

CHAPTER - 1

INTRODUCTION

exploring a problem situation

1.1 The Problem

Despite the impressive gains in global food production, over the last half century, an estimated 790 million people remain hungry. Many of the chronically hungry are people from farm families, who have neither the means to produce the food they need nor sufficient income to purchase it (*Sandra Postel, et al., 2003*). Situation in India is still daunting and calls for stepped up action.

India has been trying to address the issues of poverty and livelihood, through a number of policies and programme interventions. For example:

- Just after independence, the Government launched a number of development initiatives under the Community Development Programmes in 1952 with a view to bringing integrated development in the rural areas where people were poverty-stricken. The growing number of group based initiatives, like SGSY, is yet to prove substantive as interventions for poverty alleviation.
- The River Valley project was launched in 1962-63 to control siltation of reservoirs. Even after more than 45 years, reservoirs are still silting at an alarming rate.
- The Drought Prone Areas Programme (DPAP) was launched in 1972-73 to mitigate effects of drought in drought prone vulnerable areas. But not even single district/block is free from drought. Drought continues to cause immense suffering and hardship to human beings and livestock.
- The National Watershed Development Project for Rain-fed Agriculture (NWDPA) was launched in 1985-86 to increase and stabilise production of rain-fed crops like pulses, oilseeds and millets. However, production still depends on the monsoons (*IIRR, 2000*).

There have been several explanations for the non-achievement. Corrective measures are also in place to take care of the growing poverty and deprivations. Technology has been one of the key factors that can induce changes in the life of the people. Technology is erroneously considered and explained in physical terms. Technology is not only a physical tool, but also intellectual and methodological. The

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recent emphasis in poverty alleviation has shifted from pure asset creation to the innovation of technology for the poor farmers. People all over the world have high hopes that new technologies will lead to healthier lives, greater social freedom, increased knowledge and more productive livelihoods (*Human Development Report, 2001*). It is argued that the technology does not have to follow income divide. Throughout the history, technology has been a powerful tool for human development and poverty reduction.

Technology, however, has its share of risks. There are challenges, which the poor societies face in minimising the risks. Market driven technologies are helping the rich and not the poor. The Human Development Report observes that the market is a powerful engine of technological progress, but it is not powerful enough to create and diffuse the technologies needed to eradicate poverty. Technology is created in response to market pressures, but not for the needs of the poor people, who have little purchasing power (*Human Development Report, 2001*).

In recent years, the emphasis has been shifted to need based appropriate technologies that can represent the innovations and creativity of the local communities for whom the technology is created. Appropriate technology is all that can bring the benefits of the technologies to the poor.

In terms of collaboration of stakeholders, the individual based initiatives have proved inadequate and there is an added impetus over group-based initiatives. Coleman for example, underlines the need for a group based and organised endeavour as an effective instrument for dealing with poverty. He observes that absence of a proclivity for a community that inhibits people from exploiting economic opportunities that are available to them, is the surest cause of poverty and misery. The problem is one of deficit of what Coleman has called “social capital” the ability of people to work together for common purposes in groups and organisations (*Coleman J., 1988, Francis Fukuyama, 1995*) and further observe that only group of people driven by sharp focus and trust can take on poverty and other deficiencies. The great philosopher Emile Durkheim in his famous book “The

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Division of Labour” observes “A nation can be maintained only if, between the State and the Individual, there is interposed a whole series of secondary groups near enough to the individuals to attract them strongly in their sphere of action and drag them, in this way, into general torrent of social life. Occupational groups are suited to fill this role, and that is their destiny”.

In spite of its vast natural resource base, Jalpaiguri District is one among the backward districts in the country. The long international border with Bhutan and in particular with Bangladesh accelerates the influx of migrants since independence that have demonstrated its adverse effect on society, economy and environment. Besides, Jalpaiguri District has its trove a vibrant mélange of many a tribe and community, enormous variety of wild life, amidst the grandiose and vast verdant forest. Albeit infamously called industry-less, Jalpaiguri District is the largest tea producer in the State. The other two famous Ts, Timber and Tourism, however, failed to redeem the due prestige despite their potential. The district is marked with the following unique characteristics.

- Close proximity of international border with Nepal, Bhutan and Bangladesh
- In spite of vast natural resources, it is still a backward area
- Poor irrigation and Agri-marketing facilities
- Lack of infrastructure
- Frequent flood and avulsion
- Lacks in human resource appreciation
- Rapid transformation of land-use for short-term benefit
- Ad-hoc intervention with myopic view resulting in increasing frequency and magnitude of disasters deteriorating the quality of life.

The district produces a huge quantity of surplus fruits and vegetables. The lack of cold storage and marketing facilities are major impediment to the growth of these sectors. On the other hand, these factors influence unwarranted transformation of agriculture-land to tea gardens, which again face lower acceptability in the international market. Despite profuse reserves of ground water, some parts of the

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district are still facing drinking water crisis. Jalpaiguri has always been deficit in its basic need of food grain production. To produce more food and to bring more lands under agriculture, creating more irrigation facilities is a must. Deforestation has been a great menace. People virtually eking out on poor agriculture, depend on forest produce. Forest has been the surrogate source of income for them.

In this context, it is strongly observed that

- **The local level need based appropriate technologies are better absorbed and are applied effectively, when mandated by functional groups rather than individuals for better economic development. At a large social context, this results in sustained alleviation of poverty and increase in income level of the individuals belonging to those functional groups directly and more so indirectly, of the local society in the arena in which these functional groups belong and thrive.**
- **To come out of poverty, the poor must organise themselves into functional groups of various kinds and nature, depending on the situations and they must take advantage of local level need based appropriate technologies to augment their economy and thus to enhance the quality of life gradually.**

It is noted that poverty can be effectively dealt with if local level appropriate technologies and organisations of the people are combined together. While the technology would help people expand their choices to lead lives that they value, the organisation would generate social capital to meaningfully utilise the technology for the common good.

In this context, we can see a possible link between the technology (local and appropriate) and people's organisations as combined efforts for poverty reduction. The appropriate technology helps in unfolding the knowledge gap and organisation of the people offers the formidable social capital necessary for transforming assets into entrepreneurial opportunities.

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Adoptions of technologies are often mediated by social factors like attitude and values. Many stereotypes determine how the people perceive the technology, more so by the poor people. Technology has often been seen as an elite domain over which common people cannot have access and control.

Examples to the contrary are abound which suggest that if the poor are enabled using appropriate enabling strategies and inputs, they can have the benefits of technology to reduce their drudgery and poverty. Technology, organisation and poverty link should, therefore, look like as follows.

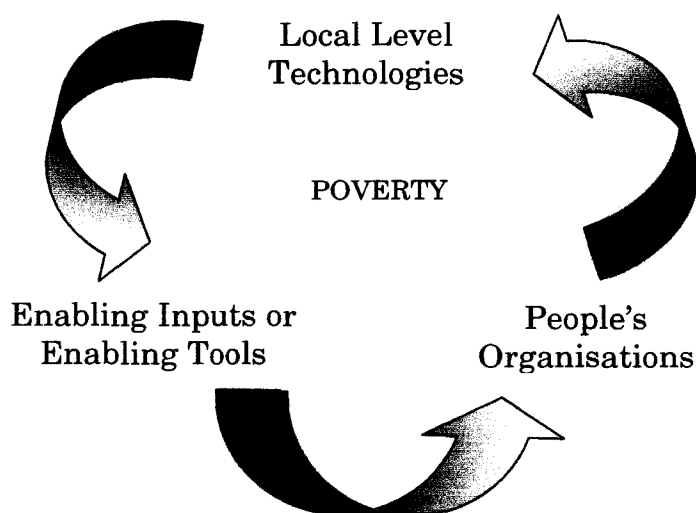


Figure 1.1 Enabling tools for poverty alleviation

- (i) The above schematic presentation indicates that local level technologies can be evolved given the right kind of enabling environment facilitated through appropriate inputs like social mobilisation, sensitivity and skill training and hand holding. The technology developed by the local community or developed in close collaboration with them could offer opportunity for easy and comfortable handling. The elite nuance from the technology is thereby demystified. The ownership then is shifted to a group and the application becomes completely internalised as a tool for poverty alleviation.
- (ii) Local level appropriate technologies have been useful in dealing with poverty and creating prosperity among them. As it is clear from *Figure 1.1*,

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the technological innovations combined with enabling inputs to the people add to the strength of the people's organisations. As a well arranged system, they are likely to make final assault on poverty. The driving force for wealth creation is market opportunities. Development interventions such as technology, capital, capacity building, information, policy and infrastructure are factors that enable market participation.

In the present study, the dynamics of local technology, its interface with the local community organisations and their combined impact on poverty alleviation are dealt with. The technologies are varied and organisations are diverse in the area of the study. For purpose of this study, technology and organisations have been considered as independent variables whereas poverty has been taken as dependent variable.

Technologies considered in the study mainly include:

1. Fuel efficient irrigation pumps
2. Stone hammers
3. Water harvesting structures and field channels
4. Improvised bearing fitted potter wheels and
5. Motorised cum pedal spinning machines

Organisations as considered in the study mainly include:

1. Farmers organisations
2. Mistry cooperatives
3. Self help groups
4. Eco-Development committees
5. Beneficiary Groups

The development/poverty has been considered in terms of:

1. Increased income
2. Enhanced/Better quality of life
3. Empowerment of the women
4. Welfare of the marginalised sections of the society like SC/ST

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5. Healthier life
6. Greater social freedom
7. Increased knowledge and
8. Increased and diversified livelihood

The poverty alleviation through the technologies mandated by functional groups will go a long way in sustainable development, as because the poor would be accessible to greater social freedom and increased awareness. The relationship, among the variables, is analysed using the matrix of quantitative as well as qualitative indicators as shown in *Table 1.1*.

Table 1.1 Matrix of Quantitative and Qualitative indicators

Development aspect	Technology	Organization
Increased Income	<ul style="list-style-type: none"> • Quantitative analysis • Qualitative analysis • Cases 	<ul style="list-style-type: none"> • Effectiveness of social changes brought • Duration of work in the area of study • Cases
Enhanced Quality of life	<ul style="list-style-type: none"> • Quantitative analysis • Qualitative analysis • Cases 	<ul style="list-style-type: none"> • Effectiveness of social changes brought • Duration of work in the area of study • Cases
Women Empowerment	<ul style="list-style-type: none"> • Quantitative analysis • Qualitative analysis • Cases 	<ul style="list-style-type: none"> • Effectiveness of social changes brought • Duration of work in the area of study • Cases
SC/ST Welfare	<ul style="list-style-type: none"> • Quantitative analysis • Qualitative analysis • Cases 	<ul style="list-style-type: none"> • Effectiveness of social changes brought • Duration of work in the area of study • Cases
Healthier Life	<ul style="list-style-type: none"> • Quantitative analysis • Qualitative analysis • Cases 	<ul style="list-style-type: none"> • Effectiveness of social changes brought • Duration of work in the area of study • Cases
Greater Social freedom	<ul style="list-style-type: none"> • Quantitative analysis • Qualitative analysis • Cases 	<ul style="list-style-type: none"> • Effectiveness of social changes brought • Duration of work in the area of study • Cases
Increased Knowledge	<ul style="list-style-type: none"> • Quantitative analysis • Qualitative analysis • Cases 	<ul style="list-style-type: none"> • Effectiveness of social changes brought • Duration of work in the area of study • Cases
Increased and diversified livelihood	<ul style="list-style-type: none"> • Quantitative analysis • Qualitative analysis • Cases 	<ul style="list-style-type: none"> • Effectiveness of social changes brought • Duration of work in the area of study • Cases

1.2 The Area of Study

The Jalpaiguri district lies between 26° 16' to 27° 00' North latitude and 88° 04' to 89° 53' East longitude comprising an area of 6227 square kilometres. The rectangular shaped Jalpaiguri district is elongated in East-West direction and is bordered by Assam in the East, Darjeeling district and Bhutan in the North, Darjeeling district and Bangladesh in the West and Cooch Behar district and Bangladesh in the South. The total population of the district was 34,03,204 in 2001, showing an increase of 21.52 % during the last decade (1991–2001). Out of the total population, 36.69% is scheduled castes population and 18.86% is scheduled tribes population and thus together they constitute 55.55% of the total population of the district.

The district consists of 3 sub-divisions, 13 blocks/panchayat samities, 16 police stations, 146 Gram Panchayats and 774 mouzas including 158 tea estates and 77 forest villages (*Map 1.1, Map 1.2*). The soil of Jalpaiguri district is characterised by its coarse texture, low water retention capacity, acidic in reaction (5.1 to 7.3) and poor in organic matter (0.5 to 2.2%), nitrogen (0.03 to 0.20), phosphorous (29 to 40 kg/hectare) and potassium (100 to 150 kg/hectare).

About 24% of the total geographical area of Jalpaiguri district is covered by forest (*Appendix-VIII*). Sal is gregarious, but it is found in mixture of a varying proportion of the following species like *Terminalia*, *Chkraisia tabularis*, *Lagerstroemia parviflora*, *Amoora rohiruka*, *Careya arborea* etc. Riverine forests are found in sandy soils near the river beds. Most important among these types are *Acacia catechu* and *Dalbergia sissoo* found along the beds of all major rivers in the piedmont zone. Wet mixed forest is found in the relatively low lying and dampened areas with better edaphic condition includes *Machilus spp.*, *Listsaca spp.*, *Cryptocarya spp.*, *Cinnamomum spp.*, *Actiondaphne spp.*, *Meliosma spp.*, *Eugenia spp.* etc. Dry mixed forest with the dominating species being *Terminalia*, *Gmelina*,

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Sterculla, *Terrameles premna* spp. *Machilus* spp. etc. is found along the interfluves of the major rivers of the district.

Tea gardens occupy a large part of the district covering 19% of its geographical area and form a characteristic land cover (Appendix-IX). Among the cultivated crops, rice is the most important food grain. In addition to the organised Tea industry, many types of small scale and cottage industries have come up to cater the needs of increasing population. Of late, tourism industry is gaining ground, yet the poor infrastructure facilities impede the desired development. The district also suffers from food and electricity shortage. Jalpaiguri is well connected by rail and road network with neighbouring districts as well as to the other parts of the State. Principal traded commodities exported are timber, tea, tobacco, livestock, vegetables and fruits. Principal imports are food grains, textile and consumer goods. Development of agriculture and tourism can give a boost to the development of Jalpaiguri district.

Jalpaiguri District is famous for 3Ts – Tea, Tourism and Timber. Jalpaiguri district is adorned with splendid natural beauty in the entire spread of district. Innumerable rivers, range of hills and dense forest upto horizon, spread over tea gardens, are the sources of endless joy and pleasure to the nature lovers. **For the academically minded**, the district, presents Totopara, the home of the Toto tribes, tribal villages in the Buxa Region and the beauty of hillocks Jetti, Samsing, Ghatia, Kurti, Juranti and Chalouni. **For those with a religious bent of mind**, there is the famous shiva temple at Jalpesh. There are lesser known temples or remains of temples such as Jatileswar, Jateswar, Devi Choudhurani temple, Markarpara Kalibari and Bhabani Pathak's pagoda style wooden temple in Sikarpur tea garden. **For those with a love of history**, there are places like Buxa Fort in the Buxa Tiger Reserve, the Nal Raja's fort in the Chilapata forest and other remains dating back to the era of king of Bhutan and the Maharaja of Cooch Behar. **For those with adventurous mind**, there are wild life sanctuaries such as Buxa Tiger Reserve, Jaldapara, Chapramari and National Forests such as Gorumara. **For those with**

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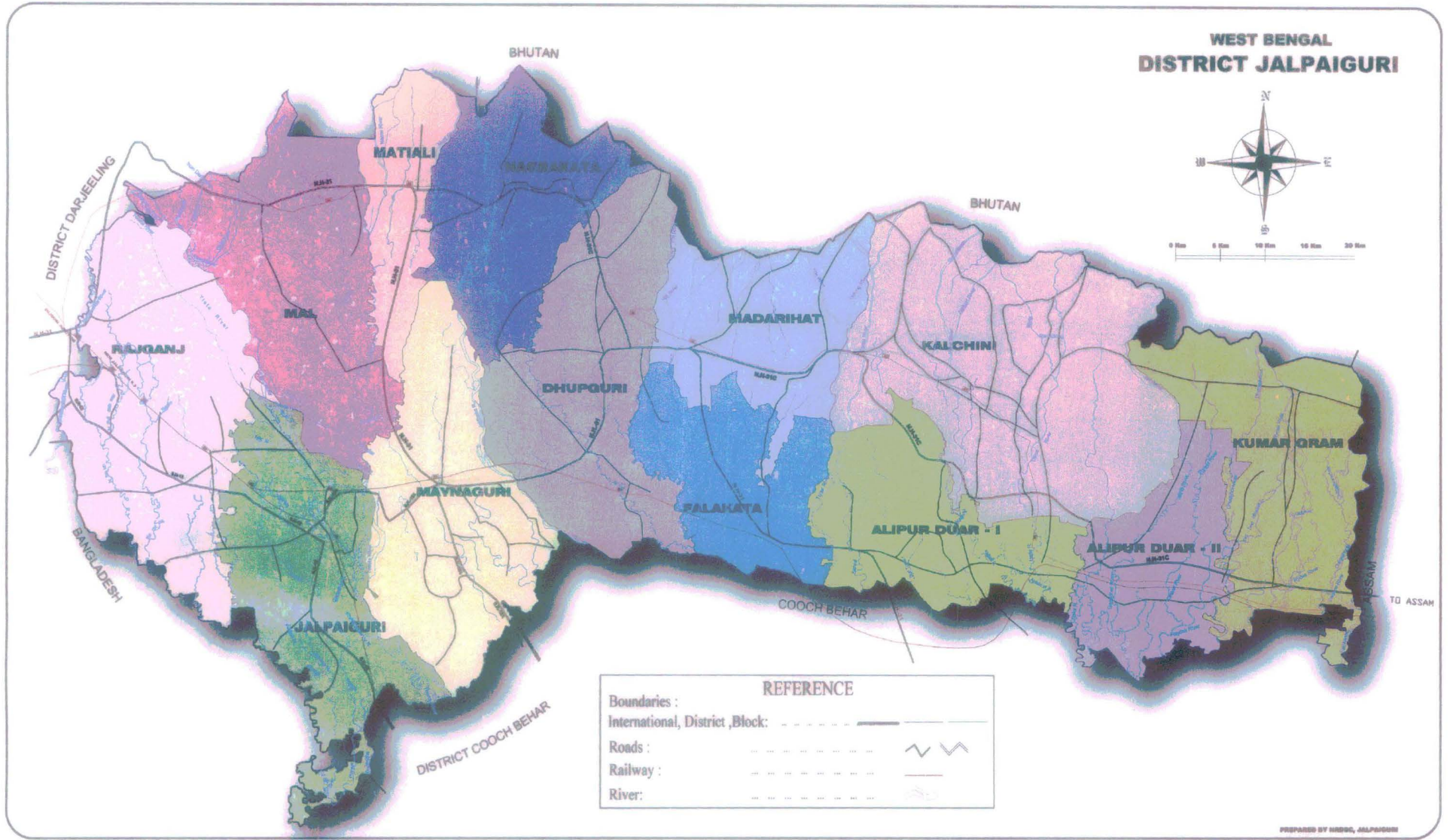
business mind, wide spread green carpet in the form of Tea Gardens greets everywhere and connected Tea resorts / Bungalows at tea gardens would be perfect for their heavenly stay at Dooars.

Jalpaiguri District has international border with Bhutan and Bangladesh. The district is sharply divided by the river Teesta. The river Sankosh demarcates the eastern border with Assam. The lush green stretch of land once abounded with carnivorous beasts in the primeval forests between these rivers, is in common parlance known as Duars, a distorted form of doors which is reminiscent of the traditional passes / doors to Bhutan and Tibet for exchange of merchandises. This stretch of land, once the happy abode and hunting ground of dreaded diseases was permanently ceded to British India in 1865. The advent of the tea plantation industry in 1874, the only mentionable large scale industry, made the demographic mosaic of the district, a complex one, due to importance of tribal workforce in a big way from the adjoining regions.

The district was formed on 1st January 1869 by amalgamating Duars with Jalpaiguri parganas and some thanas of erstwhile Rangpur district. The district has an average length of 144 kms., from East to West and an average breadth of 40 kms from North to South. The main rivers are Teesta, Torsa, Jaldhaka, Raidak and Sankosh.

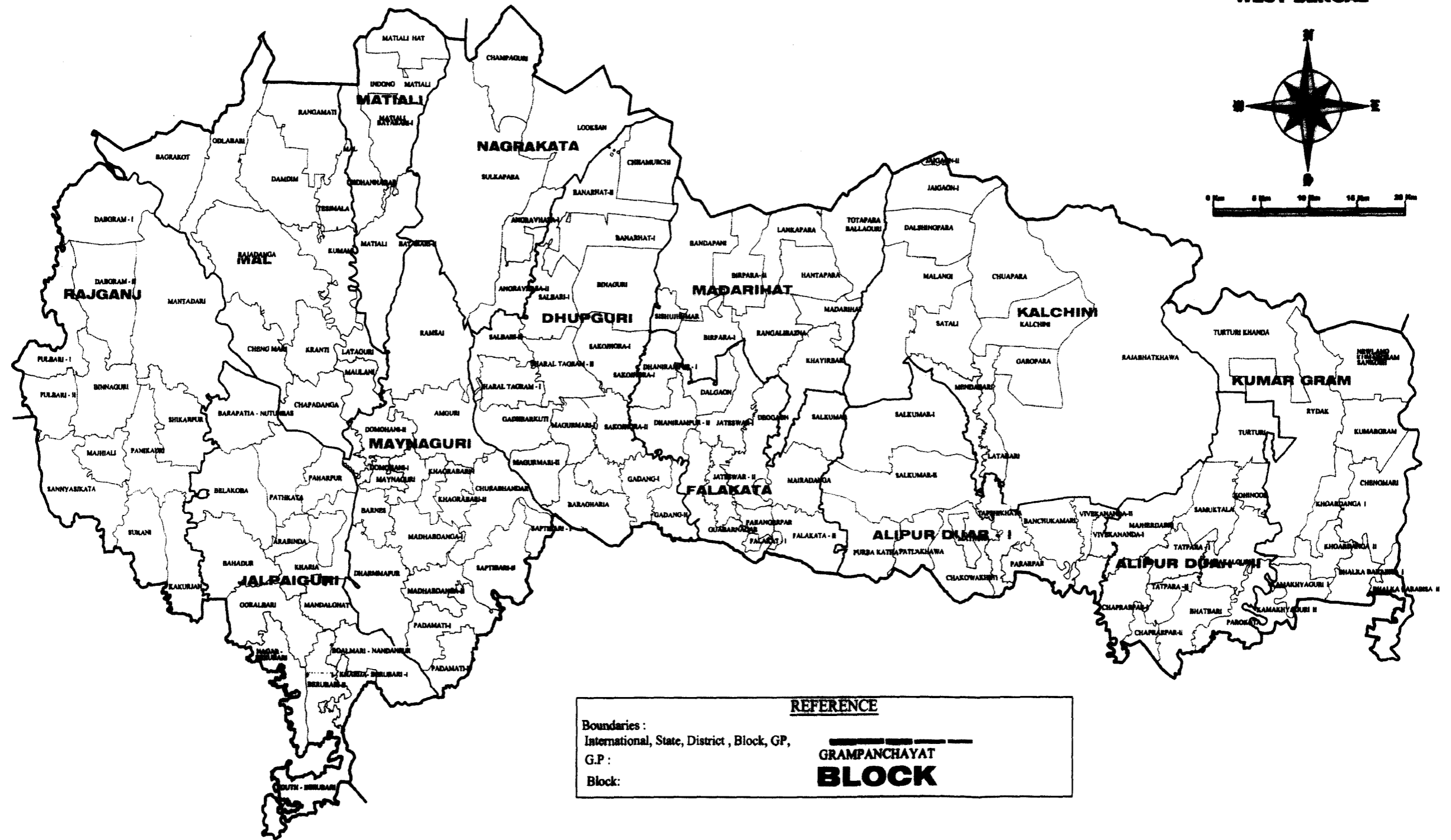
It is the largest District of North Bengal and ranks fourth among the districts in West Bengal in size. However, Jalpaiguri is one of the thinly populated districts in the State with a population density of 546 per square kilometre. Incidentally, the district ranks fourth in terms of lowest population density in the State.

Moreover, Jalpaiguri has the highest concentration of SC/ST (*Appendix – I*) population in the state of West Bengal. The percentage of scheduled castes population is 36.69% and the percentage of scheduled tribes population is 18.86% and the total SC/ST population is 55.55% (*Census Report, 2001*). Interestingly, it is to be noted that there is also a fair mixture of different linguistic groups speaking various dialects and languages.



Map 1.1 Administrative Map of Jalpaiguri District

DISTRICT JALPAIGURI WEST BENGAL



Map 1.2 Gram Panchayats Map of Jalpaiguri District

1.3 Hypotheses

If anything about doing field research is truly contextual, it is the approach and methods used for the research. Any major difference in the field situation for example, culture, environment, climate or infrastructure can cause the research results slightly different from the expectation of initial research set-up. The increased understanding of the local situation certainly helped in formulating the hypotheses and also the critically reflecting realities in the study area concerning the poor have helped in defining the objectives accordingly.

This research was based on the following hypotheses. Validation of these hypotheses in the field was done by field surveys, field visits, interactions, interviews and data analysis.

- **The villages/communities where technologies have been put to use will be positive on the indicators of development in the under developed areas as identified under the backwardness index evolved for the Jalpaiguri district.**
- **The communities that have had direct involvement in the innovation and development of technologies will make better use of the technologies concerned. Their technological and technical insight would be much more developed than those who have not been involved.**
- **Group managed technologies would be more cost effective and efficient than those being individually managed as the former will have the benefit of collective wisdom and insight.**
- **Technologies that are locally developed with the involvement of the various stakeholders will be more easily internalised and adopted by the farmers than that are developed externally.**
- **People's organisations with homogeneous membership would be more effective and cohesive than those with heterogeneous membership.**

1.4 Objectives

Based on these hypotheses, it was strongly noted that the local based appropriate technologies through people's organisations are better absorbed to alleviate poverty. All stakeholders have their own objectives and values focusing on the role of the three major factors (appropriate technologies, people organisations, pervasive poverty). This logically resulted in pin pointed research objectives. The objectives were formulated around the role of these three factors in the intermingling process of overall economic development.

Considering the above, the following objectives have been formulated:

1. To evolve a backwardness index for critically segregating the backward administrative unit areas
2. To examine the context(s) in which local level technologies have evolved
3. To examine and analyse the dynamics and process of technological development
4. To examine and analyse the physical and mechanical aspects of the given technology
5. To study stakeholders' profiles and level of poverty and technology interface
6. To examine the management aspects
7. To examine the organisational dynamics of people's organisations in managing the technology and poverty alleviation activities
8. To examine the organisational aspects of the technology management
9. To undertake cost benefit analysis of the technology
10. To examine the economic, social and gender spin off
11. To suggest policy recommendations

The research objectives were the foundations for the critical analysis and better appreciation of the hypotheses. Case studies, Engineering analysis and Data interpretation were the building blocks for the research objectives.

1.5 Methodology

To fulfil the objectives, the methodology adopted is to be rationalistic one, comprising an integration of secondary and data processing followed by analysis. The methodological framework for the study comprised of the following.

1.5.1 Reconnaissance Survey

The basic aerial data was obtained from different organisations, from Census reports, draft plans and project reports and from the field work. These have been used in preparing the detailed programme of the present research work. Significant changes of the socio-economic, technological and institutional levels vis-à-vis interventions were followed by comparing the old documents with the newer one.

1.5.2 Scheme for Data Collection

The scheme for data collection has been carried out in two stages. Firstly, different relevant data was collected from primary source i.e., from direct measurement in the field. Secondly, relevant data like budget allocation for the Central sector schemes, budget allocation for State sector schemes, population details, BPL population details, weather reports, irrigation command area details, crops yield data, road network plan, etc was collected from different organisations/institutes such as Planning Commission, P&RD Department, Government of West Bengal, Jalpaiguri District Collectorate, Jalpaiguri Zilla Parisad, North Bengal Flood Control Commission (NBFCC), Irrigation and Waterways Department, Flood Meteorological Office at Jalpaiguri, Agriculture Department and Line Departments.

1.5.3 Data Processing

The data that have been collected from various sources both primary and secondary sources have been processed in the respective contexts concerned. The reliability of the data collected from secondary sources has been checked statistically. The data was processed using usual statistical tools and methods to arrive at interpretations/inferences.

1.5.4 The Case Study

The fieldworks for this thesis were exploratory. This means that the methods used were targeted on getting generalising findings on statistical basis. Instead, it was aimed at contributing to the solution of certain conceptual problems by thorough understanding of the research hypotheses and research objectives.

For thorough understanding, the case study method appeared to be a good methodology. The case study is a type of research during which the researcher tries to gain a profound insight into one or several objects or processes that are restricted in time and space (*Verschuren and Doorewaard, 1999*). Case studies enabled to go deep into the situation so as to find underlying thoughts, ideas and processes.

Selection of cases was based on a whole range of criteria. Case selection of the stakeholders is based on the available data and additional information from various sources.

1.5.5 Tools and Techniques

For both the case studies and the action research, different tools and techniques for data collection were used. Most of these were quite straight-forward and do not need any explanation about the technical use. But, applied in the context of this research, all tools or techniques have their own advantages and limitations and so they are mentioned and elucidated to show the relevance for this research. Different types of data acquired by the different techniques are mentioned along with their relevance for answering the research objectives.

1.5.6 Interviews and Group Interviews

The most straightforward technique of data collection for social studies is conducting interviews. Depending on the format of the interviews, the data collected could be either quantitative or qualitative. To reach the research objective of gaining a better understanding of a social phenomenon, conducting in-depth interviews have been chosen with a relatively small number of people rather than collecting less detailed information from a larger sample. The plan was to make the interviews as

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informal and open as possible, to enable the respondents to talk about issues that they considered as important. An attempt has been made to complement the data gathered from group interviews.

1.5.7 Participant's Observation

Participant's observation is mainly a form of observation where a researcher sets up and takes part in the observational study. The researcher does take an active role during his data collection by participating in the activities in the core area of research. 'Sociologists who use participant's observation aim to discover the nature of social reality by understanding the actor's perception, understanding and interpretation of the social world. For this reason, participant's observation is sometimes called a naturalistic method. Advantages of observing people while participating in activities are better and that the researcher can interpret these activities more easily from the perspective of the others. Participant's observations also have some serious drawbacks; for example, there may be problems of access to a group. Besides, participant's observation is primarily interpretative, which entails that the data collected during observation does not make sense without its social context.

1.5.8 Workshops and Training

Organising workshops and giving training are both techniques for data collection that are less familiar in sociological / anthropological research, as this is basically based on studying and understanding existing situations rather than introducing change. However, in the context of the research methodology for this study, organising workshops and giving training is more appropriate.

The concept and setting of a workshop is primarily to observe interactions between the individual members of the people's organisations. The primary objective of the workshops was to have the participants think and talk about some predefined topics related to the research work and the workshops were primarily focused on the process of interaction.

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Giving training in a social research context entails on the one hand the introduction of new knowledge and on other hand the observation of the social processes that are initiated by this new knowledge. Especially with the research on the role of technology in addressing poverty, knowledge exchange is one of the processes that precede the actual exchange of technology.

1.5.9 Document Analysis

There were series of documents available related to both the technologies and the people's organisations which were consulted during the research. The documents consulted include:

1. Evaluation reports
2. Progress reports
3. Review notes
4. Action plans
5. Process documentations
6. Technical brochures

1.5.10 Backwardness Indices

Base line surveys were conducted in all Gram Panchayats in Jalpaiguri district using Base Line Survey forms (*Appendix – II*). Jalpaiguri district was divided into poverty pockets using a backwardness index developed during this study. The following diagnostic criteria were used to identify the GP wise backwardness index.

1. Concentration of SC and ST population
2. Absolute Below Poverty Line population (BPL population)
3. Forest Villages and Closed Tea Gardens
4. Remoteness (from the National, State Highways and District Roads)
5. Infrastructure Deficiency

The village level data obtained from Census report 2001 in addition to the data from sample surveys conducted on random basis throughout the district were thoroughly analysed and processed. An attempt was also made to identify the low

growth areas, high incidence of poverty areas and poor governance areas which could be utilised to access and compare the level of innovation and application of certain local level appropriate technologies and their management, as it would ensure the element of objectivity and fair play in addressing poverty.

An attempt was made to correlate the identified backward GPs of the district with different socio-economic parameters including social deviations and norm violating behaviour by the villagers especially the youths.

1.5.11 Sample Surveys on Local Level Technologies

Different technologies were identified; however, after detailed analysis based on base line survey, the local level technologies have been restricted to the following for the purpose of this study.

1. Fuel efficient irrigation pumps
2. Stone hammers
3. Water harvesting structures and field channels
4. Improved bearing fitted potter wheels and
5. Motorised cum pedal spinning machines

All the clusters of group-based activities were identified and proportionate sampling was made to cover the technologies that were being used along with their management practices. Locations, where technologies were developed, have also been made as part of the sample.

1.6 References

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