Chapter 5: DEVELOPMENT PLANNING PROCESSES

5.1 Introduction

Being the largest CD block of Jalpaiguri districts, Dhupguri has been one of the fore-runner blocks in evolving local technologies related to agriculture and irrigation. The Dhupguri block, being one of the first generation agricultural societies, has a tradition of innovative farmers trying to subsist and survive. It is said that the farmers have been very hard working in the face of a hostile environment marked by chain of rivers and rivulets criss-crossing the district. The recurrent flood takes heavy toll in degrading the land by erosion. Also, the very nature of the soil does not allow adequate water retention. As a result, although there is heavy rain, short dry spell proves great loss to the farmers. On the positive side, the higher water table allows easy lifting of water for irrigation (Sarkar & Subbiah, 2006; Rana, 2008).

The block has shown gradual progression on entrepreneurship with several of the farmers taking on horticulture and vegetable production in professional manner. The prospect of many agro-processing industries may open up new vista for the poor farmers to increase and diversify their agriculture produce taking full advantage of the emerging technologies. Interestingly the poverty of the rural poor is not coming in their way to adopt and manage the changes to better their quality of life. There are strong historical and structural factors that have influenced both the degree of development of the block as whole as well as relative backward pockets within the block.

5.2 Contemporary Processes of Development Planning

In this extreme situation, there have been several institutional interventions in the realms of technology and people's organisation. To begin with, the mid-eighties witnessed a significant bi-lateral funding under Indo-Dutch North Bengal Terai Development project. The interventions spanned over three phases in 1984-2000 and had the following technological components: i) River lift irrigation, ii) Shallow tube wells and iii) Soil Conservation measures. Besides, the project also under took various innovative initiatives to evolve/modify certain technologies including: a) modification in the existing shallow lift pumps for fuel

efficiency; b) development of Stone Hammer for drilling the rocky layers; c) Bamboo filter and d) Clay water filter.

The interesting feature of the technology has been their management. The shallow tube wells, river lift irrigation and soil conservation enjoyed strong stakeholder's involvement in their operational management. At the technology level, local *mistries* (village mechanics) were attending the technical needs through their cooperatives that offered them institutional and financial legitimacy (Jan Nederstigt, 2005).

Close on this Indo-Dutch project, the district has also received an important support from the Planning Commission of India under its Rastriya Sam Vikash Yojana (RSVY). The un-tied flexible funding has been utilised for various innovations besides a set of other interventions including agriculture, minor irrigation, soil conservation, entrepreneurship development and rehabilitation of insurgents. The common development interventions include:

- Minor irrigation through water harvesting structures and field channels
- Soil conservation
- Agricultural diversification
- Bearing fitted potter wheels
- Motorised cum pedal spinning machines
- Social fisheries in *vested* and community water bodies.

Besides these special institutional interventions, the respective Department of Agriculture and Department of Minor Irrigation have been working on the technologies already developed. They have also been utilising the existing programmes of the Government to try further innovations. There are several areas of Government intervention in this district both in the general infrastructure sector and the social sector. Almost all the major national development programmes and the state level programmes are being implemented through different agencies in this district. Primarily, the three-tier Pancheyeti Raj bodies and the Block level Planning Committee has taken most decisions relating to development. Pancheyeti Raj bodies and Line Departments implement the schemes relating to development (Photo 7-18).

PHOTOGRAPHS SHOWING DEVELOPMENT INITIATIVES IN DHUPGURI BLOCK

Photo 7. Water harvesting structure at Galandi river

Photo 8. Land reclamation structure

Photo 9. Water harvesting structures

Photo 10. Pucca field channel for irrigation

Photo 11. Construction of Dug well for irrigation

Photo 12. Community orchard in closed tea gardens

Photo 13. Vermi-compost Pit for Bio-fertilisers

Photo 14. Augmentation of Eri host plantation

Photo 15. Construction of Eri rearing house

Photo 16. Popularisation of Mushroom culture

Photo 17. A beneficiary group of Mushroom culture

Photo 18. A beneficiary group of Eri-spinning

5.2.1 Road Transport

In this large block with forests, tea gardens, rivers and rivulets criss-crossing, it is a big challenge to provide proper communication facilities to the villages and hamlets. A major effort was taken to identify the rural roads in terms of the utility values i.e. the number of people benefited by connecting them to schools, hospitals, market etc. and to construct all weather roads with black top under the Prime Minister's Gram Sarak Yojona (PMGSY). The Core Area Network (CAN) plans for the district and the District Rural Roads Plan (DRRP) have already been prepared to prioritise the construction of the roads in the district.

Five roads covering a total of 39.7 kms were constructed in the recent past and the work is in progress for another six roads with a total length of 34.6 kms. These roads also include small cross drainage structures and bigger bridges. Over the past few years under the various rural infrastructure development schemes, such roads and bridges have been planned and constructed.

Rural Infrastructure Development Fund, provided by NABARD as loan is effectively used to a large extent to improve district roads and bigger bridges. A large portion of the district has been covered by this fund to improve the connectivity status and the main link roads along with the bridges which are of vital nature. National Highway Authority of India has also earmarked an important link road namely Falakata-Alipurduar road for improvement apart from four lanes of the National Highways that are already passing through the East-West direction along the south central part of the block. The state highways are also maintained by the Public Works Department of the State Government.

5.2.2 Power Supply

In the power sector, the main challenge is in reaching power to the rural population. Towards this end the State Government has already set up Rural Energy Development Corporation which has over the past few years sponsored 421 schemes at a total cost of Rs. 15.00 crores covering benefit to 16,000 families. The major problem, however, is of improving the transmission and distribution system by upgrading the transformers and conductors in view of the increased load owing to demand generated as a result of rural electrification. Another problem is to create more a pervasive distribution network into all the areas of the district with particular emphasis to the more distant and difficult areas. Towards

this end, the WBREDC is continuously funding for system improvement activities as a part of their project. The gap, however, needs to be filled up and accordingly RIDF, MPLAD, BEUP and UUP funds are utilised for improvement in the systems as well as network facilities.

5.2.3 Flood Control Measures

Another major area of concern in Jalpaiguri is the occurrence of flash floods almost every year. These floods are mainly caused by mountainous rivers flowing through the district at a stiff gradient carrying very heavy silt loads. Although the damage to agricultural lands, roads, bridges and private properties vary widely year to year, it can be safely said that this problem requires consistent and effective intervention. It is, however, impossible to take structural measures to prevent these flash floods. The North Bengal Flood Control Commission has done the maintenance of 90 kms of embankments in the district through the non-plan fund they receive from the State Government and also has taken up many new schemes from plan grants. Of late, some schemes have been taken up under RIDF also. The Uttarbanga Unnayan Parshad (UUP) has been set up a couple of years back to address the special problems of North Bengal region. The entire subject of management of floods in North Bengal has now become the subject of study by WAPCOS. The Disaster Risk Management Plan of the district is in place and in this document an attempt has been made to address the difficulties in this area.

5.2.4 Irrigation and Water Supply

Another area of major concern is the lack of irrigation facilities and the backwardness of agriculture. Jalpaiguri has always been a deficient district in terms of its food requirement and food-grains production. Dhupguri ranked 1st in food grains productivity in between 2000-2001 and 2006-2007 respectively. The agricultural productivity is low in comparison to other parts of the State, main reasons for which are excessive and erratic rainfall, porosity of soil, soil erosion, soil acidity and poor use of good quality of seeds and fertilizers. In addition, there are imbalances in using of fertilizers, micro-nutrient deficiency and lack of crop diversification. Poor coverage of arable lands under irrigation (about 33%) is an area of serious concern particularly with regard to poor agricultural activities during the Rabi season. Several forms of irrigation such as river lift, irrigation

through shallow tube well, medium deep tube-well and surface flow irrigation are in use. The farmers have traditionally resorted to surface irrigation through a system called "Jampoi" in which a bund is constructed across the stream and the water so raised is used to irrigate fields through unlined surface canals. The construction of such irrigation systems using local technology and local manpower is sustainable. Fortunately, even the ground water resources of this district are very rich and therefore large-scale ground water exploitation/utilisation schemes could be taken up without adverse impacts. Some efforts have been made to extend the benefits of irrigation through minor irrigation projects both under the Dutch assisted North Bengal Terai Development Project and from the plan grants to the Zilla Parishad by the Water Investigation and Development Department. The Uttarbanga Unnayan Parshad (UUP) has also contributed handsomely to improve the situation in the district in this regard.

5.2.5 Soil Conservation and Soil Reclamation

Soil conservation is another related area of intervention. Dhupguri block enjoys a humid tropical climate with an average annual air temperature of 24.1°C and average annual rainfall 3266 mm. Major portion of this rainfall is drained through surface and run into the major river systems. The soil of this district is alluvial in nature and has a light texture and defined as sandy loam to loamy sand which is highly permeable. This soil characteristic coupled with heavy runoff increases the vulnerability of agricultural and other lands in the district to erosion. The common forms of erosion are sheet, rill, gully erosion and stream bank erosion. There are problems of sand deposition due to occasional change in river courses and deposition of debris during the flooding. The soil and water conservation measures are carried out by the Soil Conservation Office in the district, but the level of investment is not significant to address the problems.

5.2.6 Education and Human Resource Development

As per the CCA survey report (2005-6), excluding the 0-6 years age group, the total literacy rate in Dhupguri block was 64.02%, with male literacy being 75.64% and female literacy at 50.90%. There are 190 primary schools in the block with 650 teachers. The school-student ratio is 210 and the pupil-teacher ratio is 62. At the upper primary level, there are 32 schools with 209 teachers. At the pre-primary level, Dhupguri block has 218 Anganwadi centres cater to the pre-schooling requirements. Under RIDF-VII, a scheme has

been taken up to provide multi-purpose centres (Anganwadi and SSK) 16 in number, one in each Gram Panchayet.

There are a considerable number of 12417 school drop-out in Dhupguri block as per Gram Samsad level CCA survey conducted during the period of 2004-5. Thus one in every five family in the block housed at least one school drop-out. To look after the development of primary schooling, DFID assisted District Primary Education Programme (DPEP) was launched in the year 2000. Through the DPEP, primarily creation of suitable infrastructure (New School Buildings, Additional Classrooms), teachers' training (pedagogy, English-teaching, Science teaching) have been taken up in a large way. An innovative step is to involve the parents, teachers and opinion makers (in the form of Ward Education Committees or Village Education Committees) in creating infrastructure for the schools and monitoring quality of teaching etc.

The DPEP has not addressed the requirements at the pre-school level as well as at the upper primary level. To bridge this gap, the district has been brought within the Sarva Shiksha Abhiyan (SSA), aiming at providing quality elementary education for all. SSA is an effort to recognize the need for improving the performance of the school system and to provide community owned quality elementary education in the mission mode. It also envisages bridging of gender and social gaps.

State Government has set a target to provide education and health for all. In order to achieve this, in collaboration with State Government and UNICEF, a parallel stream of education for children under the, Sishu Siksha Karmasuchi was taken up in this district. The Sishu Siksha Kendras (SSK) aim at bringing all those children between 5 and 9 years of age, for whom the formal system of education could not be provided due to absence of primary schools in the locality or difficult terrain. These child education centres have been set up entirely through community support and are managed by the concerned gram pancheyets through the stakeholders. It is also planned that each centre will provide schooling facilities at least to 25 to 30 children in the age group stated. These centres are models for imparting attractive and joyful learning to the children by creating a very congenial learning atmosphere even for those who fight shy of school education. This system of education is rather an extension of the existing schooling system and it is not a departure from the structured educational system.

Sishu Siksha Karmasuchi in this block has already been in existence for some time. Presently a total of 216 SSKs are running in different corners and in various hamlets which could not be touched with the amenities of formal educational system before due to geographical barriers. Approximately 1,03,00 students have been enrolled in these schools. The Sahayaks/Sahayikas who are imparting lessons to the students in these SSKs have been given special training for this purpose.

This scheme has been primarily funded by the P&RD Department of State Government which is meeting the honorarium for Sahayaks/Sahayikas and supervisors and the contingent expenditure for SSKs. UNICEF has extended assistance by providing fund for organising training of the Sahayaks/Sahayikas and the supervisors and for arranging some teaching aids. The State Government Education Department has taken the responsibility of supplying text books of different subjects on primary education to the children of these CECs.

5.2.7 Health and Sanitation

Being backward, Dhupguri block is confronted with a very major social problem which is also a great concern for the programme of eradicating water-borne diseases like Diarrhoea, Dysentery etc. As such, only 27.76% of the households in the block have access to toilets. In the rural areas, this figure is even lower at 19.43%. In the district, the block ranks 8th in terms of access to toilets. For providing sanitation to all the rural families, majority of whom are living under the poverty line, a total sanitation programme has been taken up with financial assistance from the Government of India and the State Government. After a house to house survey in the blocks a total of 47812 families having no sanitation facilities, have so far been identified. These families have been made the target group and a total campaign has been launched for making these families aware of the problem. Infrastructural facilities have been created by installing sanitary marts at GP as well as block level so that people's awareness and demand can be substantially increased and sanitary appliances can be provided at a reasonable cost. In addition to this programme, a scheme has also been taken up for providing sanitation and drinking water facilities in the primary and junior high schools having inadequate facilities in this respect. All primary schools have been brought under the coverage of good sanitation and drinking water facilities under the Total Sanitation

Campaign, projects sanctioned by the Government of India and the State Government on an 80:20 basis.

5.2.8 Safe Drinking Water Supply

In the drinking water sector, there are lots of activities attempted in this block both in the preventive and curative areas. As much as 39.5% of the total households have safe drinking water facility within their own households. Household survey under CCA programme reveals that about 26089 households in Dhupguri block have not access to safe drinking water under their own possession. It's a great concern to the PRIs and initiatives must be taken immediately to ameliorate the grave situation.

Under the Basic Health Project sponsored by German Technical Cooperation Agency and German Development Bank, there is a focus on capacity building for management of basic health services, implementation of standards and norms for Basic Health Care interventions, logistic and maintenance of health facilities and community perception in providing health services. At the subsidiary health centre, primary health centre and block primary health centre level, there is a programme to improve civil infrastructure, availability of equipments and medicines.

The block is endemic in Malaria and every year several deaths occur due to Malaria. On an average, in a year, over 25 thousand blood slides were collected from patients with fever. Special stress was given to provide treatment to those affected by Malaria. Another problem area is Leprosy with a current prevalence rate of 3.2 per 10,000 populations. The target is to bring it down to less than 1 per 10,000 through effective implementation of the National Leprosy Eradication Programme (NLEP). Health care is receiving due attention from the State Government as well as the district administration and several programmes are implemented in Dhupguri.

5.2.9 Poverty Alleviation

In spite of fact that Dhupguri is one of the economically sound blocks in Jalpaiguri district, it still suffers from poverty. Gram samsad level household survey reveals that 24570 out of 66101 families (32.2%) be identified as below poverty level (BPL). This

clearly indicates the economic backwardness scenario of Dhupguri block. It is also important to note that 9155 families of the block (13.9%) have no households under their possession. This clearly indicates that a large number of families live in unauthorized occupation.

5.2.10 Livelihood and Job Opportunity

Dhupguri is predominately agricultural block and the agrarian economy overwhemly suppressed the other form of economic activities. 44.3% of the total families in Dhupguri have no cultivable land under their own possession and as such family members has to depend on daily wage earnings for sustenance. As the source of employment is mostly depends on agricultural activities, the job opportunity has been found seasonal and centred around the crop calendar. As a result, the rural area of the block has been experiencing large idle man-days. CCA field survey identified a total number of 11.6 million idle man-days per year in Dhupguri block. Thus, the present state of economic activities in Dhupguri block can absorb 75% of her total work force. Creating additional job opportunity to provide livelihood sustenance to the remaining 25% man-days would be the focal point of futureristic development planning in Dhupguri block.

5.3 Decentralised Planning

Decentralized planning implies the formulation and implementation of an integrated and balanced proposal for development on a concrete understanding of the resources, problems, needs and priorities (Ghosh, 1991; Baruah, Ghosh & Krishnayya, 1999). It is also related to local needs, varieties and resources. Planning is generally viewed as the effective utilization of the potential resources available to the society and in this sense it is guided by the aim of working out a rational solution to different problems. Planning involves with appraisal of past trends and performance and assessment of major current problems and identification of measures for future development (Krishnavva, et al. 1999; Mishra, 1990). It tries to review the resources that were available at the proceeding plan and scope of their availability in future.

The geospatial data available with the Government departments at block/district level at present bristle with inherent problems like non-availability and obsolescence and they are inaccessible to many of the potential users. The major disadvantage is that they fail to

furnish the spatial information required by the officials or the elected representatives (PRIs). Therefore, the departments like District Rural Development Agency, Lead banks, Agriculture department, Animal resources development, Agri-irrigation, Horticulture, I & W department, Pollution control board and SWID etc., which take area/location specific decisions based on the information available in the maps, are forced to use these maps with several inadequacies and obsolescence (Yeh, 1991; Natraj, 1986). These departments do not have facilities for preparation of maps of their own with updated information.

The enactment of the 73rd and the 74th Constitutional amendments in 1996 induced decentralized planning and made the district to village pancheyet as three tier planning for the implementation of rural development programmes. Both the planners and politicians have realized the stern reality that decentralized planning has no substitute for a vast and a heterogeneous country like India. The amendment listed 29 subjects as sectors of planning under the new pancheyeti raj dispensation. That is, since 1996, the decision-making in the area of rural development has been decentralized and thereby made a permanent imprint on the national scene.

The 73rd and 74th Amendments have paved the way for establishment of District Planning Committee at the District level, Gram Sabha at the village level and ward Committees within the municipalities as the structural means for devolution of decision making power from the centre to the grassroots level together with other constitutional provisions give new meaning and content to multi-level decision making process in which Pancheyets, Municipalities and District Planning Committees become institutions of self governance throughout the country (Rao,1991; Singh, 1996).

The elected representatives often take area/location specific decisions. They are in need of geo-spatial data on a large scale, particularly at the gram pancheyet and gram samsad levels. Thus, there is a vast scope for the use of geo-informatics facilitating the decision making process at various levels of decentralized planning (Avyangar, R.S., 1998; Burrough, 1986; Carver, 2001).

Local level planning is propagated as an important tool in realizing integrated rural development with emphasis on the weaker groups in society (Baruah, et.al. 1999). This paper makes an attempt to give a tentative idea of the possible organization and content of

local level plans. The major functions of the local level planning and its activities are the following:

i) To collect all the plans under preparation by all agencies (government, semi government, professional and private) that are involved in planned development activities of relevance for the area.

ii) To collect all goals, objectives and targets indicators in the higher and lower level plan.

iii) To obtain information on the resources available in and allocated to the area.

iv) To indicate gaps with existing or proposed pattern of development activities and identify new projects and programmes that has to be elaborated by the relevant agencies in order to reach the goals and objectivities.

v) To obtain information on the result of previously planned development activities in the area and the reason for their success or failure.

The integration of the above mention activities/information is of paramount importance in decentralized planning process at grass root level to achieve the following:

a) an overall analysis of the present situation,

b) general description of the desired future situation on the basis of the accepted goals, objectives and targets and

c) a coherent set of programme of actions that can be implemented with the resource base that lead to the desired future situation.

5.4 The Three Tier Pancheyeti Raj Institution (PRIs)

The three tier Pancheyeti Raj Institution is well established over the years through the democratic processes of elected representative right from the lowest of grass-root level of gram samsad i.e., polling booths. As per the 73rd Constitution Amendments the general development plan and its implementation is basically vested on the elected representative of gram sabha/samsad and so on. Dhupguri block in fact among the leading block of the country to initiate the implementation of 73rd Constitution amendment through the PRIs initiatives. The three tier PRIs institutions of Dhupguri block is diagrammatically represented in table 5.1.

Table 5.1. The 3-Tier Pancheyeti Raj Institutions (PRIs) in Dhupguri block.

1st Tier	2nd Tier	3rd Tier			Nos. of Samsads/Sabha
Zilla Parisad: **JALPAIGURI**	Pancheyet Samity (CDBlock): **DHUPGURI**	Gram Pancheyets (GP): **XVI**	1	Chamurchi	XXII
			2	Banarhat I	XXX
			3	Banarhat II	XXII
			4	Binnaguri	XX
			5	Salbari I	XIII
			6	Salbari II	X
			7	Sakojhora I	XXIV
			8	Sakojhora II	XII
			9	Jhar Altagram I	XVI
			10	Jhar Altagram II	VIII
			11	Magurmari I	XIII
			12	Magurmari II	XI
			13	Gadang I	XII
			14	Gadang II	XII
			15	Barogharia	XXI
			16	Gadhairkuthi	XVI

5.5 Participatory Planning

The concept of participatory planning in conjunction with the 3-tier Pancheyeti Raj Institutions stands as one strong pillar in the concept of 73rd and 74th Constitution amendments. The essence of the concept sounds strong when it conceived as planning exercise begins with the confidence of stakeholders for whom plans would be implemented. In fact participatory approach in the entire exercise often demonstrates better implementation of the programme and adoptability by the stakeholders on sustainable basis.

India has been trying to address the issues of poverty and livelihoods, through a number of policy and program interventions. Just after independence the Government of India launched a number of development initiatives under the Community Development Programs (1952) with a view to bringing integrated development in the rural areas. Poverty continues in the rural societies. 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 Area Development Program (DPAP) was launched in 1972-73 to mitigate effort of drought and drought prone vulnerable areas. But not even single district/block is drought proof. Drought continues to cause

immense suffering and hardship to human beings and livestock. The National Watershed Development Project for Rain-fed Agriculture (NWDPRA) 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.

There have been several explanations to 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 a tool physical as well as intellectual and methodological. The 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 freedoms, increased knowledge and more productive livelihoods (Human Development Report 2001).

5.6 Watersheds planning

The watershed management concept was introduced at national level during the fifth plan (1974-75) for treating the watersheds in the catchments of River Valley Projects for reducing sediment inflow into big reservoirs and subsequently to catchments of selected flood prone rivers. The National Water resources Councils (NWRC), the apex policy making body for water resource development in India formulated the 1987 and 2002 national policies. The UN Millennium Declaration and Year of Freshwater 2003 have laid fresh initiatives on using the integrated water resource management to tackle the problem of growing mismatch between demand and supply. The national Water policy 2002 clearly recognizes the unequivocal role of watershed in integrated sustainable water resources development. The common guidelines for integrated watershed development 2007 indicate a new framework for the next generation watershed programme.

A large number of schemes for sustainable development of natural resources on watershed basis with large overlap of objectives and tackled by various line departments at state levels, PRIs at local level and various ministries at central level are being taken up. Although they act upon the common natural resource but very seldom there is proper coordination which is very critical in achieving sustainability of such interventions. Despite

the fact that vast sums of money have been pumped into various schemes under watershed management, most of these attempts have met with little success due to lack of an integrated and scientific approach in natural resources development. The reason for this state of affairs is lack of adequate, accurate and scientific information on the natural resources at watershed level and tools for integrating information to generate management options.

5.6.1 Watershed Management

Watershed management is defined as the preservation and development of land, soil, water and biomass resources of the area for the ultimate benefit of the people. The primary concern of the watershed management should be to continuously increase the productive capacity of the land, water, biomass and other resources by selecting and developing the best way of managing the renewable and non-renewable resources within watershed to meet the present and future needs of the community. The overall objectives of all watershed management programmes are:

a) to modify excess of rainfall being drained as runoff
b) to manage and utilize runoff for useful purposes
c) to control erosion and effect reduction of sediment production
d) to reduce intensity of runoff for a specific pattern of precipitation
e) to enhance groundwater storage wherever applicable by increasing infiltration
f) optimum use land resources in the watershed, thus by developing forest and fodder resources.
g) to rehabilitate, conserve and enhance balance of land-water-biomass on one side and needs of humankind on the other.

It can be seen that the watershed management by definition integrates all the natural aspects of the land and water resources of the watershed; physical behaviour and quality of land and water surface water and ground water. It also takes care of the spatial variation of resources and demands. Integrated watershed management planning is a comprehensive multi-resource management planning process, involving all stakeholders within the watershed, who together as a group, cooperatively work towards identifying the resource issues and concerns of the watershed, as well as develop and implement a watershed plan with solutions that are environmentally, socially and economically sustainable.

In a country like India, where emphasis is being placed on making the local-level users participate in the management of natural resources at the watershed level, it is imperative that these local-level organizations be strengthened by providing the integrated watershed management tools which are user-friendly, but still use all the scientific knowledge to arrive at the appropriate decisions.

5.6.2 Watershed Model of Dhupguri Block

Integrated watershed development is a complex activity. Most of the complexities are related to the planning of the sustainable development of watershed and also the involvement of community based stakeholders for its sustenance. Techniques of comparing alternatives for development and select the most promising alternative holds the key in the field of watershed planning. Arc Hydro-model can be used to determine the effect of different policies, scenarios, and alternative measures on the output of a complex natural resources system of watershed. The level of natural sustenance as well as that under different levels of community and techno-economic interventions can also be visualized.

The primary focus of the study is to develop resource based methodology for integrated watershed development through exploring watershed GIS data models (Arc Hydro-model) and implement the requirements of stakeholders dealing with the integrated watershed development using the model for the Dhupguri block.

Land and water are the two important natural endowments which are crucial for sustenance of humanity. Thus, management of land and water resources on a sustained basis without deterioration is the main stay of the mankind. Watershed is a natural hydrological unit which has evolved over time as basic unit of management and development of these vital natural resources. Watershed is a natural physical unit always defined with respect to a point on the natural stream, in which water from all over the topographic area flows under gravity to a common drainage point or hydrologically watershed is an area which has only one outlet for runoff / surface flows in response to the precipitation occurring on the area. Thus, the extent of watershed at a point is always unique. The size of the watershed increases if the point selected as outlet moves downstream.

In watershed approach, the development is not confined just to a part alone, but covers the entire area starting from the highest point of the area (ridge line) to the outlet of the natural stream (pour point), thus, allowing optimum interaction and synergestic effect between land and water resources of the area. Thus, it is the most logical approach for planning optimum development of natural resources of an area.

5.7 Conclusions:

It is strongly observed that the local level need based developments 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.

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

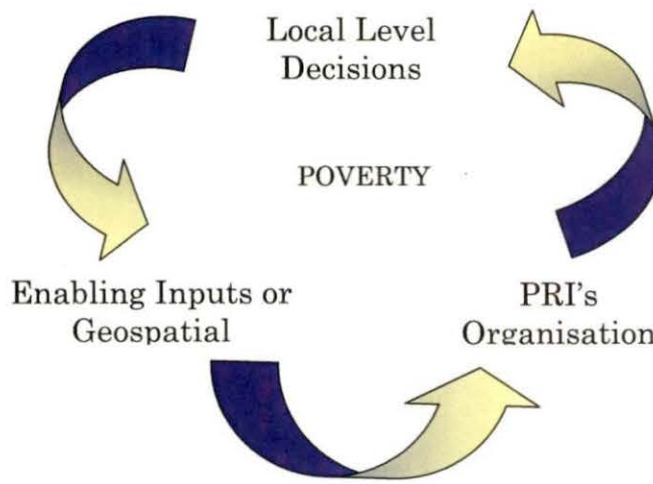

Figure 5.1: Enabling tools for poverty alleviation

Examples to the contrary are abound which suggest that if the poor are enabled using appropriate strategies and inputs they can have the benefits of technology to reduce their drudgery and poverty. In the present study, the dynamics of local level decision support, its interface with the local community organizations and their combined impact on poverty alleviation are dealt with. The technologies are varied and organizations are diverse in the area of the study. For practical purpose, technology and organizations have been considered as independent variables where as poverty has been taken as dependent variable.

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