr.Shanker Pd.Poudyal	Member,WUC
	Mr.Gopal Budhathoki	Treasurer,WUC
	Mr.Santosh Chalise	Secretary,WUC
	Mr.Ram Bdr.Khatry	VMW
	Mr.R.S Yadav	Overseer Site Incharge during Cons.
Bhattedanda	Mr.Chandra Pd.Dulal	Ex Village Chairman
	Mr.Amrit N.Ghimire	Chairman,WUC Wd.5 & 8
	Mr.Yadu Pd.Dahal	Member,WUC
	Mr.Nuk Bdr.Maharjan	Consumer
	Mr.Dal Bdr.Jimma	Consumer/local postman
	Mr.Prem N.Chaukhel	Consumer
	Mr.Ganga Pd.Sanjel	VMW,Wd 5 & 8
	Mr.N.Tenjing	Manager Dev.section,UMN Nepal
	Mr.Bharat Rayamajhi	Overseer,UMN,Nepal
	Mr.K.P.Sharma	Village Health Worker,UMN
Danchhi	Mr.Bhattarai	Supervisor,Danchhi w/s
	Mr.K.P.Shrestha	jr.Plumber, do

One of the organised meetings with
Asst.Committe members in Danchhi

Ex Hon.Minister visited the site to
convince the committe members in Danchhi

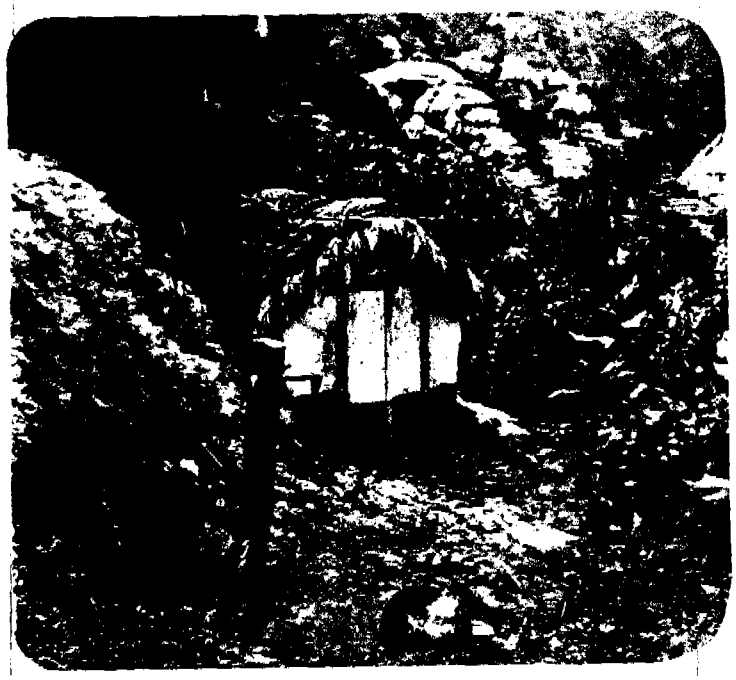


RCC Tank under construction in Danchhi

Voluntary Labour Contribution in Danchhi

Danchhi,ward no 8

Bhattedanda,ward no.8



A typical HH latrine,Bhattedanda

Kitchen Gardening an additional source of income,Bhattedanda